APPENDICES

A. Air Quality and Greenhouse Gas Emissions Memo
B. Arborist Report
C. Historic Resource Evaluation Report
D. Preliminary Soils Report
E. Fault Study Evaluation
F. Preliminary Environmental Assessment - Equivalent
G. Noise Memo
H. Pedestrian and Safety Study

Appendix A

Air Quality and Greenhouse Gas Emissions Memo

November 4, 2019

Meghan Gibson
Chambers Group, Inc.
600 West Broadway, Suite 250
Glendale, CA 91204

Subject: **Los Angeles Unified School District – Shenandoah Elementary School Comprehensive Modernization Project Air Quality and Greenhouse Gas Emissions Technical Memorandum**

Dear Ms. Gibson:

Vista Environmental has conducted this analysis to evaluate if the proposed Shenandoah Elementary School Comprehensive Modernization Project (proposed project) would cause significant air quality or greenhouse gas (GHG) emissions impacts. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows the South Coast Air Quality Management District (SCAQMD) recommendations for quantification of emissions and evaluation of potential air quality and greenhouse gas impacts.

Project Site Location and Study Area

The approximately 7.6-acre school site is located at 2450 Shenandoah Street within the City of Los Angeles (City). The project site is bounded by both multi-family and single-family homes to the north, single-family homes and Halm Avenue to the east, a preschool, single-family homes and the terminus of Bedford Street to the south, and Shenandoah Street and single-family homes to the west. The nearest freeway is Interstate 10 that is located as near as 650 feet to the southeast of the project site, the nearest railroad is the Metro Expo Line located as near as 0.7 mile to the south, and the nearest airport is Santa Monica Airport located as near as 3.7 miles to the southwest.

Proposed Project Description

The proposed project would include removal of 33 classrooms that total 30,719 square feet of building space that are currently in portable buildings. In their place, a new two-story classroom building (Classroom Building 300) approximately 32,290 square feet in size would be constructed. In addition, 21,214 square feet of the existing Administration Building and 12,002 square feet of the existing North Classroom Building would be remodeled with Americans with Disabilities Act (ADA) upgrades, systems upgrades, internet protocol convergence, and various exterior/interior finish upgrades. The lunch shelter and lunch pavilion located on the south side of the Main Administration Building that is 2,965 square feet would be demolished and a new lunch shelter that is approximately 4,000 square feet would be constructed that will span to the new Classroom Building 300.

A new kindergarten Play Area will be constructed on the south side of the new Classroom Building 300. In addition, the existing parking area in the southwest end of campus will be reconfigured and will be constructed with 77 parking spaces. The hardcourt play areas will be reconfigured to create Physical Education (P.E.) stations, a turf play area, and other onsite amenities per the current LAUSD standards.

Other Campus-Wide upgrades include the following:

- Major site-wide infrastructure, including water, irrigation, HVAC, gas, sewer, fire, telephone and data systems, electrical, and storm drainage;
- Programmatic access requirements to meet and address ADA;
- Landscape and hardscape improvements (new parking and playgrounds, described above);
- Improvements to various safety conditions, including site lighting, fencing/gates, and/or closed-circuit television (CCTV) systems as needed; and
- Application of fresh exterior paint to provide a uniform appearance and enhance curb appeal.

In summary, the proposed project would disturb 6.3-acres of the 7.6-acre school site that would include demolition of 33,684 square feet of building space and approximately 265,000 square feet of hardscape area, site preparation that would include the export of up to 5,000 cubic yards of contaminated soil from the project site, building construction of approximately 30,900 square feet of building space and paving of approximately 4.13-acres.

The proposed project would not change the current capacity of the school or affect student enrollment. No changes to traditional school operations, school-related events, or community use would occur as a result of the proposed project.

Regulatory Setting

The Proposed Project site lies within the Air Basin, which is managed by the SCAQMD. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) have been established for the following criteria pollutants: carbon monoxide (CO), ozone, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide, and visibility.

Areas are classified under the Federal Clean Air Act as either “attainment” or “nonattainment” areas for each criteria pollutant, based on whether the NAAQS have been achieved or not. Attainment relative to the state standards is determined by the California Air Resources Board (CARB). The Air Basin has been designated by the Federal Environmental Protection Agency (EPA) as a nonattainment area for O_3 and $PM_{2.5}$. Currently, the Air Basin is in attainment with the NAAQS for CO, SO_2, NO_2, and PM_{10}. The Air Basin is designated as partial nonattainment for lead and is based on two source specific monitors in Vernon and in the City of Industry that are both near battery recycling facilities. The 2012 Lead SIP for Los Angeles County provides measures to meet attainment of lead by December 31, 2015. Current monitoring data shows that lead is now below the standards at all monitoring stations, however it will take three years of meeting the standards before Los Angeles County can request to be re-designated by the EPA.

The EPA has designated Air Basin as extreme nonattainment for the 8-hour average ozone standard. In 2015, the EPA strengthened its 8-hour “primary” and “secondary” ozone standards to 0.070 parts per million (ppm). The previous standard, set in 2008, was 0.075 ppm. The SCAQMD, the agency principally responsible for comprehensive air pollution control in the Air Basin, adopted the 2016 Air Quality Management Plan (AQMP) in March 2016 that provides measures to reduce 8-hour ozone levels to below the federal standard by 2037. Additionally, the EPA has designated the Air Basin as nonattainment for $PM_{2.5}$. In 1997, the EPA established standards for $PM_{2.5}$ (particles less than 2.5 micrometers), which were

not implemented until March 2002. The 1997 $PM_{2.5}$ standard of 15 µg/m^3 was attained on August 24, 2016. However, on December 14, 2012, the EPA revised the primary annual $PM_{2.5}$ NAAQS from 15 µg/m^3 to 12 µg/m^3. The 2012 AQMP provides measures to reduce $PM_{2.5}$ emissions to within the federal standard by December 31, 2025. $PM_{2.5}$ is a subset of the PM_{10} emissions whose standards were developed to complement the PM_{10} standards that cover a full range of inhalable particle matter. For the PM_{10} health standards, the annual PM_{10} standard was revoked by the EPA on October 17, 2006; and the 24-hour average PM_{10} attainment status was for the Air Basin was redesignated to attainment (maintenance) on July 26, 2013.

The Air Basin has been designated by CARB as a nonattainment area for ozone, NO_2, PM_{10}, and $PM_{2.5}$. Currently, the Air Basin is in attainment with the state ambient air quality standards for CO, SO_2, and sulfates and is unclassified for visibility-reducing particles and hydrogen sulfide. The adopted AQMPs provide measures to meet the state standards for ozone, NO_2, PM_{10}, and $PM_{2.5}$. Table A presents the designations and classifications applicable to the Proposed Project area.

Table A – Designations/Classifications for the Project Area

Pollutant	Averaging Time Standard	National Standards Attainment Date[1]	California Standards[2]
1979 1-Hour Ozone (O_3)[3]	1-Hour (0.12 ppm)	Nonattainment (Extreme) 2/6/2023	Nonattainment
1997 8-Hour Ozone (O_3)[4]	8-Hour (0.08 ppm)	Nonattainment (Extreme) 6/15/2024	
2008 8-Hour Ozone (O_3)	8-Hour (0.075 ppm)	Nonattainment (Extreme) 7/20/2032	
2015 8-Hour Ozone (O_3)	8-Hour (0.070 ppm)	Nonattainment (Extreme) 8/3/2038	
Carbon Monoxide (CO)	1-Hour (35 ppm) 8-Hour (9 ppm)	Attainment (Maintenance) 6/11/2007 (attained)	Maintenance
Nitrogen Dioxide (NO_2)[5]	1-Hour (100 ppb)	Unclassifiable/Attainment Attained	Attainment
	Annual (0.053 ppm)	Attainment (Maintenance) 9/22/1998	
Sulfur Dioxide (SO_2)[6]	1-Hour (75 ppb)	Designation Pending/ Pending	Attainment
	24-Hour (0.14 ppm) Annual (0.03 ppm)	Unclassifiable/Attainment 3/19/1979 (attained)	
Particulate Matter (PM_{10})	24-Hour (150 µg/m^3)	Attainment (Maintenance) 7/26/2013	Nonattainment
Particulate Matter ($PM_{2.5}$)	24-Hour (35 µg/m^3)	Nonattainment (Serious) 12/31/2019	Nonattainment
	1997 Annual (15.0 µg/m^3)	Attainment 8/24/2016	
	Annual (12.0 µg/m^3)	Nonattainment 12/31/2025	
Lead (Pb)	3-Months Rolling (0.15 µg/m^3)	Nonattainment (Partial)[7] 12/31/2015	Nonattainment

[1] Obtained from http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf?sfvrsn=14

[2] Obtained from http://www.arb.ca.gov/desig/adm/adm.htm.

[3] 1-hour O_3 standard (0.12 ppm) was revoked, effective June 15, 2005; however, the Basin has not attained this standard based on 2008-2010 data has some continuing obligations under the former standard.

[4] 1997 8-hour O_3 standard (0.08 ppm) was reduced (0.075 ppm) in 2008; the 1997 O_3 standard and most related implementation rules remain in place until the 1997 standard is revoked by U.S. EPA.

[5] New NO_2 1-hour standard, effective August 2, 2010; attainment designations January 20, 2012; annual NO_2 standard retained.

[6] The 1971 annual and 24-hour SO_2 standards were revoked, effective August 23, 2010; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard. Area designations are expected in 2012, with Basin designated Unclassifiable/Attainment

[7] Partial Nonattainment designation – Los Angeles County portion of Basin only. Expect redesignation to attainment based on current monitoring data.

Air Quality Setting

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographical features. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with physical features of the landscape to determine their movement and dispersal, and consequently, their effect on air quality. The combination of topography and inversion layers generally prevents dispersion of air pollutants in the South Coast Air Basin (Air Basin).

The climate of the Air Basin lies in the semi-permanent high-pressure zone of the eastern Pacific Ocean, which results in a mild climate, tempered by cool sea breezes. Although the Air Basin has a semiarid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the basin by offshore winds, the ocean effect is dominant. Periods of heavy fog are frequent; and low stratus clouds, often referred to as “high fog” are a characteristic climate feature. Average temperatures for Culver City, which is the nearest monitoring station to the project site, range from an average low of 45.3 degrees Fahrenheit (°F) in January to an average high of 79.0 °F in August. Rainfall averages approximately 13.15 inches a year, with almost all annual rainfall coming from the fringes of mid-latitude storms from late November to early April and summers being almost completely dry[1].

Winds are an important parameter in characterizing the air quality environment of a project site because they determine the regional pattern of air pollution transport and control the rate of dispersion near a source. Daytime winds in the Air Basin are usually light breezes from off the coast as air moves regionally onshore from the cool Pacific Ocean. These winds are usually the strongest in the dry summer months. Nighttime winds in the Air Basin result mainly from the drainage of cool air off the mountains to the east, and they occur more often during the winter months and are usually lighter than the daytime winds. Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day.

During the winter and fall months, surface high-pressure systems north of the Air Basin, combined with other meteorological conditions, can result in very strong winds from the northeast called “Santa Ana Winds.” These winds normally have durations of a few days before predominant meteorological

[1] Western Regional Climate Center, accessed August 25, 2019. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2214

conditions are reestablished. The highest wind speed typically occurs during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. It is not uncommon to have sustained winds of 60 miles per hour with higher gusts during a Santa Ana Wind.

Monitored Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Air Basin provided in the Final 2012 AQMP, December 2012, indicate that, collectively, mobile sources account for 59 percent of the volatile organic compounds (VOC), 88 percent of the NOx emissions, and 40 percent of directly emitted PM2.5, with another 10 percent of PM2.5 from road dust.

SCAQMD has divided the Air Basin into 38 air-monitoring areas. The project site is located in Air Monitoring Area 2, which covers northwest coast Los Angeles County. Since not all air monitoring stations measure all of the tracked pollutants, the data from the following two monitoring stations, listed in the order of proximity to the project site have been used; West Los Angeles-VA Hospital Station (VA Hospital Station) and Los Angeles-North Main Street Station (North Main Street Station).

The VA Hospital Station is located approximately 3.9 miles west of the project site and the North Main Street Station is located approximately nine miles east of the project site. The monitoring data is presented in Table B and shows the most recent three years of monitoring data from CARB. Ozone and NOx were measured at the VA Hospital Station and PM10 and PM2.5 were measured at the North Main Street Station. CO measurements have not been provided, since CO is currently in attainment in the Air Basin and monitoring of CO within the Air Basin ended on March 31, 2013.

Table B – Local Area Air Quality Monitoring Summary

Pollutant (Standard)	Year[1] 2016	2017	2018
Ozone:[1]			
Maximum 1-Hour Concentration (ppm)	0.085	0.099	0.094
Days > CAAQS (0.09 ppm)	0	**1**	0
Maximum 8-Hour Concentration (ppm)	0.073	0.077	0.073
Days > NAAQS (0.070 ppm)	**2**	**3**	**2**
Days > CAAQs (0.070 ppm)	**2**	**3**	**2**
Nitrogen Dioxide:[1]			
Maximum 1-Hour Concentration (ppb)	54.5	55.7	64.7
Days > NAAQS (100 ppb)	0	0	0
Inhalable Particulates (PM10):[2]			
Maximum 24-Hour California Measurement (ug/m^3)	64	64.6	68.2
Days > NAAQS (150 ug/m^3)	0	0	0
Days > CAAQS (50 ug/m^3)	21	40	31
Annual Arithmetic Mean (AAM) (ug/m^3)	25.8	25.7	30.2
Annual > NAAQS (50 ug/m^3)	No	No	No
Annual > CAAQS (20 ug/m^3)	**Yes**	**Yes**	**Yes**
Ultra-Fine Particulates (PM2.5):[2]			
Maximum 24-Hour National Measurement (ug/m^3)	44.3	54.9	61.4
Days > NAAQS (35 ug/m^3)	**2**	**6**	**6**
Annual Arithmetic Mean (AAM) (ug/m^3)	11.7	12.0	12.8
Annual > NAAQS and CAAQS (12 ug/m^3)	No	No	**Yes**

Notes: Exceedances are listed in **bold.** CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million; ppb = parts per billion; ND = no data available.
[1] Data obtained from the VA Hospital Station.
[2] Data obtained from the North Main Street Station.
Source: http://www.arb.ca.gov/adam/

Project Impacts

Consistent with CEQA and the State CEQA Guidelines, a significant impact related to air quality and GHG emissions would occur if the proposed project is determined to:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;

- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

Air Quality Compliance

CEQA requires a discussion of any inconsistencies between a Proposed Project and applicable general plans (GP) and regional plans (CEQA Guidelines Section 15125). The regional plan that applies to the Proposed Project includes the SCAQMD AQMP. Therefore, this section discusses any potential inconsistencies of the Proposed Project with the AQMP.

The purpose of this discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the Proposed Project would interfere with the region's ability to comply with federal and state air quality standards. If the decision-makers determine that the Proposed Project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD CEQA Handbook states that "New or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A Proposed Project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The SCAQMD CEQA Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

(2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

<u>Criterion 1 - Increase in the Frequency or Severity of Violations?</u>
Based on the air quality modeling analysis contained in this Air Analysis, it was determined that short-term construction impacts and long-term operations impacts would not result in significant impacts based on the SCAQMD regional, local, and toxic air contaminant thresholds of significance.

Therefore, the Proposed Project is not expected to contribute to the exceedance of any air pollutant concentration standards and is found to be consistent with the AQMP for the first criterion.

<u>Criterion 2 - Exceed Assumptions in the AQMP?</u>
Consistency with the AQMP assumptions is determined by performing an analysis of the Proposed Project with the assumptions in the AQMP. The emphasis of this criterion is to insure that the analyses conducted for the Proposed Project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide consist of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters

constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on the Southern California Association of Governments (SCAG). Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA. For this project, the City of Los Angeles General Plan define the assumptions that are represented in the AQMP.

The proposed project consists of removal or demolition of the 33 portables and approximately 265,000 square feet of pavement area, site preparation activities that would require up to 18,000 cubic yards of dirt to be either imported or exported from the project site, building construction of Classroom Building 300 and the proposed lunch shelter, and finally onsite paving and offsite street work. The project site is designated as Public Facilities (PF) in the General Plan and is zoned Public Facilities 1 (PF-1). The proposed project is consistent with the current land use designations and would not require a General Plan Amendment or zone change. In addition, development of the proposed project would not result in an increase in employee or student capacity at the School. Project construction would be required to comply with SCAQMD Rules and Regulations, including Rules 402 and 403 that controls the emissions of air contaminants, odors and fugitive dust. Therefore, based on the above, the proposed project is not anticipated to exceed the AQMP assumptions for the proposed project site and is found to be consistent with the AQMP for the second criterion.

Based on the discussion above, the Proposed Project will not result in an inconsistency with the SCAQMD AQMP. Accordingly, the Proposed Project would not conflict with or obstruct implementation of the applicable air quality plan.

Cumulative Net Increase in Non-Attainment Pollution

As shown above in Table A, the proposed project area is designated as a federal and/or state nonattainment area for ozone, PM10 and PM2.5. To estimate if the proposed project may adversely affect the air quality in the region, the SCAQMD has prepared CEQA Air Quality Handbook (SCAQMD 1993) to provide guidance to those who analyze the air quality impacts of proposed projects. The SCAQMD CEQA Handbook states that any project in the Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes of this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table C.

Table C – SCAQMD Regional Criteria Pollutant Emission Thresholds of Significance

	Pollutant Emissions (pounds/day)					
	VOC	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Construction	75	100	550	150	150	55
Operation	55	55	550	150	150	55

Source: http://www.aqmd.gov/ceqa/handbook/signthres.pdf

Project-related construction and operational air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the Air Basin. In order to assess local air quality impacts the SCAQMD has developed Localized Significant Thresholds (LSTs) to assess the project-related air emissions in the project vicinity. SCAQMD has also provided Final Localized Significance Threshold

Methodology (LST Methodology), July 2008, which details the methodology to analyze local air emission impacts. The LST Methodology found that the primary emissions of concern are NO_2, CO, PM10, and PM2.5.

The LST Methodology provides Look-Up Tables with different thresholds based on the location and size of the project site and distance to the nearest sensitive receptors. The Proposed Project would disturb approximately 6.3 acres, however less than 50 percent of the school site would be disturbed at any one time. Since the Look-Up Tables provide (1-acre, 2-acre, and 5-acre project sizes), the 5-acre project site was utilized, since it is the closest size available to the proposed area to be disturbed. As detailed above, the project site is located in Air Monitoring Area 2, which covers northwest coastal Los Angeles County. The nearest sensitive receptors to the project site are single-family homes located adjacent to the south and east sides of the project site and multi-family homes located adjacent to the north side of the project site. According to the LST Methodology, any receptor located closer than 25 meters (82 feet) shall be based on the 25 meter thresholds, which have been utilized to calculate the local thresholds. Table D below shows the NOx, CO, PM10, and PM2.5 for both construction and operational activities.

Table D – SCAQMD Local Air Quality Thresholds of Significance

Activity	Allowable Emissions[1] (pounds/day)			
	NOx	CO	PM10	PM2.5
Construction	221	1,861	13	6
Operation	221	1,861	3	2

Notes:
[1] The nearest sensitive receptors are homes located adjacent to the project site. According to SCAQMD Methodology, all receptors closer than 25 meters are based on the 25 meter threshold.
Source: Calculated from SCAQMD's Mass Rate Look-up Tables for five acres in Air Monitoring Area 2, Northwest Coastal Los Angeles County.

Construction Emissions

Construction of the proposed project would create air emissions primarily from equipment exhaust and fugitive dust. The air emissions from the Proposed Project were analyzed through use of the CalEEMod model (the CalEEMod Printouts are attached to this Letter). Construction activities for the proposed project are anticipated to start in the third quarter of 2021 and would be completed in 36 months. The first phase of construction is anticipated to occur over three months and would consist of either removal or demolition of 33 classrooms currently in portables and demolition of approximately 265,000 square feet of pavement. The second phase of construction is anticipated to occur over three months and would consist of site preparation that would require up to 5,000 cubic yards of contaminated soil to be exported and up to 18,000 cubic yards of non-contaminated soil to be either imported or exported from the project site, which may result in up to 23,000 cubic yards of soil to be exported from the project site. Building construction activities would occur after the completion of the site preparation phase and is anticipated to occur over 12 months and would consist of construction of Classroom Building 300 that is approximately 32,290 square feet in size as well as the proposed lunch shelter that is approximately 4,000 square feet. Since architectural coatings would be applied throughout the duration of the building construction phase, an architectural coating phase was also analyzed that would occur concurrently with the building construction phase. The final phase would consist of the onsite asphalt paving and off-site street work, which is anticipated to occur over three months. The construction equipment utilized in the CalEEMod model for each phase of construction activities was obtained from Table 3-2 provided in the Project Description for the proposed project.

Construction-Related Regional Impacts

The CalEEMod model has been utilized to calculate the construction-related regional emissions from the proposed project. The worst-case summer or winter daily construction-related criteria pollutant emissions from the proposed project for each phase of construction activities are shown below in Table E and the CalEEMod model run printout is attached to this letter.

Table E – Construction-Related Regional Criteria Pollutant Emissions

Activity	Pollutant Emissions (pounds/day)[1]					
	VOC	NOx	CO	SO_2	PM10	PM2.5
Demolition						
Onsite	1.74	14.59	15.45	0.03	1.89	0.89
Offsite	0.19	3.86	1.51	0.01	0.43	0.12
Total of Onsite and Offsite	1.93	18.45	16.96	0.04	2.32	1.01
Site Preparation						
Onsite	1.40	13.56	13.55	0.02	8.92	5.15
Offsite	0.46	11.93	3.73	0.04	1.06	0.31
Total of Onsite and Offsite	1.86	25.49	17.28	0.06	9.98	5.46
Combined Building Construction/Architectural Coatings						
Onsite	3.21	17.93	18.38	0.03	0.93	0.87
Offsite	0.58	3.53	4.82	0.02	1.43	0.39
Total of Onsite and Offsite	3.79	21.46	23.20	0.05	2.36	1.26
Onsite Asphalt Paving and Off-Site Street Work						
Onsite	0.81	6.56	9.20	0.01	0.33	0.30
Offsite	0.08	1.29	0.74	0.01	0.23	0.07
Total of Onsite and Offsite	0.89	7.85	9.94	0.02	0.56	0.37
Maximum Daily Emissions	**3.79**	**25.49**	**23.20**	**0.06**	**9.98**	**5.46**
SCQAMD Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Threshold?	No	No	No	No	No	No

Notes:
[1] Based on adherence to fugitive dust suppression requirements from SCAQMD Rule 403.
[2] Onsite emissions from equipment not operated on public roads.
[3] Offsite emissions from vehicles operating on public roads.
Source: CalEEMod Version 2016.3.2.

Table E shows that none of the analyzed criteria pollutants would exceed the regional emissions thresholds during any of the construction phases for the proposed project. Therefore, a less than significant regional air quality impact would occur from construction of the proposed project.

Construction-Related Local Impacts

Construction-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the Air Basin.

The local air quality emissions from construction were analyzed through utilizing the methodology described in *Localized Significance Threshold Methodology* (LST Methodology), prepared by SCAQMD, revised October 2009. The LST Methodology found the primary criteria pollutant emissions of concern

are NOx, CO, PM10, and PM2.5. In order to determine if any of these pollutants require a detailed analysis of the local air quality impacts, each phase of construction was screened using the SCAQMD's Mass Rate LST Look-up Tables. The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily onsite emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. Table F shows the onsite emissions from the CalEEMod model for the different construction phases and the calculated emissions thresholds that have been detailed above.

Table F – Construction-Related Local Criteria Pollutant Emissions

Construction Phase	Onsite Pollutant Emissions (pounds/day)[1]			
	NOx	CO	PM10	PM2.5
Demolition	14.59	15.45	1.89	0.89
Site Preparation	13.56	13.55	8.92	5.15
Combined Building Construction/Architectural Coatings	17.93	18.38	0.93	0.87
Onsite Asphalt Paving and Off-Site Street Work	6.56	9.20	0.33	0.30
Maximum Onsite Daily Emissions	17.93	18.38	8.92	5.15
SCAQMD Thresholds[2]	**221**	**1,861**	**13**	**6**
Exceeds Threshold?	No	No	No	No

Notes:
[1] Based on adherence to fugitive dust suppression requirements from SCAQMD Rule 403.
[2] The nearest sensitive receptors are homes located adjacent to the project site. According to SCAQMD Methodology, all receptors closer than 25 meters are based on the 25 meter threshold.
Source: Calculated from SCAQMD's Mass Rate Look-up Tables for five acres in Air Monitoring Area 2, Northwest Coastal Los Angeles County.

The data provided in Table F shows that none of the analyzed criteria pollutants would exceed the local emissions thresholds during any of the construction phases for the proposed project. Therefore a less than significant local air quality impact would occur from construction of the proposed project.

Operational Emissions

The Proposed Project consists of removal or demolition of the 33 portables and approximately 265,000 square feet of pavement area, site preparation activities that would require up to 18,000 cubic yards of dirt to be either imported or exported from the project site, building construction of Classroom Building 300 and the proposed lunch shelter, and finally onsite paving and offsite street work. Development of the Proposed Project would not result in an increase in employee or student capacity at the School or would create any additional vehicle trips. Operational emissions associated with the proposed project would likely be slightly less than the emissions currently occurring within the existing school due to a decrease in energy usage associated with the new building that will be designed and built to meet the most current Title 24 building energy standards that would result in a much more energy efficient structure than the existing portables that would be removed as part of the proposed project. Therefore, operation of the proposed project would result in a slight decrease in air emissions within the Air Basin. As such, operation of the proposed project would not violate air quality standards or contribute substantially to an existing or projected air quality violation. Operational impacts would be less than significant.

Accordingly, the proposed project would not result in a cumulative considerable net increase of any criteria pollutant.

Sensitive Receptors

The nearest sensitive receptors to the project site are single-family homes located adjacent to the south and east sides of the project site and multi-family homes located adjacent to the north side of the project site. In addition, onsite students, teachers and other school staff would also be in close proximity to construction activities associated with the proposed project. As discussed above, the local concentrations of criteria pollutant emissions have been calculated for construction activities and the operational activities were found to create less emissions than what are created from existing conditions. The analysis above found that less than significant criteria pollutant concentrations would occur during construction and operation of the proposed project.

In addition, to the criteria pollutant emissions impacts analyzed above, construction activities have the potential to expose nearby sensitive receptors to toxic air contaminants (TACs), which would be created from the operation of diesel-powered equipment in the form of diesel particulate matter (DPM). According to SCAQMD methodology, health effects from TACs are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment, the varying distances that construction equipment would operate to the nearby sensitive receptors, and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 70 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. In addition, California Code of Regulations Title 13, Article 4.8, Chapter 9, Section 2449 regulates emissions from off-road diesel equipment in California. This regulation limits idling of equipment to no more than five minutes, requires equipment operators to label each piece of equipment and provide annual reports to CARB of their fleet's usage and emissions. This regulation also requires systematic upgrading of the emission Tier level of each fleet, and currently no commercial operator is allowed to purchase Tier 0 or Tier 1 equipment and by January 2023 no commercial operator is allowed to purchase Tier 2 equipment. In addition to the purchase restrictions, equipment operators need to meet fleet average emissions targets that become more stringent each year between years 2014 and 2023. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project.

Therefore, implementation of the proposed project would not expose sensitive receptors to substantial pollutant concentrations, and impacts would be less than significant.

Generation of Greenhouse Gas Emissions

Significant legislative and regulatory activities directly and indirectly affect climate change and GHGs in California. The primary climate change legislation in California is AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing greenhouse gas emissions in California, and AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. In addition to AB 32, Executive Order B-30-15 was issued on April 29, 2015 that aims to reduce California's GHG emissions 40 percent below 1990 levels by 2030. In September 2016, AB 197 and SB 32 codified into statute the GHG emission reduction targets provided in Executive Order B-20-15.

CARB is the state agency charged with monitoring and regulating sources of emissions of GHGs in California that contribute to global warming in order to reduce emissions of GHGs. The CARB Governing Board approved the 1990 GHG emissions level of 427 million tons of CO_2 equivalent ($MtCO_2e$) on December 6, 2007. Therefore, in 2020, annual emissions in California are required to be at or below 427

$MtCO_2e$. The CARB Board approved the Climate Change Scoping Plan (Scoping Plan) in December 2008, the First Update to the Scoping Plan in May 2014, and California's 2017 Climate Change Scoping Plan in November 2017. The Scoping Plans define a range of programs and activities that will be implemented primarily by state agencies but also include actions by local government agencies. Primary strategies addressed in the Scoping Plans include new industrial and emission control technologies; alternative energy generation technologies; advanced energy conservation in lighting, heating, cooling, and ventilation; reduced-carbon fuels; hybrid and electric vehicles; and other methods of improving vehicle mileage. Local government will have a part in implementing some of these strategies. The Scoping Plans also call for reductions in vehicle-associated GHG emissions through smart growth that will result in reductions in vehicle miles traveled (CARB 2008, 2014, 2017).

The CalEEMod model used above to calculate the criteria pollutant emissions was also utilized to calculate the GHG emissions associated with construction and operation of the proposed project (see attached CalEEMod printouts). The CalEEMod model calculated GHG emissions generated from construction activities for the proposed project that include removal or demolition of the 33 portables and approximately 265,000 square feet of pavement area, site preparation activities that would require up to 5,000 cubic yards of contaminated soil to be exported and up to 18,000 cubic yards of non-contaminated soil to be either imported or exported from the project site, building construction of Classroom Building 300 and the proposed lunch shelter, and finally onsite paving and offsite street work. Per the analysis methodology presented in the SCAQMD Working Group meetings, the construction emissions were amortized over 30 years. Development of the proposed project would not result in an increase in employee or student capacity at the School or would create any additional vehicle trips. Operational GHG emissions associated with the proposed project would likely be slightly less than the emissions currently occurring within the existing school due to a decrease in energy usage associated with the new building that will be designed and built to meet the most current Title 24 building energy standards that would result in a much more energy efficient structure than the existing portables that would be removed as part of the proposed project. A summary of the GHG emissions created from construction of the proposed project is shown below in Table G. As detailed above, operation of the proposed project would not create any additional GHG emissions and as such, operational emissions have not been included in Table G.

Table G – Construction Related Greenhouse Gas Emissions

	Greenhouse Gas Emissions (Metric Tons)			
Construction Phase	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Demolition	121.11	0.02	0.00	121.56
Site Preparation	184.55	0.03	0.00	185.28
2022 Combined Building Construction/Architectural Coatings	496.81	0.08	0.00	498.94
2023 Combined Building Construction/Architectural Coatings	162.74	0.03	0.00	163.44
Onsite Asphalt Paving and Off-Site Street Work	55.53	0.01	0.00	55.86
Total Construction Emissions	**1,020.74**	**0.17**	**0.00**	**1,025.08**
Amortized Total Construction Emissions (30 years)[1]	**34.02**	**0.01**	**0.00**	**34.17**
SCAQMD Draft Threshold of Significance				**3,000**

Notes:
[1] Construction emissions amortized over 30 years as recommended in the SCAQMD GHG Working Group on November 19, 2009.
Source: CalEEMod Version 2016.3.2.

The data provided in Table G above shows that the proposed project would create a total of 1,025.08 $MTCO_2e$ or 34.17 $MTCO_2e$ per year, when amortized over a 30 year period. According to the SCAQMD draft threshold of significance detailed above, a cumulative global climate change impact would occur if the GHG emissions created from a proposed project would exceed 3,000 $MTCO_2e$ per year. Therefore, a less than significant generation of greenhouse gas emissions would occur from implementation of the proposed project. Impacts would be less than significant.

Greenhouse Gas Plan Consistency

The California State Legislature adopted AB 32 in 2006, that requires the State's GHG emissions by 2020 to meet the GHG emissions level created in 1990 and adopted AB 197 and SB 32 in 2016, that requires the State's GHG emissions to be 40 percent below 1990 levels by 2030.

In order to achieve the target provided in AB 32, the SCAQMD developed a Working Group that developed a tiered approach in order to determine if proposed land use projects would contribute to an exceedance of the GHG emissions targets detailed in AB 32. As shown above, the proposed project would generate 34.17 $MTCO_2e$ per year from construction of the proposed project and operation of the proposed project is not anticipated to generate any GHG emissions, since development of the proposed project would not result in an increase in employee or student capacity at the School or would create any additional vehicle trips and would also result in a more efficient building than the existing structures. The GHG emissions generated from the proposed project would be within the "Tier 3" quantitative threshold of 3,000 $MTCO_2e$ per year for all land use projects as recommended by the SCAQMD.

The SCAQMD has not yet updated its "Tier 3" quantitative threshold to address AB 197 and SB 32. However, it is anticipated that the "Tier 3" thresholds would be reduced around 40 percent, which is equivalent to how much more stringent AB 197 and SB 32 are over AB 32. Since the Proposed Project's GHG emissions are 99 percent below the "Tier 3" threshold, it is anticipated that the Proposed Project's GHG emissions would remain less than significant under any future thresholds developed to address AB 197 and SB 32. Therefore, the proposed project would not conflict with any applicable plan, policy, or regulation adopted for reducing the emissions of GHGs. A less than significant impact would occur.

Please let me know if you have any questions or need additional information with regard to the above analysis. I can be reached at (949) 510-5355, or email me at greg@vistalb.com.

Sincerely,

Greg Tonkovich, AICP
Vista Environmental
949 510 5355

Encl.: CalEEMod Printouts

LAUSD Shenandoah Elementary School Modernization Project

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	30.87	1000sqft	2.18	30,870.00	0
Other Asphalt Surfaces	4.13	Acre	4.13	179,902.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2024
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Approx 6.31-acre of Site will be disturbed. Building300=26,870 sq ft and LunchShelter=4,000 sqft. Total of 30,870 sqft of new building space & 4.13acre of hardscape.

Construction Phase - Construction Schedule provided by applicant

Off-road Equipment - 1 Compressor

Off-road Equipment - 1 Bore/Drill Rig, 1 Crane, 1 Pump, 4 Forklifts, 2 Tractors/Loader/Backhoe. (1 Compressor analyzed under concurrent Painting Phase)

Off-road Equipment - 1 Excavator, 1 Crushing/Proc Equip, 1 Rubber Tired Loader, 1 Skid Steer Loader, 2 Air Compressor

Off-road Equipment - 1 Paver, 1 Roller, 2 Tractor/Loader/Backhoe

Off-road Equipment - 1 Excavator, 1 Plate Compactor, 2 Rollers, 1 Rubber Tired Loader, 1 Tractor/Loader/Backhoe, 1 Trencher

Trips and VMT - 6 vendor trucks added to Demo, Site Prep to account for water trucks. 18 vendor trucks added to Paving to account for Asphalt and Water Trucks

Demolition - 33,126 sq ft of Portables to be demolished = 1,524 tons + 265,000 sq ft of Paving area to be demolished = 6,404 tons. Total 7,928 tons of debris

Grading - 5,000 cu yd contaminated soil exported and 18,000 cu yd imported or exported. Worst-Case of 23,000 cu yd exported

Vehicle Trips - No additional trips would be generated from the project.

Construction Off-road Equipment Mitigation - Water Exposed Area 2 times per day selected to account for SCAQMD Rule 403 minimum requirements

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	66.00
tblConstructionPhase	NumDays	10.00	64.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	20.00	261.00
tblConstructionPhase	NumDays	20.00	65.00
tblGrading	AcresOfGrading	0.00	6.80
tblGrading	MaterialExported	0.00	23,000.00
tblLandUse	LotAcreage	0.71	2.18
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Onsite Paving-Offsite Street Work
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,875.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	18.00
tblTripsAndVMT	WorkerTripNumber	23.00	15.00
tblTripsAndVMT	WorkerTripNumber	25.00	18.00
tblTripsAndVMT	WorkerTripNumber	15.00	10.00
tblVehicleTrips	WD_TR	15.43	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.9252	18.4006	16.9502	0.0410	2.9843	0.7455	3.7298	0.5017	0.7230	1.2246	0.0000	4,061.8942	4,061.8942	0.6024	0.0000	4,076.9532
2022	3.7353	25.3562	23.1950	0.0617	19.2447	0.9421	20.0051	10.2288	0.8881	10.9303	0.0000	6,395.2374	6,395.2374	0.9977	0.0000	6,420.1806
2023	3.5466	19.1041	22.6828	0.0566	1.4201	0.8165	2.2366	0.3817	0.7697	1.1514	0.0000	5,578.8026	5,578.8026	0.9451	0.0000	5,602.4303
Maximum	**3.7353**	**25.3562**	**23.1950**	**0.0617**	**19.2447**	**0.9421**	**20.0051**	**10.2288**	**0.8881**	**10.9303**	**0.0000**	**6,395.2374**	**6,395.2374**	**0.9977**	**0.0000**	**6,420.1806**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.9252	18.4006	16.9502	0.0410	1.5705	0.7455	2.3160	0.2876	0.7230	1.0106	0.0000	4,061.8942	4,061.8942	0.6024	0.0000	4,076.9532
2022	3.7353	25.3562	23.1950	0.0617	9.2239	0.9421	9.9844	4.7568	0.8881	5.4584	0.0000	6,395.2374	6,395.2374	0.9977	0.0000	6,420.1806
2023	3.5466	19.1041	22.6828	0.0566	1.4201	0.8165	2.2366	0.3817	0.7697	1.1514	0.0000	5,578.8026	5,578.8026	0.9451	0.0000	5,602.4303
Maximum	**3.7353**	**25.3562**	**23.1950**	**0.0617**	**9.2239**	**0.9421**	**9.9844**	**4.7568**	**0.8881**	**5.4584**	**0.0000**	**6,395.2374**	**6,395.2374**	**0.9977**	**0.0000**	**6,420.1806**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.35**	**0.00**	**44.03**	**51.17**	**0.00**	**42.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition-Interim Housing	Demolition	10/1/2021	12/31/2021	5	66	
2	Site Preparation-Modernization	Site Preparation	1/1/2022	3/31/2022	5	64	
3	Building Construction-Modernization	Building Construction	4/1/2022	3/31/2023	5	261	
4	Architectural Coating	Architectural Coating	4/1/2022	3/31/2023	5	261	
5	Onsite Paving-Offsite Street Work	Paving	4/1/2023	6/30/2023	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.13

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 46,305; Non-Residential Outdoor: 15,435; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition-Interim Housing	Air Compressors	2	8.00	78	0.48
Demolition-Interim Housing	Crushing/Proc. Equipment	1	8.00	85	0.78
Demolition-Interim Housing	Excavators	1	8.00	158	0.38
Demolition-Interim Housing	Rubber Tired Loaders	1	8.00	203	0.36
Demolition-Interim Housing	Skid Steer Loaders	1	8.00	65	0.37
Site Preparation-Modernization	Excavators	1	8.00	158	0.38
Site Preparation-Modernization	Plate Compactors	1	8.00	8	0.43
Site Preparation-Modernization	Rollers	2	8.00	80	0.38
Site Preparation-Modernization	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation-Modernization	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation-Modernization	Trenchers	1	8.00	78	0.50
Building Construction-Modernization	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction-Modernization	Cranes	1	7.00	231	0.29
Building Construction-Modernization	Forklifts	4	8.00	89	0.20
Building Construction-Modernization	Pumps	1	8.00	84	0.74

Building Construction-Modernization	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Onsite Paving-Offsite Street Work	Pavers	1	8.00	130	0.42
Onsite Paving-Offsite Street Work	Rollers	1	8.00	80	0.38
Onsite Paving-Offsite Street Work	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition-Interim Housing	9	15.00	6.00	784.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation-Modernization	10	18.00	6.00	2,875.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction-Modernization	11	89.00	35.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Onsite Paving-Offsite Street Work	6	10.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition-Interim Housing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5705	0.0000	2.5705	0.3892	0.0000	0.3892			0.0000			0.0000
Off-Road	1.7436	14.5874	15.4467	0.0284		0.7332	0.7332		0.7113	0.7113		2,720.6748	2,720.6748	0.5194		2,733.6591
Total	**1.7436**	**14.5874**	**15.4467**	**0.0284**	**2.5705**	**0.7332**	**3.3037**	**0.3892**	**0.7113**	**1.1004**		**2,720.6748**	**2,720.6748**	**0.5194**		**2,733.6591**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0990	3.1864	0.7471	9.2700e-003	0.2077	9.7800e-003	0.2175	0.0569	9.3600e-003	0.0663		1,005.4756	1,005.4756	0.0682		1,007.1815
Vendor	0.0182	0.5825	0.1523	1.5400e-003	0.0384	1.1900e-003	0.0396	0.0111	1.1400e-003	0.0122		164.9284	164.9284	9.7200e-003		165.1713
Worker	0.0643	0.0442	0.6042	1.7100e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2500e-003	0.0457		170.8155	170.8155	5.0300e-003		170.9413
Total	**0.1816**	**3.8132**	**1.5036**	**0.0125**	**0.4138**	**0.0123**	**0.4261**	**0.1125**	**0.0118**	**0.1242**		**1,341.2194**	**1,341.2194**	**0.0830**		**1,343.2940**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1567	0.0000	1.1567	0.1751	0.0000	0.1751			0.0000			0.0000
Off-Road	1.7436	14.5874	15.4467	0.0284		0.7332	0.7332		0.7113	0.7113	0.0000	2,720.6748	2,720.6748	0.5194		2,733.6591
Total	**1.7436**	**14.5874**	**15.4467**	**0.0284**	**1.1567**	**0.7332**	**1.8899**	**0.1751**	**0.7113**	**0.8864**	**0.0000**	**2,720.6748**	**2,720.6748**	**0.5194**		**2,733.6591**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0990	3.1864	0.7471	9.2700e-003	0.2077	9.7800e-003	0.2175	0.0569	9.3600e-003	0.0663		1,005.4756	1,005.4756	0.0682		1,007.1815
Vendor	0.0182	0.5825	0.1523	1.5400e-003	0.0384	1.1900e-003	0.0396	0.0111	1.1400e-003	0.0122		164.9284	164.9284	9.7200e-003		165.1713
Worker	0.0643	0.0442	0.6042	1.7100e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2500e-003	0.0457		170.8155	170.8155	5.0300e-003		170.9413
Total	**0.1816**	**3.8132**	**1.5036**	**0.0125**	**0.4138**	**0.0123**	**0.4261**	**0.1125**	**0.0118**	**0.1242**		**1,341.2194**	**1,341.2194**	**0.0830**		**1,343.2940**

3.3 Site Preparation-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.2196	0.0000	18.2196	9.9490	0.0000	9.9490			0.0000			0.0000
Off-Road	1.3950	13.5604	13.5544	0.0236		0.7257	0.7257		0.6684	0.6684		2,276.5550	2,276.5550	0.7287		2,294.7728
Total	**1.3950**	**13.5604**	**13.5544**	**0.0236**	**18.2196**	**0.7257**	**18.9452**	**9.9490**	**0.6684**	**10.6174**		**2,276.5550**	**2,276.5550**	**0.7287**		**2,294.7728**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3565	11.1939	2.7967	0.0346	0.7855	0.0321	0.8177	0.2153	0.0307	0.2461		3,757.4227	3,757.4227	0.2542		3,763.7771
Vendor	0.0171	0.5540	0.1441	1.5300e-003	0.0384	1.0400e-003	0.0395	0.0111	1.0000e-003	0.0121		163.4915	163.4915	9.3800e-003		163.7261
Worker	0.0723	0.0479	0.6689	1.9800e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		197.7682	197.7682	5.4600e-003		197.9047
Total	**0.4458**	**11.7958**	**3.6096**	**0.0381**	**1.0251**	**0.0348**	**1.0599**	**0.2798**	**0.0332**	**0.3129**		**4,118.6824**	**4,118.6824**	**0.2690**		**4,125.4078**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1988	0.0000	8.1988	4.4771	0.0000	4.4771			0.0000			0.0000
Off-Road	1.3950	13.5604	13.5544	0.0236		0.7257	0.7257		0.6684	0.6684	0.0000	2,276.5550	2,276.5550	0.7287		2,294.7728
Total	**1.3950**	**13.5604**	**13.5544**	**0.0236**	**8.1988**	**0.7257**	**8.9245**	**4.4771**	**0.6684**	**5.1454**	**0.0000**	**2,276.5550**	**2,276.5550**	**0.7287**		**2,294.7728**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3565	11.1939	2.7967	0.0346	0.7855	0.0321	0.8177	0.2153	0.0307	0.2461		3,757.4227	3,757.4227	0.2542		3,763.7771
Vendor	0.0171	0.5540	0.1441	1.5300e-003	0.0384	1.0400e-003	0.0395	0.0111	1.0000e-003	0.0121		163.4915	163.4915	9.3800e-003		163.7261
Worker	0.0723	0.0479	0.6689	1.9800e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		197.7682	197.7682	5.4600e-003		197.9047
Total	**0.4458**	**11.7958**	**3.6096**	**0.0381**	**1.0251**	**0.0348**	**1.0599**	**0.2798**	**0.0332**	**0.3129**		**4,118.6824**	**4,118.6824**	**0.2690**		**4,125.4078**

3.4 Building Construction-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6450	16.0484	15.9602	0.0326		0.8177	0.8177		0.7647	0.7647		3,144.8634	3,144.8634	0.8474		3,166.0485
Total	**1.6450**	**16.0484**	**15.9602**	**0.0326**		**0.8177**	**0.8177**		**0.7647**	**0.7647**		**3,144.8634**	**3,144.8634**	**0.8474**		**3,166.0485**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0999	3.2316	0.8405	8.9100e-003	0.2241	6.0700e-003	0.2302	0.0645	5.8100e-003	0.0703		953.7006	953.7006	0.0547		955.0688
Worker	0.3574	0.2369	3.3073	9.8100e-003	0.9948	7.7900e-003	1.0026	0.2638	7.1700e-003	0.2710		977.8540	977.8540	0.0270		978.5287
Total	**0.4572**	**3.4684**	**4.1478**	**0.0187**	**1.2189**	**0.0139**	**1.2328**	**0.3284**	**0.0130**	**0.3413**		**1,931.5546**	**1,931.5546**	**0.0817**		**1,933.5975**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6450	16.0484	15.9602	0.0326		0.8177	0.8177		0.7647	0.7647	0.0000	3,144.8634	3,144.8634	0.8474		3,166.0485
Total	**1.6450**	**16.0484**	**15.9602**	**0.0326**		**0.8177**	**0.8177**		**0.7647**	**0.7647**	**0.0000**	**3,144.8634**	**3,144.8634**	**0.8474**		**3,166.0485**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0999	3.2316	0.8405	8.9100e-003	0.2241	6.0700e-003	0.2302	0.0645	5.8100e-003	0.0703		953.7006	953.7006	0.0547		955.0688
Worker	0.3574	0.2369	3.3073	9.8100e-003	0.9948	7.7900e-003	1.0026	0.2638	7.1700e-003	0.2710		977.8540	977.8540	0.0270		978.5287
Total	**0.4572**	**3.4684**	**4.1478**	**0.0187**	**1.2189**	**0.0139**	**1.2328**	**0.3284**	**0.0130**	**0.3413**		**1,931.5546**	**1,931.5546**	**0.0817**		**1,933.5975**

3.4 Building Construction-Modernization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5255	14.6571	15.8472	0.0327		0.7102	0.7102		0.6642	0.6642		3,147.2869	3,147.2869	0.8449		3,168.4093
Total	**1.5255**	**14.6571**	**15.8472**	**0.0327**		**0.7102**	**0.7102**		**0.6642**	**0.6642**		**3,147.2869**	**3,147.2869**	**0.8449**		**3,168.4093**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0741	2.4520	0.7591	8.6200e-003	0.2241	2.8300e-003	0.2269	0.0645	2.7100e-003	0.0672		923.6760	923.6760	0.0485		924.8885
Worker	0.3356	0.2143	3.0457	9.4500e-003	0.9948	7.5700e-003	1.0024	0.2638	6.9700e-003	0.2708		942.0490	942.0490	0.0243		942.6573
Total	**0.4097**	**2.6663**	**3.8048**	**0.0181**	**1.2189**	**0.0104**	**1.2293**	**0.3284**	**9.6800e-003**	**0.3380**		**1,865.7250**	**1,865.7250**	**0.0728**		**1,867.5458**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5255	14.6571	15.8472	0.0327		0.7102	0.7102		0.6642	0.6642	0.0000	3,147.2869	3,147.2869	0.8449		3,168.4093
Total	**1.5255**	**14.6571**	**15.8472**	**0.0327**		**0.7102**	**0.7102**		**0.6642**	**0.6642**	**0.0000**	**3,147.2869**	**3,147.2869**	**0.8449**		**3,168.4093**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0741	2.4520	0.7591	8.6200e-003	0.2241	2.8300e-003	0.2269	0.0645	2.7100e-003	0.0672		923.6760	923.6760	0.0485		924.8885
Worker	0.3356	0.2143	3.0457	9.4500e-003	0.9948	7.5700e-003	1.0024	0.2638	6.9700e-003	0.2708		942.0490	942.0490	0.0243		942.6573
Total	**0.4097**	**2.6663**	**3.8048**	**0.0181**	**1.2189**	**0.0104**	**1.2293**	**0.3284**	**9.6800e-003**	**0.3380**		**1,865.7250**	**1,865.7250**	**0.0728**		**1,867.5458**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2727	1.8780	2.4181	3.9600e-003		0.1090	0.1090		0.1090	0.1090		375.2641	375.2641	0.0244		375.8749
Total	**1.5608**	**1.8780**	**2.4181**	**3.9600e-003**		**0.1090**	**0.1090**		**0.1090**	**0.1090**		**375.2641**	**375.2641**	**0.0244**		**375.8749**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0723	0.0479	0.6689	1.9800e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		197.7682	197.7682	5.4600e-003		197.9047
Total	**0.0723**	**0.0479**	**0.6689**	**1.9800e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4500e-003**	**0.0548**		**197.7682**	**197.7682**	**5.4600e-003**		**197.9047**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2727	1.8780	2.4181	3.9600e-003		0.1090	0.1090		0.1090	0.1090	0.0000	375.2641	375.2641	0.0244		375.8749
Total	**1.5608**	**1.8780**	**2.4181**	**3.9600e-003**		**0.1090**	**0.1090**		**0.1090**	**0.1090**	**0.0000**	**375.2641**	**375.2641**	**0.0244**		**375.8749**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0723	0.0479	0.6689	1.9800e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		197.7682	197.7682	5.4600e-003		197.9047
Total	**0.0723**	**0.0479**	**0.6689**	**1.9800e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4500e-003**	**0.0548**		**197.7682**	**197.7682**	**5.4600e-003**		**197.9047**

3.5 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944		375.2641	375.2641	0.0225		375.8253
Total	**1.5437**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**		**375.2641**	**375.2641**	**0.0225**		**375.8253**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0433	0.6160	1.9100e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		190.5268	190.5268	4.9200e-003		190.6498
Total	**0.0679**	**0.0433**	**0.6160**	**1.9100e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**190.5268**	**190.5268**	**4.9200e-003**		**190.6498**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944	0.0000	375.2641	375.2641	0.0225		375.8253
Total	**1.5437**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**	**0.0000**	**375.2641**	**375.2641**	**0.0225**		**375.8253**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0433	0.6160	1.9100e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		190.5268	190.5268	4.9200e-003		190.6498
Total	**0.0679**	**0.0433**	**0.6160**	**1.9100e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**190.5268**	**190.5268**	**4.9200e-003**		**190.6498**

3.6 Onsite Paving-Offsite Street Work - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6484	6.5643	9.1980	0.0136		0.3288	0.3288		0.3025	0.3025		1,312.4780	1,312.4780	0.4245		1,323.0901
Paving	0.1665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8148**	**6.5643**	**9.1980**	**0.0136**		**0.3288**	**0.3288**		**0.3025**	**0.3025**		**1,312.4780**	**1,312.4780**	**0.4245**		**1,323.0901**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0381	1.2610	0.3904	4.4300e-003	0.1152	1.4600e-003	0.1167	0.0332	1.3900e-003	0.0346		475.0334	475.0334	0.0249		475.6569
Worker	0.0377	0.0241	0.3422	1.0600e-003	0.1118	8.5000e-004	0.1126	0.0296	7.8000e-004	0.0304		105.8482	105.8482	2.7300e-003		105.9166
Total	**0.0758**	**1.2851**	**0.7326**	**5.4900e-003**	**0.2270**	**2.3100e-003**	**0.2293**	**0.0628**	**2.1700e-003**	**0.0650**		**580.8816**	**580.8816**	**0.0277**		**581.5735**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6484	6.5643	9.1980	0.0136		0.3288	0.3288		0.3025	0.3025	0.0000	1,312.4780	1,312.4780	0.4245		1,323.0901
Paving	0.1665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8148**	**6.5643**	**9.1980**	**0.0136**		**0.3288**	**0.3288**		**0.3025**	**0.3025**	**0.0000**	**1,312.4780**	**1,312.4780**	**0.4245**		**1,323.0901**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0381	1.2610	0.3904	4.4300e-003	0.1152	1.4600e-003	0.1167	0.0332	1.3900e-003	0.0346		475.0334	475.0334	0.0249		475.6569
Worker	0.0377	0.0241	0.3422	1.0600e-003	0.1118	8.5000e-004	0.1126	0.0296	7.8000e-004	0.0304		105.8482	105.8482	2.7300e-003		105.9166
Total	**0.0758**	**1.2851**	**0.7326**	**5.4900e-003**	**0.2270**	**2.3100e-003**	**0.2293**	**0.0628**	**2.1700e-003**	**0.0650**		**580.8816**	**580.8816**	**0.0277**		**581.5735**

LAUSD Shenandoah Elementary School Modernization Project

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	30.87	1000sqft	2.18	30,870.00	0
Other Asphalt Surfaces	4.13	Acre	4.13	179,902.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2024
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Approx 6.31-acre of Site will be disturbed. Building300=26,870 sq ft and LunchShelter=4,000 sqft. Total of 30,870 sqft of new building space & 4.13acre of hardscape.
Construction Phase - Construction Schedule provided by applicant

Off-road Equipment - 1 Compressor

Off-road Equipment - 1 Bore/Drill Rig, 1 Crane, 1 Pump, 4 Forklifts, 2 Tractors/Loader/Backhoe. (1 Compressor analyzed under concurrent Painting Phase)

Off-road Equipment - 1 Excavator, 1 Crushing/Proc Equip, 1 Rubber Tired Loader, 1 Skid Steer Loader, 2 Air Compressor

Off-road Equipment - 1 Paver, 1 Roller, 2 Tractor/Loader/Backhoe

Off-road Equipment - 1 Excavator, 1 Plate Compactor, 2 Rollers, 1 Rubber Tired Loader, 1 Tractor/Loader/Backhoe, 1 Trencher

Trips and VMT - 6 vendor trucks added to Demo, Site Prep to account for water trucks. 18 vendor trucks added to Paving to account for Asphalt and Water Trucks

Demolition - 33,126 sq ft of Portables to be demolished = 1,524 tons + 265,000 sq ft of Paving area to be demolished = 6,404 tons. Total 7,928 tons of debris

Grading - 5,000 cu yd contaminated soil exported and 18,000 cu yd imported or exported. Worst-Case of 23,000 cu yd exported

Vehicle Trips - No additional trips would be generated from the project.

Construction Off-road Equipment Mitigation - Water Exposed Area 2 times per day selected to account for SCAQMD Rule 403 minimum requirements

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	66.00
tblConstructionPhase	NumDays	10.00	64.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	20.00	261.00
tblConstructionPhase	NumDays	20.00	65.00
tblGrading	AcresOfGrading	0.00	6.80
tblGrading	MaterialExported	0.00	23,000.00
tblLandUse	LotAcreage	0.71	2.18
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Onsite Paving-Offsite Street Work
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,875.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	18.00
tblTripsAndVMT	WorkerTripNumber	23.00	15.00
tblTripsAndVMT	WorkerTripNumber	25.00	18.00
tblTripsAndVMT	WorkerTripNumber	15.00	10.00
tblVehicleTrips	WD_TR	15.43	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.9357	18.4431	16.9597	0.0407	2.9843	0.7457	3.7299	0.5017	0.7232	1.2248	0.0000	4,029.9773	4,029.9773	0.6051	0.0000	4,045.1048
2022	3.7899	25.4876	22.9377	0.0610	19.2447	0.9423	20.0057	10.2288	0.8883	10.9308	0.0000	6,313.5145	6,313.5145	1.0067	0.0000	6,338.6814
2023	3.5984	19.1204	22.4245	0.0557	1.4201	0.8167	2.2368	0.3817	0.7698	1.1515	0.0000	5,487.6365	5,487.6365	0.9461	0.0000	5,511.2891
Maximum	**3.7899**	**25.4876**	**22.9377**	**0.0610**	**19.2447**	**0.9423**	**20.0057**	**10.2288**	**0.8883**	**10.9308**	**0.0000**	**6,313.5145**	**6,313.5145**	**1.0067**	**0.0000**	**6,338.6814**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.9357	18.4431	16.9597	0.0407	1.5705	0.7457	2.3162	0.2876	0.7232	1.0108	0.0000	4,029.9773	4,029.9773	0.6051	0.0000	4,045.1048
2022	3.7899	25.4876	22.9377	0.0610	9.2239	0.9423	9.9849	4.7568	0.8883	5.4589	0.0000	6,313.5145	6,313.5145	1.0067	0.0000	6,338.6814
2023	3.5984	19.1204	22.4245	0.0557	1.4201	0.8167	2.2368	0.3817	0.7698	1.1515	0.0000	5,487.6365	5,487.6365	0.9461	0.0000	5,511.2891
Maximum	**3.7899**	**25.4876**	**22.9377**	**0.0610**	**9.2239**	**0.9423**	**9.9849**	**4.7568**	**0.8883**	**5.4589**	**0.0000**	**6,313.5145**	**6,313.5145**	**1.0067**	**0.0000**	**6,338.6814**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.35**	**0.00**	**44.03**	**51.17**	**0.00**	**42.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition-Interim Housing	Demolition	10/1/2021	12/31/2021	5	66	
2	Site Preparation-Modernization	Site Preparation	1/1/2022	3/31/2022	5	64	
3	Building Construction-Modernization	Building Construction	4/1/2022	3/31/2023	5	261	
4	Architectural Coating	Architectural Coating	4/1/2022	3/31/2023	5	261	
5	Onsite Paving-Offsite Street Work	Paving	4/1/2023	6/30/2023	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.13

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 46,305; Non-Residential Outdoor: 15,435; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition-Interim Housing	Air Compressors	2	8.00	78	0.48
Demolition-Interim Housing	Crushing/Proc. Equipment	1	8.00	85	0.78
Demolition-Interim Housing	Excavators	1	8.00	158	0.38
Demolition-Interim Housing	Rubber Tired Loaders	1	8.00	203	0.36
Demolition-Interim Housing	Skid Steer Loaders	1	8.00	65	0.37
Site Preparation-Modernization	Excavators	1	8.00	158	0.38
Site Preparation-Modernization	Plate Compactors	1	8.00	8	0.43
Site Preparation-Modernization	Rollers	2	8.00	80	0.38
Site Preparation-Modernization	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation-Modernization	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation-Modernization	Trenchers	1	8.00	78	0.50
Building Construction-Modernization	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction-Modernization	Cranes	1	7.00	231	0.29
Building Construction-Modernization	Forklifts	4	8.00	89	0.20
Building Construction-Modernization	Pumps	1	8.00	84	0.74

Building Construction-Modernization	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Onsite Paving-Offsite Street Work	Pavers	1	8.00	130	0.42
Onsite Paving-Offsite Street Work	Rollers	1	8.00	80	0.38
Onsite Paving-Offsite Street Work	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition-Interim Housing	9	15.00	6.00	784.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation-Modernization	10	18.00	6.00	2,875.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction-Modernization	11	89.00	35.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Onsite Paving-Offsite Street Work	6	10.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition-Interim Housing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5705	0.0000	2.5705	0.3892	0.0000	0.3892			0.0000			0.0000
Off-Road	1.7436	14.5874	15.4467	0.0284		0.7332	0.7332		0.7113	0.7113		2,720.6748	2,720.6748	0.5194		2,733.6591
Total	**1.7436**	**14.5874**	**15.4467**	**0.0284**	**2.5705**	**0.7332**	**3.3037**	**0.3892**	**0.7113**	**1.1004**		**2,720.6748**	**2,720.6748**	**0.5194**		**2,733.6591**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1014	3.2254	0.7922	9.1100e-003	0.2077	9.9300e-003	0.2176	0.0569	9.5000e-003	0.0664		988.0575	988.0575	0.0706		989.8235
Vendor	0.0192	0.5813	0.1685	1.5000e-003	0.0384	1.2300e-003	0.0396	0.0111	1.1800e-003	0.0122		160.4073	160.4073	0.0104		160.6662
Worker	0.0715	0.0489	0.5524	1.6100e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2500e-003	0.0457		160.8377	160.8377	4.7300e-003		160.9560
Total	**0.1921**	**3.8557**	**1.5131**	**0.0122**	**0.4138**	**0.0125**	**0.4263**	**0.1125**	**0.0119**	**0.1244**		**1,309.3025**	**1,309.3025**	**0.0857**		**1,311.4457**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1567	0.0000	1.1567	0.1751	0.0000	0.1751			0.0000			0.0000
Off-Road	1.7436	14.5874	15.4467	0.0284		0.7332	0.7332		0.7113	0.7113	0.0000	2,720.6748	2,720.6748	0.5194		2,733.6591
Total	**1.7436**	**14.5874**	**15.4467**	**0.0284**	**1.1567**	**0.7332**	**1.8899**	**0.1751**	**0.7113**	**0.8864**	**0.0000**	**2,720.6748**	**2,720.6748**	**0.5194**		**2,733.6591**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1014	3.2254	0.7922	9.1100e-003	0.2077	9.9300e-003	0.2176	0.0569	9.5000e-003	0.0664		988.0575	988.0575	0.0706		989.8235
Vendor	0.0192	0.5813	0.1685	1.5000e-003	0.0384	1.2300e-003	0.0396	0.0111	1.1800e-003	0.0122		160.4073	160.4073	0.0104		160.6662
Worker	0.0715	0.0489	0.5524	1.6100e-003	0.1677	1.3500e-003	0.1690	0.0445	1.2500e-003	0.0457		160.8377	160.8377	4.7300e-003		160.9560
Total	**0.1921**	**3.8557**	**1.5131**	**0.0122**	**0.4138**	**0.0125**	**0.4263**	**0.1125**	**0.0119**	**0.1244**		**1,309.3025**	**1,309.3025**	**0.0857**		**1,311.4457**

3.3 Site Preparation-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.2196	0.0000	18.2196	9.9490	0.0000	9.9490			0.0000			0.0000
Off-Road	1.3950	13.5604	13.5544	0.0236		0.7257	0.7257		0.6684	0.6684		2,276.5550	2,276.5550	0.7287		2,294.7728
Total	**1.3950**	**13.5604**	**13.5544**	**0.0236**	**18.2196**	**0.7257**	**18.9452**	**9.9490**	**0.6684**	**10.6174**		**2,276.5550**	**2,276.5550**	**0.7287**		**2,294.7728**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3651	11.3218	2.9594	0.0340	0.7855	0.0326	0.8182	0.2153	0.0312	0.2466		3,691.7549	3,691.7549	0.2628		3,698.3260
Vendor	0.0180	0.5525	0.1595	1.4900e-003	0.0384	1.0800e-003	0.0395	0.0111	1.0300e-003	0.0121		158.9822	158.9822	9.9900e-003		159.2320
Worker	0.0806	0.0530	0.6105	1.8700e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		186.2225	186.2225	5.1300e-003		186.3507
Total	**0.4636**	**11.9273**	**3.7293**	**0.0373**	**1.0251**	**0.0353**	**1.0604**	**0.2798**	**0.0337**	**0.3135**		**4,036.9595**	**4,036.9595**	**0.2780**		**4,043.9086**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1988	0.0000	8.1988	4.4771	0.0000	4.4771			0.0000			0.0000
Off-Road	1.3950	13.5604	13.5544	0.0236		0.7257	0.7257		0.6684	0.6684	0.0000	2,276.5550	2,276.5550	0.7287		2,294.7728
Total	**1.3950**	**13.5604**	**13.5544**	**0.0236**	**8.1988**	**0.7257**	**8.9245**	**4.4771**	**0.6684**	**5.1454**	**0.0000**	**2,276.5550**	**2,276.5550**	**0.7287**		**2,294.7728**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3651	11.3218	2.9594	0.0340	0.7855	0.0326	0.8182	0.2153	0.0312	0.2466		3,691.7549	3,691.7549	0.2628		3,698.3260
Vendor	0.0180	0.5525	0.1595	1.4900e-003	0.0384	1.0800e-003	0.0395	0.0111	1.0300e-003	0.0121		158.9822	158.9822	9.9900e-003		159.2320
Worker	0.0806	0.0530	0.6105	1.8700e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		186.2225	186.2225	5.1300e-003		186.3507
Total	**0.4636**	**11.9273**	**3.7293**	**0.0373**	**1.0251**	**0.0353**	**1.0604**	**0.2798**	**0.0337**	**0.3135**		**4,036.9595**	**4,036.9595**	**0.2780**		**4,043.9086**

3.4 Building Construction-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6450	16.0484	15.9602	0.0326		0.8177	0.8177		0.7647	0.7647		3,144.8634	3,144.8634	0.8474		3,166.0485
Total	**1.6450**	**16.0484**	**15.9602**	**0.0326**		**0.8177**	**0.8177**		**0.7647**	**0.7647**		**3,144.8634**	**3,144.8634**	**0.8474**		**3,166.0485**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1049	3.2228	0.9302	8.6700e-003	0.2241	6.2700e-003	0.2304	0.0645	6.0000e-003	0.0705		927.3960	927.3960	0.0583		928.8531
Worker	0.3986	0.2621	3.0187	9.2400e-003	0.9948	7.7900e-003	1.0026	0.2638	7.1700e-003	0.2710		920.7668	920.7668	0.0254		921.4006
Total	**0.5034**	**3.4849**	**3.9489**	**0.0179**	**1.2189**	**0.0141**	**1.2330**	**0.3284**	**0.0132**	**0.3415**		**1,848.1628**	**1,848.1628**	**0.0836**		**1,850.2537**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6450	16.0484	15.9602	0.0326		0.8177	0.8177		0.7647	0.7647	0.0000	3,144.8634	3,144.8634	0.8474		3,166.0485
Total	**1.6450**	**16.0484**	**15.9602**	**0.0326**		**0.8177**	**0.8177**		**0.7647**	**0.7647**	**0.0000**	**3,144.8634**	**3,144.8634**	**0.8474**		**3,166.0485**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1049	3.2228	0.9302	8.6700e-003	0.2241	6.2700e-003	0.2304	0.0645	6.0000e-003	0.0705		927.3960	927.3960	0.0583		928.8531
Worker	0.3986	0.2621	3.0187	9.2400e-003	0.9948	7.7900e-003	1.0026	0.2638	7.1700e-003	0.2710		920.7668	920.7668	0.0254		921.4006
Total	**0.5034**	**3.4849**	**3.9489**	**0.0179**	**1.2189**	**0.0141**	**1.2330**	**0.3284**	**0.0132**	**0.3415**		**1,848.1628**	**1,848.1628**	**0.0836**		**1,850.2537**

3.4 Building Construction-Modernization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5255	14.6571	15.8472	0.0327		0.7102	0.7102		0.6642	0.6642		3,147.2869	3,147.2869	0.8449		3,168.4093
Total	**1.5255**	**14.6571**	**15.8472**	**0.0327**		**0.7102**	**0.7102**		**0.6642**	**0.6642**		**3,147.2869**	**3,147.2869**	**0.8449**		**3,168.4093**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0779	2.4409	0.8266	8.3900e-003	0.2241	2.9800e-003	0.2271	0.0645	2.8500e-003	0.0674		898.5946	898.5946	0.0513		899.8773
Worker	0.3755	0.2371	2.7747	8.9000e-003	0.9948	7.5700e-003	1.0024	0.2638	6.9700e-003	0.2708		887.0813	887.0813	0.0228		887.6520
Total	**0.4534**	**2.6779**	**3.6013**	**0.0173**	**1.2189**	**0.0106**	**1.2294**	**0.3284**	**9.8200e-003**	**0.3382**		**1,785.6759**	**1,785.6759**	**0.0741**		**1,787.5294**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5255	14.6571	15.8472	0.0327		0.7102	0.7102		0.6642	0.6642	0.0000	3,147.2869	3,147.2869	0.8449		3,168.4093
Total	**1.5255**	**14.6571**	**15.8472**	**0.0327**		**0.7102**	**0.7102**		**0.6642**	**0.6642**	**0.0000**	**3,147.2869**	**3,147.2869**	**0.8449**		**3,168.4093**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0779	2.4409	0.8266	8.3900e-003	0.2241	2.9800e-003	0.2271	0.0645	2.8500e-003	0.0674		898.5946	898.5946	0.0513		899.8773
Worker	0.3755	0.2371	2.7747	8.9000e-003	0.9948	7.5700e-003	1.0024	0.2638	6.9700e-003	0.2708		887.0813	887.0813	0.0228		887.6520
Total	**0.4534**	**2.6779**	**3.6013**	**0.0173**	**1.2189**	**0.0106**	**1.2294**	**0.3284**	**9.8200e-003**	**0.3382**		**1,785.6759**	**1,785.6759**	**0.0741**		**1,787.5294**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2727	1.8780	2.4181	3.9600e-003		0.1090	0.1090		0.1090	0.1090		375.2641	375.2641	0.0244		375.8749
Total	**1.5608**	**1.8780**	**2.4181**	**3.9600e-003**		**0.1090**	**0.1090**		**0.1090**	**0.1090**		**375.2641**	**375.2641**	**0.0244**		**375.8749**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0806	0.0530	0.6105	1.8700e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		186.2225	186.2225	5.1300e-003		186.3507
Total	**0.0806**	**0.0530**	**0.6105**	**1.8700e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4500e-003**	**0.0548**		**186.2225**	**186.2225**	**5.1300e-003**		**186.3507**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2727	1.8780	2.4181	3.9600e-003		0.1090	0.1090		0.1090	0.1090	0.0000	375.2641	375.2641	0.0244		375.8749
Total	**1.5608**	**1.8780**	**2.4181**	**3.9600e-003**		**0.1090**	**0.1090**		**0.1090**	**0.1090**	**0.0000**	**375.2641**	**375.2641**	**0.0244**		**375.8749**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0806	0.0530	0.6105	1.8700e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4500e-003	0.0548		186.2225	186.2225	5.1300e-003		186.3507
Total	**0.0806**	**0.0530**	**0.6105**	**1.8700e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4500e-003**	**0.0548**		**186.2225**	**186.2225**	**5.1300e-003**		**186.3507**

3.5 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944		375.2641	375.2641	0.0225		375.8253
Total	**1.5437**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**		**375.2641**	**375.2641**	**0.0225**		**375.8253**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0759	0.0480	0.5612	1.8000e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		179.4097	179.4097	4.6200e-003		179.5251
Total	**0.0759**	**0.0480**	**0.5612**	**1.8000e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**179.4097**	**179.4097**	**4.6200e-003**		**179.5251**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	1.2881					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2556	1.7373	2.4148	3.9600e-003		0.0944	0.0944		0.0944	0.0944	0.0000	375.2641	375.2641	0.0225		375.8253
Total	**1.5437**	**1.7373**	**2.4148**	**3.9600e-003**		**0.0944**	**0.0944**		**0.0944**	**0.0944**	**0.0000**	**375.2641**	**375.2641**	**0.0225**		**375.8253**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0759	0.0480	0.5612	1.8000e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		179.4097	179.4097	4.6200e-003		179.5251
Total	**0.0759**	**0.0480**	**0.5612**	**1.8000e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**179.4097**	**179.4097**	**4.6200e-003**		**179.5251**

3.6 Onsite Paving-Offsite Street Work - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6484	6.5643	9.1980	0.0136		0.3288	0.3288		0.3025	0.3025		1,312.4780	1,312.4780	0.4245		1,323.0901
Paving	0.1665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8148**	**6.5643**	**9.1980**	**0.0136**		**0.3288**	**0.3288**		**0.3025**	**0.3025**		**1,312.4780**	**1,312.4780**	**0.4245**		**1,323.0901**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0401	1.2553	0.4251	4.3200e-003	0.1152	1.5300e-003	0.1168	0.0332	1.4600e-003	0.0347		462.1344	462.1344	0.0264		462.7941
Worker	0.0422	0.0266	0.3118	1.0000e-003	0.1118	8.5000e-004	0.1126	0.0296	7.8000e-004	0.0304		99.6721	99.6721	2.5700e-003		99.7362
Total	**0.0823**	**1.2819**	**0.7369**	**5.3200e-003**	**0.2270**	**2.3800e-003**	**0.2294**	**0.0628**	**2.2400e-003**	**0.0651**		**561.8064**	**561.8064**	**0.0290**		**562.5302**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6484	6.5643	9.1980	0.0136		0.3288	0.3288		0.3025	0.3025	0.0000	1,312.4780	1,312.4780	0.4245		1,323.0901
Paving	0.1665					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8148**	**6.5643**	**9.1980**	**0.0136**		**0.3288**	**0.3288**		**0.3025**	**0.3025**	**0.0000**	**1,312.4780**	**1,312.4780**	**0.4245**		**1,323.0901**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0401	1.2553	0.4251	4.3200e-003	0.1152	1.5300e-003	0.1168	0.0332	1.4600e-003	0.0347		462.1344	462.1344	0.0264		462.7941
Worker	0.0422	0.0266	0.3118	1.0000e-003	0.1118	8.5000e-004	0.1126	0.0296	7.8000e-004	0.0304		99.6721	99.6721	2.5700e-003		99.7362
Total	**0.0823**	**1.2819**	**0.7369**	**5.3200e-003**	**0.2270**	**2.3800e-003**	**0.2294**	**0.0628**	**2.2400e-003**	**0.0651**		**561.8064**	**561.8064**	**0.0290**		**562.5302**

LAUSD Shenandoah Elementary School Modernization Project

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	30.87	1000sqft	2.18	30,870.00	0
Other Asphalt Surfaces	4.13	Acre	4.13	179,902.80	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2024
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Approx 6.31-acre of Site will be disturbed. Building300=26,870 sq ft and LunchShelter=4,000 sqft. Total of 30,870 sqft of new building space & 4.13acre of hardscape.
Construction Phase - Construction Schedule provided by applicant

Off-road Equipment - 1 Compressor

Off-road Equipment - 1 Bore/Drill Rig, 1 Crane, 1 Pump, 4 Forklifts, 2 Tractors/Loader/Backhoe. (1 Compressor analyzed under concurrent Painting Phase)

Off-road Equipment - 1 Excavator, 1 Crushing/Proc Equip, 1 Rubber Tired Loader, 1 Skid Steer Loader, 2 Air Compressor

Off-road Equipment - 1 Paver, 1 Roller, 2 Tractor/Loader/Backhoe

Off-road Equipment - 1 Excavator, 1 Plate Compactor, 2 Rollers, 1 Rubber Tired Loader, 1 Tractor/Loader/Backhoe, 1 Trencher

Trips and VMT - 6 vendor trucks added to Demo, Site Prep to account for water trucks. 18 vendor trucks added to Paving to account for Asphalt and Water Trucks

Demolition - 33,126 sq ft of Portables to be demolished = 1,524 tons + 265,000 sq ft of Paving area to be demolished = 6,404 tons. Total 7,928 tons of debris

Grading - 5,000 cu yd contaminated soil exported and 18,000 cu yd imported or exported. Worst-Case of 23,000 cu yd exported

Vehicle Trips - No additional trips would be generated from the project.

Construction Off-road Equipment Mitigation - Water Exposed Area 2 times per day selected to account for SCAQMD Rule 403 minimum requirements

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	66.00
tblConstructionPhase	NumDays	10.00	64.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	20.00	261.00
tblConstructionPhase	NumDays	20.00	65.00
tblGrading	AcresOfGrading	0.00	6.80
tblGrading	MaterialExported	0.00	23,000.00
tblLandUse	LotAcreage	0.71	2.18
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Demolition-Interim Housing
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Site Preparation-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Building Construction-Modernization
tblOffRoadEquipment	PhaseName		Onsite Paving-Offsite Street Work
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,875.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	18.00
tblTripsAndVMT	WorkerTripNumber	23.00	15.00
tblTripsAndVMT	WorkerTripNumber	25.00	18.00
tblTripsAndVMT	WorkerTripNumber	15.00	10.00
tblVehicleTrips	WD_TR	15.43	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0636	0.6111	0.5591	1.3500e-003	0.0982	0.0246	0.1228	0.0165	0.0239	0.0404	0.0000	121.1069	121.1069	0.0181	0.0000	121.5585
2022	0.4255	2.9331	2.8037	7.5200e-003	0.7518	0.1167	0.8684	0.3639	0.1095	0.4734	0.0000	681.3645	681.3645	0.1143	0.0000	684.2231
2023	0.1444	0.8786	1.0534	2.4400e-003	0.0525	0.0373	0.0898	0.0142	0.0349	0.0491	0.0000	218.2762	218.2762	0.0412	0.0000	219.3065
Maximum	**0.4255**	**2.9331**	**2.8037**	**7.5200e-003**	**0.7518**	**0.1167**	**0.8684**	**0.3639**	**0.1095**	**0.4734**	**0.0000**	**681.3645**	**681.3645**	**0.1143**	**0.0000**	**684.2231**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0636	0.6111	0.5591	1.3500e-003	0.0516	0.0246	0.0762	9.4300e-003	0.0239	0.0333	0.0000	121.1068	121.1068	0.0181	0.0000	121.5584
2022	0.4255	2.9331	2.8037	7.5200e-003	0.4311	0.1167	0.5478	0.1888	0.1095	0.2983	0.0000	681.3640	681.3640	0.1143	0.0000	684.2226
2023	0.1444	0.8786	1.0534	2.4400e-003	0.0525	0.0373	0.0898	0.0142	0.0349	0.0491	0.0000	218.2761	218.2761	0.0412	0.0000	219.3063
Maximum	**0.4255**	**2.9331**	**2.8037**	**7.5200e-003**	**0.4311**	**0.1167**	**0.5478**	**0.1888**	**0.1095**	**0.2983**	**0.0000**	**681.3640**	**681.3640**	**0.1143**	**0.0000**	**684.2226**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**40.70**	**0.00**	**33.98**	**46.16**	**0.00**	**32.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	10-1-2021	12-31-2021	0.6696	0.6696
2	1-1-2022	3-31-2022	0.8790	0.8790
3	4-1-2022	6-30-2022	0.8183	0.8183
4	7-1-2022	9-30-2022	0.8273	0.8273
5	10-1-2022	12-31-2022	0.8298	0.8298
6	1-1-2023	3-31-2023	0.7302	0.7302
7	4-1-2023	6-30-2023	0.2841	0.2841
		Highest	0.8790	0.8790

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition-Interim Housing	Demolition	10/1/2021	12/31/2021	5	66	
2	Site Preparation-Modernization	Site Preparation	1/1/2022	3/31/2022	5	64	
3	Building Construction-Modernization	Building Construction	4/1/2022	3/31/2023	5	261	
4	Architectural Coating	Architectural Coating	4/1/2022	3/31/2023	5	261	
5	Onsite Paving-Offsite Street Work	Paving	4/1/2023	6/30/2023	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.13

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 46,305; Non-Residential Outdoor: 15,435; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition-Interim Housing	Air Compressors	2	8.00	78	0.48
Demolition-Interim Housing	Crushing/Proc. Equipment	1	8.00	85	0.78
Demolition-Interim Housing	Excavators	1	8.00	158	0.38

Demolition-Interim Housing	Rubber Tired Loaders	1	8.00	203	0.36
Demolition-Interim Housing	Skid Steer Loaders	1	8.00	65	0.37
Site Preparation-Modernization	Excavators	1	8.00	158	0.38
Site Preparation-Modernization	Plate Compactors	1	8.00	8	0.43
Site Preparation-Modernization	Rollers	2	8.00	80	0.38
Site Preparation-Modernization	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation-Modernization	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation-Modernization	Trenchers	1	8.00	78	0.50
Building Construction-Modernization	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction-Modernization	Cranes	1	7.00	231	0.29
Building Construction-Modernization	Forklifts	4	8.00	89	0.20
Building Construction-Modernization	Pumps	1	8.00	84	0.74
Building Construction-Modernization	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Onsite Paving-Offsite Street Work	Pavers	1	8.00	130	0.42
Onsite Paving-Offsite Street Work	Rollers	1	8.00	80	0.38
Onsite Paving-Offsite Street Work	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition-Interim Housing	9	15.00	6.00	784.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation-Modernization	10	18.00	6.00	2,875.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction-Modernization	11	89.00	35.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Onsite Paving-Offsite Street Work	6	10.00	18.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition-Interim Housing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0848	0.0000	0.0848	0.0128	0.0000	0.0128	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0575	0.4814	0.5097	9.4000e-004		0.0242	0.0242		0.0235	0.0235	0.0000	81.4491	81.4491	0.0156	0.0000	81.8378
Total	**0.0575**	**0.4814**	**0.5097**	**9.4000e-004**	**0.0848**	**0.0242**	**0.1090**	**0.0128**	**0.0235**	**0.0363**	**0.0000**	**81.4491**	**81.4491**	**0.0156**	**0.0000**	**81.8378**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-003	0.1085	0.0253	3.0000e-004	6.7400e-003	3.2000e-004	7.0600e-003	1.8500e-003	3.1000e-004	2.1600e-003	0.0000	29.8820	29.8820	2.0700e-003	0.0000	29.9339
Vendor	6.1000e-004	0.0195	5.3000e-003	5.0000e-005	1.2500e-003	4.0000e-005	1.2900e-003	3.6000e-004	4.0000e-005	4.0000e-004	0.0000	4.8806	4.8806	3.0000e-004	0.0000	4.8881
Worker	2.1300e-003	1.6600e-003	0.0187	5.0000e-005	5.4200e-003	4.0000e-005	5.4700e-003	1.4400e-003	4.0000e-005	1.4800e-003	0.0000	4.8951	4.8951	1.4000e-004	0.0000	4.8987
Total	**6.0400e-003**	**0.1297**	**0.0493**	**4.0000e-004**	**0.0134**	**4.0000e-004**	**0.0138**	**3.6500e-003**	**3.9000e-004**	**4.0400e-003**	**0.0000**	**39.6578**	**39.6578**	**2.5100e-003**	**0.0000**	**39.7207**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0382	0.0000	0.0382	5.7800e-003	0.0000	5.7800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0575	0.4814	0.5097	9.4000e-004		0.0242	0.0242		0.0235	0.0235	0.0000	81.4490	81.4490	0.0156	0.0000	81.8377
Total	**0.0575**	**0.4814**	**0.5097**	**9.4000e-004**	**0.0382**	**0.0242**	**0.0624**	**5.7800e-003**	**0.0235**	**0.0293**	**0.0000**	**81.4490**	**81.4490**	**0.0156**	**0.0000**	**81.8377**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-003	0.1085	0.0253	3.0000e-004	6.7400e-003	3.2000e-004	7.0600e-003	1.8500e-003	3.1000e-004	2.1600e-003	0.0000	29.8820	29.8820	2.0700e-003	0.0000	29.9339
Vendor	6.1000e-004	0.0195	5.3000e-003	5.0000e-005	1.2500e-003	4.0000e-005	1.2900e-003	3.6000e-004	4.0000e-005	4.0000e-004	0.0000	4.8806	4.8806	3.0000e-004	0.0000	4.8881
Worker	2.1300e-003	1.6600e-003	0.0187	5.0000e-005	5.4200e-003	4.0000e-005	5.4700e-003	1.4400e-003	4.0000e-005	1.4800e-003	0.0000	4.8951	4.8951	1.4000e-004	0.0000	4.8987
Total	**6.0400e-003**	**0.1297**	**0.0493**	**4.0000e-004**	**0.0134**	**4.0000e-004**	**0.0138**	**3.6500e-003**	**3.9000e-004**	**4.0400e-003**	**0.0000**	**39.6578**	**39.6578**	**2.5100e-003**	**0.0000**	**39.7207**

3.3 Site Preparation-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5830	0.0000	0.5830	0.3184	0.0000	0.3184	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0446	0.4339	0.4337	7.6000e-004		0.0232	0.0232		0.0214	0.0214	0.0000	66.0882	66.0882	0.0212	0.0000	66.6171
Total	**0.0446**	**0.4339**	**0.4337**	**7.6000e-004**	**0.5830**	**0.0232**	**0.6063**	**0.3184**	**0.0214**	**0.3398**	**0.0000**	**66.0882**	**66.0882**	**0.0212**	**0.0000**	**66.6171**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0115	0.3693	0.0918	1.1000e-003	0.0247	1.0400e-003	0.0257	6.7800e-003	9.9000e-004	7.7800e-003	0.0000	108.2770	108.2770	7.4900e-003	0.0000	108.4642
Vendor	5.6000e-004	0.0180	4.8600e-003	5.0000e-005	1.2100e-003	3.0000e-005	1.2400e-003	3.5000e-004	3.0000e-005	3.8000e-004	0.0000	4.6912	4.6912	2.8000e-004	0.0000	4.6982
Worker	2.3200e-003	1.7400e-003	0.0201	6.0000e-005	6.3100e-003	5.0000e-005	6.3600e-003	1.6800e-003	5.0000e-005	1.7200e-003	0.0000	5.4959	5.4959	1.5000e-004	0.0000	5.4997
Total	**0.0144**	**0.3891**	**0.1167**	**1.2100e-003**	**0.0322**	**1.1200e-003**	**0.0333**	**8.8100e-003**	**1.0700e-003**	**9.8800e-003**	**0.0000**	**118.4641**	**118.4641**	**7.9200e-003**	**0.0000**	**118.6621**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2624	0.0000	0.2624	0.1433	0.0000	0.1433	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0446	0.4339	0.4337	7.6000e-004		0.0232	0.0232		0.0214	0.0214	0.0000	66.0881	66.0881	0.0212	0.0000	66.6170
Total	**0.0446**	**0.4339**	**0.4337**	**7.6000e-004**	**0.2624**	**0.0232**	**0.2856**	**0.1433**	**0.0214**	**0.1647**	**0.0000**	**66.0881**	**66.0881**	**0.0212**	**0.0000**	**66.6170**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0115	0.3693	0.0918	1.1000e-003	0.0247	1.0400e-003	0.0257	6.7800e-003	9.9000e-004	7.7800e-003	0.0000	108.2770	108.2770	7.4900e-003	0.0000	108.4642
Vendor	5.6000e-004	0.0180	4.8600e-003	5.0000e-005	1.2100e-003	3.0000e-005	1.2400e-003	3.5000e-004	3.0000e-005	3.8000e-004	0.0000	4.6912	4.6912	2.8000e-004	0.0000	4.6982
Worker	2.3200e-003	1.7400e-003	0.0201	6.0000e-005	6.3100e-003	5.0000e-005	6.3600e-003	1.6800e-003	5.0000e-005	1.7200e-003	0.0000	5.4959	5.4959	1.5000e-004	0.0000	5.4997
Total	**0.0144**	**0.3891**	**0.1167**	**1.2100e-003**	**0.0322**	**1.1200e-003**	**0.0333**	**8.8100e-003**	**1.0700e-003**	**9.8800e-003**	**0.0000**	**118.4641**	**118.4641**	**7.9200e-003**	**0.0000**	**118.6621**

3.4 Building Construction-Modernization - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1612	1.5728	1.5641	3.2000e-003		0.0801	0.0801		0.0749	0.0749	0.0000	279.5913	279.5913	0.0753	0.0000	281.4747
Total	**0.1612**	**1.5728**	**1.5641**	**3.2000e-003**		**0.0801**	**0.0801**		**0.0749**	**0.0749**	**0.0000**	**279.5913**	**279.5913**	**0.0753**	**0.0000**	**281.4747**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0100	0.3216	0.0868	8.6000e-004	0.0216	6.0000e-004	0.0222	6.2400e-003	5.8000e-004	6.8100e-003	0.0000	83.8057	83.8057	5.0100e-003	0.0000	83.9309
Worker	0.0352	0.0264	0.3039	9.2000e-004	0.0956	7.6000e-004	0.0963	0.0254	7.0000e-004	0.0261	0.0000	83.2214	83.2214	2.2900e-003	0.0000	83.2787
Total	**0.0452**	**0.3480**	**0.3907**	**1.7800e-003**	**0.1172**	**1.3600e-003**	**0.1186**	**0.0316**	**1.2800e-003**	**0.0329**	**0.0000**	**167.0271**	**167.0271**	**7.3000e-003**	**0.0000**	**167.2095**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1612	1.5728	1.5641	3.2000e-003		0.0801	0.0801		0.0749	0.0749	0.0000	279.5909	279.5909	0.0753	0.0000	281.4744
Total	**0.1612**	**1.5728**	**1.5641**	**3.2000e-003**		**0.0801**	**0.0801**		**0.0749**	**0.0749**	**0.0000**	**279.5909**	**279.5909**	**0.0753**	**0.0000**	**281.4744**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0100	0.3216	0.0868	8.6000e-004	0.0216	6.0000e-004	0.0222	6.2400e-003	5.8000e-004	6.8100e-003	0.0000	83.8057	83.8057	5.0100e-003	0.0000	83.9309
Worker	0.0352	0.0264	0.3039	9.2000e-004	0.0956	7.6000e-004	0.0963	0.0254	7.0000e-004	0.0261	0.0000	83.2214	83.2214	2.2900e-003	0.0000	83.2787
Total	**0.0452**	**0.3480**	**0.3907**	**1.7800e-003**	**0.1172**	**1.3600e-003**	**0.1186**	**0.0316**	**1.2800e-003**	**0.0329**	**0.0000**	**167.0271**	**167.0271**	**7.3000e-003**	**0.0000**	**167.2095**

3.4 Building Construction-Modernization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0496	0.4764	0.5150	1.0600e-003		0.0231	0.0231		0.0216	0.0216	0.0000	92.7930	92.7930	0.0249	0.0000	93.4158
Total	**0.0496**	**0.4764**	**0.5150**	**1.0600e-003**		**0.0231**	**0.0231**		**0.0216**	**0.0216**	**0.0000**	**92.7930**	**92.7930**	**0.0249**	**0.0000**	**93.4158**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4600e-003	0.0806	0.0258	2.8000e-004	7.1700e-003	9.0000e-005	7.2600e-003	2.0700e-003	9.0000e-005	2.1600e-003	0.0000	26.9226	26.9226	1.4700e-003	0.0000	26.9593
Worker	0.0110	7.9200e-003	0.0927	2.9000e-004	0.0317	2.5000e-004	0.0319	8.4200e-003	2.3000e-004	8.6400e-003	0.0000	26.5890	26.5890	6.8000e-004	0.0000	26.6061
Total	**0.0134**	**0.0885**	**0.1185**	**5.7000e-004**	**0.0389**	**3.4000e-004**	**0.0392**	**0.0105**	**3.2000e-004**	**0.0108**	**0.0000**	**53.5116**	**53.5116**	**2.1500e-003**	**0.0000**	**53.5654**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0496	0.4764	0.5150	1.0600e-003		0.0231	0.0231		0.0216	0.0216	0.0000	92.7929	92.7929	0.0249	0.0000	93.4157
Total	**0.0496**	**0.4764**	**0.5150**	**1.0600e-003**		**0.0231**	**0.0231**		**0.0216**	**0.0216**	**0.0000**	**92.7929**	**92.7929**	**0.0249**	**0.0000**	**93.4157**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4600e-003	0.0806	0.0258	2.8000e-004	7.1700e-003	9.0000e-005	7.2600e-003	2.0700e-003	9.0000e-005	2.1600e-003	0.0000	26.9226	26.9226	1.4700e-003	0.0000	26.9593
Worker	0.0110	7.9200e-003	0.0927	2.9000e-004	0.0317	2.5000e-004	0.0319	8.4200e-003	2.3000e-004	8.6400e-003	0.0000	26.5890	26.5890	6.8000e-004	0.0000	26.6061
Total	**0.0134**	**0.0885**	**0.1185**	**5.7000e-004**	**0.0389**	**3.4000e-004**	**0.0392**	**0.0105**	**3.2000e-004**	**0.0108**	**0.0000**	**53.5116**	**53.5116**	**2.1500e-003**	**0.0000**	**53.5654**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1262					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0267	0.1840	0.2370	3.9000e-004		0.0107	0.0107		0.0107	0.0107	0.0000	33.3625	33.3625	2.1700e-003	0.0000	33.4168
Total	**0.1530**	**0.1840**	**0.2370**	**3.9000e-004**		**0.0107**	**0.0107**		**0.0107**	**0.0107**	**0.0000**	**33.3625**	**33.3625**	**2.1700e-003**	**0.0000**	**33.4168**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	5.3400e-003	0.0615	1.9000e-004	0.0193	1.5000e-004	0.0195	5.1300e-003	1.4000e-004	5.2800e-003	0.0000	16.8313	16.8313	4.6000e-004	0.0000	16.8429
Total	**7.1200e-003**	**5.3400e-003**	**0.0615**	**1.9000e-004**	**0.0193**	**1.5000e-004**	**0.0195**	**5.1300e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**16.8313**	**16.8313**	**4.6000e-004**	**0.0000**	**16.8429**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1262					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0267	0.1840	0.2370	3.9000e-004		0.0107	0.0107		0.0107	0.0107	0.0000	33.3625	33.3625	2.1700e-003	0.0000	33.4168
Total	**0.1530**	**0.1840**	**0.2370**	**3.9000e-004**		**0.0107**	**0.0107**		**0.0107**	**0.0107**	**0.0000**	**33.3625**	**33.3625**	**2.1700e-003**	**0.0000**	**33.4168**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1200e-003	5.3400e-003	0.0615	1.9000e-004	0.0193	1.5000e-004	0.0195	5.1300e-003	1.4000e-004	5.2800e-003	0.0000	16.8313	16.8313	4.6000e-004	0.0000	16.8429
Total	**7.1200e-003**	**5.3400e-003**	**0.0615**	**1.9000e-004**	**0.0193**	**1.5000e-004**	**0.0195**	**5.1300e-003**	**1.4000e-004**	**5.2800e-003**	**0.0000**	**16.8313**	**16.8313**	**4.6000e-004**	**0.0000**	**16.8429**

3.5 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0419					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3100e-003	0.0565	0.0785	1.3000e-004		3.0700e-003	3.0700e-003		3.0700e-003	3.0700e-003	0.0000	11.0641	11.0641	6.6000e-004	0.0000	11.0807
Total	**0.0502**	**0.0565**	**0.0785**	**1.3000e-004**		**3.0700e-003**	**3.0700e-003**		**3.0700e-003**	**3.0700e-003**	**0.0000**	**11.0641**	**11.0641**	**6.6000e-004**	**0.0000**	**11.0807**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2200e-003	1.6000e-003	0.0187	6.0000e-005	6.4100e-003	5.0000e-005	6.4600e-003	1.7000e-003	5.0000e-005	1.7500e-003	0.0000	5.3776	5.3776	1.4000e-004	0.0000	5.3810
Total	**2.2200e-003**	**1.6000e-003**	**0.0187**	**6.0000e-005**	**6.4100e-003**	**5.0000e-005**	**6.4600e-003**	**1.7000e-003**	**5.0000e-005**	**1.7500e-003**	**0.0000**	**5.3776**	**5.3776**	**1.4000e-004**	**0.0000**	**5.3810**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0419					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3100e-003	0.0565	0.0785	1.3000e-004		3.0700e-003	3.0700e-003		3.0700e-003	3.0700e-003	0.0000	11.0641	11.0641	6.6000e-004	0.0000	11.0806
Total	**0.0502**	**0.0565**	**0.0785**	**1.3000e-004**		**3.0700e-003**	**3.0700e-003**		**3.0700e-003**	**3.0700e-003**	**0.0000**	**11.0641**	**11.0641**	**6.6000e-004**	**0.0000**	**11.0806**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2200e-003	1.6000e-003	0.0187	6.0000e-005	6.4100e-003	5.0000e-005	6.4600e-003	1.7000e-003	5.0000e-005	1.7500e-003	0.0000	5.3776	5.3776	1.4000e-004	0.0000	5.3810
Total	**2.2200e-003**	**1.6000e-003**	**0.0187**	**6.0000e-005**	**6.4100e-003**	**5.0000e-005**	**6.4600e-003**	**1.7000e-003**	**5.0000e-005**	**1.7500e-003**	**0.0000**	**5.3776**	**5.3776**	**1.4000e-004**	**0.0000**	**5.3810**

3.6 Onsite Paving-Offsite Street Work - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0211	0.2133	0.2989	4.4000e-004		0.0107	0.0107		9.8300e-003	9.8300e-003	0.0000	38.6965	38.6965	0.0125	0.0000	39.0093
Paving	5.4100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0265**	**0.2133**	**0.2989**	**4.4000e-004**		**0.0107**	**0.0107**		**9.8300e-003**	**9.8300e-003**	**0.0000**	**38.6965**	**38.6965**	**0.0125**	**0.0000**	**39.0093**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2700e-003	0.0414	0.0133	1.4000e-004	3.6900e-003	5.0000e-005	3.7300e-003	1.0600e-003	5.0000e-005	1.1100e-003	0.0000	13.8459	13.8459	7.5000e-004	0.0000	13.8648
Worker	1.2300e-003	8.9000e-004	0.0104	3.0000e-005	3.5600e-003	3.0000e-005	3.5900e-003	9.5000e-004	3.0000e-005	9.7000e-004	0.0000	2.9875	2.9875	8.0000e-005	0.0000	2.9895
Total	**2.5000e-003**	**0.0423**	**0.0237**	**1.7000e-004**	**7.2500e-003**	**8.0000e-005**	**7.3200e-003**	**2.0100e-003**	**8.0000e-005**	**2.0800e-003**	**0.0000**	**16.8335**	**16.8335**	**8.3000e-004**	**0.0000**	**16.8542**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0211	0.2133	0.2989	4.4000e-004		0.0107	0.0107		9.8300e-003	9.8300e-003	0.0000	38.6964	38.6964	0.0125	0.0000	39.0093
Paving	5.4100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0265**	**0.2133**	**0.2989**	**4.4000e-004**		**0.0107**	**0.0107**		**9.8300e-003**	**9.8300e-003**	**0.0000**	**38.6964**	**38.6964**	**0.0125**	**0.0000**	**39.0093**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.2700e-003	0.0414	0.0133	1.4000e-004	3.6900e-003	5.0000e-005	3.7300e-003	1.0600e-003	5.0000e-005	1.1100e-003	0.0000	13.8459	13.8459	7.5000e-004	0.0000	13.8648
Worker	1.2300e-003	8.9000e-004	0.0104	3.0000e-005	3.5600e-003	3.0000e-005	3.5900e-003	9.5000e-004	3.0000e-005	9.7000e-004	0.0000	2.9875	2.9875	8.0000e-005	0.0000	2.9895
Total	**2.5000e-003**	**0.0423**	**0.0237**	**1.7000e-004**	**7.2500e-003**	**8.0000e-005**	**7.3200e-003**	**2.0100e-003**	**8.0000e-005**	**2.0800e-003**	**0.0000**	**16.8335**	**16.8335**	**8.3000e-004**	**0.0000**	**16.8542**

Appendix B

Arborist Report

Carlberg ASSOCIATES

Horticulturists and
Registered Consulting
ARBORISTS

CITY OF LOS ANGELES TREE INVENTORY REPORT
SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA 90034

SUBMITTED TO:

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JANUARY 22, 2018

CITY OF LOS ANGELES TREE INVENTORY REPORT - SHENANDOAH ELEMENTARY SCHOOL - 2450 SHENANDOAH STREET, LOS ANGELES

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

BACKGROUND AND ASSIGNMENT 1

OBSERVATIONS 2

CONCLUSION 2

TABLE 1 – TREE INVENTORY 3

EXHIBIT 1 – AERIAL IMAGE OF SUBJECT PROPERTY 6

EXHIBIT 2 – REDUCED COPY OF TREE LOCATION MAP 7

CAPTIONED TREE PHOTOGRAPHS 8

HEALTH AND STRUCTURE GRADE DEFINITIONS 15

ARBORIST DISCLOSURE STATEMENT 17

RESUME 18

COVER SHEET FOR TREE LOCATION EXHIBIT (5 SHEETS) 20
(INSERT MAP POCKETS)

Carlberg ASSOCIATES
Horticulturists and Registered Consulting ARBORISTS

January 22, 2018

Craig Atkinson AIA, LEED AP
IBI GROUP
315 West 9th Street, Suite 600
Los Angeles California 90015-4206

Re: Shenandoah Elementary School, 2450 Shenandoah Street, Los Angeles, California 90034

Dear Mr. Atkinson,

EXECUTIVE SUMMARY

This report was prepared in accordance with the City of Los Angeles Tree Preservation Ordinance No. 177.404 and the Los Angeles Unified School District guidelines. According to the Ordinance, "protected" trees are coast live oak, western sycamore, Southern California black walnut, or California bay laurel with trunk diameters (measured at 4.5 feet above grade) of 4 inches or greater. A total of 39 private property trees and seven trees immediately adjacent to the neighboring property to the south were inventoried. Three of the private property trees are considered "protected" by the ordinance. City of Los Angeles rights-of-way trees were not inventoried.

BACKGROUND AND ASSIGNMENT

The Los Angeles Unified School District (LAUSD) is proposing a school modernization project, which consists of building renovations, new classroom structures and pavement demolition and re-paving within certain areas on the school lot. We were retained to visit the property and evaluate and inventory all City of Los Angeles "protected" trees with trunk diameters of four inches or greater and all other trees with trunk diameters of eight inches or greater. A comprehensive analysis of each tree as it pertains to construction was not requested and is not a part of this study. This report is based on our site visit on December 19, 2017.

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OBSERVATIONS

We inventoried 39 trees of various species throughout the subject property and seven off-site trees with canopies that overhang onto the school property. Tree trunks were recorded in the field, from grade, using the topographical map provided to us.

Table 1 is a summary of the tree species comprising the 46 total trees. Captioned photographs and the exhibits at the end of this report illustrate site context, tree locations, tree structure, and vigor. Tree locations are graphically represented on the 'Tree Location Exhibit.'

CONCLUSION

Once the design is finalized, LAUSD may request an analysis of construction impacts to each tree and recommendations for protection of trees during the construction process. We are available to provide this study as requested.

Very truly yours,



Cy Carlberg, Registered Consulting Arborist

TABLE 1 –TREE INVENTORY

Tree #	Common Name Botanical Name	DBH(s) (inches	Height (feet)	Canopy Spread NS/EW	Health	Structure	Scenic[1] (CEQA)	Protected
1	Camphor *Cinnamomun camphora*	16.5	25	32	A	B	No	No
2	Canary Island pine *Pinus canariensis*	33	55	40	A	A	**Yes**	No
3	London plane *Platanus x acerifolia*	24	25	36	C	C	No	No
4	California pepper *Schinus molle*	12.5	18	24	A	B	No	No
5	Brazilian pepper *Schinus terebinthifolius*	6, 6, 9, 10, 8	25	36	A	B-	No	No
6	Canary Island pine *Pinus canariensis*	27	65	33	A	A-	**Yes**	No
7	yellowood *Afrocarpus gracilior*	26.5, 29	35	60	B	B-	No	No
8	*yellowood* *Afrocarpus gracilior*	27	35	40	B	B	No	No
9	myrtle *Myrtus communis*	4, 4, 5, 6	18	18	B	B	No	No
10	tree of heaven *Ailanthus altissima*	9, 11, 12, 13, 15	35	54	A	C	No	No
11	tree of heaven *Ailanthus altissima*	7, 7	25	15	C	C	No	No
12	tree of heaven *Ailanthus altissima*	9	25	15	C	C	No	No
13	tree of heaven *Ailanthus altissima*	11, 13	30	32	A	C	No	No
14	London plane *Platanus x acerifolia*	23	30	45	A	A	**Yes**	No
15	London plane *Platanus x acerifolia*	14.5	20	20	C	C	No	No
16	coast live oak *Quercus agrifolia*	29 at 4'	20	25/15/15/15 N/E/S/W	A	B	No	**Yes**
17	London plane *Platanus x acerifolia*	9, 12	30	42	B-	B-	No	No
18	London plane *Platanus x acerifolia*	10.5	30	22	B-	B-	No	No
19	California sycamore *Platanus racemosa*	22	45	30/10/10/15 N/E/S/W	A	B-	**Yes**	**Yes**
20	California sycamore *Platanus racemosa*	30	45	12/10/20/15 N/E/S/W	C	C	**Yes**	**Yes**
21	Italian cypress *Cupressus sempervirens*	8	25	4	A	A	No	No
22	Italian cypress *Cupressus*	8	25	4	A	A	No	No

Tree #	Common Name Botanical Name	DBH(s) (inches	Height (feet)	Canopy Spread NS/EW	Health	Structure	Scenic[1] (CEQA)	Protected
	sempervirens							
23	Italian cypress *Cupressus sempervirens*	8	25	4	A	A	No	No
24	Italian cypress *Cupressus sempervirens*	8	25	4	A	A	No	No
25	Italian cypress *Cupressus sempervirens*	8	25	4	A	A	No	No
26	Italian cypress *Cupressus sempervirens*	8	25	4	A	A	No	No
27	carrotwood *Cupaniopsis anacardioides*	10.5, 11	25	33	A	A	No	No
28	London plane *Platanus x acerifolia*	12	18	16	C	C	No	No
29	London plane *Platanus x acerifolia*	14.5	25	28	B	A	No	No
30	shamel ash *Fraxinus uhdei*	23	25	36	B	B	No	No
31	shamel ash *Fraxinus uhdei*	22.5	25	33	A	B-	No	No
32	shamel ash *Fraxinus uhdei*	16	20	24	B-	B	No	No
33	shamel ash *Fraxinus uhdei*	16	22	25	B-	C	No	No
34	shamel ash *Fraxinus uhdei*	23.5	30	38	B-	C	No	No
35	rusty leaf fig *Ficus rubiginosa*	41 at 4'	40	48	A	A	**Yes**	No
36	Canary Island pine *Pinus canariensis*	20	50	18	A	B	**Yes**	No
37	Canary Island pine *Pinus canariensis*	22	55	23	A	A	**Yes**	No
38	Canary Island pine *Pinus canariensis*	14.5	40	21	A	B	No	No
39	Canary Island pine *Pinus canariensis*	18	35	18	A	B	No	No
40	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site
41	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site
42	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site
43	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site

Tree #	Common Name Botanical Name	DBH(s) (inches	Height (feet)	Canopy Spread NS/EW	Health	Structure	Scenic[1] (CEQA)	Protected
44	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site
45	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site
46	Indian laurel fig *Ficus microcarpa*	unknown	40	30/8 NS/EW	A	B	No	No, Off-Site

1 - A scenic tree is highly visible, prominent and possesses unique or distinctive aesthetic qualities due to its size, structure, unusual specimen, etc.



EXHIBIT 1 - AERIAL VIEW OF THE SUBJECT AREA
2450 SHENANDOAH STREET, LOS ANGELES, CA
SOURCE: ZIMAS

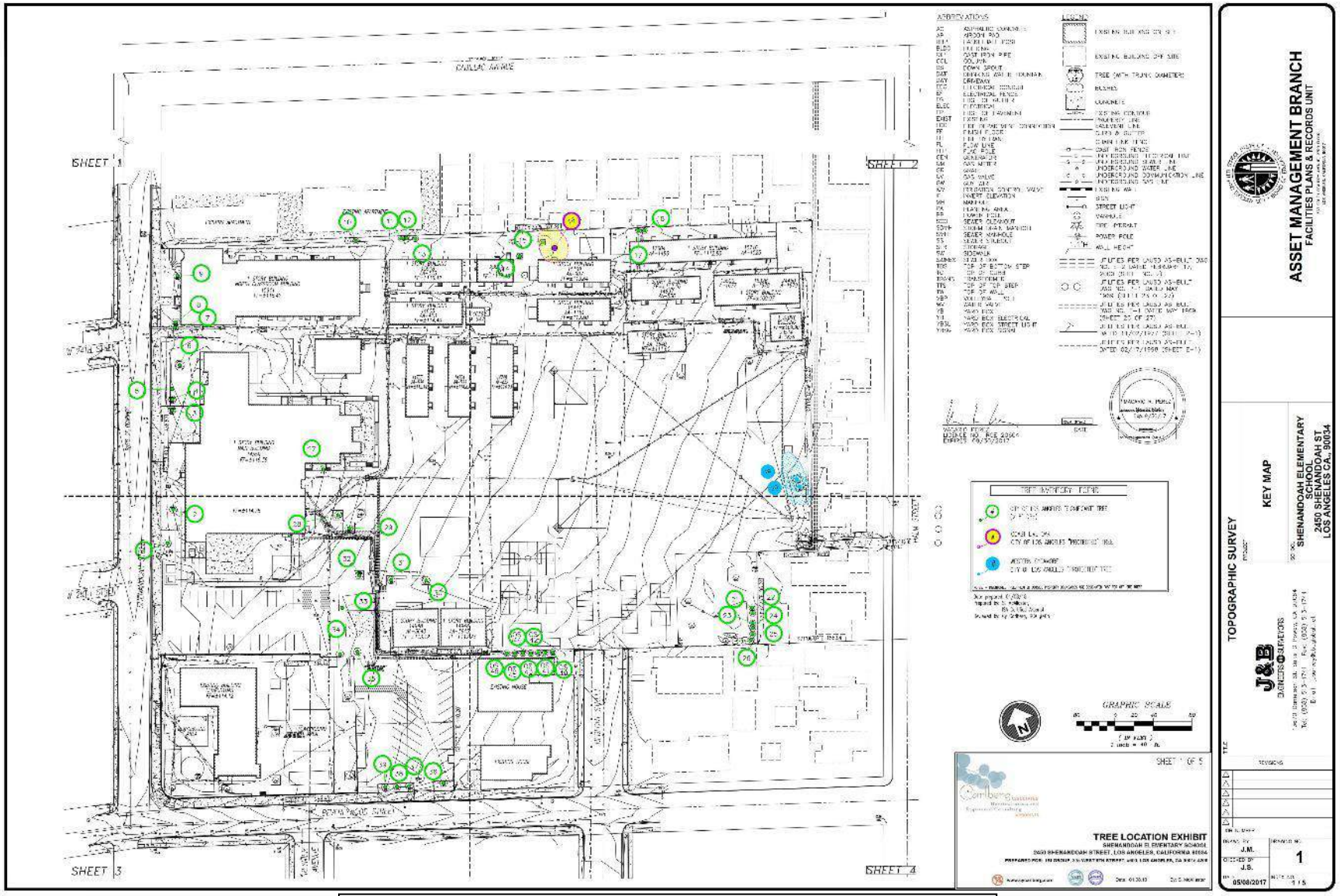


EXHIBIT 2 – REDUCED COPY OF TREE LOCATION EXHIBIT

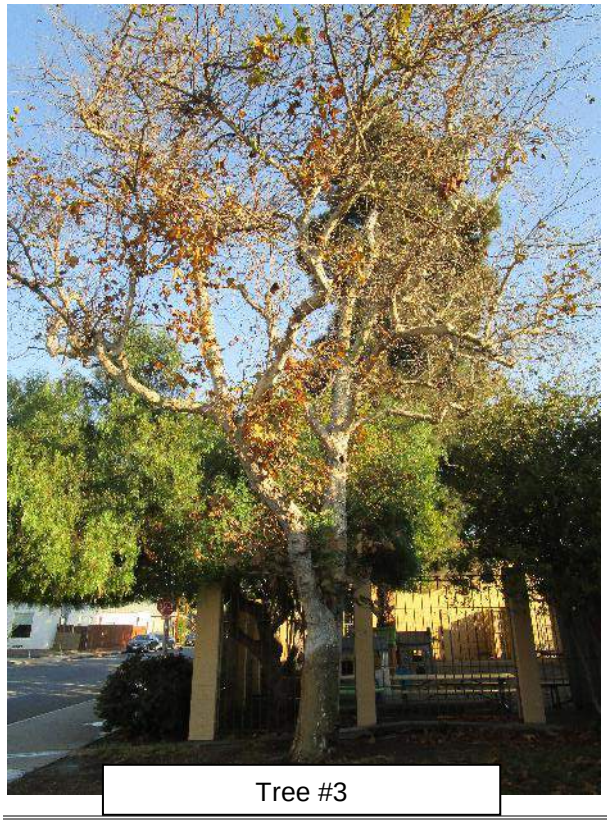
CAPTIONED TREE PHOTOGRAPHS



Tree #1



Tree #2



Tree #3



Tree #4



Tree #5



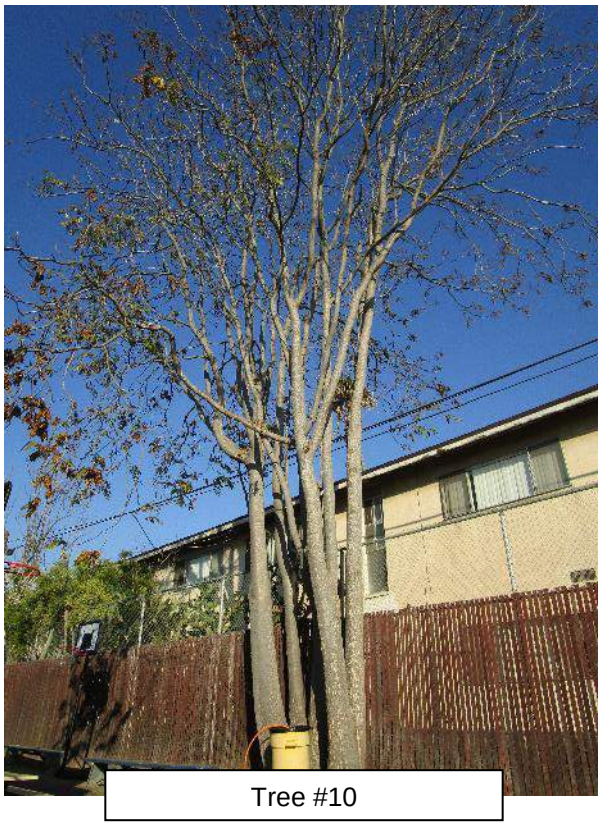
Tree #6



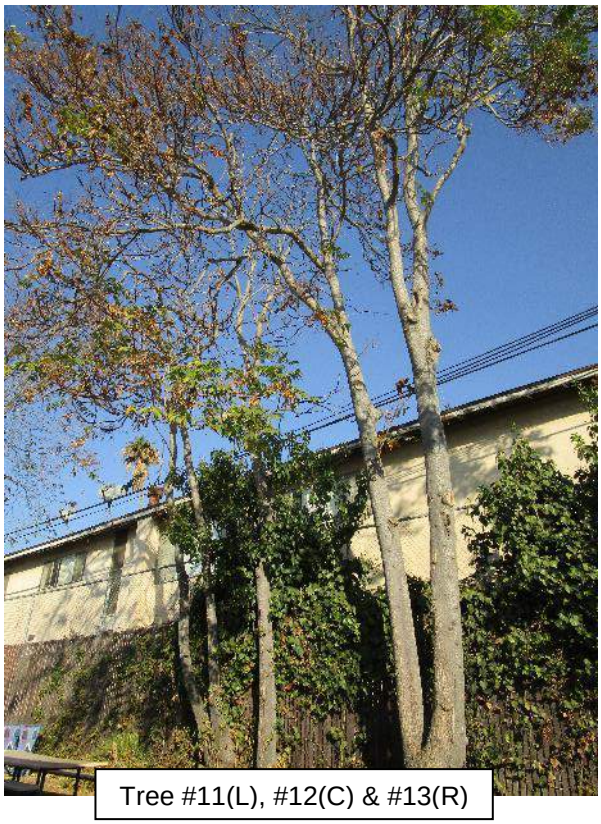
Tree #7(R) - #8(L)



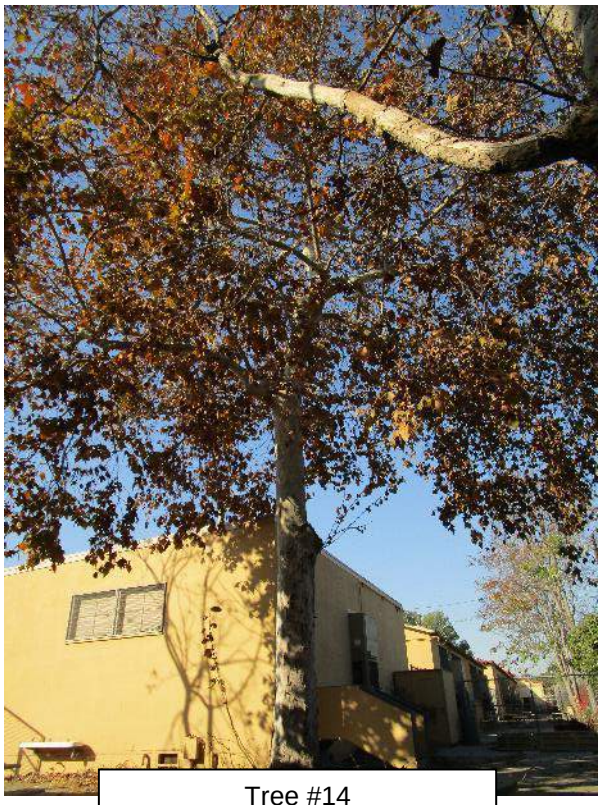
Tree #9



Tree #10



Tree #11(L), #12(C) & #13(R)



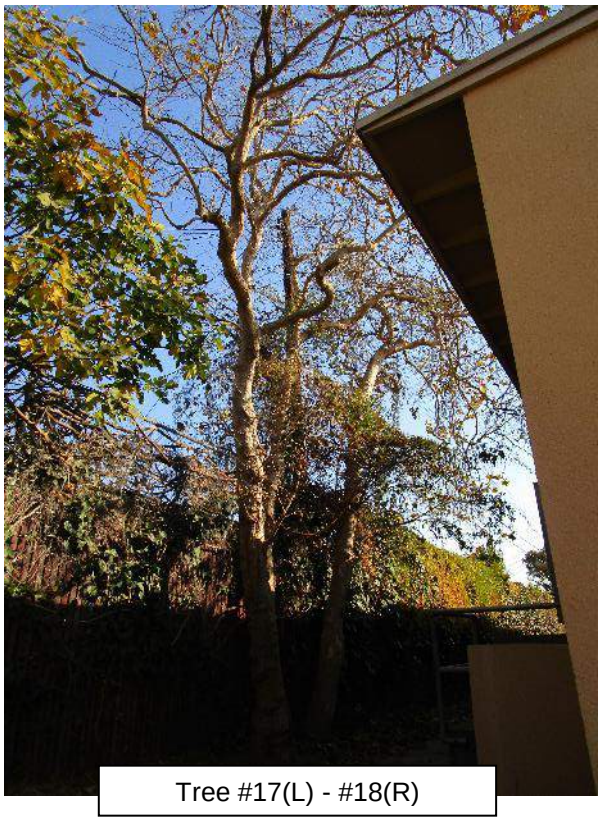
Tree #14



Tree #15



Tree #16



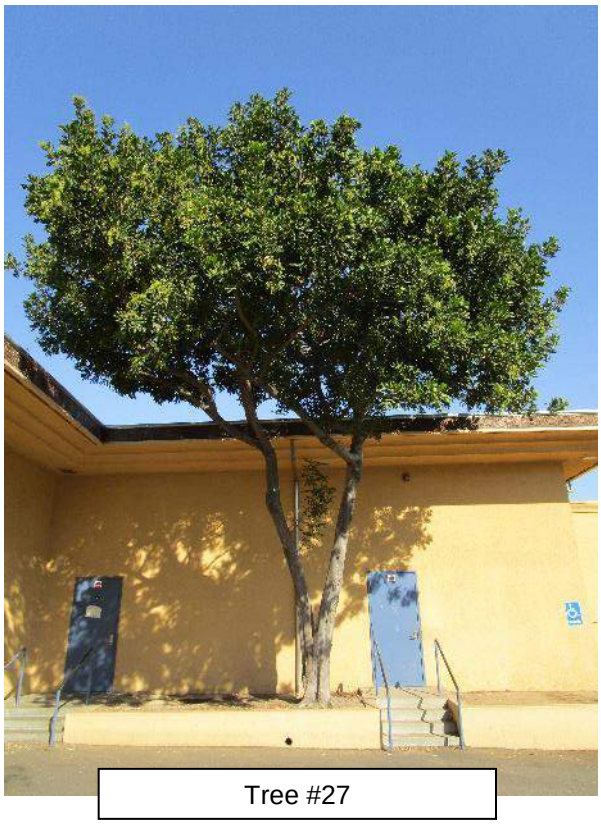
Tree #17(L) - #18(R)



Tree #19(L) - #20(R)



Tree #21(L) - #26(R)



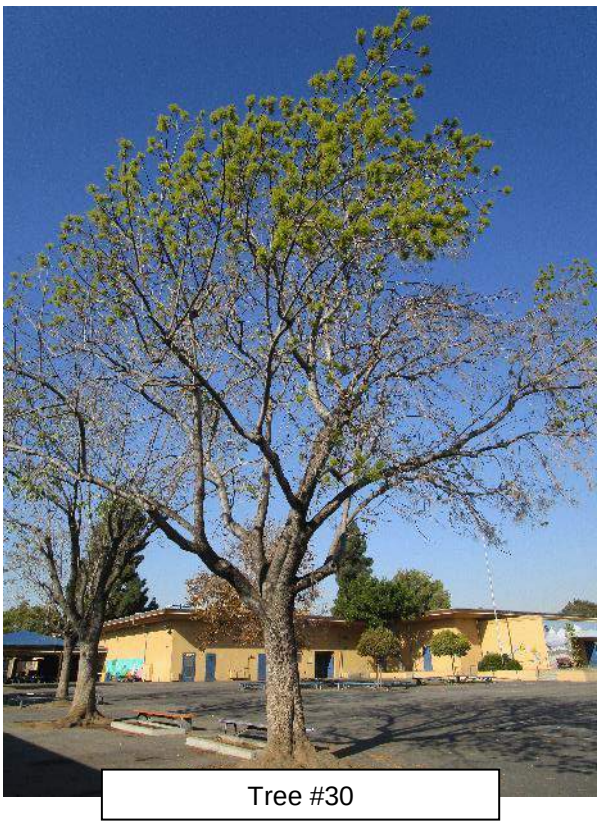
Tree #27



Tree #28



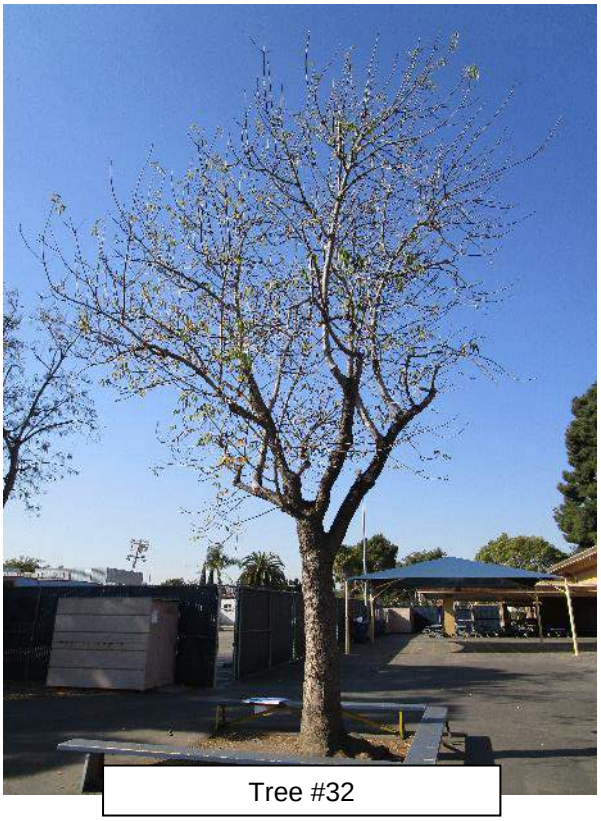
Tree #29



Tree #30



Tree #31



Tree #32



Tree #33



Tree #34



Tree #35



Tree #36



Tree #37(L) - #38(C) - #39(R)



Tree #OS40(L) - #OS46(R)

HEALTH AND STRUCTURE GRADE DEFINITIONS

Health and structure ratings of the trees are based on the archetype tree of the same species through a subjective evaluation of its physiological health, aesthetic quality, and structural integrity.

Overall physiological condition (health) and structural condition were rated A-F:

Health

a. Outstanding – Exceptional trees of good growth form and vigor for their age class; exhibiting very good to excellent health as evidenced by normal to exceptional shoot growth during current season, good bud development and leaf color, lack of leaf, twig or branch dieback throughout the crown, and the absence of decay, bleeding, or cankers. Common leaf and/or twig pests may be noted at very minor levels.
b. Above average – Good to very good trees that exhibit minor necrotic or physiological symptoms of stress and/or disease; shoot growth is less than reasonably expected, leaf color is less than optimal in some areas, the crown may be thinning, minor levels of leaf, twig, and branch dieback may be present, and minor areas of decay, bleeding, or cankers may be manifesting. Minor amounts of epicormic growth may be present. Minor amounts of fire damage or mechanical damage may be present. Still healthy, but with moderately diminished vigor and vitality. No significant decline noted.
c. Average – Average, moderately good trees whose growth habit and physiological or fire-induced symptoms indicate an equal chance to either decline or continue with good health into the near future. Most of these trees exhibit moderate to significant small deadwood in outer crown areas, decreased shoot growth and diminished leaf color and mass. Some stem and branch dieback is usually present and epicormic growth may be moderate to extensive. Cavities, pockets of decay, relatively significant fire damage, bark exfoliation, or cracks may be present. Moderate to significant amounts of insect or disease symptoms may be present; the tree may be shaded or crowded in such a way that it is expected to negatively impact the lifespan of the tree. Tree may be in early decline.
d. Below Average/Poor - trees whose growth habit and physiological or fire-induced symptoms indicate significant, irreversible decline. Most of these trees exhibit significant dieback of wood in the crown, possibly accompanied by significant epicormic sprouting. Shoot growth and leaf color and mass is either significantly diminished or nonexistent throughout the crown. Cavities, pockets of decay, significant fire damage, bark exfoliation, and/or cracks may be present. Significant amounts of insect or disease symptoms may be present; the tree may be shaded or crowded in such a way that it has negatively impacted the lifespan of the tree. Tree appears to be in irreversible decline.
e. Dead or in spiral of decline – this tree exhibits very little to no signs of life.

Structure

A) Outstanding – Trees with outstanding structure for their species exhibit trunk and branch arrangement and orientation that result in a sturdy form or architecture that resists failure under normal circumstances. The spacing, orientation, and size of the branches relative to the trunk are quintessential for the species and free from defects. No outward sign of decay or pathological disease is present. Some trees exhibit naturally inherent branching defects, like multiple, narrow points of attachment from one point on the trunk, which would preclude them from achieving an “A” grade.
B) Above average - Trees with good to very good structure for their species. They exhibit trunk and branch arrangement and orientation that result in a relatively sturdy form or architecture that resists failure under normal circumstances, but may have some mechanical damage, over-pruning, or other minor structural defects. The spacing, orientation, and size of the branches relative to the trunk are still in the normal

range for the species, but they exhibit a minor degree of defects. Minor, sub-critical levels of decay or pathological disease may be present, but the degree of damage is not yet structurally significant. Trees that exhibit naturally inherent branching defects, like multiple, narrow points of attachment from one point on the trunk, would generally fall in to this category. A small percentage of the canopy may be shaded or crowded, but not in such a way that it is expected to negatively impact the structural integrity or lifespan of the tree.

C) Average - Trees with moderately good structure for their species, but with obvious defects. They exhibit trunk and branch arrangement and orientation that result in a less than sturdy form or architecture, which reduces their resistance to failure under normal circumstances. Moderate levels of mechanical damage, over-pruning, or other structural defects may be present. The spacing, orientation, and size of some of the branches relative to the trunk are not in the normal range for the species. Moderate to significant levels of decay or pathological disease may be present that increase the likelihood of structural instability. Influences such as an excessive trunk lean, slope erosion, root pruning, or other growth-inhibiting factors may be present. A moderate to significant percentage of the canopy may be shaded or crowded in such a way that it is expected to negatively impact the structural integrity or lifespan of the tree. Risk of full or partial failure in the near future appears to be moderately elevated.

D) Well Below Average/Poor - Trees poor structure for their species and with obvious defects. They exhibit trunk and branch arrangement and orientation that result in a significantly less than sturdy form or architecture, significantly reducing their resistance to failure under normal circumstances. Significant levels of mechanical damage, over-pruning, or other structural defects may be present. The spacing, orientation, and size of many of the branches relative to the trunk are not in the normal range for the species. Significant levels of decay or pathological disease may be present that increase the likelihood of structural instability. Influences such as an excessive trunk lean, slope erosion, root pruning, or other growth-inhibiting factors may be present. A significant percentage of the canopy may be shaded or crowded in such a way that it is expected to negatively impact the structural integrity or lifespan of the tree. Risk of full or partial failure in the near future appears to be advanced.

E) Severely Compromised – trees with very poor structure and numerous or severe defects due to growing conditions, historical or recent pruning, mechanical damage, history of limb or trunk failures, advanced and irreparable decay, disease, or severe fire damage. Trees with this rating are in severe, irreparable decline, or are barely alive. Risk of full or partial failures in the near future may be severe.

ARBORIST DISCLOSURE STATEMENT

Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees contribute greatly to our enjoyment and appreciation of life. Nonetheless, they are subject to the laws of gravity and physiological decline. Therefore, neither arborists nor tree owners can be reasonably expected to warrant unfailing predictability or elimination of risk.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.

Risk assessments were neither requested nor performed on any of the trees for this project.

CY CARLBERG
CARLBERG ASSOCIATES
2402 California Avenue, Santa Monica, California 90403
(310) 453-TREE
cy@cycarlberg.com

Education
B.S., Landscape Architecture, California State Polytechnic University, Pomona, 1985
Graduate, Arboricultural Consulting Academy, American Society of Consulting Arborists, Chicago, Illinois, 2002
Graduate, Municipal Forestry Institute, Lied, Nebraska, 2012

Experience
Consulting Arborist, Carlberg Associates, 1998-present
Manager of Grounds Services, California Institute of Technology, Pasadena, 1992-1998
Director of Grounds, Scripps College, Claremont, 1988-1992

Certificates
Certified Arborist (#WE-0575A), International Society of Arboriculture, 1990
Registered Consulting Arborist (#405), American Society of Consulting Arborists, 2002
Certified Urban Forester (#013), California Urban Forests Council, 2004
Certified Tree Risk Assessor (#1028), International Society of Arboriculture, 2011

Areas of Expertise

Ms. Carlberg is experienced in the following areas of tree management and preservation:

- Tree health and risk assessment
- Master Planning
- Tree inventories and reports to satisfy jurisdictional requirements
- Expert Testimony
- Post-fire assessment, valuation, and mitigation for trees and native plant communities
- Value assessments for native and non-native trees
- Pest and disease identification
- Guidelines for oak preservation
- Selection of appropriate tree species
- Planting, pruning, and maintenance specifications
- Tree and landscape resource mapping – GPS, GIS, and AutoCAD
- Planning Commission, City Council, and community meetings representation

Previous Consulting Experience

Ms. Carlberg has overseen residential and commercial construction projects to prevent damage to protected and specimen trees. She has thirty-five years of experience in arboriculture and horticulture and has performed tree health evaluation, value and risk assessment, and expert testimony for private clients, government agencies, cities, school districts, and colleges. Representative clients include:

The Huntington Library and Botanical Gardens
The Los Angeles Zoo and Botanical Gardens
The Rose Bowl and Brookside Golf Course, Pasadena
Walt Disney Concert Hall and Gardens
The Art Center College of Design, Pasadena
Pepperdine University
Loyola Marymount University
The Claremont Colleges (Pomona, Scripps, CMC, Harvey Mudd, Claremont Graduate University, Pitzer, Claremont University Center)
Quinn, Emanuel, Urquhart and Sullivan (attorneys at law)
The City of Claremont
The City of Beverly Hills
The City of Pasadena
The City of Los Angeles
The City of Santa Monica
Santa Monica/Malibu Unified School District
San Diego Gas & Electric
Los Angeles Department of Water and Power
Rancho Santa Ana Botanic Garden, Claremont
Latham & Watkins, LLP (attorneys at law)

Affiliations

Ms. Carlberg serves with the following national, state, and community professional organizations:

- California Urban Forests Council, Board Member, 1995-2006
- Street Tree Seminar, Past President, 2000-present
- American Society of Consulting Arborists Academy, Faculty Member, 2003-2005, 2014
- American Society of Consulting Arborists, Board of Directors, 2013-Present
- Member, Los Angeles Oak Woodland Habitat Conservation Strategic Alliance, 2010-present

JAMES SANCHEZ
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james@cycarlberg.com • m: 310.924.2246 • www.cycarlberg.com

Education
Graduate, Environmental Horticulture Program, El Camino College, Torrance, California, 2002
Graduate, Hawthorne High School, Hawthorne, California, 1995

Experience
Staff Arborist, Carlberg Associates, 2015-present
Staff Arborist, Approved Tree Care, 2014-2015
Community Forester, Tree Musketeers, 2010-2014
Interior Plant Technician, Reliable Plant Service, 2008-2009
Exterior Plant Technician, Inner Gardens, 2006-2007
Exterior Plant Lead, Rolling Greens Nursery, 2005-2006
Nursery Foreman, Big Seven Nursery, 2001-2003

Certificates
Certified Arborist (#WE-9883A), International Society of Arboriculture, 2012
Environmental Horticulture Certificate, El Camino College, 2002
Certified Tree Risk Assessor, International Society of Arboriculture, 2017

AREAS OF EXPERTISE

Mr. Sanchez is experienced in the following areas of tree management and preservation:

- Tree health assessment
- Tree inventories and reports to satisfy jurisdictional requirements
- Pest and disease identification
- Selection of appropriate tree species
- Planting, pruning, and maintenance specifications
- Working with community and city leaders in large tree planting programs

PREVIOUS CONSULTING EXPERIENCE

Mr. Sanchez has performed tree inventories, health evaluations, and impact analyses for private developers, architects, engineers, and homeowners. He has over 14 years of experience in arboriculture and is trained in environmental horticulture. Representative clients include:

City of Pasadena
City of South Gate
Metropolitan Transit Authority
E & S Ring, Inc.
Hollywood Forever Cemetery
Archdiocese of Los Angeles
City of Signal Hill
Kovac Architects
City of Torrance
Ojai Valley Community Hospital
The Kibo Group
Monte Vista Grove Homes
Google Venice
John Anson Ford Theater
The Village Green, Baldwin Hills
Camp Munz/Mendenhall
Hotel Figueroa
California State University, Long Beach
Pacific Charter School
Mill Creek Development
Los Angeles Unified School District
City of South Gate
Claremont Golf Course
The New Home Company
William Carey University
City of Inglewood
Universal Hilton
Gensler Architects
Marmol Radziner, Architects
Rose Bowl Stadium
Aurora/Signature Health Services
Colfax Charter Elementary School
Highpointe Communities
Snapchat
Los Angeles Football Club
Monte Cedro Senior Living
Southern California Edison
Howard Hughes Center
Katella High School
Square One Homes
EPT Landscape Architecture
Tim Barber, Ltd., Architects

AFFILIATIONS

Mr. Sanchez serves with the following national professional organizations:

- Member in good standing, International Society of Arboriculture, Western Chapter

ABBREVIATIONS

AC	ASPHALTIC CONCRETE
AP	AIRCON PAD
BBP	BASKETBALL POST
BLDG	BUILDING
CIP	CAST IRON PIPE
COL	COLUMN
DS	DOWN SPOUT
DWF	DRINKING WATER FOUNTAIN
DWY	DRIVEWAY
EEC	ELECTRICAL CONDUIT
EF	ELECTRICAL FENCE
EG	EDGE OF GUTTER
ELEC	ELECTRICAL
EP	EDGE OF PAVEMENT
EXIST	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
FLP	FLAG POLE
GEN	GENERATOR
GM	GAS METER
GR	GRATE
GV	GAS VALVE
GW	GUY WIRE
ICV	IRRIGATION CONTROL VALVE
IE	INVERT ELEVATION
MH	MANHOLE
PA	PLANTING AREA
PP	POWER POLE
SCO	SEWER CLEANOUT
SDMH	STORM DRAIN MANHOLE
SMH	SEWER MANHOLE
SS	SEWER STUBOUT
STR	STORAGE
SW	SIDEWALK
SWRBX	SEWER BOX
TBS	TOP OF BOTTOM STEP
TC	TOP OF CURB
TRANS	TRANSFORMER
TTS	TOP OF TOP STEP
TW	TOP OF WALL
VBP	VOLLEYBALL POLE
WV	WATER VALVE
YB	YARD BOX
YBE	YARD BOX ELECTRICAL
YBSL	YARD BOX STREET LIGHT
YBSG	YARD BOX SIGNAL

LEGEND

- EXISTING BUILDING ON SITE
- EXISTING BUILDING OFF SITE
- TREE (WITH TRUNK DIAMETER) — PEPPER, 2.5'
- BUSHES
- CONCRETE
- EXISTING CONTOUR — 112
- PROPERTY LINE
- EASEMENT LINE
- CURB & GUTTER
- CHAIN LINK FENCE
- CAST IRON FENCE
- UNDERGROUND ELECTRICAL LINE — E
- UNDERGROUND SEWER LINE — S
- UNDERGROUND WATER LINE — W
- UNDERGROUND COMMUNICATION LINE — C
- UNDERGROUND GAS LINE — G
- EXISTING WALL
- SIGN
- STREET LIGHT
- MANHOLE
- FIRE HYDRANT
- POWER POLE
- WALL HEIGHT — 1.1'H
- UTILITIES PER LAUSD AS-BUILT DWG NO. E-2 DATED FEBRUARY 17, 2000 (SHEET NO. 2)
- UTILITIES PER LAUSD AS-BUILT DWG NO. P-1 DATED MAY 1969 (SHEET 23 OF 27)
- UTILITIES PER LAUSD AS-BUILT DWG NO. E-1 DATED MAY 1969 (SHEET 26 OF 27)
- UTILITIES PER LAUSD AS-BUILT DATED 11/02/1977 (SHEET P-1)
- UTILITIES PER LAUSD AS-BUILT DATED 02/17/1998 (SHEET E-1)

MACARIO PEREZ
LICENCE NO.: RCE 20604
EXPIRES: 09/30/2017

RText (RText)
DATE

MACARIO R. PEREZ
No. 20604
Exp. 9/30/17
AcDbArcAlignedText (ATEXT)

TREE INVENTORY LEGEND

- # — CITY OF LOS ANGELES "SIGNIFICANT" TREE (> 8" DBH)
- # — COAST LIVE OAK, CITY OF LOS ANGELES "PROTECTED" TREE
- # — WESTERN SYCAMORE, CITY OF LOS ANGELES "PROTECTED" TREE

NOTES: – INVENTORIED TREES PLOTTED OUTSIDE PROPERTY BOUNDARIES ARE DESIGNATED "OS" FOR OFF-SITE TREES.

Date prepared: 01/08/18
Prepared by: S. McAllaster,
ISA Certified Arborist
Reviewed by: Cy Carlberg, RCA #405

GRAPHIC SCALE
80 0 20 40 80
(IN FEET)
1 inch = 40 ft.

SHEET 1 OF 5

Carlberg ASSOCIATES
Horticulturists and Registered Consulting ARBORISTS

TREE LOCATION EXHIBIT
SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET, LOS ANGELES, CALIFORNIA 90034
PREPARED FOR: IBI GROUP, 315 WEST 9TH STREET, #600, LOS ANGELES, CA 90015-4206

www.cycarlberg.com Date: 01.08.18 By: S. McAllaster

LOS ANGELES UNIFIED SCHOOL DISTRICT · BOARD OF EDUCATION
333 SOUTH BEAUDRY AVENUE, 23RD FLOOR
LOS ANGELES, CALIFORNIA 90017

ASSET MANAGEMENT BRANCH
FACILITIES PLANS & RECORDS UNIT

TITLE: TOPOGRAPHIC SURVEY

PROJECT: KEY MAP

SCHOOL: SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH ST
LOS ANGELES CA., 90034

J&B ENGINEERS SURVEYORS
13670 Danielson St. Suite G Poway, CA 92064
Tel: (858) 513-1741 Fax: (858) 513-1744
Email: jbsurvey@sbcglobal.net

REVISIONS

JOB NUMBER	
DRAWN BY: J.M.	DRAWING NO.: 1
CHECKED BY: J.S.	
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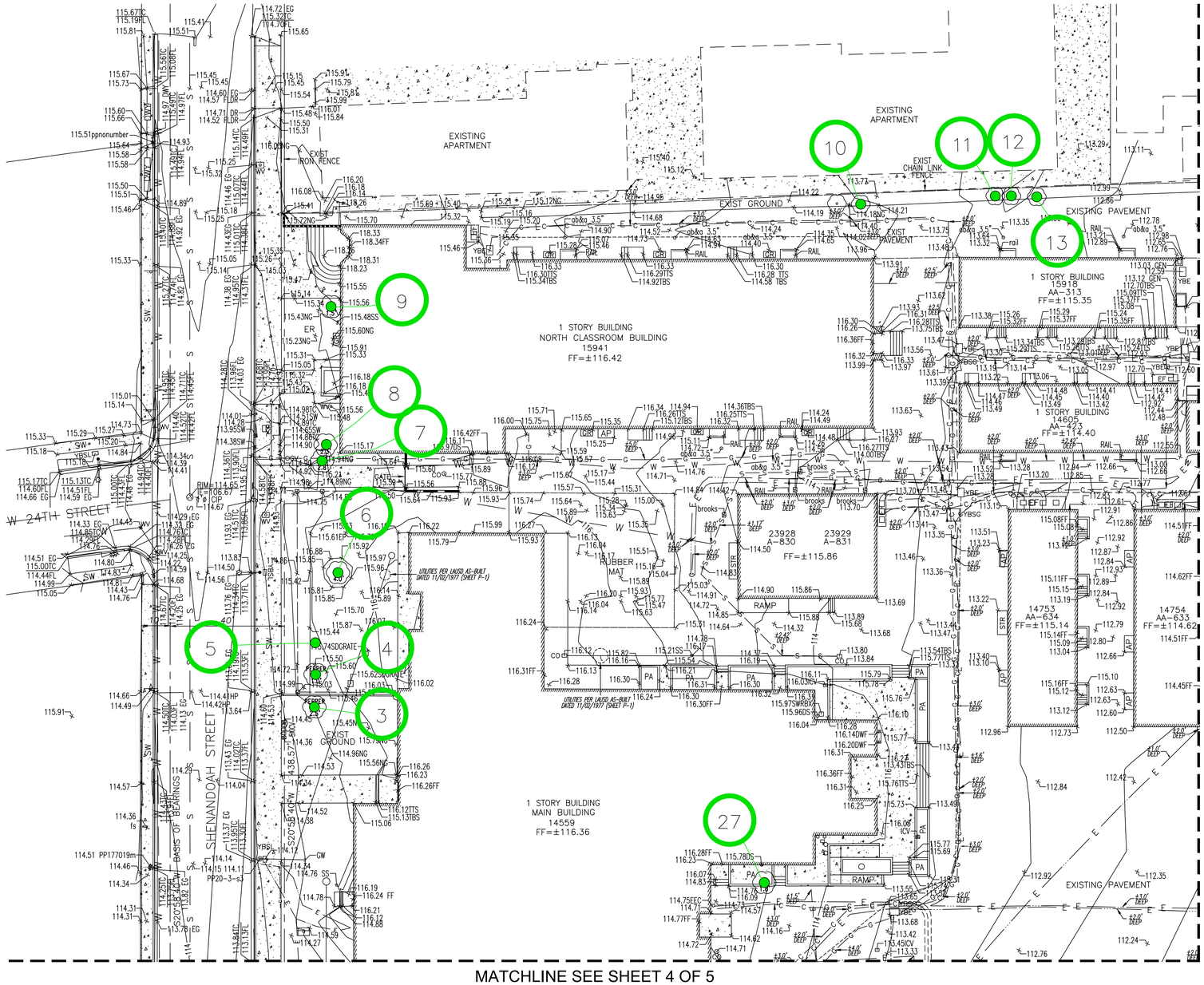

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BLDG	BUILDING
CIP	CAST IRON PIPE
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Date prepared: 01/08/18
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Reviewed by: Cy Carlberg, RCA #405

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www.cycarlberg.com Date: 01.08.18 By: S. McAllaster

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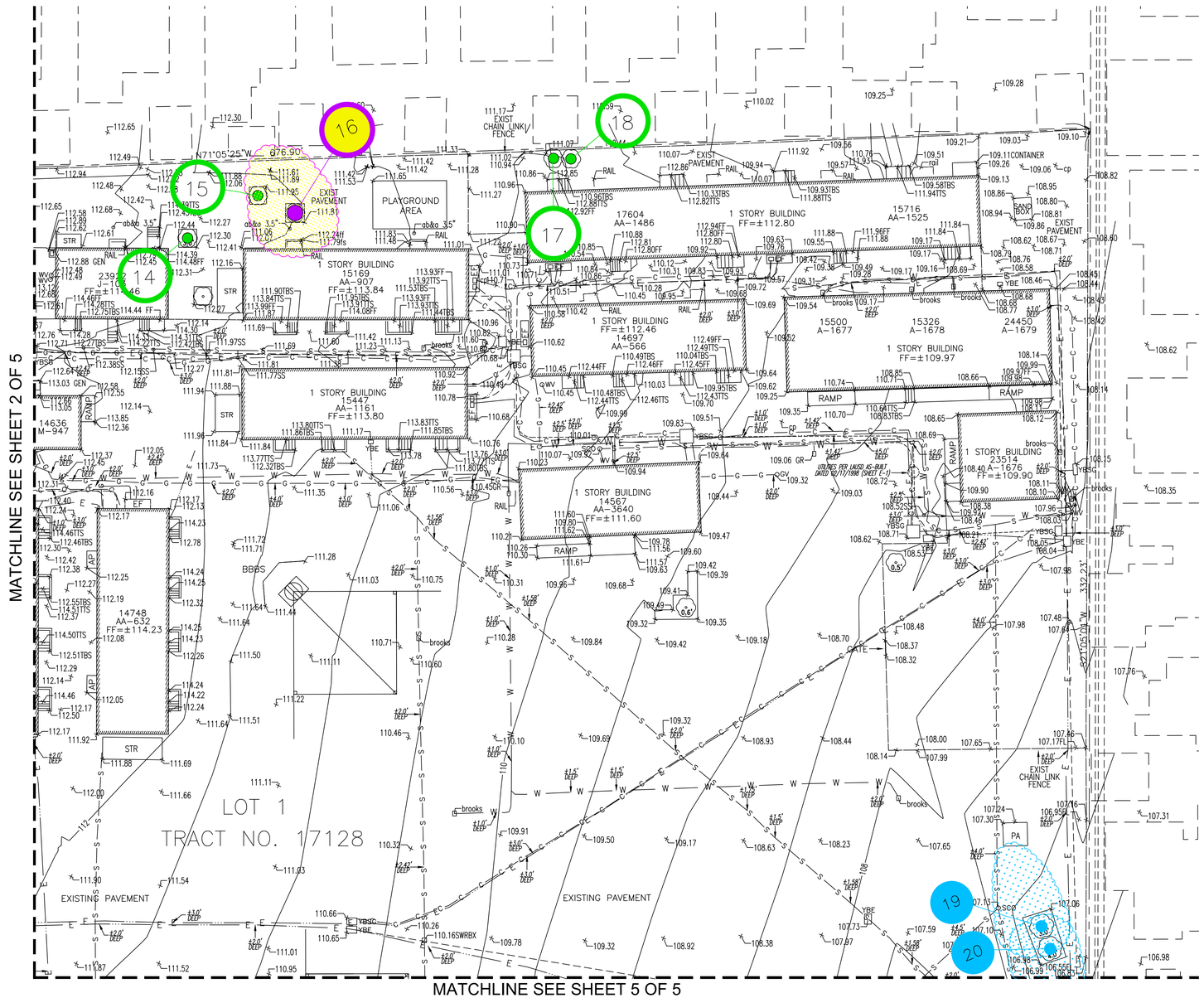

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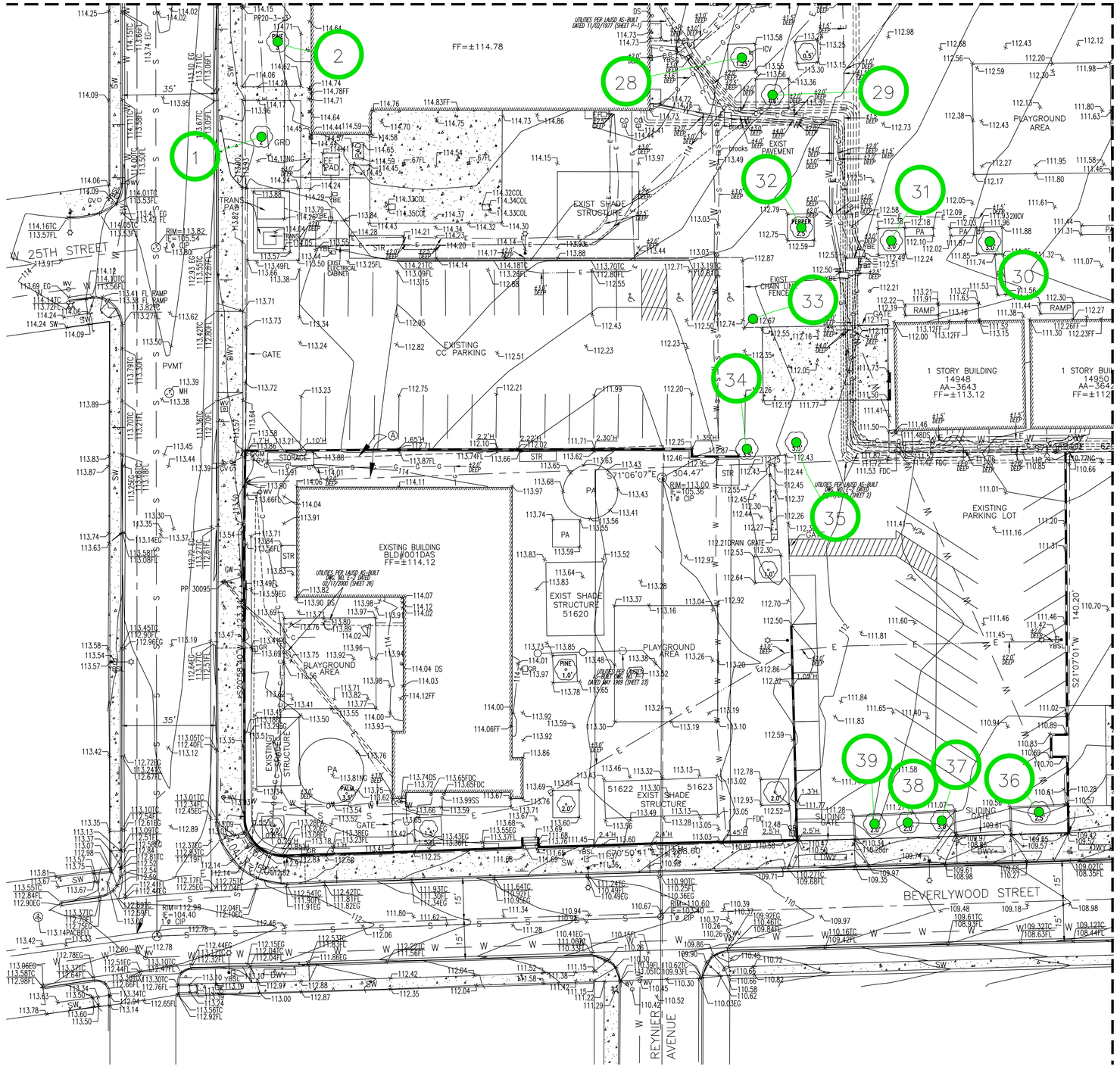

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Ⓐ – 8' STORM DRAIN EASEMENT BY ORDINANCE NO. 5911 PER TRACT NO. 17128

Ⓑ – 2' EASEMENT FOR POLE LINES AND CONDUITS AND RIGHTS THERETO IN FAVOR OF CITY OF LOS ANGELES PER DOCUMENT RECORDED IN BOOK 15499, PAGE 271.

Ⓒ – 3' EASEMENT FOR POLE LINES AND RIGHTS INCIDENTAL THERETO IN FAVOR OF CITY OF LOS ANGELES RECORDED IN BOOK 2829, PAGE 176

Ⓓ – 5' EASEMENT FOR POLE LINES, CONDUITS, AND RIGHTS INCIDENTAL THERETO IN FAVOR OF SOUTHERN CALIFORNIA TELEPHONE COMPANY IN BOOK 16971, PAGE 46.

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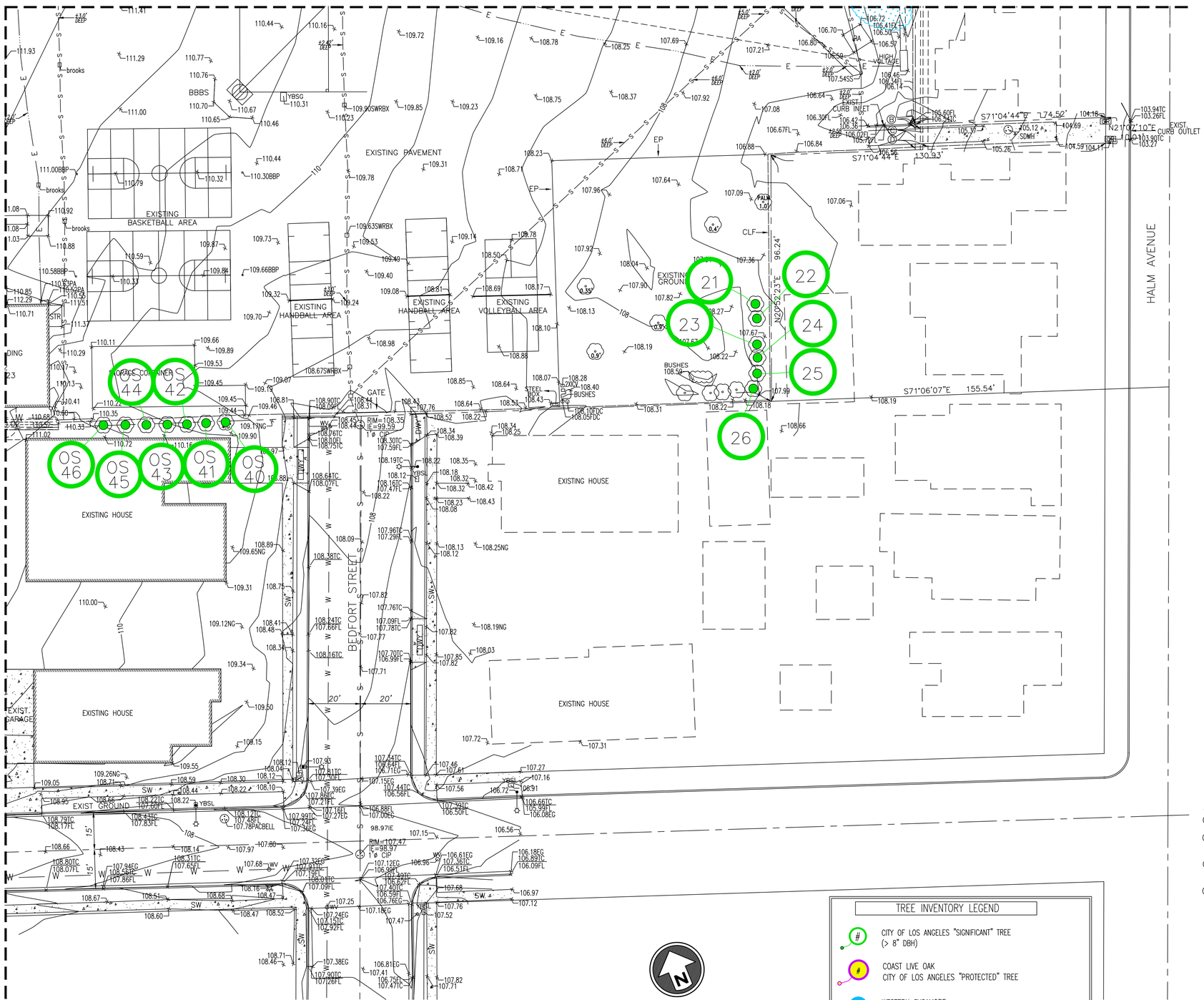
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HALM AVENUE
BEDFORT STREET
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BBBS
YBSG
YBSL
YBSL
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Shenandoah Elementary School

Historical Resources Evaluation Report

prepared for

Los Angeles Unified School District
Office of Environmental Health and Safety
333 South Beaudry Avenue, 21st Floor
Los Angeles, California 90017

Contact: Gwenn Godek
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November 2018

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Please cite this report as follows:

Los Angeles Unified School District. 2018. *Shenandoah Elementary School: Historical Resources Evaluation Report*. Prepared by Rincon Consultants, Inc. Los Angeles, CA.

Table of Contents

Table of Contents i
1 Executive Summary 1
2 Introduction 3
2.1 Regulatory Framework 6
2.2 Methods 8
2.3 Previous Historical Resource Surveys 9
3 Campus Site Description and History 11
3.1 Overview Description 11
4 Historic Overview 25
4.1 Focused Neighborhood History 25
5 Associated Design Professional Biographies 29
5.1 Alfred S. Nibecker, Jr. 29
5.1 Norman E. Kocher 29
5.3 Jose Y. Almanza 30
6 Significance Evaluation 31
6.1 Designation Criteria A/1/1 33
6.2 Designation Criteria B/2/2 33
6.3 Designation Criteria C/3/3 34
7 Conclusion 35
8 Bibliography 37

Tables

Table 1 Shenandoah Elementary School Buildings 13

Figures

Figure 1 Vicinity Map 4
Figure 2 Location Map 5
Figure 3 Campus Map 12
Figure 4 Classroom Building North, West (Primary) Elevation 14
Figure 5 Classroom Building North, South Elevation 14
Figure 6 Administrative Building, West Elevation 15

Figure 7 Administrative Building, East Elevation.....15

Figure 8 Lunch Shelter Extending from North Elevation of Administrative Building.....16

Figure 9 Shenandoah Children's Center, North and West Elevations.....16

Figure 10 Representative Portable Buildings 17

Figure 11 1927 Sanborn Fire Insurance Company map, earliest documented incarnation of the Shenandoah Street Elementary School campus.....18

Figure 12 1940 Classroom & Auditorium Elevations and Sections, Shenandoah Street School. 19

Figure 13 1950 Sanborn Fire Insurance Company map, Shenandoah Street Elementary School campus, including the 1929 Administrative Building, 1940 Classroom Building, and several portable buildings installed in the late 1940s. 21

Figure 14 1970 aerial photograph, Shenandoah Street Elementary School campus, depicting old Main Building and new Children's Unit Building. 22

Figure 15 1975 design for Exterior Elevations, Administrative Building, Shenandoah Street Elementary School campus. 23

Appendices

Appendix A Resource Records

1 Executive Summary

Rincon Consultants, Inc. (Rincon) was retained by the Los Angeles Unified School District (LAUSD) to complete a historical resources evaluation of the Shenandoah Elementary School campus, which includes Shenandoah Elementary School and Early Education Center located south of the main campus (subject campus). The subject campus is located at 2450 Shenandoah Street in the Mid-City neighborhood of Los Angeles, California. The campus has been extensively redeveloped through the construction and demolition of numerous buildings, and currently contains three permanent and 23 portable buildings and structures.

This evaluation was prepared to inform future planning efforts and to facilitate compliance with LAUSD's cultural resource policies and the California Environmental Quality Act (CEQA), which requires lead agencies to consider the impacts of proposed projects on historical resources. All work completed as part of the current effort was conducted in accordance with the requirements of CEQA and applicable local regulations. The current study included background research, an intensive-level field survey, and preparation of this Historical Resources Evaluation Report.

Based on the current study, Shenandoah Elementary School and its buildings are recommended ineligible for federal, state, or local designation under any applicable criteria. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building dates to 1940. This building does not exhibit any of the character-defining features identified in *Los Angeles Unified School District Historic Context Statement, 1870 to 1969* for schools constructed between 1933 and 1945, such as unified site design, indoor-outdoor integration, plentiful windows of varying sizes and configurations, or a stylistically modern design.[1] The subject campus also includes a number of buildings that were developed after World War II, but these buildings were constructed intermittently over a period of 40 years and are not representative of LAUSD design principles of the postwar era. The campus does not appear eligible for federal, state, or local designation under any applicable criteria and is not considered a historical resource for the purposes of CEQA.

Rincon Senior Architectural Historian Steven Treffers served as the project lead, with oversight and quality assurance/quality control provided by Architectural History Program Manager Shannon Carmack. Additional assistance was provided by Rincon architectural historians Rachel Perzel and Susan Zamudio-Gurrola. All of these individuals meet and exceed the Secretary of the Interior's Professional Qualifications Standards for Architectural History and History.

[1] Sapphos Environmental, Inc. *Los Angeles Unified School District Historic Context Statement, 1870 to 1969* (Los Angeles Unified School District Office of Environmental Health and Safety, March 2014).

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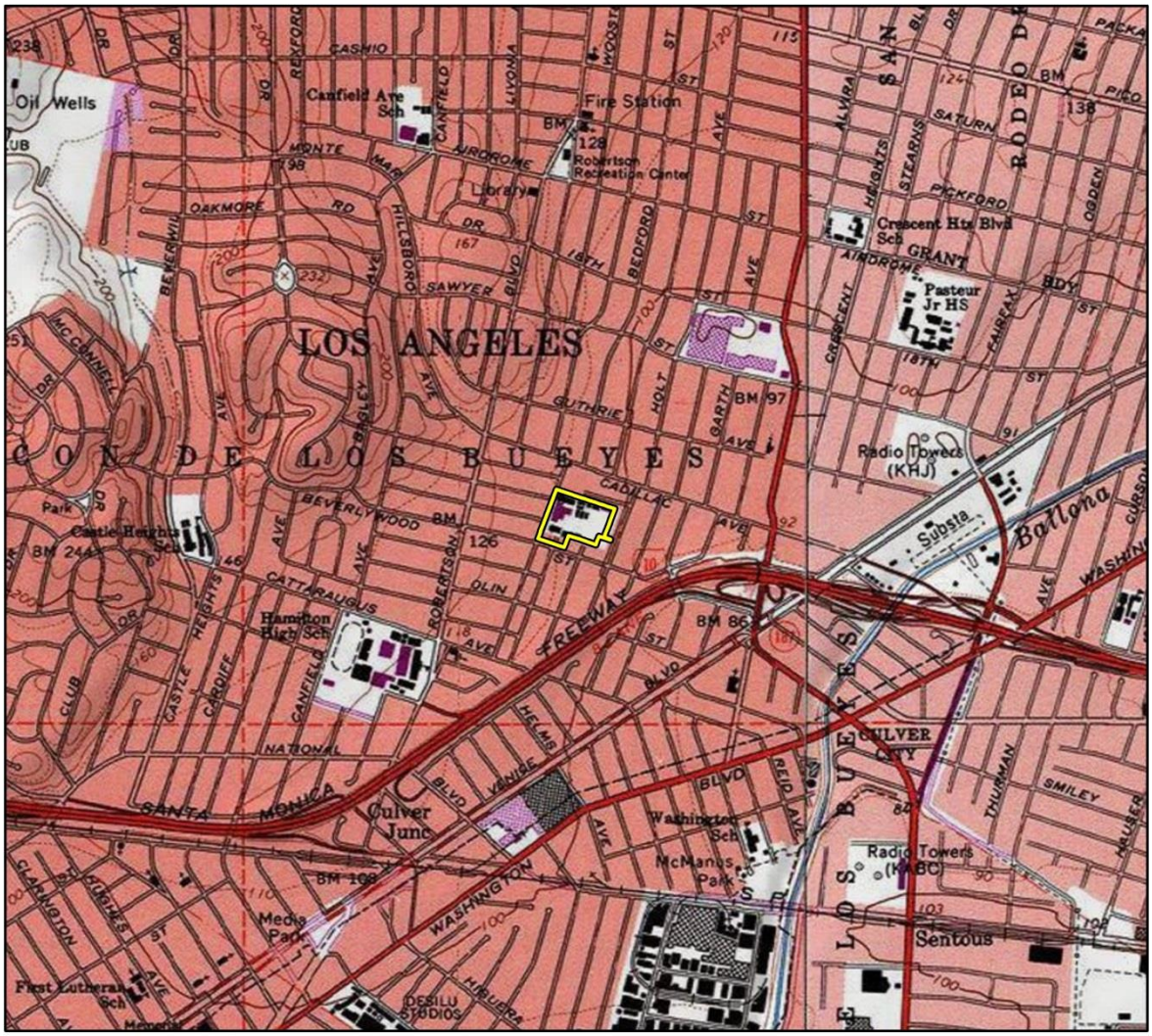
2 Introduction

Shenandoah Street Elementary school is located on a level, irregularly shaped site in the Mid-City neighborhood of Los Angeles, California, approximately 0.2 mile north of Interstate 10 (Figure 1). The 6.7-acre campus is bound by Cadillac Avenue to the north, South Halm Avenue to the east, Beverlywood Street to the south, and South Shenandoah to the west (Figure 2). The school's entrance faces Shenandoah Street. Development in the surrounding area is primarily single- and multi-family residential in character.

Figure 1 Vicinity Map



Imagery provided by National Geographic Society, ESRI and its licensors © 2017. Beverly Hills Quadrangle. T01S R14W S31. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.



Figure 2 Location Map



Imagery provided by Google and its licensors © 2017.
Additional data provided by LA Unified School District, 2017.

2.1 Regulatory Framework

CEQA requires lead agencies to consider the impacts of proposed projects on historical resources. Under CEQA, historical resources are defined properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), or a local register. Eligible resources may include buildings, sites, structures, objects, cultural landscapes, and historic districts. Properties that are listed in the NRHP or found eligible for the NRHP through consensus with the State Office of Historic Preservation are automatically listed in the CRHR. Federal, state, and local designation criteria are presented below.

National Register of Historic Places

The NRHP was established by the National Historic Preservation Act (NHPA) of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[2] The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

- **Criterion A.** It is associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B.** It is associated with the lives of persons who are significant in our past.
- **Criterion C.** It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D.** It has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting at least one of the above designation criteria, resources must also retain integrity, or enough of their historic character or appearance, to be "recognizable as historical resources and to convey the reasons for their significance."[3] The National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities, defined as follows:

1. **Location.** The place where the historic property was constructed or the place where the historic event occurred
2. **Design.** The combination of elements that create the form, plan, space, structure, and style of a property
3. **Setting.** The physical environment of a historic property
4. **Materials.** The physical elements combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property

[2] Code of Federal Regulations 36, Code of Federal Regulations 60.2.

[3] California Office of Historic Preservation, "California Register and National Register: A Comparison (for Purposes of Determining Eligibility for the California Register)," Technical Assistance Series No. 6. (Sacramento, CA, 14 March 2006).

5. **Workmanship.** The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory
6. **Feeling.** A property's expression of the aesthetic or historic sense of a particular period of time
7. **Association.** The direct link between an important historic event or person and a historic property[4]

California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change."[5] Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs may be nominated for inclusion in the CRHR. According to PRC Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1.** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2.** It is associated with the lives of persons important in our past.
- **Criterion 3.** It embodies the distinctive characteristics of a type, period, region, or method of installation, or represents the work of an important creative individual, or possesses high artistic values.
- **Criterion 4.** It has yielded or may be likely to yield information important in prehistory or history.

It is possible that a resource that does not possess sufficient integrity for NRHP listing may still be eligible for the CRHR. Furthermore, while typically NRHP eligibility requires a property to be at least 50 years of age, there is no age requirement for listing in the CRHR. Rather, regulations specify that enough time must have passed for a property to be evaluated within its historic context.

Los Angeles Historic-Cultural Monuments

Local landmarks in the city of Los Angeles are known as Historic-Cultural Monuments and are under the aegis of the Los Angeles Planning Department, Office of Historic Resources. A Historic Cultural Monument is defined in the Cultural Heritage Ordinance as follows:

> Historic-Cultural Monument (Monument) is any site (including significant trees or other plant life located on the site), building or structure of particular historic or cultural significance to the City of Los Angeles, including historic structures or sites in which the broad cultural, economic or social history of the nation, State or community is reflected or exemplified; or which is identified

[4] U.S. Department of the Interior, National Park Service. "How to Apply the National Register Criteria for Evaluation, "*National Register Bulletin* No. 15 (Washington D.C., 2002).

[5] Public Resources Code, Sections 21083.2 and 21084.1.

with historic personages or with important events in the main currents of national, State or local history; or which embodies the distinguishing characteristics of an architectural type specimen, inherently valuable for a study of a period, style or method of construction; or a notable work of a master builder, designer, or architect whose individual genius influenced his or her age.[6]

LAUSD Historic Context Statement, 1870 to 1969

In addition to using all applicable criteria of significance, this evaluation utilized the methodology and framework for evaluations described in the 2014 *LAUSD Historic Context Statement*. Adopted by the LAUSD Board of Education, the *LAUSD Historic Context Statement* offers a consistent, standard approach for evaluating schools and campuses throughout the district. The document utilizes the NRHP Multiple Property Documentation (MPD) format, which provides a comparative, context-driven framework for evaluating related properties. As discussed in that document, "the MPD approach defines themes of significance, eligibility standards, and related property types. Properties sharing a theme of significance are then assessed consistently, in comparison with resources that share similar physical characteristics and historical associations."[7]

2.2 Methods

This historical resources evaluation was completed in accordance with recognized professional standards, following the Secretary of the Interior's Standards for Preservation Planning, Identification, Evaluation and Registration; California Office of Historic Preservation; and National Park Service professional standards and guidelines. Applicable national, state, and local level criteria were considered, as were the context-driven methods and framework used in *LAUSD Historic Context Statement, 1869-1970* and other applicable historic context statements, including SurveyLA, the citywide historic resources survey conducted by the Los Angeles Office of Historic Resources.[8]

Efforts were made to identify previous historical resource evaluations of the subject campus and other related LAUSD schools. This included a records search of the California Historical Resources Information System, conducted at the South Central Coastal Information Center at California State University, Fullerton in June 2017. The California Historical Resources Information System search reviewed the combined listings of the NRHP, CRHR, California State Historical Landmarks, California Points of Historical Interest, and California Historic Resources Inventory. In addition, the findings of the following surveys were reviewed:

- Post-1994 Northridge Earthquake Historical Resources Surveys: These surveys were conducted for the Federal Emergency Management Agency in support of compliance with Section 106 of the National Preservation Act and recorded 71 LAUSD campuses.

[6] Los Angeles Municipal Code, Section 22.171.7, added by Ordinance No. 178,402, Effective 4-2-07

[7] Sapphos Environmental, Inc. *Los Angeles Unified School District: Historic Context Statement, 1870 to 1969* (Los Angeles Unified School District Office of Environmental Health and Safety, March 2014).

[8] Ibid; As part of SurveyLA, the Los Angeles Department of City Planning Office of Historic Resources has been developing a citywide historic context statement, which provides a framework for identifying and evaluating the city's historic resources; see Los Angeles Department of City Planning Office of Historic Resources, "SurveyLA, Historic Context," https://preservation.lacity.org/historic-context (accessed 2 October 2017).

- Phase 1 and 2 Getty Surveys: These surveys were conducted in two multi-year phases between 2001 and 2004 and expanded on the post-Northridge Earthquake surveys, covering approximately 410 LAUSD campuses.[9]
- 2014 LAUSD Historic Resources Survey: Completed in 2014, this historic resources survey included 55 LAUSD campuses that the time of survey, were over 45 years of age. Of these 14 were found eligible for NRHP and/or CRHR listing.[10]
- SurveyLA: A multi-year, citywide historical resources survey that is currently being finalized by the Los Angeles Office of Historic Resources.

Property-specific research was also conducted to document the construction and alteration history of the subject campus and to explore potential significant associations. A package of historic aerial and topographic maps and Sanborn Fire Insurance Maps for the property was acquired from Environmental Data Resources. Other sources reviewed include the combined collections of ProQuest historical newspapers, historic *Los Angeles Times*, Los Angeles Public Library (including the California Index), University of Southern California Libraries and Special Collections, and the online photographic collection of the Huntington Library and yearbooks at Classmates.com. Rincon staff also reviewed Vault Drawings on file with LAUSD, which include architectural plans and drawings detailing the construction and alteration histories of the subject campus and its buildings.

Susan Zamudio-Gurrola and Rachel Perzel conducted an intensive-level survey of the subject campus on August 11, 2017. All buildings and structures on the subject campus were photographed and documented in field notes describing character-defining features, materials, and alterations. The survey included the exteriors and interiors of campus buildings.

The campus and its buildings were recorded on California Department of Parks and Recreation (DPR) 523 series forms, which are included in Appendix A of this report.

The subject campus was evaluated for listing in the NRHP, CRHR, and local designation using applicable criteria, and the consistent framework and registration requirements of the LAUSD Historic Context Statement. Campus buildings were considered both individually as well as collectively as potential historic districts.

If a building was found to meet federal, state, and/or local designation criteria, an integrity assessment was prepared to determine if they are able to convey their significance. The analysis considered the seven aspects of integrity as defined by the National Park Service and include a detailed explanation of why and how a property does or does not retain integrity. An integrity assessment was not completed however for those buildings that did not appear to meet applicable designation criteria.

2.3 Previous Historical Resource Surveys

Shenandoah Elementary School is located in the West Adams-Baldwin Hills-Leimert Community Plan Area (CPA), an area that was surveyed in 2012 as part of SurveyLA, the Los Angeles Office of Historic

[9] Leslie Heumann, Science Applications International Corporation, "Historic Resources Survey of the Los Angeles Unified School District," (Pasadena, CA, 2002-2004).

[10] Sapphos Environmental, Inc., *LAUSD Historic Context Statement*.

Resources' citywide historic resources survey.[11] Neither the campus nor any of the individual school buildings were identified at that time.

In 2002, in fulfillment of a planning grant provided under the Preserve Initiative of the J. Paul Getty Trust, the LAUSD performed its first systematic survey in an effort to identify historically significant school properties in the district. Shenandoah Elementary School was included in this survey and found ineligible for federal, state, or local designation.

[11] Architectural Resources Group, *Historic Resources Survey Report: West Adams-Baldwin Hills-Leimert Community Plan Area* (Los Angeles: City of Los Angeles Department of City Planning, Office of Historic Resources, September 2012, revised July 2016).

3 Campus Site Description and History

3.1 Overview Description

Located in a primarily residential area of Los Angeles' Mid-City neighborhood, the Shenandoah Elementary School campus occupies an L-shaped 6.7-acre site. The campus features three permanent buildings located along the western boundary of the campus and oriented towards Shenandoah Street, as well as 24 portable buildings to the east that are primarily grouped along the northern edge of the campus.

The oldest extant building on campus is the Classroom Building North, which was constructed in 1940 and is located at the northwestern corner of the campus. With little setback from South Shenandoah Street, the rectangular-shaped, single-story building contains the campus assembly hall in a shorter, north-south trending wing, as well as classrooms in the longer, east-west trending wing. The building features very minimal elements of Spanish Colonial/Mission Revival-style architecture, embodied in its smooth stucco wall cladding, red-clay tile roof, and limited circular window openings. Additional fenestration includes multi-light, wood-framed, double-hung and transom windows of varying size and groupings. Two entrances to the building are extant on the west, street-facing facade; both are accessible via clay tile-clad steps.

Immediately south of the Classroom Building North and centrally sited along the western edge of the campus is the one-story Administrative Building. The building features an irregular shaped plan and includes a covered, open-air lunch shelter that extends from its southern wall plane. Constructed in 1977, the building features minimal elements of Late Modern design. These features are limited to its rectangular massing and flat roof with pronounced fascia that exhibits a repetitive Mayan-influenced design motif. A variety of window styles are present across the building, including bands of single-light metal windows topped with single-light transoms in addition to metal-framed, single and multi-light units framed by projecting concrete surrounds. With the exception of the wood-paneled front entry doors, doors throughout the building are covered with modern metal security units.

One-story with an L-shaped plan, the Shenandoah Children's Center Building anchors the southwest corner of the subject campus. Constructed in 1970, the building features elements of Late Modern-style architecture in its minimally pitched roof that incorporates a slight repeating saw-tooth pattern and exaggerated overhangs created by concrete roof beams extending several feet from the wall plane. A large corrugated metal roof screen sits atop the roof and shields heating, ventilation, and air-conditioning equipment. Exterior wall surfaces are sheathed in stucco and punctuated by bands of metal-framed windows, primarily limited to the south and east elevations. Doors are also spread across these elevations and consist of solid, metal door types.

The numerous portable buildings are limited primarily to the northern boundary of the campus. These non-descript buildings are similar in their design and materials: they are one story, square or rectangular in plan, capped by flat or minimally pitched gabled roofs, and sheathed in stucco. They feature limited windows and solid doors accessed by short sets of stairs. With the exception of some landscaping along the perimeter of the campus, the ground is covered mostly in asphalt and includes a central recreational area and two surface parking lots in the southwestern quadrant.

Figure 3 Campus Map



Imagery provided by Google and its licensors © 2017.
Additional data provided by LA Unified School District, 2017.

Table 1 Shenandoah Elementary School Buildings

No.	Name	Type	Year Built
1	Classroom Building - North	Permanent	1940
2	Administrative Building	Permanent	1977
3	Two/Three Unit Relocatable	Portable	1955
4	Two/Three Unit Relocatable	Portable	1956
5	Two/Three Unit Relocatable	Portable	1953
6	Single Unit Modular	Portable	1986
7	Single Unit Modular	Portable	1986
8	Single Unit Modular	Portable	1991
9	Single Unit Modular	Portable	1991
10	Single Unit Modular	Portable	1991
11	Single Unit Modular	Portable	1991
12	Sanitary Relocatable	Portable	1949
13	Two/Three Unit Relocatable	Portable	1947
14	Two/Three Unit Relocatable	Portable	1949
15	Two/Three Unit Relocatable	Portable	1949
16	Two/Three Unit Relocatable	Portable	1949
17	Two/Three Unit Relocatable	Portable	1949
18	Two/Three Unit Relocatable	Portable	1950
19	Double Unit Modular	Portable	1997
20	Double Unit Modular	Portable	1997
20	Double Unit Modular	Portable	1997
21	Double Unit Modular	Portable	1997
22	Double Unit Modular	Portable	1998
23	Double Unit Modular	Portable	1998
24	Storage Unit Relocatable	Portable	1975
25	Two/Three Unit Relocatable	Portable	1949
N/A	Shenandoah Children's Center	Permanent	1970

Figure 4 Classroom Building North, West (Primary) Elevation



Figure 5 Classroom Building North, South Elevation



Figure 6 Administrative Building, West Elevation



Figure 7 Administrative Building, East Elevation



Figure 8 Lunch Shelter Extending from North Elevation of Administrative Building



Figure 9 Shenandoah Children's Center, North and West Elevations



Figure 10 Representative Portable Buildings



3.2 Site History and Construction Chronology

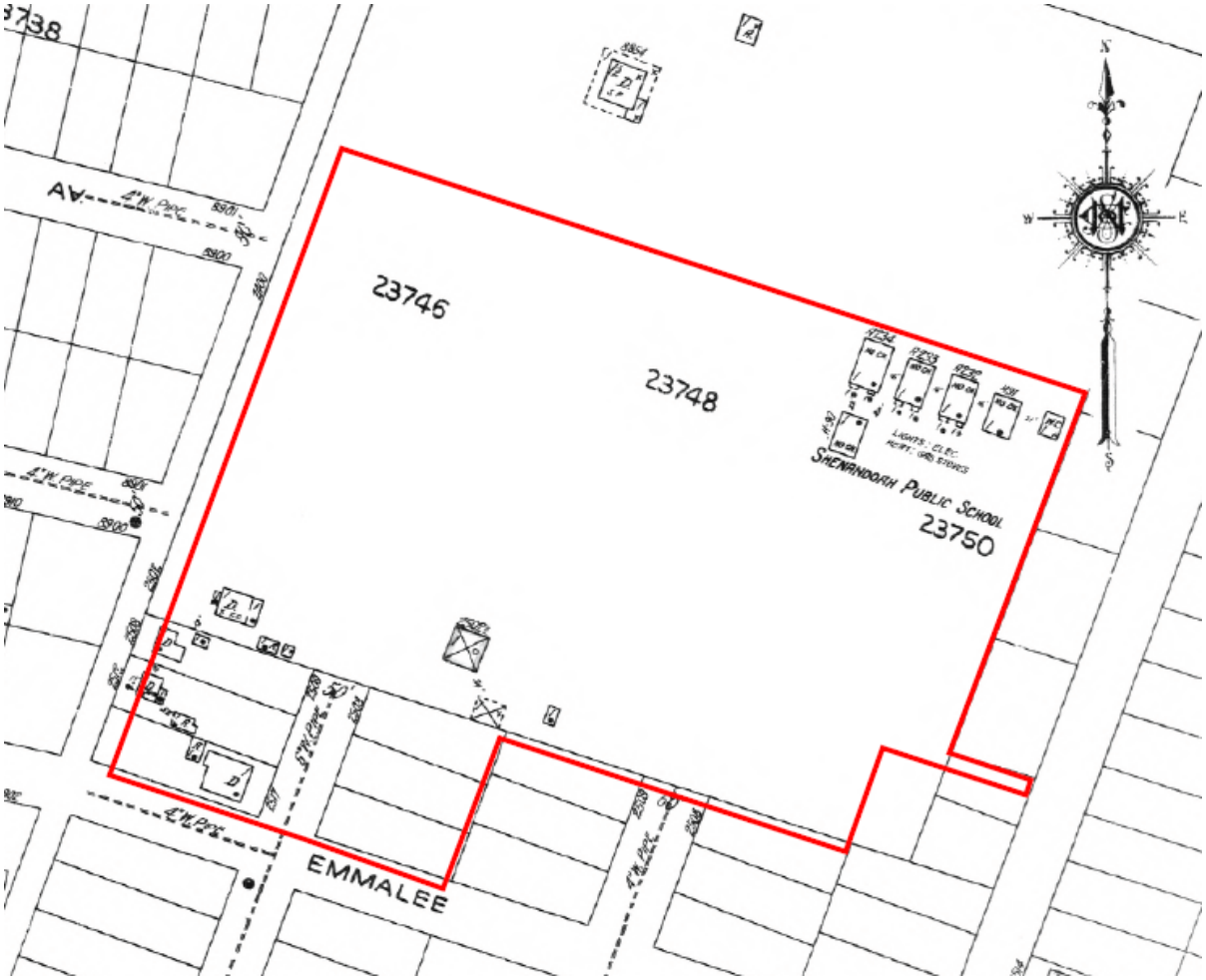
Until the late-19th century much of the area surrounding the present-day Shenandoah Elementary School site was part of the Rancho Rincón de los Bueyes. In 1865, Jose Antonio Rocha II built an adobe home (extant) just north of the present Shenandoah Elementary School site, at what is now 2400 Shenandoah Street. Seven years later, in 1872, Rocha purchased his home and another 100 adjoining acres of farmland from the owners of the Rancho Rincón de los Bueyes. The rural, agricultural character of this section of Los Angeles gave way residential and commercial construction as urban development spread west from the city core in the late-19th and early-20th centuries. Much of Rocha's rancho was subdivided in subsequent years. In 1915, the City of Los Angles annexed the school site and surrounding vicinity.[12]

Historic aerial photographs show that the community surrounding the Shenandoah Street Elementary School (also referred to in its early years as Shenandoah Public School or Shenandoah Street School) site was still sparsely developed through the 1920s. By the late 1930s, as suburban development continued to push westward from Central Los Angeles, more dense residential construction occurred in the blocks surrounding the school site. By the late 1940s, the surrounding neighborhood was completely built out, as expected with the post-World War II population and construction boom in Los Angeles. Shenandoah Elementary School helped fill the need for educational facilities for young children in a predominantly residential neighborhood that developed rapidly over an approximately 20-year period.

[12] Photograph: "Rocha Adobe restored." Accessed via Calisphere at https://calisphere.org/item/7bb7b4381e25d6f6f08b1f9e4200c0b1/.

The earliest available documentation of the site, a Sanborn Fire Company map from 1927, depicts the school occupying a much smaller area in what would today be the northeast corner of the campus. At the time, the school was composed of six small, nearly square buildings (Figure 11). By the following year, several small buildings were added in the same area. A narrow strip of residential lots separated the school from Halm Avenue, although these lots were not fully developed with homes until the 1940s.[13]

Figure 11 1927 Sanborn Fire Insurance Company map, earliest documented incarnation of the Shenandoah Street Elementary School campus.



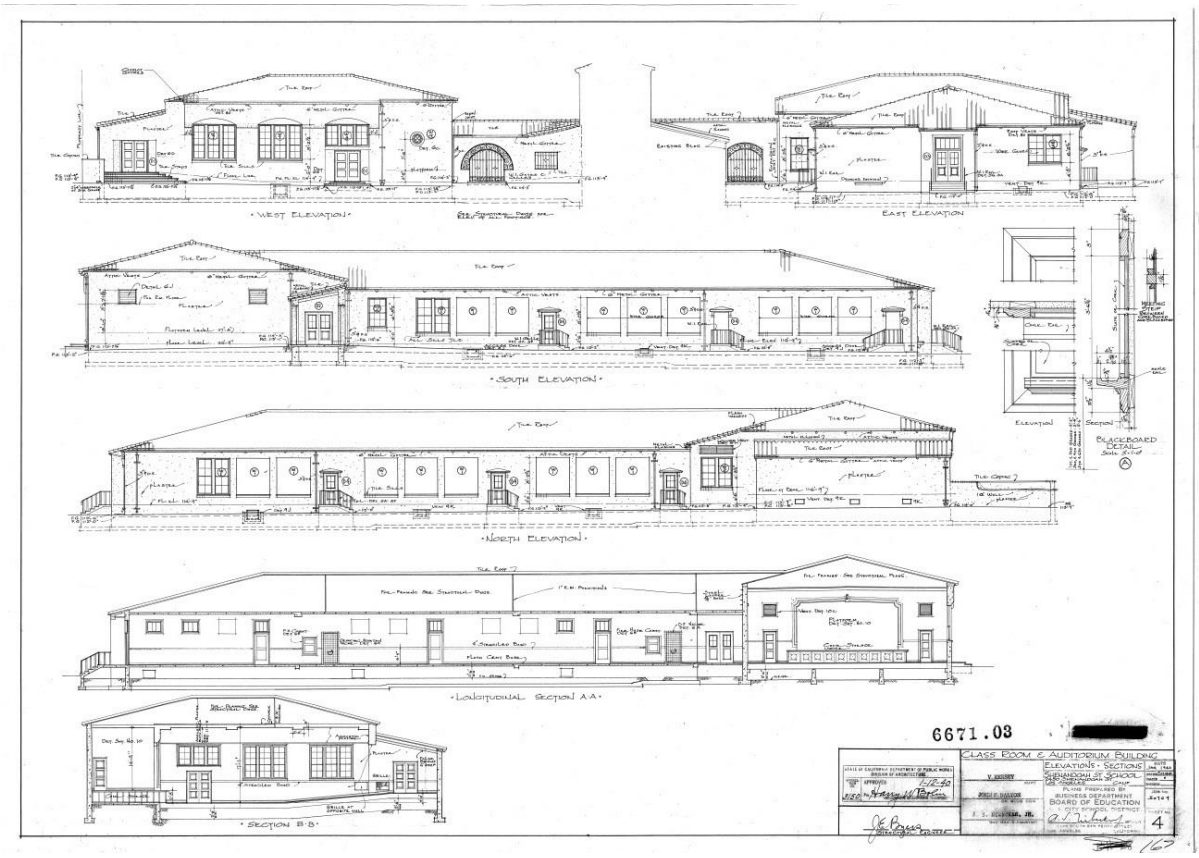
In 1929 the Los Angeles Board of Education approved plans by its architectural division for the construction of a new building at the Shenandoah School site. Designed as a 65-foot by 182-foot two-story brick building, it included 12 units (assumed to be classrooms) and required an appropriation of $84,000.[14] The new building, which fronted Shenandoah Street, was completed by the following year.[15] Various smaller buildings have been located to the rear (east) of the main building since that time, although locations have varied over the decades. For example, in 1938 a

[13] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.
[14] 1929. *Los Angeles Time.* "School Designed." October 13.
[15] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.

cluster of five buildings was located in the northeast corner of the property, all of which have since been demolished.

In February 1940, the Board of Education awarded a contract to Los Angeles-based contractor, David J. Reed, to construct a new auditorium and classroom building at the school site for an estimated $49,450 (Figure 12).[16] Reed worked on other area school construction projects, such as Nathaniel Narbonne School in Lomita, Thomas A. Edison School in Burbank, and Cahuenga School.[17]Constructed slightly north of the main building that was built a decade earlier, the new building was designed by district architect Alfred S. Nibecker, Jr. and provided a combination of auditorium and classroom space.

Figure 12 1940 Classroom and Auditorium Elevations and Sections, Shenandoah Street School.



While World War II triggered a massive influx of migrants seeking jobs in the region's booming defense industry, the financial and economic constraints of wartime severely limited spending on public school infrastructure. Following the relative austerity of the World War II era, a postwar baby boom further strained the Los Angeles public school system's ability to accommodate the growing school-age population. As explained in the *LAUSD Historic Context Statement*:

[16] 1940. *Los Angeles Times.* "School Contract Let." February 6.

[17] 1932. *Los Angeles Times.* "Board to Spend Huge Amount." December 18; 1936. *Los Angeles Times.* "New Work List Grows." July 26; 1937. *San Bernardino Daily Sun*, "S.B. Firm is Low Bidder on School Plans." December 16;1942. *Los Angeles Times.* "School Buildings Contracts Awarded." March 13.

> In 1949–1950, enrollment at U.S. elementary and secondary schools stood at 25.1 million. In one decade, this number expanded by nearly 50 percent to approximately 36 million; by 1971, it reached 46 million. In 1955, in the midst of this boom, "editors at the Architectural Forum worried, 'every 15 minutes enough babies are born to fill another classroom and we are already 250,000 classrooms behind.' The rising population of young American children made school building, together with housing, the most widely discussed architectural challenge after World War II."
>
> Perhaps in no other state of the union was this growth felt more acutely than in California. The booming birth rate was accompanied by a wave of in-migration, as new settlers were drawn by established employment centers in, among other things, the aerospace industry, which had shifted operations to peacetime production. [18]
>
> Overcrowding led to the need to offer "half-day" sessions for children, where attendance happened in shifts of half-days. Bond issues in 1946, 1952, and 1955 addressed the pressing need for new school construction, and the resulting funds paid for the construction and expansion of numerous schools. The 1946 bond issue provided $75 million, which helped generate 66 new schools, with a total of over 2,300 classrooms, over 480 cafeterias, gyms, auditoriums, and other ancillary buildings. In addition, over $7.8 million went toward land for new schools, $3.2 million for maintenance and improvements to an aging stock of facilities, $4.5 million for grounds improvements, and $10.6 million for equipment. In spite of these investments, another $148 million was proposed for a 1952 bond issue.
>
> In 1948, district-wide enrollment stood at 301,000 students; by 1949, this figure had increased by 15,000, with enrollment reaching over 316,000. By the end of the 1950s baby boom, however, the student population of the Los Angeles City school district more than doubled, climbing from 316,000 to over 645,000. A further increase of 28,000 pupils was predicted for the school year 1960–1961.[19]

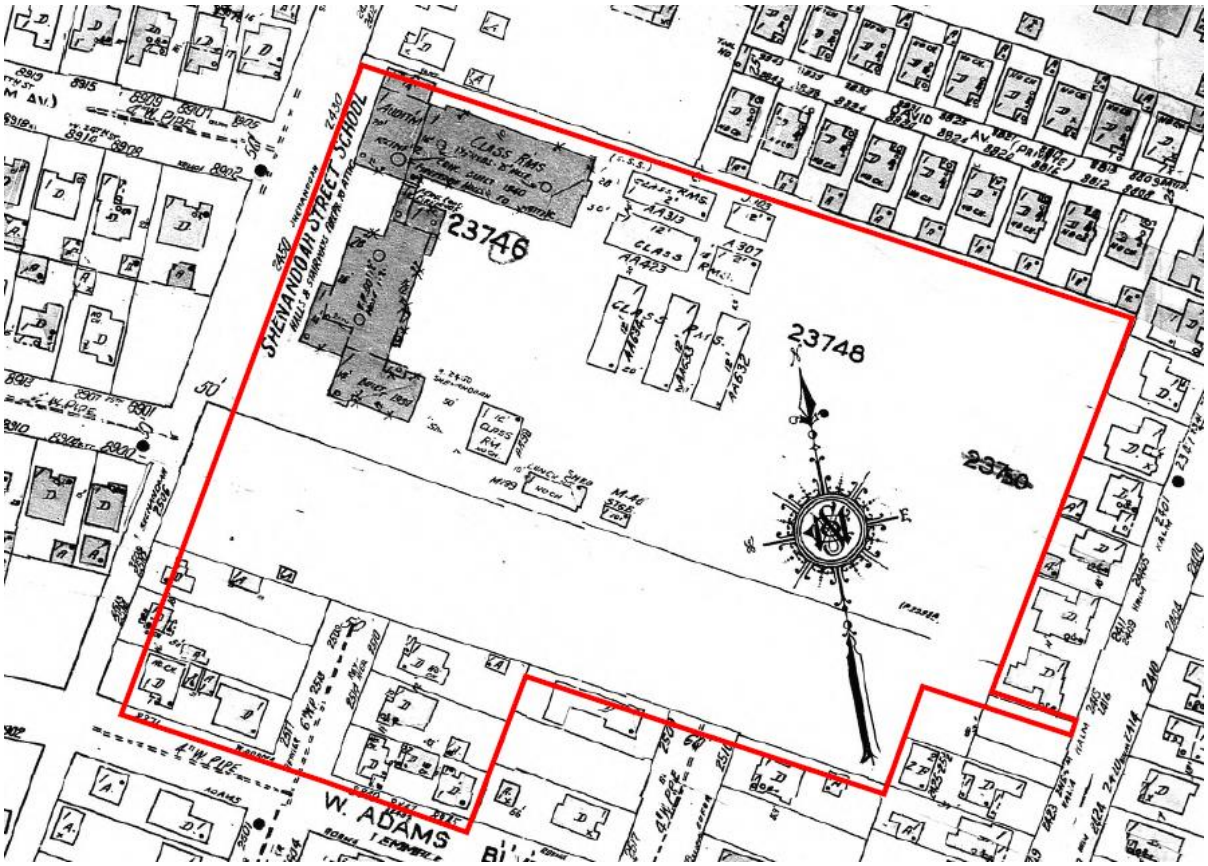
In the late 1940s and early 1950s, district officials addressed growing enrollment at Shenandoah Elementary School by adding a number of portable classroom buildings. By 1948, the buildings at the northeast corner of the property had been removed, and within the next two years, a cluster of ten larger portable classrooms was added in the center of the school property, (Figure 13). Several additional portable buildings were installed in the 1950s. In all, 11 extant portable buildings are situated on the campus, seven dating to the late 1940s, and four from the 1950s.[20]

[18] Sapphos Environmental, Inc., 71.

[19] Sapphos Environmental, Inc., 102.

[20] Los Angeles Unified School District. 2010. Shenandoah Elementary School: Pre-Planning Survey. Prepared by Martinez Architects, Inc. Playa del Rey, CA. June 15, 2010.

Figure 13 1950 Sanborn Fire Insurance Company Map, Shenandoah Street Elementary School Campus, Including the 1929 Administrative Building, 1940 Classroom Building, and Several Portable Buildings Installed in the Late 1940s.



The LAUSD developed a new child care center at Shenandoah Elementary School in the late 1960s through the early 1970s. District officials acquired properties along Beverlywood Street and the existing homes and garages were demolished to develop the child care center's buildings, playground, and parking area.[21] Two buildings were developed at the southwest corner of the property for this purpose between 1964 and 1970. A 1969 Sanborn map depicts a single-story, wood-framed "youth center" in this section of the property.[22] This building has since been demolished to make space for a small parking lot. The other building, the L-shaped Shenandoah Children's Center Building at the corner of Shenandoah and Beverlywood streets, dates to 1970 and was designed by Norman E. Kocher, an architect with the design section of the Los Angeles Board of Education.[23]

[21] 1973. *Los Angeles Times.* "Education Board Approves Payments." February 1; 1973. *Los Angeles Times* "Site to be Cleared." May 3.

[22] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.

[23] Los Angeles Unified School District (LAUSD). Vault Drawings: 1929-2007 (Children's Center Building, 1969.) From LAUSD Facilities Site Portal: Site 13491: Shenandoah ES. Los Angeles, CA.

Figure 14 1970 Aerial Photograph, Shenandoah Street Elementary School Campus, Depicting Old Main Building and new Children's Unit Building

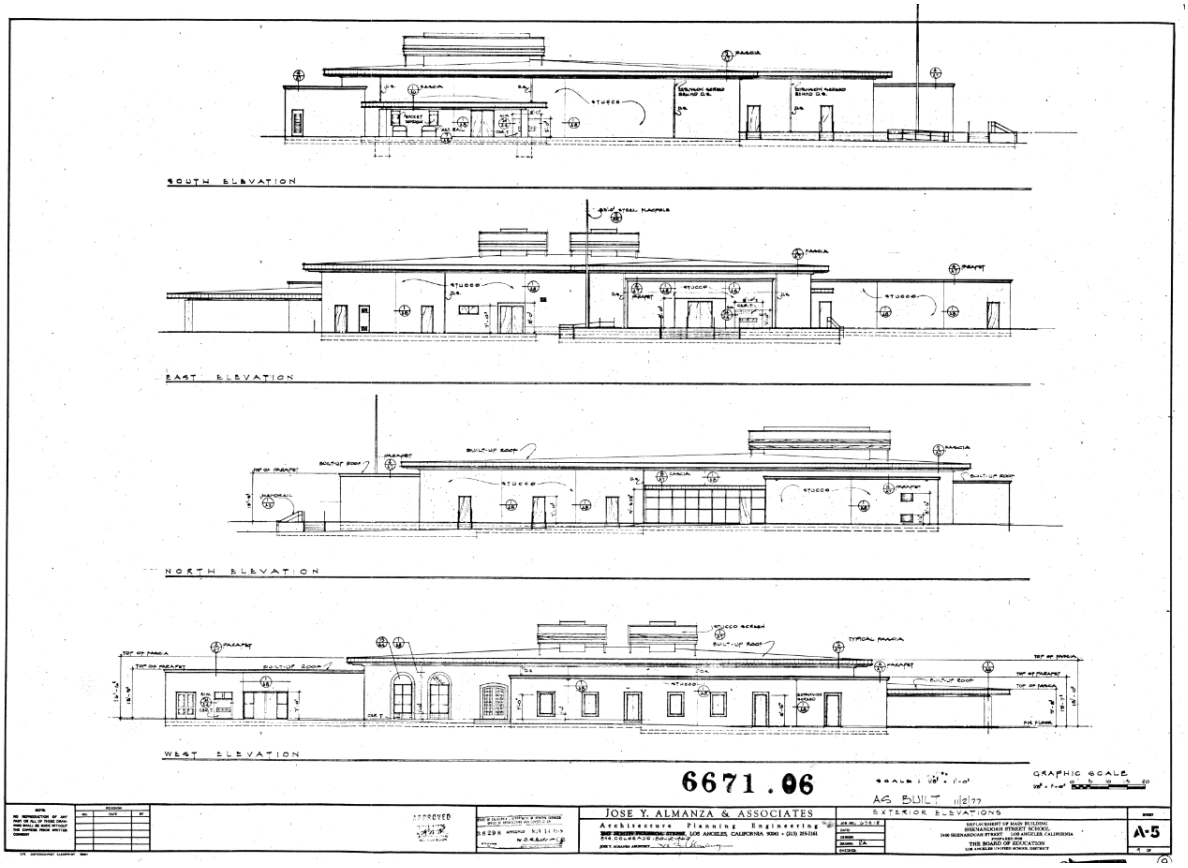


In 1971, the school board began to make plans to demolish the old main building located at the central-western edge of the property. The building was replaced with the new Administrative Building in 1974, designed by architect Jose Almanza and estimated to cost $964,902, which included two kindergarten rooms, four standard classrooms, administrative space, a multi-purpose room, cafeteria, and an outdoor eating area. The new building featured Mayan-inspired fascia, and featured de-mountable interior walls to allow for flexible use of spaces and a sunken reading pit in the middle of the library room (Figure 15).[24] Construction began the following year and continued through 1977.[25]

[24] 1974. *Los Angeles Times.* "New School Will Feature Innovations." November 28.

[25] Los Angeles Unified School District (LAUSD). Vault Drawings: 1929-2007 (New Main Building, 1975.) From LAUSD Facilities Site Portal: Site 13491: Shenandoah ES. Los Angeles, CA.

Figure 15 1975 design for Exterior Elevations, Administrative Building, Shenandoah Street Elementary School campus.



As the school campus changed during this period, so did approaches to public education in Los Angeles. In the late 1970s, Shenandoah School was one of many schools to participate in a school racial desegregation program undertaken by the Los Angeles Board of Education. Proponents of this "busing" program intended to reverse the effects of residential segregation on the demographic character of several city schools. The late-20th century "racial geography" of Los Angeles had been determined, in part, by such real estate industry practices as restrictive covenants and "redlining." Although both of these practices were banned before the district implemented its busing program, many Los Angeles neighborhoods remained racially segregated in fact, if not by policy. Because schools enrolled students primarily from within surrounding neighborhood boundaries, *de facto* racial segregation likewise defined the racial make-up of many schools. Acceding to civil rights activists' objections to strict school enrollment boundaries, the district began experimenting with busing programs in the 1950s and 1960s. After a 1977 California Supreme Court decision ordering a "'reasonable and feasible' integration plan," the Board of Education proposed a mandatory busing program.[26] As part of one of the largest such programs ever attempted in a U.S. city at the time, approximately 30,000 children were bused to different schools within Los Angeles in order to racially integrate city schools. The school district identified Shenandoah Elementary School, whose student body the *Los Angeles Times* described as "90 percent minority," became a target of the

[26] Sapphos Environmental, Inc. 108-109, 113.

busing program.[27] Mandatory busing in the LAUSD district was short-lived, due to its controversial reception, explained in the *LAUSD Historic Context Statement* thus:

> The program was controversial and contested on a number of fronts. Just two years after the Los Angeles Board of Education proposed its plan, California's Proposition 1 sought to reverse it through a constitutional ban on mandatory busing. On the ballot in November 1979, Proposition 1 passed handily, with 70 percent of voters supporting the end of the practice. On appeal in 1982, the US Supreme Court found Proposition 1 constitutional and upheld the ban on mandatory busing.[28]

The campus expanded in the following two decades, though this expansion did not include the construction of any significant permanent buildings. During the 1980s and 1990s, additional portable facilities were added along the southern boundary and in the northeastern portion of the property, developing into the current campus configuration. The area immediately surrounding the school remains predominantly residential, as it has been since at least the 1930s.[29]

[27] 1978. *Los Angeles Times.* "Parents Face Hope, Frustration." August 28.

[28] Sapphos Environmental, Inc., 113.

[29] Environmental Data Resources, Inc. (EDR). 2017. EDR Aerial Photo Decade Package Report: Shenandoah ES School. Shelton, CT. June 20.

4 Historic Overview

4.1 Focused Neighborhood History

The Shenandoah Elementary School campus is located in the western reaches of the West Adams-Baldwin Hills-Leimert CPA in Los Angeles' Mid-City neighborhood. This section presents historic context and background on the development and settlement history of the West Adams-Baldwin Hills-Leimert CPA, surrounding the Shenandoah Elementary School campus. A discussion of the area's early development is excerpted below from the SurveyLA survey report:

> The West Adams-Baldwin Hills-Leimert CPA was incorporated into the city of Los Angeles gradually over 80 years in 21 separate annexations and one consolidation. The CPA includes the Los Angeles neighborhoods of Arlington Heights, Jefferson Park, Leimert Park, Hyde Park, Baldwin Hills-Crenshaw, Mid-City, Palms, and Beverlywood. The westernmost portion of the greater West Adams neighborhood, including the West Adams Terrace and Jefferson Park HPOZs, is within the boundaries of the CPA. The easternmost sections of the Palms and Beverlywood neighborhoods are also within the CPA.
>
> Hyde Park, which is located at the southern tip of the CPA, was an incorporated city prior to its consolidation into the City of Los Angeles in 1923. Established in 1887, Hyde Park was a stop on the Atchison, Topeka and Santa Fe Railway's Harbor Subdivision, which linked downtown Los Angeles to the port at Wilmington. The area was largely built out with modest single-family homes in the first two decades of the 20th century. Perhaps due to its short period of incorporation (1922-1923), there is no evidence of a city center or municipal buildings that might have served this community. A handful of residences as well as a few institutional properties are all that remain of Hyde Park.
>
> The northern quadrant of the West Adams-Baldwin Hills-Leimert CPA developed in a southwesterly pattern beginning at the turn of the 20th century, as a growing network of streetcars and railroads enabled suburban development on land outside of the historic city center. The earliest subdivisions are located in the northeastern parts of the CPA, in the neighborhoods of Arlington Heights and Jefferson Park. The Arlington Heights area was particularly well served by public transit, with a streetcar traversing every major east-west artery. The interior streets filled with single- and multi-family houses beginning in the early 1900s and continuing through the boom of the 1920s.
>
> Many of the tracts that were established in the 1910s and '20s were equipped with restrictions on the size and appearance of building stock as well as on who could live within their boundaries. Covenants often barred minority residents from living within these tracts and as a result, much of the city was off-limits to non-white homeowners until the late 1940s, when racially restrictive housing covenants were ruled unconstitutional. Even after the 1948 Supreme Court decision, restrictive housing practices continued to be enforced by neighborhood groups and realtors who used intimidation—and at times, violence—to keep non-white residents out of neighborhoods.
>
> Leimert Park, laid out by Walter Leimert in 1927, was almost exclusively inhabited by white homeowners in the prewar era and had restrictive covenants in the deeds to ensure its homogeny. One group, the benignly-named Neighborly Endeavors, worked to keep the neighborhood free of non-whites in the 1950s, going so far as to burn crosses on front lawns

and vandalize the homes of unwanted neighbors. Despite their efforts, a number of black families moved into Leimert Park and stood their ground against the intimidation and violence. More and more upwardly-mobile African American families moved to Leimert Park after 1950 and their population grew from 70 persons to about 4,200 in one decade alone. By 1960, non-whites (including African Americans, Japanese Americans and Latin Americans) comprised half of the total population and Leimert Park became one of the city's most diverse neighborhoods, with notable residents such as Ella Fitzgerald, Ray Charles, and Los Angeles's first African American mayor, Tom Bradley.

In the years leading up to World War II, there was a thriving Japanese American community in the Exposition Park and Jefferson Park neighborhoods, west of the University of Southern California (and just to the east of the West Adams-Baldwin Hills-Leimert CPA boundary). After the war and the period of forced internment, the area's Japanese American residents returned to seinan (meaning southwest) to resume life in their community. In the following years, many nissei (second-generation) pushed westward into the Crenshaw district, which after the war became a vibrant center of Japanese American commerce and culture. North of Leimert Park, there was a small district of undeveloped land to the east of Crenshaw that was the site of the notorious Black Dahlia murder in 1947. In the late 1950s, a group of Japanese American investors planned a shopping center on Crenshaw Boulevard and a subdivision of single-family residences and apartment buildings. The development of the Crenshaw Square shopping center and adjacent residential neighborhood was a sign of considerable nissei progress in Los Angeles, not only because of the scale and success of the development, but also due to the fact that the "principles behind the shopping center and the subdivision consciously promoted their ethnic character." While Japanese American communities before the war tended to assimilate into existing neighborhoods, drawing little attention to their presence, in Crenshaw, Japanese culture was celebrated in the design of new buildings and landscapes.

Without adjacent streetcar service, Baldwin Hills remained largely undeveloped until the late 1940s and '50s. When Baldwin Hills Village (now known as the Village Green), a groundbreaking garden apartment community, was constructed in 1941 it was surrounded by open fields on all sides. Baldwin Hills Village was also governed by restrictive housing practices and remained an all-white community until the 1960s. The complex received international acclaim for its design, low-density planning, and high quality of living; large multi-family developments sprang up on adjacent vacant land, apparently hoping to capitalize on the popularity of the complex. The Crenshaw Village apartment community was constructed in 1948 and was advertised as having "garden type private home apartments." City directory research indicates that many of the residents of Crenshaw Village were Jewish; at that time, Jewish residents were restricted from living at nearby Baldwin Hills Village. It appears that the flats of Baldwin Hills were home to a thriving Jewish community until the 1960s and '70s, when drug and gang activity became a growing presence in the neighborhood, and many of Los Angeles's Jewish residents moved to west Los Angeles and parts of the San Fernando Valley.

The 1950s and '60s brought residential development in the hilly area above Baldwin Hills, called Baldwin Hills Estates. The hills are populated with sprawling single-family homes, many with unobstructed northerly views of the Los Angeles basin and Santa Monica Mountains. The area, along with View Park to the south (which is outside of Los Angeles city limits), became home to a number of affluent African American residents in the 1960s and

'70s, and remains today one of the wealthiest majority African American communities in the United States.[30]

[30] Los Angeles, City of.2016. West Adams-Baldwin Hills-Leimert Community Plan Area. Survey LA-Historic Resources Survey Report. Department of City Planning. Prepared by Architectural Resources Group. Pasadena, CA. September, 2012, Revised July, 2016.

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5 Associated Design Professional Biographies

The following section presents biographies for design professionals who are known to be associated with the principal buildings at Shenandoah Street Elementary School.

5.1 Alfred S. Nibecker, Jr.

The 1940 Classroom Building North was designed by Alfred S. Nibecker, Jr. Born in in Spokane, Washington in 1890, Nibecker received his degree at the Massachusetts Institute of Technology before eventually arriving in Los Angeles.[31] As detailed in the LAUSD Historic Context Statement:

> In the 1920s, Nibecker began private practice in Los Angeles; he joined the Los Angeles City Board of Education as an architect in 1926, where he remained until his retirement in 1955. In his three-decade career with the school district, Nibecker oversaw the construction of, and contributed designs to, hundreds of school plant projects. Many commissions were completed by the district's in-house staff, but many others were handled by a range of the region's best architects and builders, with an increasing number of firms specializing in school design. In addition to his work with the Los Angeles City school districts, Nibecker was a fellow of the American Institute of Architects and served on the National Committee on School House Construction, the National Advisory Council on School Building Problems, run under the auspices of the U.S. Department of the Interior, Office of Education. In 1955, Nibecker was made an honorary member of the Structural Engineers Association of Southern California, the association's highest award.[32]

Nibecker retired in 1955 and was replaced by Ernst Raymond C. Billerbeck. He continued to live in South Pasadena until his death in 1989.[33]

5.1 Norman E. Kocher

The Shenandoah Children's Center Building was designed by Los Angeles-based architect Norman E. Kocher in 1969. Born in Whittier, California in 1915, Kocher received his Bachelor's Degree in Architecture from the University of Southern California in 1942.[34] From 1942 through 1949, he served as a draftsman for Stiles O. Clements and Associates before founding the firm of Benedict, Beckler, and Kocher in 1950. This firm ultimately dissolved in 1955 when Kocher took a position with the design section of the Los Angeles Board of Education, as the assistant director to the principal architect. Archival research was unable to identify substantial information on the works of Kocher, who died in 1999.

[31] American Institute of Architects, American Architects Directory (New York: R.R. Bowker Company, 1962).

[32] Sapphos Environmental, Inc., 42.

[33] Ancestry.com. *U.S., Social Security Death Index, 1935-2014* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc., 2014.

[34] Ancestry.com. *U.S., Social Security Applications and Claims Index, 1936-2007* [database on-line]. Provo, UT, USA: Ancestry.com Operations, Inc., 2015; American Institute of Architects, American Architects Directory (New York: R.R. Bowker Company, 1970).

5.3 Jose Y. Almanza

The LAUSD commissioned architect Jose Almanza to design the new Main Building at Shenandoah Elementary School, completed in 1977 as a replacement for a 1930 building. No consequential information was found on Almanza. He appears to have been active in the 1970s, and designed Los Angeles County Fire Station #1 at 1108 North Eastern Avenue.[35]

[35] 2017. Alpha Construction Company, Inc., "Earlier School & Public." Accessed on August 15, 2017 at https://www.alphaconstruction.com/general-contractor-galleries-ca/earlier-projects/earlier-school-public/.

6 Significance Evaluation

This evaluation utilized the framework for historic resource assessments described in the *LAUSD Historic Context Statement, 1870-1969*, which follows the NRHP Multiple Property Documentation format (MPD). The MPD format "defines themes of significance, eligibility standards, and related property types. Properties sharing a theme of significance are then assessed consistently, in comparison with resources that share similar physical characteristics and historical associations."[36] In addition, this evaluation utilized the MPD-format historic context statements prepared as part of SurveyLA, which similarly identify themes of significance along with associated registration requirements.[37]

In addition to each of the applicable federal, state, and local designation criteria, one evaluation framework and its associated eligibility standards and integrity thresholds were identified and applied to this evaluation after careful consideration of all themes and subthemes. Each building on the campus was evaluated using these evaluation frameworks for eligibility both individually and as a contributor to any potential historic district.

Evaluation Framework 1

Context: Public and Private Institutional Development | Education

Theme: LAUSD | Post-1933 Long Beach Earthquake School Plants, 1933-1945

Property Type: Institutional/Education

Property Subtypes: Elementary, Junior High Schools, and High School Buildings and Campuses

Period of Significance: 1933 to 1945

Area of Significance: Education

Geographic Location: Citywide

Area of Significance: A/1

Eligibility Standards

- Exemplified post-Long Beach earthquake school planning and design concepts of the period, including requirements under the 1934 Field Act
- One-story massing for elementary schools; up to two-stories for junior/high schools
- Retains most of the associative and character-defining features from the period of significance

Character-Defining Features – Buildings/Structures

- One-story massing for elementary schools; up to two stories for middle and senior high schools
- Reinforced concrete, steel- or wood-frame construction
- Classroom wings designed for easy access and views to outdoors—with variations including L-, H-, T-shaped building plans

[36] Sapphos Environmental, Inc., 4.

[37] Los Angeles, City Of. Survey LA Citywide Historic Context Statement Resource Guide. Los Angeles Department of City Planning Office of Historic Resources. April 2012.

- Generous expanses of windows, including steel- and wood-framed multi-light windows, awning and hopper casements, clerestories, and large-pane fixed windows; window groupings often mark the location of classrooms
- Stylistically more streamlined and less ornamental than 1920s period-revival styles
- Emphasis on "traditional Southern Californian" styles, such as Spanish Colonial and Mission Revival
- Styles can also include PWA Streamline Moderne, Art Deco, Late Moderne, and proto-modern styles
- May have been partially or fully funded through Works Progress Administration, 1935 to 1943
- Works Progress Administration projects may include significant interior artwork such as murals, paintings and sculpture
- May have been designed by a prominent architect of the period

Character-Defining Features – Campus/District

- Unified site plan consisting of buildings and structures designed and sited according to their use
- Use of designed outdoor and landscaped spaces, for outdoor study, recreation and dining
- Often displays connecting sheltered corridors throughout campus
- Emphasis on a more expansive site plan
- Varied collection of buildings, differentiated by function and use (rather than a single building with all functions inside)
- Might include an elaborate administration building, located near the campus entrance; administration buildings usually serve as the focal point of the campus
- Campus often composed of groupings of classroom wings, auditoriums, gymnasiums, cafeterias, and outdoor recreation and dining areas
- Middle or senior high schools might include a gymnasium designed in the style of the campus overall

Integrity Considerations

- Should retain most of the essential physical features from the period of significance
- Some materials may have been removed or altered
- Modern lighting and fencing of site acceptable
- Schools from this period generally include buildings constructed after the period of significance, in particular post-World War II buildings, which may be noncontributing
- Eligible properties under this theme may be a single building, if it exemplifies the design ideals of the era, or a grouping (campus) of buildings constructed during the period of significance
- Intact campus groupings from the pre-1945 era are not common
- Many pre-1933 schools were substantially remodeled following the Long Beach earthquake – may retain a 1920s plan but with 1930s stylistic detailing
- Pre-1933 schools rehabilitated post-1933 might exhibit added seismic supports of steel columns, beams, or diagonal bracing; original masonry might be covered by concrete/stucco sheathing

- Should retain integrity of Materials, Design, Workmanship, Feeling, and Association from its period of significance

6.1 Designation Criteria A/1/1

Historic District Evaluation: The three permanent buildings on the subject campus were developed over a period of nearly 50 years, with the Classroom Building North constructed in 1940, the Children's unit in 1970, and the Administrative Building in 1977. As a result, the campus does not exhibit a unified site plan or architectural style to the extent that it meets the eligibility requirements for historic districts as described in the LAUSD Historic Context Statement for eligibility under Criteria A/1/1. Furthermore, Shenandoah Elementary was one of many schools associated with the late 1970s busing program, but archival research failed to identify information indicating that these associations are significant in the context of the Civil Rights Movement in Los Angeles.[38]

Individual Resource Evaluation: None of the buildings located on the subject campus appear to be individually eligible under Criteria A/1/1. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building, the Classroom Building North, dates to 1940. This building does not meet the eligibility standards outlined in the LAUSD *Historic Context Statement* as it does not exemplify post-Long Beach earthquake school planning and design concepts. Most notably, its design and site placement do not represent the indoor-outdoor integration characteristic of the era. The building's rectangular plan is counter to the L-H-, and T-shaped building plans that provided easy access and views to the outdoors, and its windows are limited, not generous, as required of schools eligible under this theme.

The remaining two permanent buildings were added to the campus in 1970 and 1977, which postdates the period of significance of 1945-1969 for postwar schools identified in the LAUSD *Historic Context Statement*. Even so, these buildings do not exhibit the character-defining elements required of schools under this theme, including building plans and site designs that clearly express function and easily identifiable indoor-outdoor spaces. As a result they do not appear individually eligible under Criteria A/1/1.

6.2 Designation Criteria B/2/2

Historic District and Individual Resource Evaluation: Per the guidance of the National Park Service, properties significant for their association with an important person in our past, must illustrate a person's important achievements.[39] Archival research completed as part of this study failed to identify any historic personages significantly associated with the subject campus. As a result, the subject campus and its individual resources do not appear eligible for designation either individually or as a historic district under Criteria B/2/2.

[38] See Los Angeles, City of.2018. *Los Angeles Citywide Historic Context Statement: African American History of Los Angeles.* Department of City Planning, Office of Historic Resources. February, 2018.

[39] U.S. Department of the Interior, National Park Service, 14.

6.3 Designation Criteria C/3/3

Historic District Evaluation: Developed in phases over a period of nearly 50 years, the buildings located on the Shenandoah Elementary School campus does not feature cohesive design intent or unified architectural style. As such, the campus does not meet any of the applicable eligibility standards outlined in the LAUSD *Historic Context Statement* and does not appear eligible as a historic district under Criteria C/3/3.

Individual Resource Evaluation: None of the buildings located on the Shenandoah Elementary School campus appear individually eligible for federal, state, or local designation under Criteria C/3/3. The 1940 Classroom Building North features minimal elements of Spanish Colonial/Mission Revival-style architecture, but it was designed and constructed after the height of these styles' popularity and does not embody many of the character-defining features identified in the LAUSD *Historic Context Statement*, such as arched openings, arcades, and exterior patios and courtyards.

The two postwar buildings on campus, while displaying varying degrees of Late Modern-influenced architecture, cannot be considered distinctive examples of the style and do not appear eligible under Criteria C/3/3. Both were constructed in the 1970s and neither features a direct expression of structural systems, generous expanses of fenestration, or extensive use of sheltered corridors as identified in the LAUSD Historic Context Statement.

7 Conclusion

In summary, Shenandoah Elementary School is recommended as ineligible for federal, state, or local designation under any applicable criteria. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building dates to 1940. This building does not exhibit any of the character-defining features identified in the LAUSD Historic Context Statement for schools constructed between 1933 and 1945, such as unified site design, indoor-outdoor integration, plentiful windows of varying sizes and configurations, or a stylistically modern design. The subject campus also includes a number of buildings that were developed after World War II, but these buildings were constructed intermittently over a period of 40 years and are not representative of LAUSD design principles of the postwar era. The campus does not appear eligible for federal, state, or local designation under any applicable criteria and is not considered a historical resource for the purposes of CEQA.

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Appendix A

Resource Records



Shenandoah Elementary School

Historical Resources Evaluation Report

prepared for

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Please cite this report as follows:

Los Angeles Unified School District. 2018. *Shenandoah Elementary School: Historical Resources Evaluation Report*. Prepared by Rincon Consultants, Inc. Los Angeles, CA.

Table of Contents

Table of Contents i
1 Executive Summary 1
2 Introduction 3
2.1 Regulatory Framework 6
2.2 Methods 8
2.3 Previous Historical Resource Surveys 9
3 Campus Site Description and History 11
3.1 Overview Description 11
4 Historic Overview 25
4.1 Focused Neighborhood History 25
5 Associated Design Professional Biographies 29
5.1 Alfred S. Nibecker, Jr. 29
5.1 Norman E. Kocher 29
5.3 Jose Y. Almanza 30
6 Significance Evaluation 31
6.1 Designation Criteria A/1/1 33
6.2 Designation Criteria B/2/2 33
6.3 Designation Criteria C/3/3 34
7 Conclusion 35
8 Bibliography 37

Tables

Table 1 Shenandoah Elementary School Buildings 13

Figures

Figure 1 Vicinity Map 4
Figure 2 Location Map 5
Figure 3 Campus Map 12
Figure 4 Classroom Building North, West (Primary) Elevation 14
Figure 5 Classroom Building North, South Elevation 14
Figure 6 Administrative Building, West Elevation 15

Figure 7 Administrative Building, East Elevation.....15

Figure 8 Lunch Shelter Extending from North Elevation of Administrative Building.....16

Figure 9 Shenandoah Children's Center, North and West Elevations.....16

Figure 10 Representative Portable Buildings 17

Figure 11 1927 Sanborn Fire Insurance Company map, earliest documented incarnation of the Shenandoah Street Elementary School campus.....18

Figure 12 1940 Classroom & Auditorium Elevations and Sections, Shenandoah Street School. 19

Figure 13 1950 Sanborn Fire Insurance Company map, Shenandoah Street Elementary School campus, including the 1929 Administrative Building, 1940 Classroom Building, and several portable buildings installed in the late 1940s. 21

Figure 14 1970 aerial photograph, Shenandoah Street Elementary School campus, depicting old Main Building and new Children's Unit Building. 22

Figure 15 1975 design for Exterior Elevations, Administrative Building, Shenandoah Street Elementary School campus. 23

Appendices

Appendix A Resource Records

1 Executive Summary

Rincon Consultants, Inc. (Rincon) was retained by the Los Angeles Unified School District (LAUSD) to complete a historical resources evaluation of the Shenandoah Elementary School campus, which includes Shenandoah Elementary School and Early Education Center located south of the main campus (subject campus). The subject campus is located at 2450 Shenandoah Street in the Mid-City neighborhood of Los Angeles, California. The campus has been extensively redeveloped through the construction and demolition of numerous buildings, and currently contains three permanent and 23 portable buildings and structures.

This evaluation was prepared to inform future planning efforts and to facilitate compliance with LAUSD's cultural resource policies and the California Environmental Quality Act (CEQA), which requires lead agencies to consider the impacts of proposed projects on historical resources. All work completed as part of the current effort was conducted in accordance with the requirements of CEQA and applicable local regulations. The current study included background research, an intensive-level field survey, and preparation of this Historical Resources Evaluation Report.

Based on the current study, Shenandoah Elementary School and its buildings are recommended ineligible for federal, state, or local designation under any applicable criteria. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building dates to 1940. This building does not exhibit any of the character-defining features identified in *Los Angeles Unified School District Historic Context Statement, 1870 to 1969* for schools constructed between 1933 and 1945, such as unified site design, indoor-outdoor integration, plentiful windows of varying sizes and configurations, or a stylistically modern design.[1] The subject campus also includes a number of buildings that were developed after World War II, but these buildings were constructed intermittently over a period of 40 years and are not representative of LAUSD design principles of the postwar era. The campus does not appear eligible for federal, state, or local designation under any applicable criteria and is not considered a historical resource for the purposes of CEQA.

Rincon Senior Architectural Historian Steven Treffers served as the project lead, with oversight and quality assurance/quality control provided by Architectural History Program Manager Shannon Carmack. Additional assistance was provided by Rincon architectural historians Rachel Perzel and Susan Zamudio-Gurrola. All of these individuals meet and exceed the Secretary of the Interior's Professional Qualifications Standards for Architectural History and History.

[1] Sapphos Environmental, Inc. *Los Angeles Unified School District Historic Context Statement, 1870 to 1969* (Los Angeles Unified School District Office of Environmental Health and Safety, March 2014).

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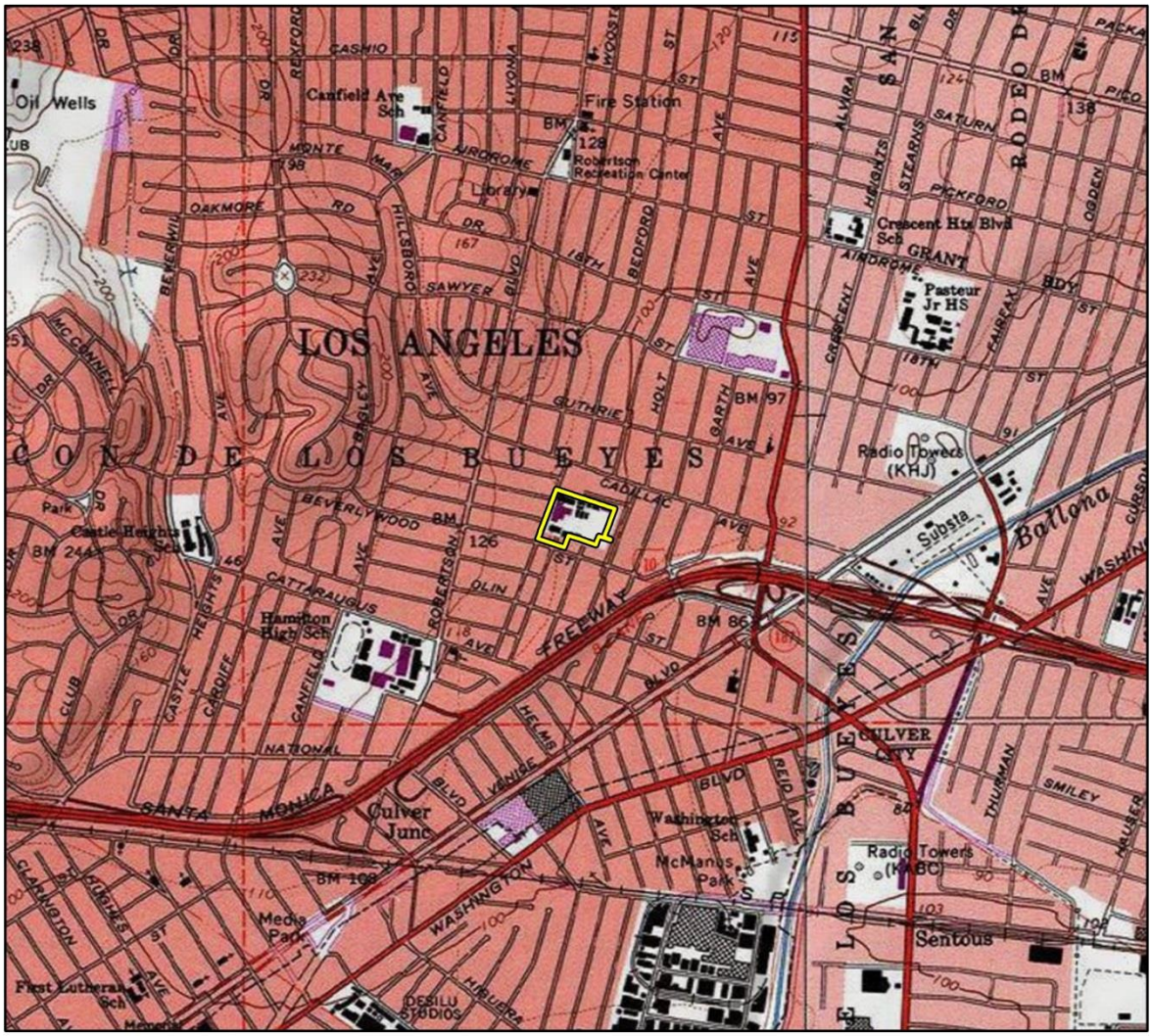
2 Introduction

Shenandoah Street Elementary school is located on a level, irregularly shaped site in the Mid-City neighborhood of Los Angeles, California, approximately 0.2 mile north of Interstate 10 (Figure 1). The 6.7-acre campus is bound by Cadillac Avenue to the north, South Halm Avenue to the east, Beverlywood Street to the south, and South Shenandoah to the west (Figure 2). The school's entrance faces Shenandoah Street. Development in the surrounding area is primarily single- and multi-family residential in character.

Figure 1 Vicinity Map



Imagery provided by National Geographic Society, ESRI and its licensors © 2017. Beverly Hills Quadrangle. T01S R14W S31. The topographic representation depicted in this map may not portray all of the features currently found in the vicinity today and/or features depicted in this map may have changed since the original topographic map was assembled.



Figure 2 Location Map



Imagery provided by Google and its licensors © 2017.
Additional data provided by LA Unified School District, 2017.

2.1 Regulatory Framework

CEQA requires lead agencies to consider the impacts of proposed projects on historical resources. Under CEQA, historical resources are defined properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), or a local register. Eligible resources may include buildings, sites, structures, objects, cultural landscapes, and historic districts. Properties that are listed in the NRHP or found eligible for the NRHP through consensus with the State Office of Historic Preservation are automatically listed in the CRHR. Federal, state, and local designation criteria are presented below.

National Register of Historic Places

The NRHP was established by the National Historic Preservation Act (NHPA) of 1966 as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[2] The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

- **Criterion A.** It is associated with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B.** It is associated with the lives of persons who are significant in our past.
- **Criterion C.** It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D.** It has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting at least one of the above designation criteria, resources must also retain integrity, or enough of their historic character or appearance, to be "recognizable as historical resources and to convey the reasons for their significance."[3] The National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities, defined as follows:

1. **Location.** The place where the historic property was constructed or the place where the historic event occurred
2. **Design.** The combination of elements that create the form, plan, space, structure, and style of a property
3. **Setting.** The physical environment of a historic property
4. **Materials.** The physical elements combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property

[2] Code of Federal Regulations 36, Code of Federal Regulations 60.2.

[3] California Office of Historic Preservation, "California Register and National Register: A Comparison (for Purposes of Determining Eligibility for the California Register)," Technical Assistance Series No. 6. (Sacramento, CA, 14 March 2006).

5. **Workmanship.** The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory
6. **Feeling.** A property's expression of the aesthetic or historic sense of a particular period of time
7. **Association.** The direct link between an important historic event or person and a historic property[4]

California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change."[5] Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs may be nominated for inclusion in the CRHR. According to PRC Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1.** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2.** It is associated with the lives of persons important in our past.
- **Criterion 3.** It embodies the distinctive characteristics of a type, period, region, or method of installation, or represents the work of an important creative individual, or possesses high artistic values.
- **Criterion 4.** It has yielded or may be likely to yield information important in prehistory or history.

It is possible that a resource that does not possess sufficient integrity for NRHP listing may still be eligible for the CRHR. Furthermore, while typically NRHP eligibility requires a property to be at least 50 years of age, there is no age requirement for listing in the CRHR. Rather, regulations specify that enough time must have passed for a property to be evaluated within its historic context.

Los Angeles Historic-Cultural Monuments

Local landmarks in the city of Los Angeles are known as Historic-Cultural Monuments and are under the aegis of the Los Angeles Planning Department, Office of Historic Resources. A Historic Cultural Monument is defined in the Cultural Heritage Ordinance as follows:

> Historic-Cultural Monument (Monument) is any site (including significant trees or other plant life located on the site), building or structure of particular historic or cultural significance to the City of Los Angeles, including historic structures or sites in which the broad cultural, economic or social history of the nation, State or community is reflected or exemplified; or which is identified

[4] U.S. Department of the Interior, National Park Service. "How to Apply the National Register Criteria for Evaluation, "*National Register Bulletin* No. 15 (Washington D.C., 2002).

[5] Public Resources Code, Sections 21083.2 and 21084.1.

with historic personages or with important events in the main currents of national, State or local history; or which embodies the distinguishing characteristics of an architectural type specimen, inherently valuable for a study of a period, style or method of construction; or a notable work of a master builder, designer, or architect whose individual genius influenced his or her age.[6]

LAUSD Historic Context Statement, 1870 to 1969

In addition to using all applicable criteria of significance, this evaluation utilized the methodology and framework for evaluations described in the 2014 *LAUSD Historic Context Statement*. Adopted by the LAUSD Board of Education, the *LAUSD Historic Context Statement* offers a consistent, standard approach for evaluating schools and campuses throughout the district. The document utilizes the NRHP Multiple Property Documentation (MPD) format, which provides a comparative, context-driven framework for evaluating related properties. As discussed in that document, "the MPD approach defines themes of significance, eligibility standards, and related property types. Properties sharing a theme of significance are then assessed consistently, in comparison with resources that share similar physical characteristics and historical associations."[7]

2.2 Methods

This historical resources evaluation was completed in accordance with recognized professional standards, following the Secretary of the Interior's Standards for Preservation Planning, Identification, Evaluation and Registration; California Office of Historic Preservation; and National Park Service professional standards and guidelines. Applicable national, state, and local level criteria were considered, as were the context-driven methods and framework used in *LAUSD Historic Context Statement, 1869-1970* and other applicable historic context statements, including SurveyLA, the citywide historic resources survey conducted by the Los Angeles Office of Historic Resources.[8]

Efforts were made to identify previous historical resource evaluations of the subject campus and other related LAUSD schools. This included a records search of the California Historical Resources Information System, conducted at the South Central Coastal Information Center at California State University, Fullerton in June 2017. The California Historical Resources Information System search reviewed the combined listings of the NRHP, CRHR, California State Historical Landmarks, California Points of Historical Interest, and California Historic Resources Inventory. In addition, the findings of the following surveys were reviewed:

- Post-1994 Northridge Earthquake Historical Resources Surveys: These surveys were conducted for the Federal Emergency Management Agency in support of compliance with Section 106 of the National Preservation Act and recorded 71 LAUSD campuses.

[6] Los Angeles Municipal Code, Section 22.171.7, added by Ordinance No. 178,402, Effective 4-2-07

[7] Sapphos Environmental, Inc. *Los Angeles Unified School District: Historic Context Statement, 1870 to 1969* (Los Angeles Unified School District Office of Environmental Health and Safety, March 2014).

[8] Ibid; As part of SurveyLA, the Los Angeles Department of City Planning Office of Historic Resources has been developing a citywide historic context statement, which provides a framework for identifying and evaluating the city's historic resources; see Los Angeles Department of City Planning Office of Historic Resources, "SurveyLA, Historic Context," https://preservation.lacity.org/historic-context (accessed 2 October 2017).

- Phase 1 and 2 Getty Surveys: These surveys were conducted in two multi-year phases between 2001 and 2004 and expanded on the post-Northridge Earthquake surveys, covering approximately 410 LAUSD campuses.[9]
- 2014 LAUSD Historic Resources Survey: Completed in 2014, this historic resources survey included 55 LAUSD campuses that the time of survey, were over 45 years of age. Of these 14 were found eligible for NRHP and/or CRHR listing.[10]
- SurveyLA: A multi-year, citywide historical resources survey that is currently being finalized by the Los Angeles Office of Historic Resources.

Property-specific research was also conducted to document the construction and alteration history of the subject campus and to explore potential significant associations. A package of historic aerial and topographic maps and Sanborn Fire Insurance Maps for the property was acquired from Environmental Data Resources. Other sources reviewed include the combined collections of ProQuest historical newspapers, historic *Los Angeles Times*, Los Angeles Public Library (including the California Index), University of Southern California Libraries and Special Collections, and the online photographic collection of the Huntington Library and yearbooks at Classmates.com. Rincon staff also reviewed Vault Drawings on file with LAUSD, which include architectural plans and drawings detailing the construction and alteration histories of the subject campus and its buildings.

Susan Zamudio-Gurrola and Rachel Perzel conducted an intensive-level survey of the subject campus on August 11, 2017. All buildings and structures on the subject campus were photographed and documented in field notes describing character-defining features, materials, and alterations. The survey included the exteriors and interiors of campus buildings.

The campus and its buildings were recorded on California Department of Parks and Recreation (DPR) 523 series forms, which are included in Appendix A of this report.

The subject campus was evaluated for listing in the NRHP, CRHR, and local designation using applicable criteria, and the consistent framework and registration requirements of the LAUSD Historic Context Statement. Campus buildings were considered both individually as well as collectively as potential historic districts.

If a building was found to meet federal, state, and/or local designation criteria, an integrity assessment was prepared to determine if they are able to convey their significance. The analysis considered the seven aspects of integrity as defined by the National Park Service and include a detailed explanation of why and how a property does or does not retain integrity. An integrity assessment was not completed however for those buildings that did not appear to meet applicable designation criteria.

2.3 Previous Historical Resource Surveys

Shenandoah Elementary School is located in the West Adams-Baldwin Hills-Leimert Community Plan Area (CPA), an area that was surveyed in 2012 as part of SurveyLA, the Los Angeles Office of Historic

[9] Leslie Heumann, Science Applications International Corporation, "Historic Resources Survey of the Los Angeles Unified School District," (Pasadena, CA, 2002-2004).

[10] Sapphos Environmental, Inc., *LAUSD Historic Context Statement*.

Resources' citywide historic resources survey.[11] Neither the campus nor any of the individual school buildings were identified at that time.

In 2002, in fulfillment of a planning grant provided under the Preserve Initiative of the J. Paul Getty Trust, the LAUSD performed its first systematic survey in an effort to identify historically significant school properties in the district. Shenandoah Elementary School was included in this survey and found ineligible for federal, state, or local designation.

[11] Architectural Resources Group, *Historic Resources Survey Report: West Adams-Baldwin Hills-Leimert Community Plan Area* (Los Angeles: City of Los Angeles Department of City Planning, Office of Historic Resources, September 2012, revised July 2016).

3 Campus Site Description and History

3.1 Overview Description

Located in a primarily residential area of Los Angeles' Mid-City neighborhood, the Shenandoah Elementary School campus occupies an L-shaped 6.7-acre site. The campus features three permanent buildings located along the western boundary of the campus and oriented towards Shenandoah Street, as well as 24 portable buildings to the east that are primarily grouped along the northern edge of the campus.

The oldest extant building on campus is the Classroom Building North, which was constructed in 1940 and is located at the northwestern corner of the campus. With little setback from South Shenandoah Street, the rectangular-shaped, single-story building contains the campus assembly hall in a shorter, north-south trending wing, as well as classrooms in the longer, east-west trending wing. The building features very minimal elements of Spanish Colonial/Mission Revival-style architecture, embodied in its smooth stucco wall cladding, red-clay tile roof, and limited circular window openings. Additional fenestration includes multi-light, wood-framed, double-hung and transom windows of varying size and groupings. Two entrances to the building are extant on the west, street-facing facade; both are accessible via clay tile-clad steps.

Immediately south of the Classroom Building North and centrally sited along the western edge of the campus is the one-story Administrative Building. The building features an irregular shaped plan and includes a covered, open-air lunch shelter that extends from its southern wall plane. Constructed in 1977, the building features minimal elements of Late Modern design. These features are limited to its rectangular massing and flat roof with pronounced fascia that exhibits a repetitive Mayan-influenced design motif. A variety of window styles are present across the building, including bands of single-light metal windows topped with single-light transoms in addition to metal-framed, single and multi-light units framed by projecting concrete surrounds. With the exception of the wood-paneled front entry doors, doors throughout the building are covered with modern metal security units.

One-story with an L-shaped plan, the Shenandoah Children's Center Building anchors the southwest corner of the subject campus. Constructed in 1970, the building features elements of Late Modern-style architecture in its minimally pitched roof that incorporates a slight repeating saw-tooth pattern and exaggerated overhangs created by concrete roof beams extending several feet from the wall plane. A large corrugated metal roof screen sits atop the roof and shields heating, ventilation, and air-conditioning equipment. Exterior wall surfaces are sheathed in stucco and punctuated by bands of metal-framed windows, primarily limited to the south and east elevations. Doors are also spread across these elevations and consist of solid, metal door types.

The numerous portable buildings are limited primarily to the northern boundary of the campus. These non-descript buildings are similar in their design and materials: they are one story, square or rectangular in plan, capped by flat or minimally pitched gabled roofs, and sheathed in stucco. They feature limited windows and solid doors accessed by short sets of stairs. With the exception of some landscaping along the perimeter of the campus, the ground is covered mostly in asphalt and includes a central recreational area and two surface parking lots in the southwestern quadrant.

Figure 3 Campus Map



Imagery provided by Google and its licensors © 2017.
Additional data provided by LA Unified School District, 2017.

Table 1 Shenandoah Elementary School Buildings

No.	Name	Type	Year Built
1	Classroom Building - North	Permanent	1940
2	Administrative Building	Permanent	1977
3	Two/Three Unit Relocatable	Portable	1955
4	Two/Three Unit Relocatable	Portable	1956
5	Two/Three Unit Relocatable	Portable	1953
6	Single Unit Modular	Portable	1986
7	Single Unit Modular	Portable	1986
8	Single Unit Modular	Portable	1991
9	Single Unit Modular	Portable	1991
10	Single Unit Modular	Portable	1991
11	Single Unit Modular	Portable	1991
12	Sanitary Relocatable	Portable	1949
13	Two/Three Unit Relocatable	Portable	1947
14	Two/Three Unit Relocatable	Portable	1949
15	Two/Three Unit Relocatable	Portable	1949
16	Two/Three Unit Relocatable	Portable	1949
17	Two/Three Unit Relocatable	Portable	1949
18	Two/Three Unit Relocatable	Portable	1950
19	Double Unit Modular	Portable	1997
20	Double Unit Modular	Portable	1997
20	Double Unit Modular	Portable	1997
21	Double Unit Modular	Portable	1997
22	Double Unit Modular	Portable	1998
23	Double Unit Modular	Portable	1998
24	Storage Unit Relocatable	Portable	1975
25	Two/Three Unit Relocatable	Portable	1949
N/A	Shenandoah Children's Center	Permanent	1970

Figure 4 Classroom Building North, West (Primary) Elevation



Figure 5 Classroom Building North, South Elevation



Figure 6 Administrative Building, West Elevation



Figure 7 Administrative Building, East Elevation



Figure 8 Lunch Shelter Extending from North Elevation of Administrative Building



Figure 9 Shenandoah Children's Center, North and West Elevations



Figure 10 Representative Portable Buildings



3.2 Site History and Construction Chronology

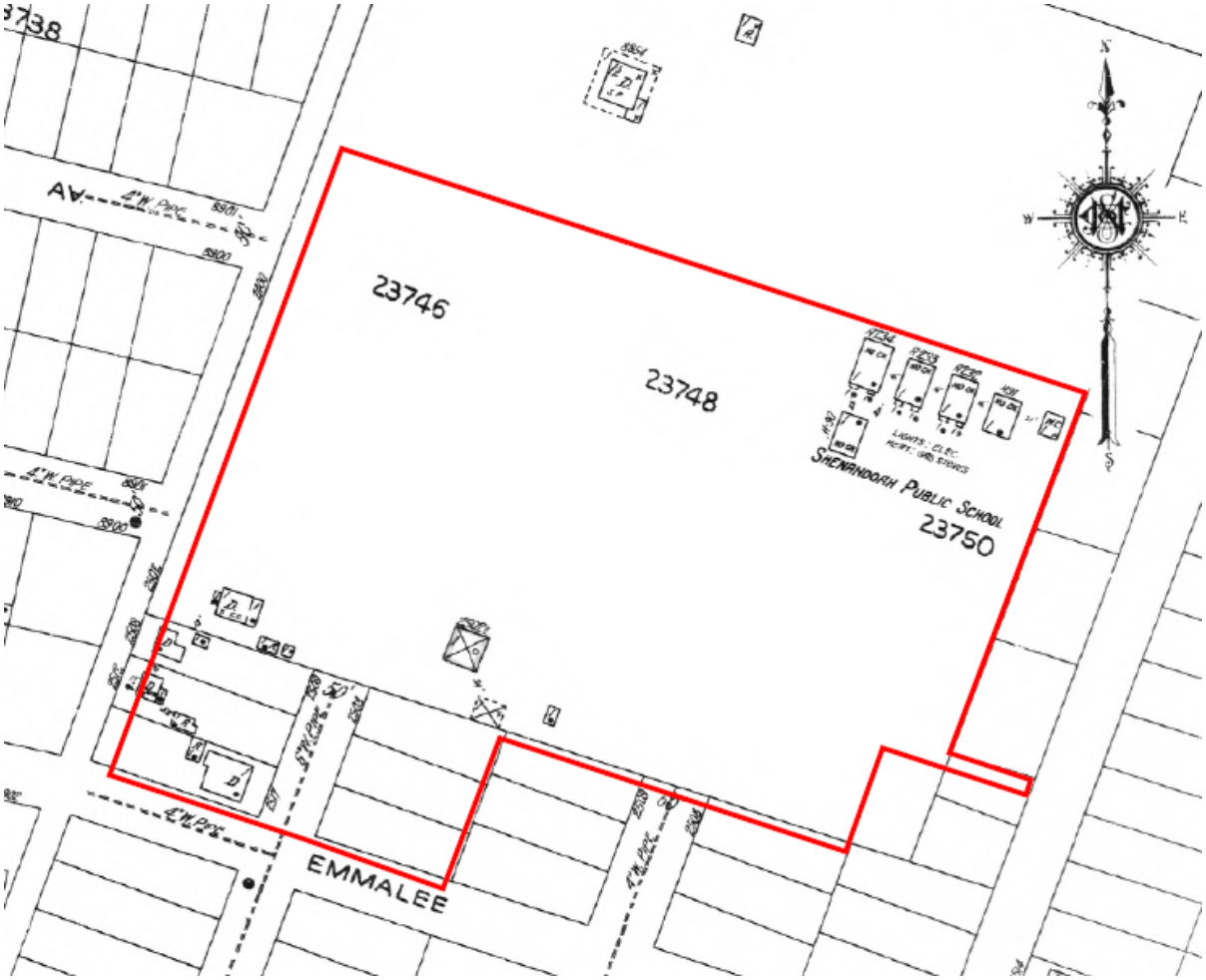
Until the late-19th century much of the area surrounding the present-day Shenandoah Elementary School site was part of the Rancho Rincón de los Bueyes. In 1865, Jose Antonio Rocha II built an adobe home (extant) just north of the present Shenandoah Elementary School site, at what is now 2400 Shenandoah Street. Seven years later, in 1872, Rocha purchased his home and another 100 adjoining acres of farmland from the owners of the Rancho Rincón de los Bueyes. The rural, agricultural character of this section of Los Angeles gave way residential and commercial construction as urban development spread west from the city core in the late-19th and early-20th centuries. Much of Rocha's rancho was subdivided in subsequent years. In 1915, the City of Los Angles annexed the school site and surrounding vicinity.[12]

Historic aerial photographs show that the community surrounding the Shenandoah Street Elementary School (also referred to in its early years as Shenandoah Public School or Shenandoah Street School) site was still sparsely developed through the 1920s. By the late 1930s, as suburban development continued to push westward from Central Los Angeles, more dense residential construction occurred in the blocks surrounding the school site. By the late 1940s, the surrounding neighborhood was completely built out, as expected with the post-World War II population and construction boom in Los Angeles. Shenandoah Elementary School helped fill the need for educational facilities for young children in a predominantly residential neighborhood that developed rapidly over an approximately 20-year period.

[12] Photograph: "Rocha Adobe restored." Accessed via Calisphere at https://calisphere.org/item/7bb7b4381e25d6f6f08b1f9e4200c0b1/.

The earliest available documentation of the site, a Sanborn Fire Company map from 1927, depicts the school occupying a much smaller area in what would today be the northeast corner of the campus. At the time, the school was composed of six small, nearly square buildings (Figure 11). By the following year, several small buildings were added in the same area. A narrow strip of residential lots separated the school from Halm Avenue, although these lots were not fully developed with homes until the 1940s.[13]

Figure 11 1927 Sanborn Fire Insurance Company map, earliest documented incarnation of the Shenandoah Street Elementary School campus.



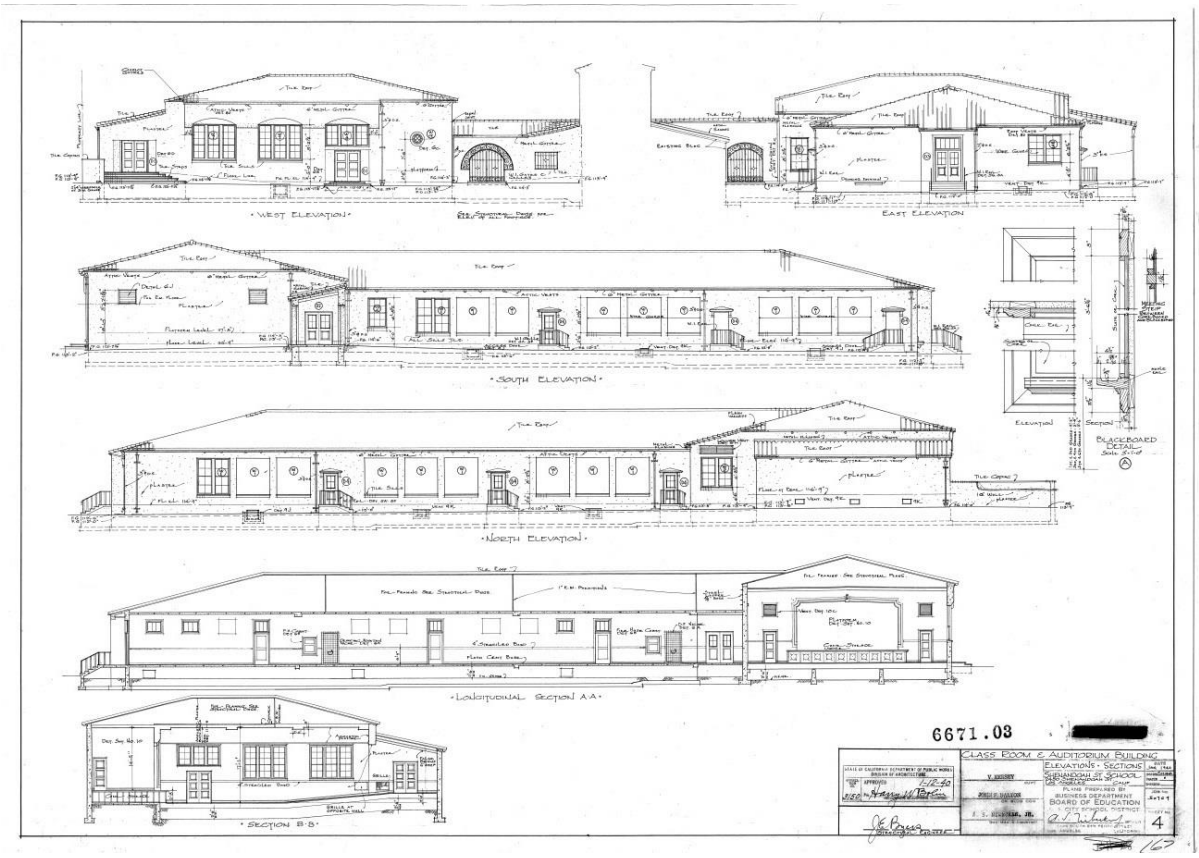
In 1929 the Los Angeles Board of Education approved plans by its architectural division for the construction of a new building at the Shenandoah School site. Designed as a 65-foot by 182-foot two-story brick building, it included 12 units (assumed to be classrooms) and required an appropriation of $84,000.[14] The new building, which fronted Shenandoah Street, was completed by the following year.[15] Various smaller buildings have been located to the rear (east) of the main building since that time, although locations have varied over the decades. For example, in 1938 a

[13] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.
[14] 1929. *Los Angeles Time.* "School Designed." October 13.
[15] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.

cluster of five buildings was located in the northeast corner of the property, all of which have since been demolished.

In February 1940, the Board of Education awarded a contract to Los Angeles-based contractor, David J. Reed, to construct a new auditorium and classroom building at the school site for an estimated $49,450 (Figure 12).[16] Reed worked on other area school construction projects, such as Nathaniel Narbonne School in Lomita, Thomas A. Edison School in Burbank, and Cahuenga School.[17]Constructed slightly north of the main building that was built a decade earlier, the new building was designed by district architect Alfred S. Nibecker, Jr. and provided a combination of auditorium and classroom space.

Figure 12 1940 Classroom and Auditorium Elevations and Sections, Shenandoah Street School.



While World War II triggered a massive influx of migrants seeking jobs in the region's booming defense industry, the financial and economic constraints of wartime severely limited spending on public school infrastructure. Following the relative austerity of the World War II era, a postwar baby boom further strained the Los Angeles public school system's ability to accommodate the growing school-age population. As explained in the *LAUSD Historic Context Statement*:

[16] 1940. *Los Angeles Times.* "School Contract Let." February 6.

[17] 1932. *Los Angeles Times.* "Board to Spend Huge Amount." December 18; 1936. *Los Angeles Times.* "New Work List Grows." July 26; 1937. *San Bernardino Daily Sun*, "S.B. Firm is Low Bidder on School Plans." December 16;1942. *Los Angeles Times.* "School Buildings Contracts Awarded." March 13.

> In 1949–1950, enrollment at U.S. elementary and secondary schools stood at 25.1 million. In one decade, this number expanded by nearly 50 percent to approximately 36 million; by 1971, it reached 46 million. In 1955, in the midst of this boom, "editors at the Architectural Forum worried, 'every 15 minutes enough babies are born to fill another classroom and we are already 250,000 classrooms behind.' The rising population of young American children made school building, together with housing, the most widely discussed architectural challenge after World War II."
>
> Perhaps in no other state of the union was this growth felt more acutely than in California. The booming birth rate was accompanied by a wave of in-migration, as new settlers were drawn by established employment centers in, among other things, the aerospace industry, which had shifted operations to peacetime production. [18]
>
> Overcrowding led to the need to offer "half-day" sessions for children, where attendance happened in shifts of half-days. Bond issues in 1946, 1952, and 1955 addressed the pressing need for new school construction, and the resulting funds paid for the construction and expansion of numerous schools. The 1946 bond issue provided $75 million, which helped generate 66 new schools, with a total of over 2,300 classrooms, over 480 cafeterias, gyms, auditoriums, and other ancillary buildings. In addition, over $7.8 million went toward land for new schools, $3.2 million for maintenance and improvements to an aging stock of facilities, $4.5 million for grounds improvements, and $10.6 million for equipment. In spite of these investments, another $148 million was proposed for a 1952 bond issue.
>
> In 1948, district-wide enrollment stood at 301,000 students; by 1949, this figure had increased by 15,000, with enrollment reaching over 316,000. By the end of the 1950s baby boom, however, the student population of the Los Angeles City school district more than doubled, climbing from 316,000 to over 645,000. A further increase of 28,000 pupils was predicted for the school year 1960–1961.[19]

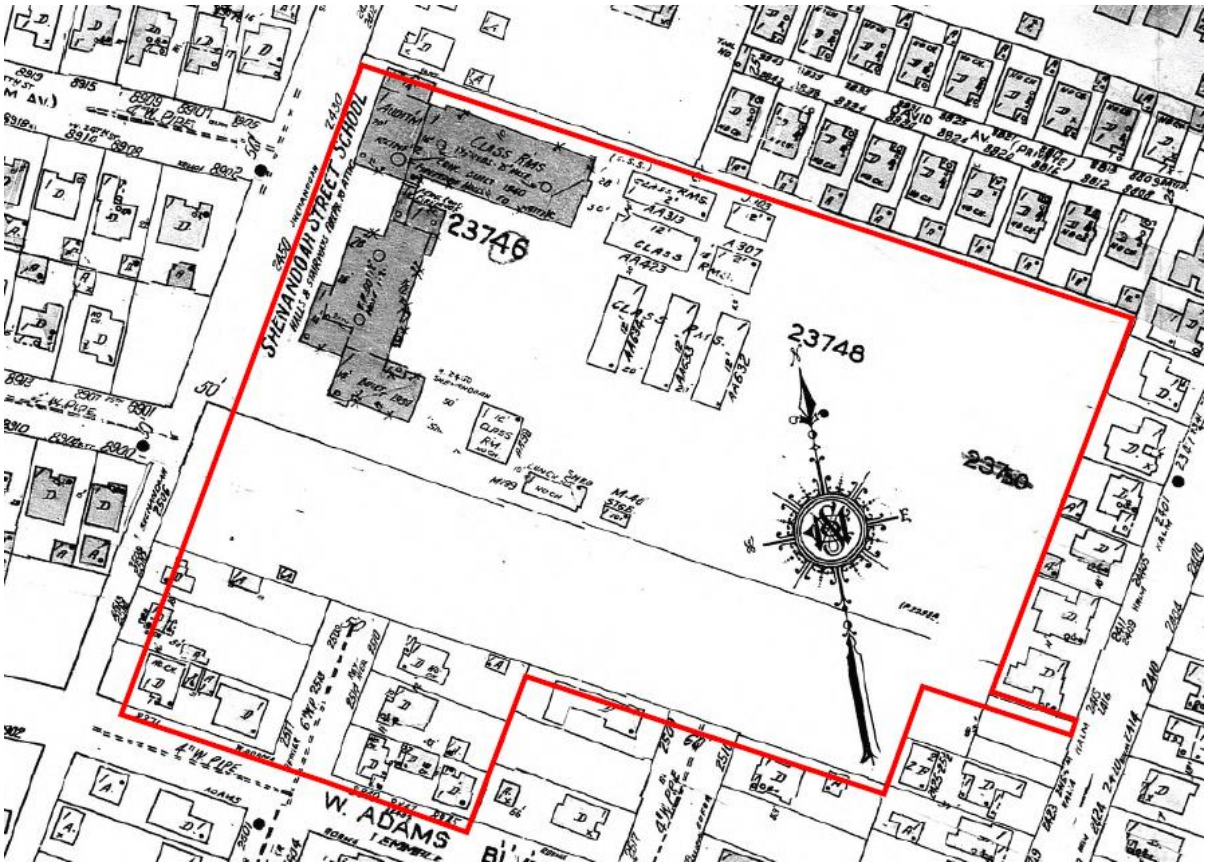
In the late 1940s and early 1950s, district officials addressed growing enrollment at Shenandoah Elementary School by adding a number of portable classroom buildings. By 1948, the buildings at the northeast corner of the property had been removed, and within the next two years, a cluster of ten larger portable classrooms was added in the center of the school property, (Figure 13). Several additional portable buildings were installed in the 1950s. In all, 11 extant portable buildings are situated on the campus, seven dating to the late 1940s, and four from the 1950s.[20]

[18] Sapphos Environmental, Inc., 71.

[19] Sapphos Environmental, Inc., 102.

[20] Los Angeles Unified School District. 2010. Shenandoah Elementary School: Pre-Planning Survey. Prepared by Martinez Architects, Inc. Playa del Rey, CA. June 15, 2010.

Figure 13 1950 Sanborn Fire Insurance Company Map, Shenandoah Street Elementary School Campus, Including the 1929 Administrative Building, 1940 Classroom Building, and Several Portable Buildings Installed in the Late 1940s.



The LAUSD developed a new child care center at Shenandoah Elementary School in the late 1960s through the early 1970s. District officials acquired properties along Beverlywood Street and the existing homes and garages were demolished to develop the child care center's buildings, playground, and parking area.[21] Two buildings were developed at the southwest corner of the property for this purpose between 1964 and 1970. A 1969 Sanborn map depicts a single-story, wood-framed "youth center" in this section of the property.[22] This building has since been demolished to make space for a small parking lot. The other building, the L-shaped Shenandoah Children's Center Building at the corner of Shenandoah and Beverlywood streets, dates to 1970 and was designed by Norman E. Kocher, an architect with the design section of the Los Angeles Board of Education.[23]

[21] 1973. *Los Angeles Times.* "Education Board Approves Payments." February 1; 1973. *Los Angeles Times* "Site to be Cleared." May 3.

[22] Environmental Data Resources, Inc. (EDR). 2017. Certified Sanborn Map Report: Shenandoah ES School. Shelton, CT. June 20.

[23] Los Angeles Unified School District (LAUSD). Vault Drawings: 1929-2007 (Children's Center Building, 1969.) From LAUSD Facilities Site Portal: Site 13491: Shenandoah ES. Los Angeles, CA.

Figure 14 1970 Aerial Photograph, Shenandoah Street Elementary School Campus, Depicting Old Main Building and new Children's Unit Building

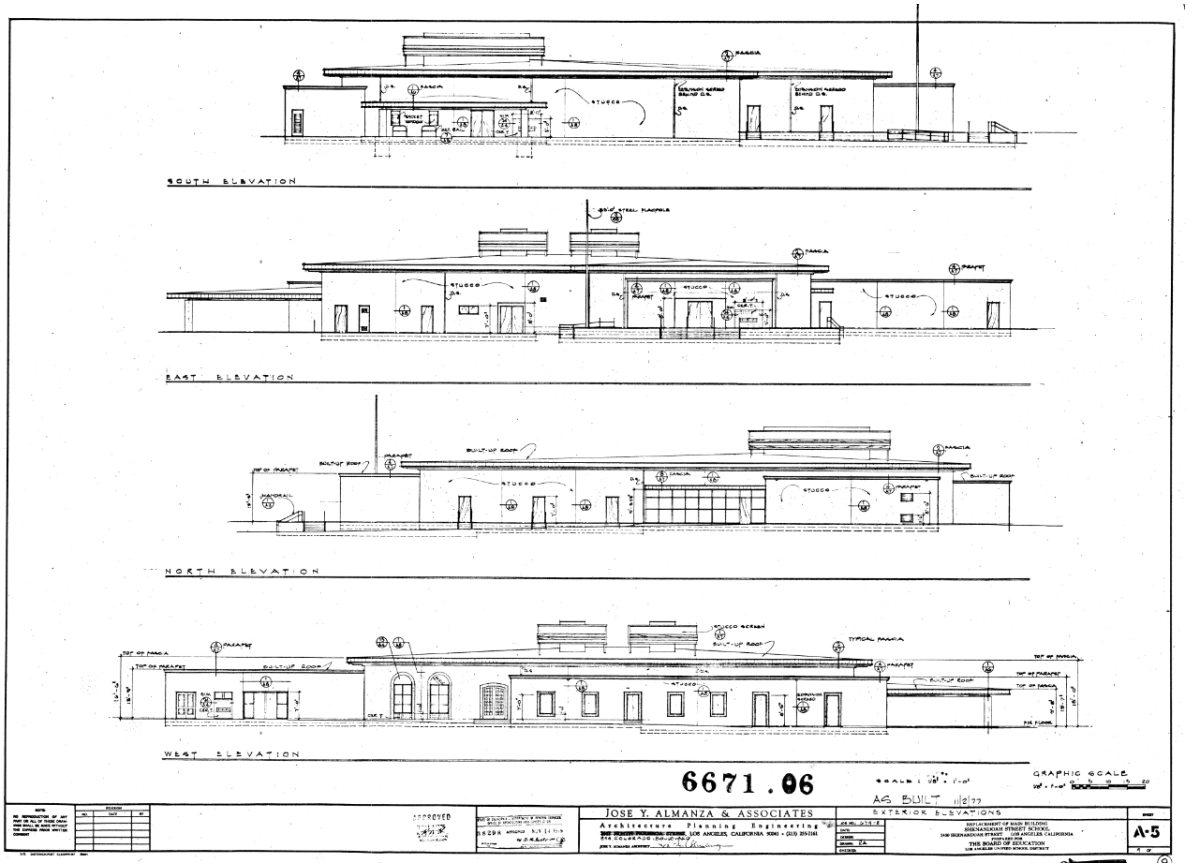


In 1971, the school board began to make plans to demolish the old main building located at the central-western edge of the property. The building was replaced with the new Administrative Building in 1974, designed by architect Jose Almanza and estimated to cost $964,902, which included two kindergarten rooms, four standard classrooms, administrative space, a multi-purpose room, cafeteria, and an outdoor eating area. The new building featured Mayan-inspired fascia, and featured de-mountable interior walls to allow for flexible use of spaces and a sunken reading pit in the middle of the library room (Figure 15).[24] Construction began the following year and continued through 1977.[25]

[24] 1974. *Los Angeles Times.* "New School Will Feature Innovations." November 28.

[25] Los Angeles Unified School District (LAUSD). Vault Drawings: 1929-2007 (New Main Building, 1975.) From LAUSD Facilities Site Portal: Site 13491: Shenandoah ES. Los Angeles, CA.

Figure 15 1975 design for Exterior Elevations, Administrative Building, Shenandoah Street Elementary School campus.



As the school campus changed during this period, so did approaches to public education in Los Angeles. In the late 1970s, Shenandoah School was one of many schools to participate in a school racial desegregation program undertaken by the Los Angeles Board of Education. Proponents of this "busing" program intended to reverse the effects of residential segregation on the demographic character of several city schools. The late-20th century "racial geography" of Los Angeles had been determined, in part, by such real estate industry practices as restrictive covenants and "redlining." Although both of these practices were banned before the district implemented its busing program, many Los Angeles neighborhoods remained racially segregated in fact, if not by policy. Because schools enrolled students primarily from within surrounding neighborhood boundaries, *de facto* racial segregation likewise defined the racial make-up of many schools. Acceding to civil rights activists' objections to strict school enrollment boundaries, the district began experimenting with busing programs in the 1950s and 1960s. After a 1977 California Supreme Court decision ordering a "'reasonable and feasible' integration plan," the Board of Education proposed a mandatory busing program.[26] As part of one of the largest such programs ever attempted in a U.S. city at the time, approximately 30,000 children were bused to different schools within Los Angeles in order to racially integrate city schools. The school district identified Shenandoah Elementary School, whose student body the *Los Angeles Times* described as "90 percent minority," became a target of the

[26] Sapphos Environmental, Inc. 108-109, 113.

busing program.[27] Mandatory busing in the LAUSD district was short-lived, due to its controversial reception, explained in the *LAUSD Historic Context Statement* thus:

> The program was controversial and contested on a number of fronts. Just two years after the Los Angeles Board of Education proposed its plan, California's Proposition 1 sought to reverse it through a constitutional ban on mandatory busing. On the ballot in November 1979, Proposition 1 passed handily, with 70 percent of voters supporting the end of the practice. On appeal in 1982, the US Supreme Court found Proposition 1 constitutional and upheld the ban on mandatory busing.[28]

The campus expanded in the following two decades, though this expansion did not include the construction of any significant permanent buildings. During the 1980s and 1990s, additional portable facilities were added along the southern boundary and in the northeastern portion of the property, developing into the current campus configuration. The area immediately surrounding the school remains predominantly residential, as it has been since at least the 1930s.[29]

[27] 1978. *Los Angeles Times.* "Parents Face Hope, Frustration." August 28.

[28] Sapphos Environmental, Inc., 113.

[29] Environmental Data Resources, Inc. (EDR). 2017. EDR Aerial Photo Decade Package Report: Shenandoah ES School. Shelton, CT. June 20.

4 Historic Overview

4.1 Focused Neighborhood History

The Shenandoah Elementary School campus is located in the western reaches of the West Adams-Baldwin Hills-Leimert CPA in Los Angeles' Mid-City neighborhood. This section presents historic context and background on the development and settlement history of the West Adams-Baldwin Hills-Leimert CPA, surrounding the Shenandoah Elementary School campus. A discussion of the area's early development is excerpted below from the SurveyLA survey report:

> The West Adams-Baldwin Hills-Leimert CPA was incorporated into the city of Los Angeles gradually over 80 years in 21 separate annexations and one consolidation. The CPA includes the Los Angeles neighborhoods of Arlington Heights, Jefferson Park, Leimert Park, Hyde Park, Baldwin Hills-Crenshaw, Mid-City, Palms, and Beverlywood. The westernmost portion of the greater West Adams neighborhood, including the West Adams Terrace and Jefferson Park HPOZs, is within the boundaries of the CPA. The easternmost sections of the Palms and Beverlywood neighborhoods are also within the CPA.
>
> Hyde Park, which is located at the southern tip of the CPA, was an incorporated city prior to its consolidation into the City of Los Angeles in 1923. Established in 1887, Hyde Park was a stop on the Atchison, Topeka and Santa Fe Railway's Harbor Subdivision, which linked downtown Los Angeles to the port at Wilmington. The area was largely built out with modest single-family homes in the first two decades of the 20th century. Perhaps due to its short period of incorporation (1922-1923), there is no evidence of a city center or municipal buildings that might have served this community. A handful of residences as well as a few institutional properties are all that remain of Hyde Park.
>
> The northern quadrant of the West Adams-Baldwin Hills-Leimert CPA developed in a southwesterly pattern beginning at the turn of the 20th century, as a growing network of streetcars and railroads enabled suburban development on land outside of the historic city center. The earliest subdivisions are located in the northeastern parts of the CPA, in the neighborhoods of Arlington Heights and Jefferson Park. The Arlington Heights area was particularly well served by public transit, with a streetcar traversing every major east-west artery. The interior streets filled with single- and multi-family houses beginning in the early 1900s and continuing through the boom of the 1920s.
>
> Many of the tracts that were established in the 1910s and '20s were equipped with restrictions on the size and appearance of building stock as well as on who could live within their boundaries. Covenants often barred minority residents from living within these tracts and as a result, much of the city was off-limits to non-white homeowners until the late 1940s, when racially restrictive housing covenants were ruled unconstitutional. Even after the 1948 Supreme Court decision, restrictive housing practices continued to be enforced by neighborhood groups and realtors who used intimidation—and at times, violence—to keep non-white residents out of neighborhoods.
>
> Leimert Park, laid out by Walter Leimert in 1927, was almost exclusively inhabited by white homeowners in the prewar era and had restrictive covenants in the deeds to ensure its homogeny. One group, the benignly-named Neighborly Endeavors, worked to keep the neighborhood free of non-whites in the 1950s, going so far as to burn crosses on front lawns

and vandalize the homes of unwanted neighbors. Despite their efforts, a number of black families moved into Leimert Park and stood their ground against the intimidation and violence. More and more upwardly-mobile African American families moved to Leimert Park after 1950 and their population grew from 70 persons to about 4,200 in one decade alone. By 1960, non-whites (including African Americans, Japanese Americans and Latin Americans) comprised half of the total population and Leimert Park became one of the city's most diverse neighborhoods, with notable residents such as Ella Fitzgerald, Ray Charles, and Los Angeles's first African American mayor, Tom Bradley.

In the years leading up to World War II, there was a thriving Japanese American community in the Exposition Park and Jefferson Park neighborhoods, west of the University of Southern California (and just to the east of the West Adams-Baldwin Hills-Leimert CPA boundary). After the war and the period of forced internment, the area's Japanese American residents returned to seinan (meaning southwest) to resume life in their community. In the following years, many nissei (second-generation) pushed westward into the Crenshaw district, which after the war became a vibrant center of Japanese American commerce and culture. North of Leimert Park, there was a small district of undeveloped land to the east of Crenshaw that was the site of the notorious Black Dahlia murder in 1947. In the late 1950s, a group of Japanese American investors planned a shopping center on Crenshaw Boulevard and a subdivision of single-family residences and apartment buildings. The development of the Crenshaw Square shopping center and adjacent residential neighborhood was a sign of considerable nissei progress in Los Angeles, not only because of the scale and success of the development, but also due to the fact that the "principles behind the shopping center and the subdivision consciously promoted their ethnic character." While Japanese American communities before the war tended to assimilate into existing neighborhoods, drawing little attention to their presence, in Crenshaw, Japanese culture was celebrated in the design of new buildings and landscapes.

Without adjacent streetcar service, Baldwin Hills remained largely undeveloped until the late 1940s and '50s. When Baldwin Hills Village (now known as the Village Green), a groundbreaking garden apartment community, was constructed in 1941 it was surrounded by open fields on all sides. Baldwin Hills Village was also governed by restrictive housing practices and remained an all-white community until the 1960s. The complex received international acclaim for its design, low-density planning, and high quality of living; large multi-family developments sprang up on adjacent vacant land, apparently hoping to capitalize on the popularity of the complex. The Crenshaw Village apartment community was constructed in 1948 and was advertised as having "garden type private home apartments." City directory research indicates that many of the residents of Crenshaw Village were Jewish; at that time, Jewish residents were restricted from living at nearby Baldwin Hills Village. It appears that the flats of Baldwin Hills were home to a thriving Jewish community until the 1960s and '70s, when drug and gang activity became a growing presence in the neighborhood, and many of Los Angeles's Jewish residents moved to west Los Angeles and parts of the San Fernando Valley.

The 1950s and '60s brought residential development in the hilly area above Baldwin Hills, called Baldwin Hills Estates. The hills are populated with sprawling single-family homes, many with unobstructed northerly views of the Los Angeles basin and Santa Monica Mountains. The area, along with View Park to the south (which is outside of Los Angeles city limits), became home to a number of affluent African American residents in the 1960s and

'70s, and remains today one of the wealthiest majority African American communities in the United States.[30]

[30] Los Angeles, City of.2016. West Adams-Baldwin Hills-Leimert Community Plan Area. Survey LA-Historic Resources Survey Report. Department of City Planning. Prepared by Architectural Resources Group. Pasadena, CA. September, 2012, Revised July, 2016.

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5 Associated Design Professional Biographies

The following section presents biographies for design professionals who are known to be associated with the principal buildings at Shenandoah Street Elementary School.

5.1 Alfred S. Nibecker, Jr.

The 1940 Classroom Building North was designed by Alfred S. Nibecker, Jr. Born in in Spokane, Washington in 1890, Nibecker received his degree at the Massachusetts Institute of Technology before eventually arriving in Los Angeles.[31] As detailed in the LAUSD Historic Context Statement:

> In the 1920s, Nibecker began private practice in Los Angeles; he joined the Los Angeles City Board of Education as an architect in 1926, where he remained until his retirement in 1955. In his three-decade career with the school district, Nibecker oversaw the construction of, and contributed designs to, hundreds of school plant projects. Many commissions were completed by the district's in-house staff, but many others were handled by a range of the region's best architects and builders, with an increasing number of firms specializing in school design. In addition to his work with the Los Angeles City school districts, Nibecker was a fellow of the American Institute of Architects and served on the National Committee on School House Construction, the National Advisory Council on School Building Problems, run under the auspices of the U.S. Department of the Interior, Office of Education. In 1955, Nibecker was made an honorary member of the Structural Engineers Association of Southern California, the association's highest award.[32]

Nibecker retired in 1955 and was replaced by Ernst Raymond C. Billerbeck. He continued to live in South Pasadena until his death in 1989.[33]

5.1 Norman E. Kocher

The Shenandoah Children's Center Building was designed by Los Angeles-based architect Norman E. Kocher in 1969. Born in Whittier, California in 1915, Kocher received his Bachelor's Degree in Architecture from the University of Southern California in 1942.[34] From 1942 through 1949, he served as a draftsman for Stiles O. Clements and Associates before founding the firm of Benedict, Beckler, and Kocher in 1950. This firm ultimately dissolved in 1955 when Kocher took a position with the design section of the Los Angeles Board of Education, as the assistant director to the principal architect. Archival research was unable to identify substantial information on the works of Kocher, who died in 1999.

[31] American Institute of Architects, American Architects Directory (New York: R.R. Bowker Company, 1962).

[32] Sapphos Environmental, Inc., 42.

[33] Ancestry.com. *U.S., Social Security Death Index, 1935-2014* [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc., 2014.

[34] Ancestry.com. *U.S., Social Security Applications and Claims Index, 1936-2007* [database on-line]. Provo, UT, USA: Ancestry.com Operations, Inc., 2015; American Institute of Architects, American Architects Directory (New York: R.R. Bowker Company, 1970).

5.3 Jose Y. Almanza

The LAUSD commissioned architect Jose Almanza to design the new Main Building at Shenandoah Elementary School, completed in 1977 as a replacement for a 1930 building. No consequential information was found on Almanza. He appears to have been active in the 1970s, and designed Los Angeles County Fire Station #1 at 1108 North Eastern Avenue.[35]

[35] 2017. Alpha Construction Company, Inc., "Earlier School & Public." Accessed on August 15, 2017 at https://www.alphaconstruction.com/general-contractor-galleries-ca/earlier-projects/earlier-school-public/.

6 Significance Evaluation

This evaluation utilized the framework for historic resource assessments described in the *LAUSD Historic Context Statement, 1870-1969*, which follows the NRHP Multiple Property Documentation format (MPD). The MPD format "defines themes of significance, eligibility standards, and related property types. Properties sharing a theme of significance are then assessed consistently, in comparison with resources that share similar physical characteristics and historical associations."[36] In addition, this evaluation utilized the MPD-format historic context statements prepared as part of SurveyLA, which similarly identify themes of significance along with associated registration requirements.[37]

In addition to each of the applicable federal, state, and local designation criteria, one evaluation framework and its associated eligibility standards and integrity thresholds were identified and applied to this evaluation after careful consideration of all themes and subthemes. Each building on the campus was evaluated using these evaluation frameworks for eligibility both individually and as a contributor to any potential historic district.

Evaluation Framework 1

Context: Public and Private Institutional Development | Education

Theme: LAUSD | Post-1933 Long Beach Earthquake School Plants, 1933-1945

Property Type: Institutional/Education

Property Subtypes: Elementary, Junior High Schools, and High School Buildings and Campuses

Period of Significance: 1933 to 1945

Area of Significance: Education

Geographic Location: Citywide

Area of Significance: A/1

Eligibility Standards

- Exemplified post-Long Beach earthquake school planning and design concepts of the period, including requirements under the 1934 Field Act
- One-story massing for elementary schools; up to two-stories for junior/high schools
- Retains most of the associative and character-defining features from the period of significance

Character-Defining Features – Buildings/Structures

- One-story massing for elementary schools; up to two stories for middle and senior high schools
- Reinforced concrete, steel- or wood-frame construction
- Classroom wings designed for easy access and views to outdoors—with variations including L-, H-, T-shaped building plans

[36] Sapphos Environmental, Inc., 4.

[37] Los Angeles, City Of. Survey LA Citywide Historic Context Statement Resource Guide. Los Angeles Department of City Planning Office of Historic Resources. April 2012.

- Generous expanses of windows, including steel- and wood-framed multi-light windows, awning and hopper casements, clerestories, and large-pane fixed windows; window groupings often mark the location of classrooms
- Stylistically more streamlined and less ornamental than 1920s period-revival styles
- Emphasis on "traditional Southern Californian" styles, such as Spanish Colonial and Mission Revival
- Styles can also include PWA Streamline Moderne, Art Deco, Late Moderne, and proto-modern styles
- May have been partially or fully funded through Works Progress Administration, 1935 to 1943
- Works Progress Administration projects may include significant interior artwork such as murals, paintings and sculpture
- May have been designed by a prominent architect of the period

Character-Defining Features – Campus/District

- Unified site plan consisting of buildings and structures designed and sited according to their use
- Use of designed outdoor and landscaped spaces, for outdoor study, recreation and dining
- Often displays connecting sheltered corridors throughout campus
- Emphasis on a more expansive site plan
- Varied collection of buildings, differentiated by function and use (rather than a single building with all functions inside)
- Might include an elaborate administration building, located near the campus entrance; administration buildings usually serve as the focal point of the campus
- Campus often composed of groupings of classroom wings, auditoriums, gymnasiums, cafeterias, and outdoor recreation and dining areas
- Middle or senior high schools might include a gymnasium designed in the style of the campus overall

Integrity Considerations

- Should retain most of the essential physical features from the period of significance
- Some materials may have been removed or altered
- Modern lighting and fencing of site acceptable
- Schools from this period generally include buildings constructed after the period of significance, in particular post-World War II buildings, which may be noncontributing
- Eligible properties under this theme may be a single building, if it exemplifies the design ideals of the era, or a grouping (campus) of buildings constructed during the period of significance
- Intact campus groupings from the pre-1945 era are not common
- Many pre-1933 schools were substantially remodeled following the Long Beach earthquake – may retain a 1920s plan but with 1930s stylistic detailing
- Pre-1933 schools rehabilitated post-1933 might exhibit added seismic supports of steel columns, beams, or diagonal bracing; original masonry might be covered by concrete/stucco sheathing

- Should retain integrity of Materials, Design, Workmanship, Feeling, and Association from its period of significance

6.1 Designation Criteria A/1/1

Historic District Evaluation: The three permanent buildings on the subject campus were developed over a period of nearly 50 years, with the Classroom Building North constructed in 1940, the Children's unit in 1970, and the Administrative Building in 1977. As a result, the campus does not exhibit a unified site plan or architectural style to the extent that it meets the eligibility requirements for historic districts as described in the LAUSD Historic Context Statement for eligibility under Criteria A/1/1. Furthermore, Shenandoah Elementary was one of many schools associated with the late 1970s busing program, but archival research failed to identify information indicating that these associations are significant in the context of the Civil Rights Movement in Los Angeles.[38]

Individual Resource Evaluation: None of the buildings located on the subject campus appear to be individually eligible under Criteria A/1/1. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building, the Classroom Building North, dates to 1940. This building does not meet the eligibility standards outlined in the LAUSD *Historic Context Statement* as it does not exemplify post-Long Beach earthquake school planning and design concepts. Most notably, its design and site placement do not represent the indoor-outdoor integration characteristic of the era. The building's rectangular plan is counter to the L-H-, and T-shaped building plans that provided easy access and views to the outdoors, and its windows are limited, not generous, as required of schools eligible under this theme.

The remaining two permanent buildings were added to the campus in 1970 and 1977, which postdates the period of significance of 1945-1969 for postwar schools identified in the LAUSD *Historic Context Statement*. Even so, these buildings do not exhibit the character-defining elements required of schools under this theme, including building plans and site designs that clearly express function and easily identifiable indoor-outdoor spaces. As a result they do not appear individually eligible under Criteria A/1/1.

6.2 Designation Criteria B/2/2

Historic District and Individual Resource Evaluation: Per the guidance of the National Park Service, properties significant for their association with an important person in our past, must illustrate a person's important achievements.[39] Archival research completed as part of this study failed to identify any historic personages significantly associated with the subject campus. As a result, the subject campus and its individual resources do not appear eligible for designation either individually or as a historic district under Criteria B/2/2.

[38] See Los Angeles, City of.2018. *Los Angeles Citywide Historic Context Statement: African American History of Los Angeles.* Department of City Planning, Office of Historic Resources. February, 2018.

[39] U.S. Department of the Interior, National Park Service, 14.

6.3 Designation Criteria C/3/3

Historic District Evaluation: Developed in phases over a period of nearly 50 years, the buildings located on the Shenandoah Elementary School campus does not feature cohesive design intent or unified architectural style. As such, the campus does not meet any of the applicable eligibility standards outlined in the LAUSD *Historic Context Statement* and does not appear eligible as a historic district under Criteria C/3/3.

Individual Resource Evaluation: None of the buildings located on the Shenandoah Elementary School campus appear individually eligible for federal, state, or local designation under Criteria C/3/3. The 1940 Classroom Building North features minimal elements of Spanish Colonial/Mission Revival-style architecture, but it was designed and constructed after the height of these styles' popularity and does not embody many of the character-defining features identified in the LAUSD *Historic Context Statement*, such as arched openings, arcades, and exterior patios and courtyards.

The two postwar buildings on campus, while displaying varying degrees of Late Modern-influenced architecture, cannot be considered distinctive examples of the style and do not appear eligible under Criteria C/3/3. Both were constructed in the 1970s and neither features a direct expression of structural systems, generous expanses of fenestration, or extensive use of sheltered corridors as identified in the LAUSD Historic Context Statement.

7 Conclusion

In summary, Shenandoah Elementary School is recommended as ineligible for federal, state, or local designation under any applicable criteria. Although the campus was initially developed in the 1920s, it no longer retains any buildings from this early period and the oldest extant building dates to 1940. This building does not exhibit any of the character-defining features identified in the LAUSD Historic Context Statement for schools constructed between 1933 and 1945, such as unified site design, indoor-outdoor integration, plentiful windows of varying sizes and configurations, or a stylistically modern design. The subject campus also includes a number of buildings that were developed after World War II, but these buildings were constructed intermittently over a period of 40 years and are not representative of LAUSD design principles of the postwar era. The campus does not appear eligible for federal, state, or local designation under any applicable criteria and is not considered a historical resource for the purposes of CEQA.

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Appendix A

Resource Records

Appendix D

Preliminary Soils Report

Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

PRELIMINARY SOILS REPORT
Proposed Comprehensive Modernization
Project No. 10368165
Shenandoah Elementary School
2450 Shenandoah Street
Los Angeles, California 90034
Assessors ID No. 4301-018-900

Converse Project No. 17-31-113-01

Prepared For:

Mr. Soroosh Moghadam
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May 18, 2017

Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

May 18, 2017

Mr. Soroosh Moghadam
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Subject: **PRELIMINARY SOILS REPORT**
Proposed Comprehensive Modernization Project No. 10368165
Shenandoah Elementary School
2450 Shenandoah Street, Los Angeles, California 90034
Assessors ID No. 4301-018-900
Converse Project No. 17-31-113-01

Dear Mr. Moghadam:

Enclosed is the Preliminary Soils Report prepared by Converse Consultants (Converse) for the proposed Comprehensive Modernization Project No. 10368165 at Shenandoah Elementary School in Los Angeles, California.

The purpose of our study was to generate a report for design purposes, consistent with the 2016 edition of California Building Code (CBC), Title 24, Chapter 16; Earthquake Design, Chapter 18A, Foundation and Retaining Wall; Appendix Chapter 33, Excavation and Grading; Part 1' section 4-317 (e) and CGS Note 48-Checklist for the review of Geologic/Seismic Reports for California Public Schools, Hospitals and Essential Services Buildings for new and existing (retrofit/modernization) buildings. Once the A/E firm has been awarded the project and an approved final schematic site design generated, a final geotechnical investigation will be conducted to satisfy CGS requirements. Additional field work, lab testing and analysis may be needed for the final soils report.

Based on our field exploration, laboratory testing, geologic evaluation and geotechnical analysis, the site is suitable from a geotechnical standpoint for the proposed Comprehensive Modernization Project at Shenandoah Elementary School, provided our conclusions and recommendations are implemented during design and construction.

We appreciate the opportunity to be of continued service to Los Angeles Unified School District. If you should have any questions, please do not hesitate to contact us at (626) 930-1275.

CONVERSE CONSULTANTS

Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President / Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
KATHIRAVETPILLAI SIVATHASAN
No. 2708
Exp 6-30-18
GEOTECHNICAL
STATE OF CALIFORNIA

Dist: 5/Addressee

PROFESSIONAL CERTIFICATION

This report for the Proposed Comprehensive Modernization Project at the existing Shenandoah Elementary School in Los Angeles, California, has been prepared by the staff of Converse Consultants under the professional supervision of the individuals whose seals and signatures appear hereon.

The findings, recommendations, specifications or professional opinions contained in this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice in this area of Southern California. There is no warranty, either expressed or implied.

In the event that changes to the property occur, or additional, relevant information about the property is brought to our attention, the conclusions contained in this report may not be valid unless these changes and additional relevant information are reviewed and the recommendations of this report are modified or verified in writing.

Woongju Mun, PhD, EIT
Senior Staff Engineer



Mark B. Schluter, PG, CEG, CHG
Senior Engineering Geologist



Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President/Principal Engineer

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EXECUTIVE SUMMARY

The following is a summary of our geotechnical exploration, findings, conclusions, and recommendations, as presented in the body of this report. Please refer to the appropriate sections of the report for complete conclusions and recommendations. In the event of a conflict between this summary and the report, or an omission in the summary, the report shall prevail.

- The project study includes a preliminary soils report for the proposed Comprehensive Modernization Project No.10368165 at the existing Shenandoah Elementary School site located at 2450 Shenandoah Street in Los Angeles, California.

- The structural loads are not known at this time but are anticipated to be moderate. In the absence of actual structural loads, we have assumed that column loads will be on the order of 300 kips (dead plus live) and wall loads will be on the order of 5 kips per linear foot. The structures are planned to be founded on compacted fill soils with shallow foundations or concrete mat foundations.

- Four (4) exploratory borings (BH-1 through BH-4) and three (3) Cone Penetration Tests (CPT-1 through CPT-3) were advanced within the project site on April 13, 2017 and April 14, 2017. The borings were advanced using a truck mounted drill rig with an 8-inch diameter hollow stem auger to a maximum depth of 51.5 feet below the existing ground surface (bgs). The Cone Penetration Tests (CPTs) were pushed into the ground with an instrumented cone-tipped probe to depths of 25 to 29 feet below existing ground surface (bgs).

- The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth of 51.5 feet bgs. Undocumented fills, ranging from 4 to 5 feet in thickness were encountered in the borings. Deeper artificial fill may exist at the site. The fill encountered consists primarily of silty sand, sand, silty clay, and clay. The alluvial soil deposits below the fill primarily consist of silty sand, sand, sandy/clayey silt, sandy/silty clay, and clay.

- Groundwater was encountered during the time of drilling to the maximum explored depth of 44 feet bgs, approximately. Based on review of Historically Highest Groundwater Map, Plate No. 1.2 in the Seismic Hazard Zone report for the Beverly Hills 7.5-minute Quadrangle (1998), the historic high groundwater level is approximately 15 feet below existing ground surface. Groundwater level of 15 feet bgs is assumed for liquefaction analysis in this report.

- The project site is not located within a currently designated State of California Earthquake Fault Zone for surface fault rupture. No surface faults are known to project through the site. The closest known faults to the project site with mappable

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surface projections are the Newport-Inglewood (L.A. basin) (Approximately 1.2 kilometers to the west), the Hollywood Fault (Approximately 5.3 kilometers to the northwest), and Santa Monica (Approximately 5.3 kilometers to the northwest).

- The site is located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Beverly Hills Quadrangle. Based on the results of our subsurface exploration and our experience on similar projects, we anticipate liquefaction potential to be very low and seismically-induced settlement to be negligible.

- The proposed building structures can be supported on shallow continuous and/or isolated spread foundations founded on compacted fill provided our earthwork recommendations are incorporated in the design and construction.

- Based on the soil corrosivity test results, the on-site soils are not considered to be corrosive to concrete nor corrosive to buried ferrous metals.

- Laboratory testing indicates the site soils have a very low expansion potential. Mitigation measure for expansive soil is not needed.

Results of our study indicate that the site is suitable from a geotechnical standpoint for the proposed development, provided that the recommendations contained in this report are incorporated into the design and construction of the project.

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE AND PROJECT DESCRIPTION 2

2.1 Site Description 2
2.2 Project Description 2

3.0 SCOPE OF WORK 3

3.1 Site Reconnaissance 3
3.2 Subsurface Exploration and Percolation Testing 3
3.3 Laboratory Testing 3
3.4 Analyses and Report 4

4.0 GEOLOGIC CONDITIONS 5

4.1 Regional Geologic Setting 5
4.2 Subsurface Profile of Project Site 5
4.3 Groundwater 6
4.4 Subsurface Variations 6

5.0 FAULTING AND SEISMIC HAZARDS 7

5.1 Seismic Characteristics of Nearby Faults 7
5.2 Surface Fault Rupture 8
5.3 Liquefaction and Seismically-Induced Settlement 9
5.4 Lateral Spreading 9
5.5 Seismically-Induced Slope Instability 9
5.6 Earthquake-Induced Flooding 9
5.7 Tsunami and Seiches 10
5.8 Volcanic Eruption Hazard 10

6.0 SEISMIC ANALYSIS 11

6.1 CBC Seismic Design Parameters 11
6.2 Site-Specific Response Spectra 11

7.0 DESIGN RECOMMENDATIONS 14

7.1 Shallow Foundations 15
7.2 Slabs-on-Grade 17
7.3 Modulus of Subgrade Reaction 17
7.4 Soil Corrosivity Evaluation 17
7.5 Site Drainage 18
7.6 Flexible Pavement Design 18
7.7 Rigid Pavement Design 19

8.0 CONSTRUCTION CONSIDERATIONS 21

8.1 General 21
8.2 Temporary Excavations 21
8.3 Geotechnical Services During Construction 21

9.0 CLOSURE 23

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10.0 REFERENCES.....24

TABLES

Page Number
Table No. 1, *Summary of Regional Faults*.....8
Table No. 2, *CBC Seismic Design Parameters*.....11
Table No. 3, *2016 CBC Mapped Acceleration Parameters*.....12
Table No. 4, *Site-Specific Response Spectrum Data*.....13
Table No. 5, *Site-Specific Seismic Design Parameters*.....13
Table No. 6, *Lateral Earth Pressures for Retaining Wall Design*.....15
Table No. 7, *Soil Corrosivity Test Results*.....17
Table No. 8, *Flexible Pavement Structural Sections*.....19
Table No. 9, *Rigid Pavement Structural Sections*.....19
Table No. 10, *Slope Ratios for Temporary Excavation*.....21

FIGURES

Page Number
Figure No. 1, *Site Location Map*.....1
Figure No. 2, *Site Plan and Approximate Location of Borings and CPTs*.....2
Figure No. 3, *Regional Geologic Map*.....5
Figure No. 4, *Geologic Cross Section A-A' and B-B'*.....6
Figure No. 5, *Southern California Regional Fault Map*.....7
Figure No. 6, *Epicenter Map of Southern California Earthquakes (1800-1999)*.....7
Figure No. 7, *Earthquake Fault Zones Map*.....8
Figure No. 8, *Seismic Hazard Zones Map*.....9
Figure No. 9, *Site-Specific Design Response Spectrum*.....12

APPENDICES

Appendix A ..... *Field Exploration*
Appendix B ..... *Laboratory Testing Program*
Appendix C ..... *Liquefaction/Seismic Settlement Analysis*
Appendix D ..... *Earthwork Specifications*

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1.0 INTRODUCTION

This report contains the findings and recommendations of our preliminary geotechnical study performed at the site of the proposed Comprehensive Modernization Project No.10368165 at the existing Shenandoah Elementary School site in Los Angeles, California, as shown on Figure No. 1, *Site Location Map*.

The purpose of our study was to generate a report for design purposes, consistent with the 2016 edition of California Building Code (CBC), Title 24, Chapter 16; Earthquake Design, Chapter 18A, Foundation and Retaining Wall; Appendix Chapter 33, Excavation and Grading; Part 1' section 4-317 (e) and CGS Note 48-Checklist for the review of Geologic/Seismic Reports for California Public Schools, Hospitals and Essential Services Buildings for new and existing (retrofit/modernization) buildings. Once the A/E firm has been awarded the project and an approved final schematic site design generated, a final geotechnical investigation will be conducted to satisfy CGS requirements. Additional field work, lab testing and analysis may be needed for the final geotechnical report.

This report is written for the project described herein and is intended for use solely by Shenandoah Elementary School, and their design team. It should not be used as a bidding document but may be made available to the potential contractors for information on factual data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

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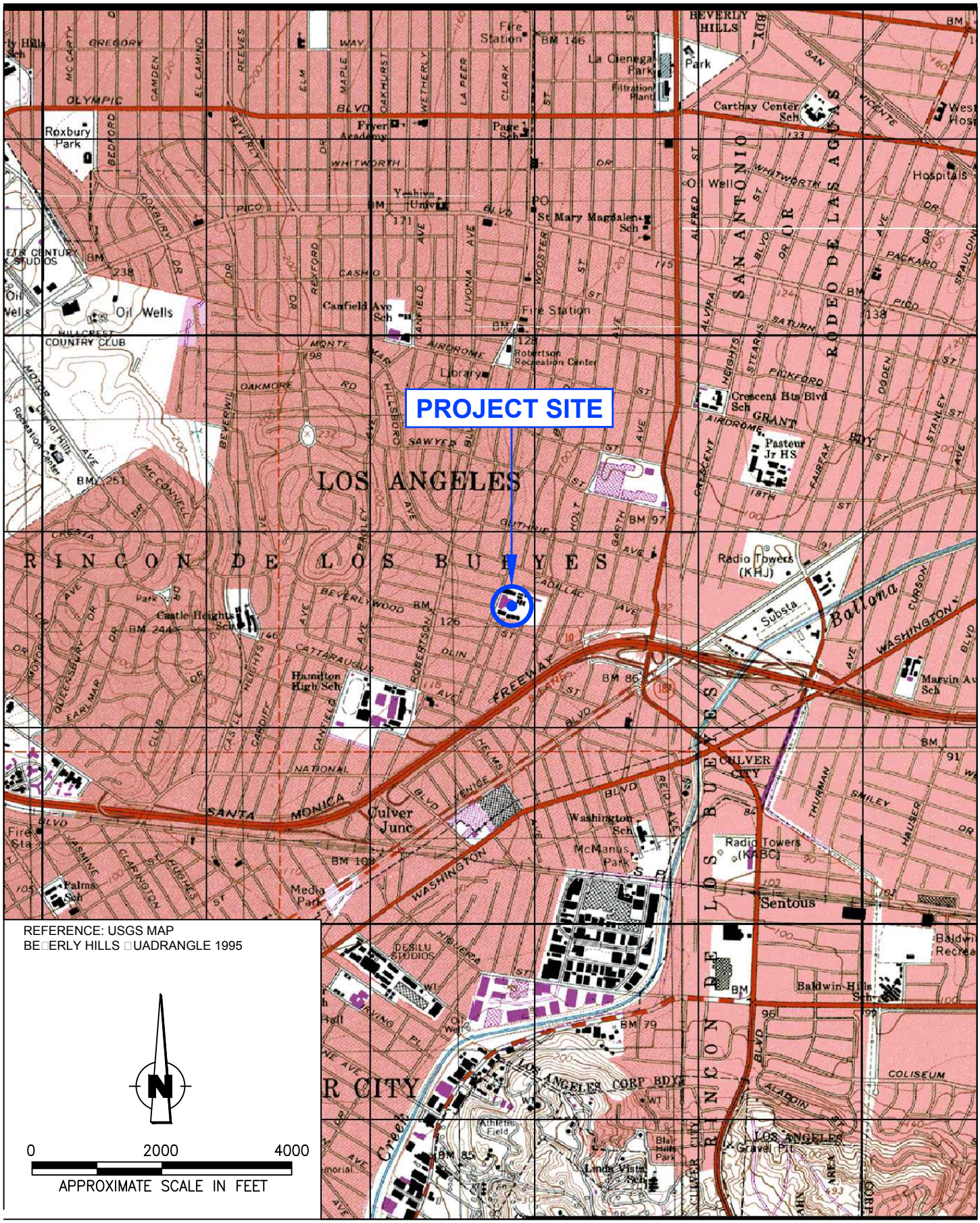

SITE LOCATION MAP

Converse Consultants

SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. 17-31-113-01

Figure No. 1

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

The subject site is located at 2450 Shenandoah Streets, Los Angeles, California and the proposed structures are planned to be within the existing Shenandoah Elementary School site, as shown on Figure No. 2, *Site Plan and Approximate Location of Borings and CPTs map*. The subject site has surface elevations ranging from approximately 110 to 116 feet relative to mean-sea-level (MSL) respectively, with general surface gradients down toward the south east.

The site coordinates for the proposed project are:

North Latitude: 34.0385 degrees
West Longitude: 118.3840 degrees

The site coordinates were centered on the subject sites and used to calculate the earthquake ground motions. Review of Engineering Geology and Seismology for Public Schools and Hospitals in California, dated August 9, 2005 (page 35) indicates that accuracy to within a few hundred meters of these coordinates is sufficient for the computation of the earthquake ground motion of the project site.

2.2 Project Description

The proposed project study includes a preliminary geotechnical study and soils report for the proposed Comprehensive Modernization Project No. 10368165 at the existing Shenandoah Elementary School site located at 2450 Shenandoah Street in City of Los Angeles, Los Angeles County, California.

The LAUSD launch team has proposed boring locations for each site to be used for the generation of the preliminary soils report. Once the A/E firm has been awarded the project and an approved final schematic site design has been generated, a final soils report will be generated based on the A/E's design and recommendations. Additional borings will be required per the approved final schematic design for the generation of the final soils report.

The structural loads are not known at this time but are anticipated to be moderate. In the absence of actual structural loads, we have assumed that column loads will be on the order of 300 kips (dead plus live) and wall loads will be on the order of 5 kips per linear foot. The structures are planned to be founded on shallow foundations or concrete mat foundations. The project sites are shown on Figure No. 2, *Site Plan and Approximate Location of Borings and CPTs*.

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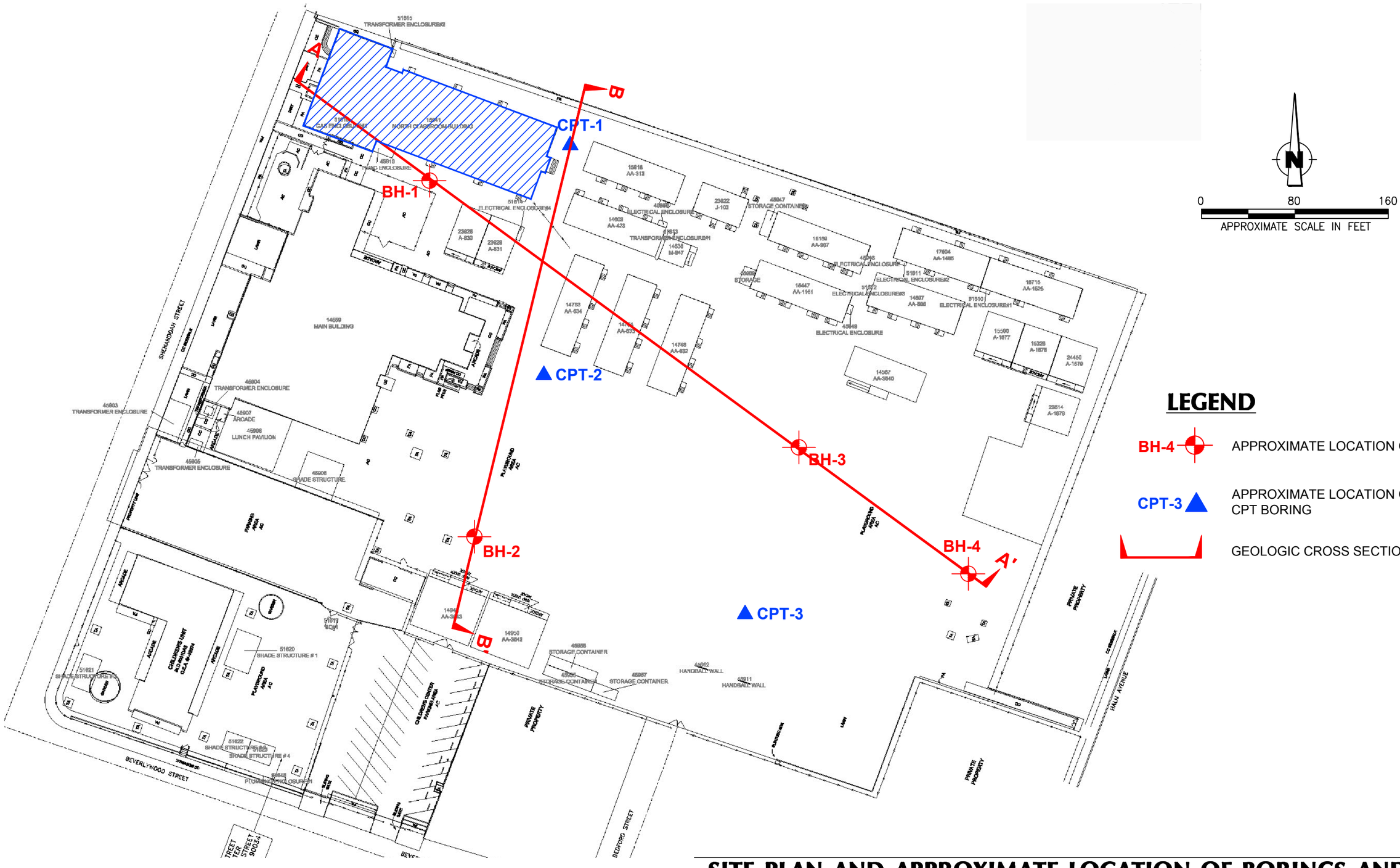

LEGEND

BH-4 — APPROXIMATE LOCATION OF BORING

CPT-3 — APPROXIMATE LOCATION OF CPT BORING

GEOLOGIC CROSS SECTION

SITE PLAN AND APPROXIMATE LOCATION OF BORINGS AND CPTS

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2450 SHENANDOAH STREET
LOS ANGELES□CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. 17-31-113-01

Figure No. 2

3.0 SCOPE OF WORK

Our scope of work consists of the tasks described in the following subsections.

3.1 Site Reconnaissance

Our field exploration included a site reconnaissance by a member of the Converse staff on April 11, 2017. The purpose of the site reconnaissance was to observe surface conditions and to mark exploratory boring locations based on a proposed boring location map provided to our office via email.

3.2 Subsurface Exploration

Four (4) exploratory borings (BH-1 through BH-4) and three (3) Cone Penetration Tests (CPT-1 through CPT-3) were advanced within the project site on April 13, 2017 and April 14, 2017. The borings were advanced using a truck mounted drill rig with an 8-inch diameter hollow stem auger to a maximum depth of 51.5 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils. The Cone Penetration Tests (CPTs) were performed by a 25-ton truck with hydraulic rams pushing an instrumented cone-tipped probe to depths of 25 to 29 feet below existing ground surface. The cone tip and friction sleeve resistance were recorded during penetration into the ground. Detailed descriptions of the field exploration and sampling program are presented in Appendix A, *Field Exploration*.

California Modified Sampler (Ring samples), Standard Penetration Test samples, and bulk soil samples were obtained for laboratory testing. Standard Penetration Tests (SPTs) were performed in selected borings at selected intervals using a standard (1.4 inches inside diameter and 2.0 inches outside diameter) split-barrel sampler. The bore holes were backfilled and compacted with soil cuttings by reverse spinning of the auger following the completion of drilling.

3.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

- In situ moisture contents and dry densities (ASTM Standard D2216)
- Fines content/Passing No. 200 sieve (ASTM D1140)
- Grain size distribution (ASTM Standard C136)
- Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)
- Direct shear (ASTM Standard D3080)
- Consolidation (ASTM Standard D2435)

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- Expansion index (ASTM Standard D4829)
- Soil corrosivity tests (Caltrans 643, 422, 417, and 532)
- R-Value (Caltrans 301)

3.4 Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated with respect to the planned construction. This report was prepared to provide the findings, conclusions and recommendations developed during our study and evaluation.

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4.0 GEOLOGIC CONDITIONS

4.1 Regional Geologic Setting

The project site is located in the northern portion of the Los Angeles Basin, along the northern boundary of the Peninsular Ranges province and the southern margin of the Transverse Ranges geomorphic province. The Los Angeles Basin is situated at the junction of two major convergent fault systems. The first group includes the northwest-trending high angle strike slip faults of the San Andreas system projecting northward from the northern terminus of the Peninsular Ranges province. Faults in this group include the Palos Verdes, Newport-Inglewood and Whittier-Elsinore fault zones. The second group includes the east-west trending low angle reverse or reverse-oblique faults bounding the southern margin of the Transverse Range province. Faults in this group include the Malibu-Santa Monica, Hollywood, Raymond and Sierra Madre fault zones. The Los Angeles Basin is bounded by active faults on all sides and is underlain by buried thrust fault zones. The seismic hazard for the Los Angeles Basin and vicinity is high.

The Los Angeles Basin is a subsiding structural depression that has accumulated as much as 10,000 feet of sediments since Middle Miocene time, about 10 million years ago. Older sediments have been indurated by deep burial and deformed by folding and faulting. Overlying those formations are younger, relatively less deformed, Quaternary aged sediments varying from marine sands to alluvial sands, gravely sands, silts and clays. Deposits of this age have been elevated by deformation and faulting along the Newport-Inglewood fault and are exposed in the Cheviot Hills and Baldwin Hills near the project site.

Soils underlying the project site consist of sand, silt and clay sediments deposited over time by rivers and local stream tributaries which once drained across the coastal plain to the Pacific Ocean. Most of these natural river and stream channels are now controlled by debris basins and flood control channels that collect surface runoff and convey storm water to the ocean. Figure No. 3, *Regional Geologic Map*, has been prepared to show the project site with respect to regional geology of the Beverly Hills Quadrangle.

4.2 Subsurface Profile of Project Site

The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth of 51.5 feet bgs. Undocumented fills, ranging from 4 to 5 feet in thickness were encountered in the borings. Deeper artificial fill may exist at the site. The fill encountered consists primarily of silty sand, sand, silty clay, and clay. The alluvial soil deposits below the fill primarily consist of silty sand, sand, sandy/clayey silt, sandy/silty clay, and clay. Sampling blow-counts correlate to relatively loose conditions near surface, and generally become denser with depth.

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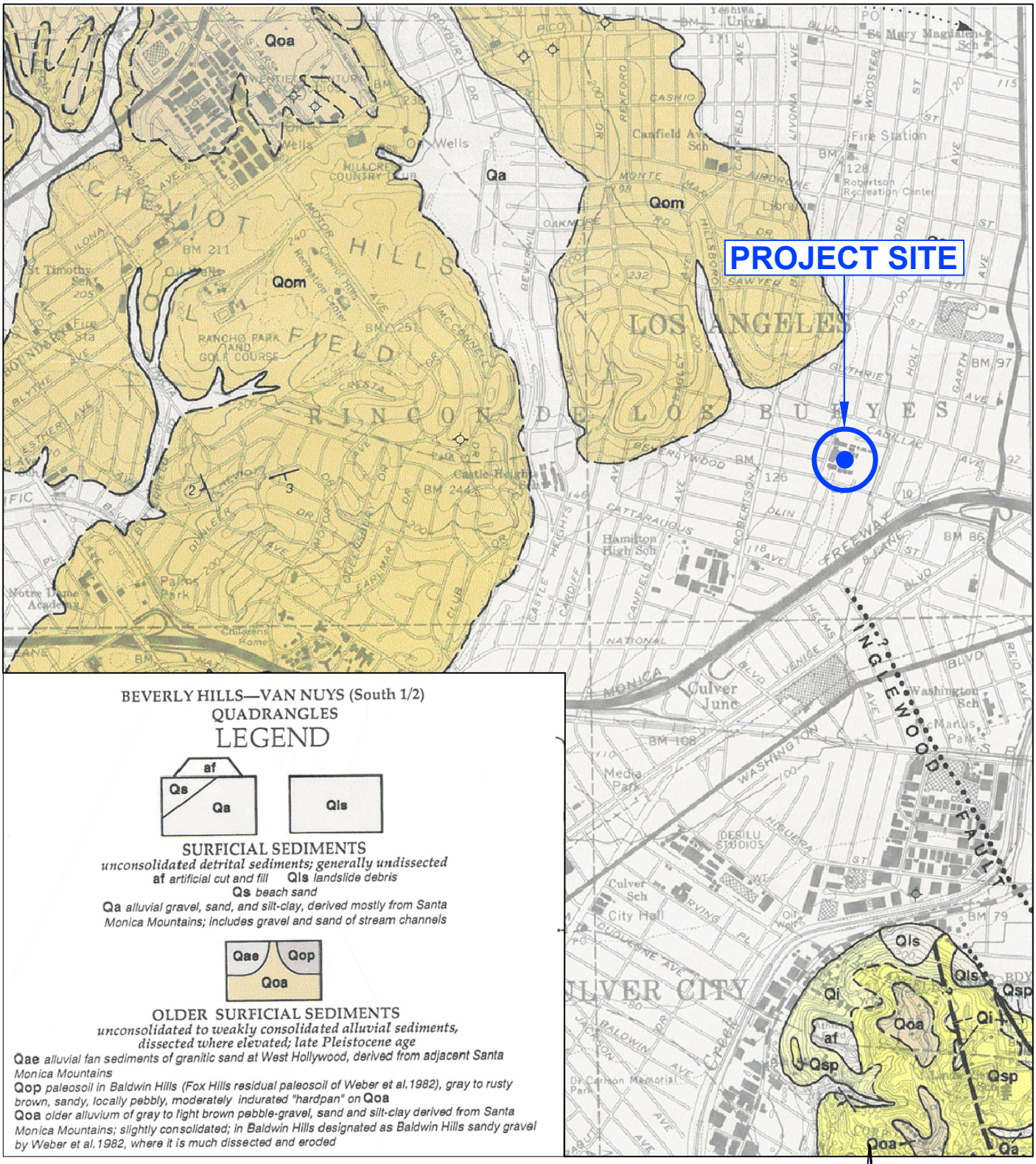

REFERENCE: GEOLOGIC MAP THE BE□ERLY HILLS AND □AN NUYS □SOUTH $\frac{1}{2}$□□UADRANGLES

REGIONAL GEOLOGIC MAP

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Project No. 16-31-277-01

Figure No. 3

Figure No. 2, *Site Plan and Approximate Location of Borings and CPTs* and Figure No. 4, *Geologic Cross Sections A-A' and B-B'*, have been drawn across the subject site to illustrate the subsurface conditions. For a detailed description of the materials encountered during our exploration, see Appendix A, Field Exploration.

4.3 Groundwater

Groundwater was encountered during the time of drilling to the maximum explored depth of 44 feet bgs, approximately. Based on review of Historically Highest Groundwater Map, Plate No. 1.2 in the Seismic Hazard Zone report for the Beverly Hills 7.5-minute Quadrangle (1998), the historic high groundwater level is approximately 15 feet below existing ground surface. Groundwater level of 15 feet bgs is assumed for liquefaction analysis in this report.

In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local conditions or during rainy seasons. Groundwater conditions below any given site vary depending on numerous factors including seasonal rainfall, local irrigation, and groundwater pumping, among other factors.

4.4 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and depositional characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If, during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

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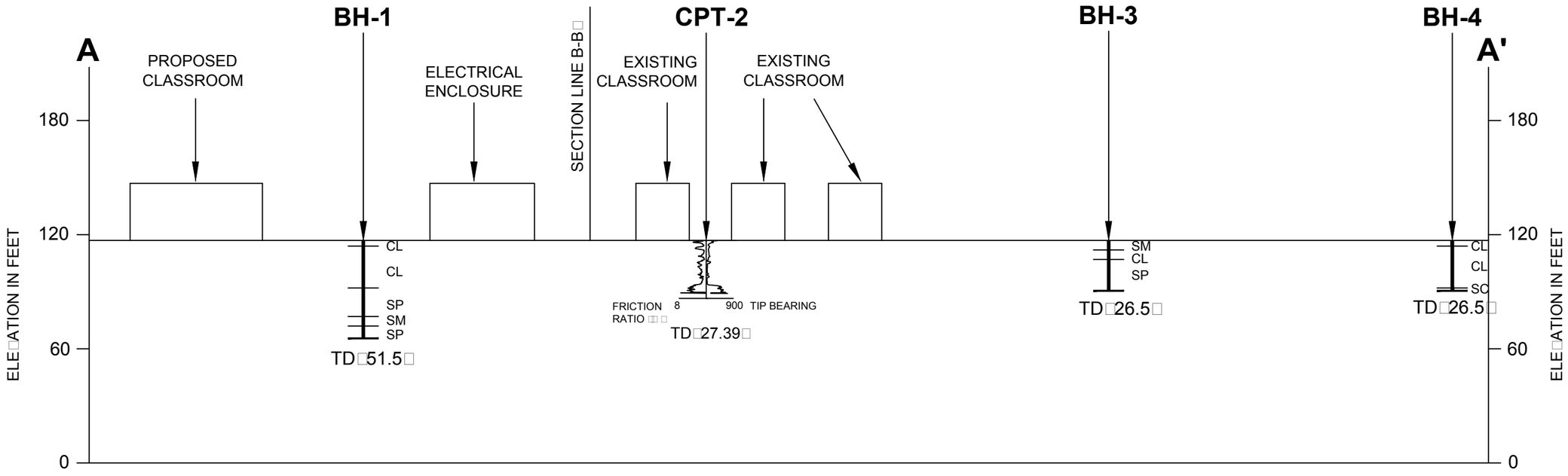

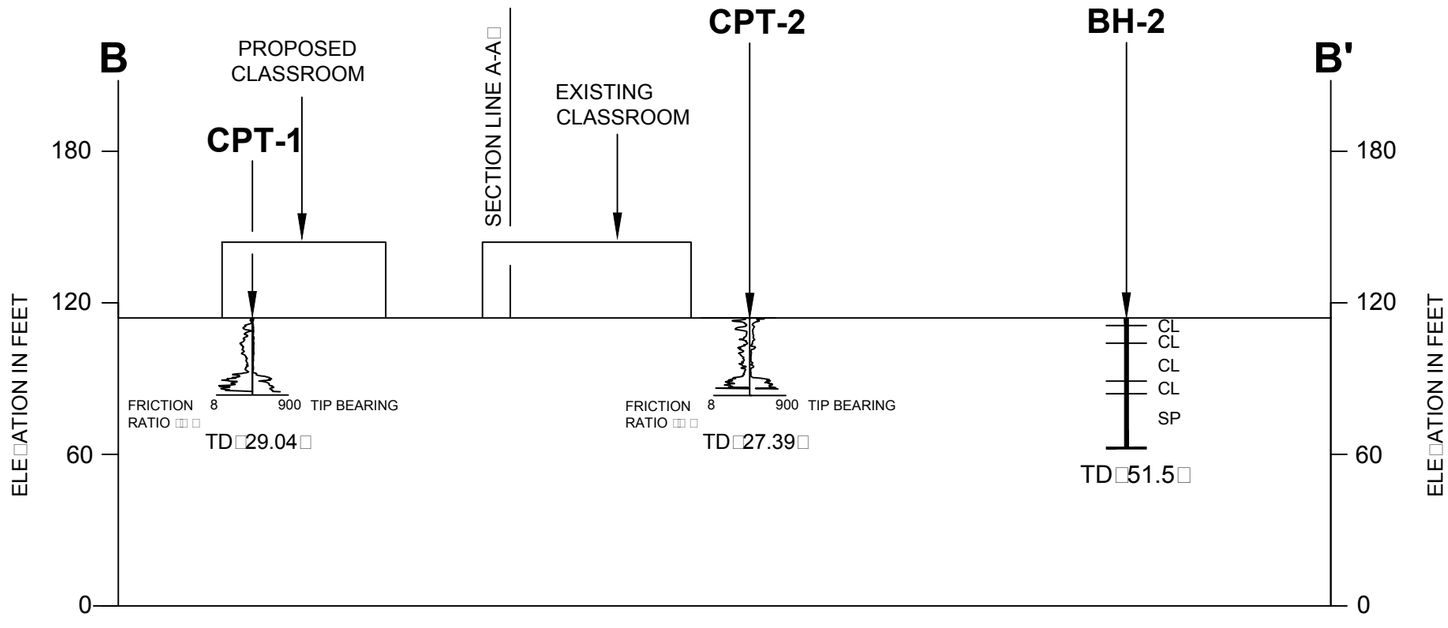

GEOLOGIC CROSS SECTION A-A′ AND B-B′

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Project No. 17-31-113-01

Figure No. 4

5.0 FAULTING AND SEISMIC HAZARDS

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, liquefaction and seismically induced settlement, lateral spreading, landslides, earthquake induced flooding, tsunamis and seiches, and volcanic eruption hazard. Results of a site-specific evaluation for each type of possible seismic hazards are discussed in the following sections.

5.1 Seismic Characteristics of Nearby Faults

The proposed site is situated in a seismically active region. As is the case for most areas of Southern California, ground-shaking resulting from earthquakes associated with nearby and more distant faults may occur at the project site. During the life of the project, seismic activity associated with active faults can be expected to generate moderate to strong ground shaking at the site. Review of recent seismological and geophysical publications indicates that the seismic hazard for the project site is high.

The closest known faults to the project site with mappable surface projections are the Newport-Inglewood fault trace (L.A. basin) located approximately 1,700 feet (0.5 kilometers) to the south and the Hollywood-Santa Monica Fault located approximately 3.5 miles (5.7 kilometers) to the northwest. The concealed Compton Thrust Fault and Elysian Park Blind Thrust along with other regional faults were included as capable faults modeled for the probabilistic seismic hazard analysis for the site. The approximate locations of these local active faults with respect to the project site are shown on Figure No. 5, *Southern California Regional Fault Map*.

There are a number of regional fault systems, which could produce ground shaking at the site during a major earthquake. Figure No. 6, *Epicenters Map of Southern California Earthquakes (1800-1999)* illustrates the frequency and magnitude of historical earthquakes in Southern California. Table No. 1, *Summary of Regional Faults,* shows the location of the known most capable faults with respect to the site within 50 kilometers. The data presented below was calculated using EQFAULT Version 3.0 with updated fault data from “The Revised 2002 California Probabilistic Seismic Hazard Maps (June 2003)”, Appendix A.

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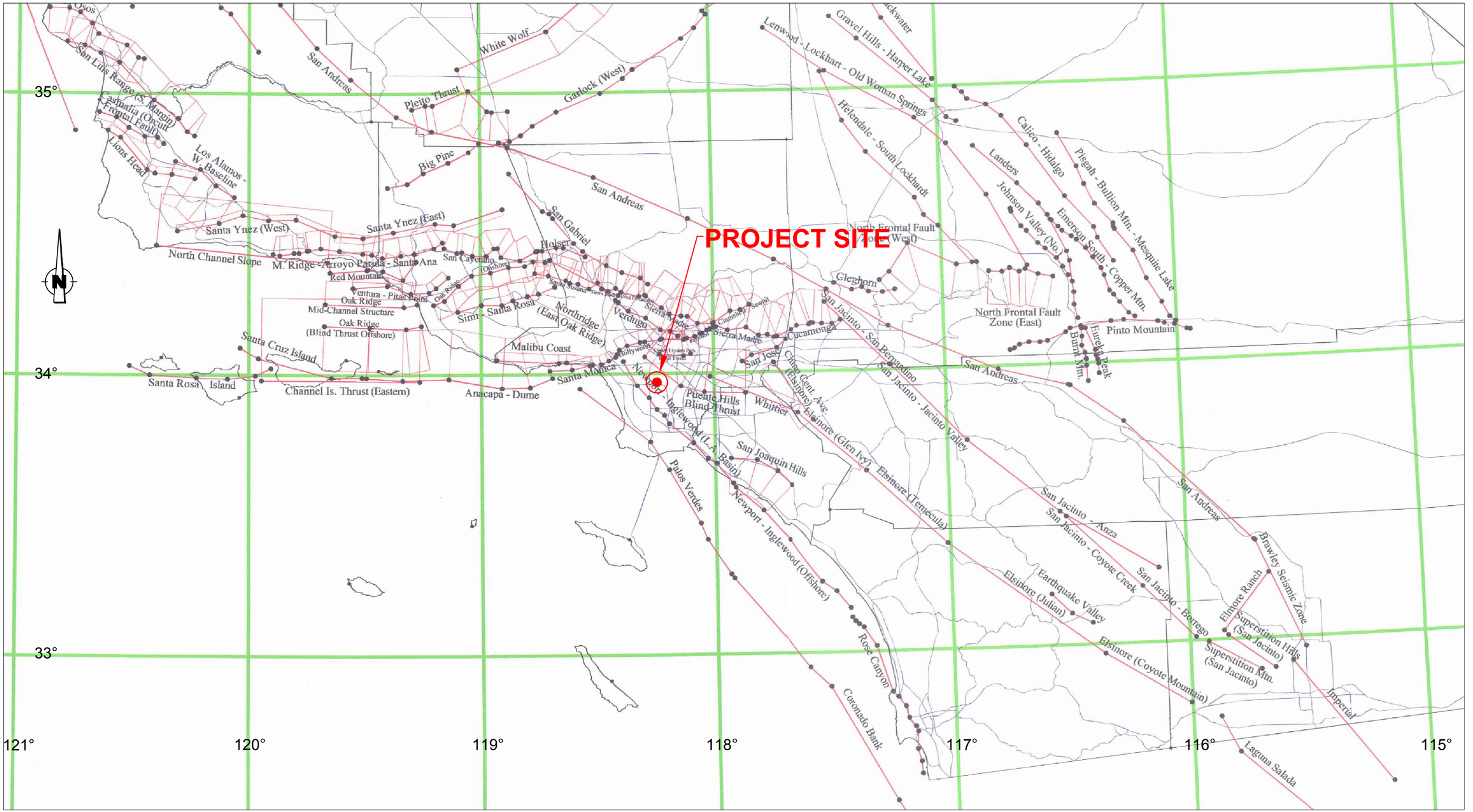

REFERENCE: PORTION OF CGS 2002 CALIFORNIA FAULT MODEL MODIFIED FOR USE WITH FRIS□SP AND E□FAULT BY THOMAS F. BLA□E□AUGUST 2004

FAULT SOURCES

BLIND THRUST FAULT□ POLYGONS INDICATE RUPTURE PLANES AND DIP DIRECTION

SOUTHERN CALIFORNIA REGIONAL FAULT MAP

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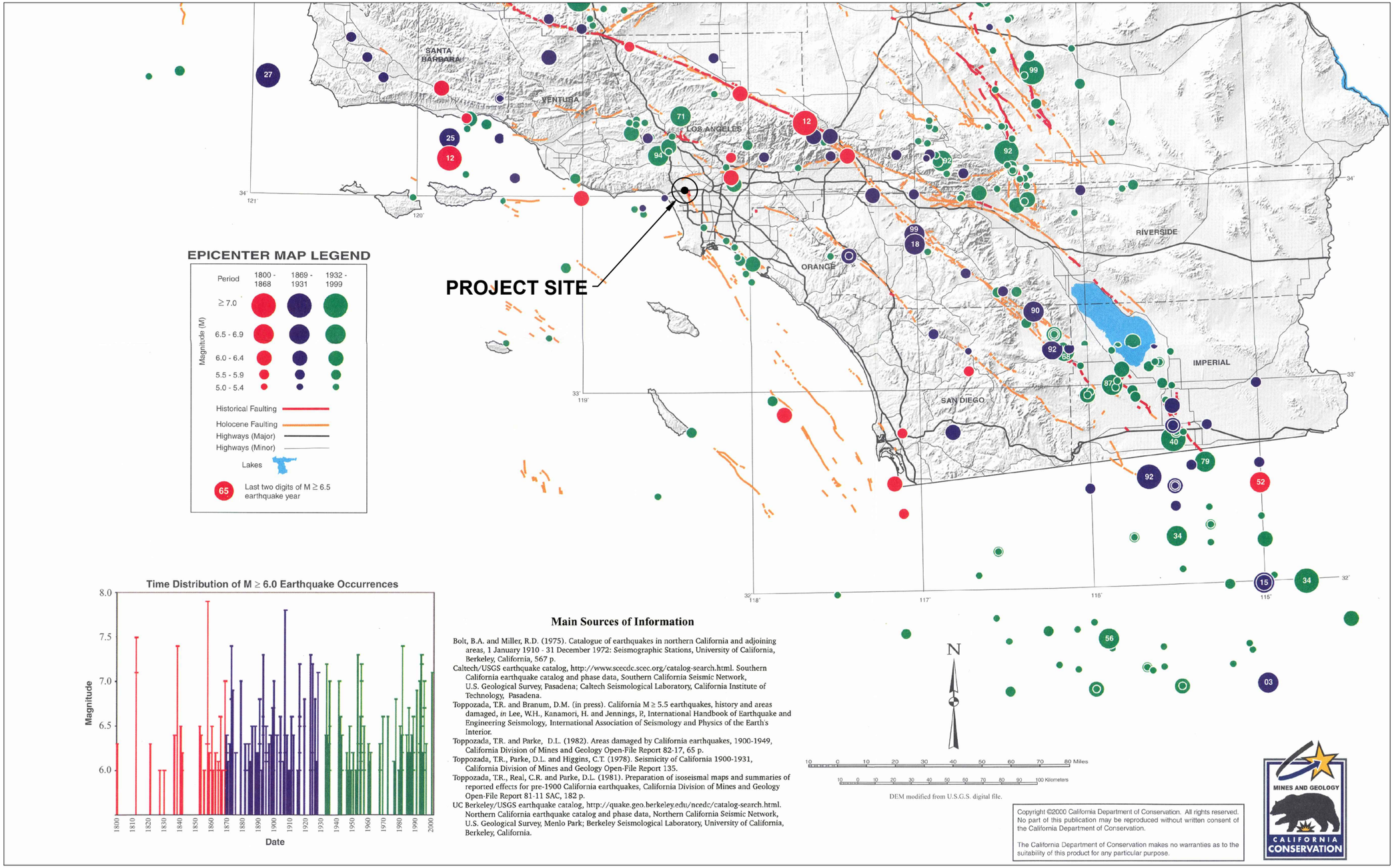
Figure No. 5



Time Distribution of M ≥ 6.0 Earthquake Occurrences

Main Sources of Information

Bolt, B.A. and Miller, R.D. (1975). Catalogue of earthquakes in northern California and adjoining areas, 1 January 1910 - 31 December 1972: Seismographic Stations, University of California, Berkeley, California, 567 p.

Caltech/USGS earthquake catalog, http://www.scecdc.scec.org/catalog-search.html. Southern California earthquake catalog and phase data, Southern California Seismic Network, U.S. Geological Survey, Pasadena; Caltech Seismological Laboratory, California Institute of Technology, Pasadena.

Toppozada, T.R. and Branum, D.M. (in press). California M ≥ 5.5 earthquakes, history and areas damaged, *in* Lee, W.H., Kanamori, H. and Jennings, P, International Handbook of Earthquake and Engineering Seismology, International Association of Seismology and Physics of the Earth's Interior.

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Toppozada, T.R., Parke, D.L. and Higgins, C.T. (1978). Seismicity of California 1900-1931, California Division of Mines and Geology Open-File Report 135.

Toppozada, T.R., Real, C.R. and Parke, D.L. (1981). Preparation of isoseismal maps and summaries of reported effects for pre-1900 California earthquakes, California Division of Mines and Geology Open-File Report 81-11 SAC, 182 p.

UC Berkeley/USGS earthquake catalog, http://quake.geo.berkeley.edu/ncedc/catalog-search.html. Northern California earthquake catalog and phase data, Northern California Seismic Network, U.S. Geological Survey, Menlo Park; Berkeley Seismological Laboratory, University of California, Berkeley, California.

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MINES AND GEOLOGY
CALIFORNIA CONSERVATION

REFERENCE: PORTION OF EPICENTERS AND AREAS DAMAGED BY M□5 CALIFORNIA EARTH□UA□ES□1800-1999 CALIFORNIA DEPARTMENT OF CONSER□ATION□ MAP SHEET 49 DATED 2000.

EPICENTER MAP OF SOUTHERN CALIFORNIA EARTHQUAKES (1800-1999)

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Project No. 17-31-113-01

Figure No. 6

Table No. 1, Summary of Regional Faults

Fault Name and Section	Approximate * Distance to Site (kilometers)	Max. Moment Magnitude (Mmax)	Slip Rate (mm/yr)
NEWPORT-INGLEWOOD (L.A. BASIN)	1.2	6.9	1.00
HOLLYWOOD	5.3	6.4	1.00
SANTA MONICA	5.3	6.6	1.00
COMPTON THRUST	8.0	6.8	1.5
MALIBU COAST	13.5	6.7	0.30
ELYSIAN PARK BLIND THRUST	14.6	6.7	1.5
NORTHRIDGE (E. OAK RIDGE)	15.6	6.9	1.50
PALOS VERDES	16.3	7.1	3.00
RAYMOND	17.5	6.5	1.50
VERDUGO	19.1	6.7	0.50
SIERRA MADRE	24.6	7.0	2.00
SIERRA MADRE (SAN FERNANDO)	26.9	6.7	2.00
ANACAPA-DUME	29.2	7.3	3.00
SANTA SUSANA	32.5	6.6	5.00
SAN GABRIEL	32.5	7.2	1.00
WHITTIER	34.2	6.8	2.50
CLAMSHELL-SAWPIT	38.0	6.5	0.50
HOLSER	40.5	6.5	0.40
SAN JOSE	44.8	6.5	0.50
OAK RIDGE (ONSHORE)	46.5	6.9	4.00
SIMI-SANTA ROSA	47.3	6.7	1.00

* Review of published geologic data and mapping including Appendix A of the 2002 California Fault Parameters Report (Cao et al., 2003).

5.2 Surface Fault Rupture

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture as shown on Figure No. 7, *Earthquake Fault Zones Map*. The Alquist-Priolo Earthquake Fault Zoning Act requires the California Geological Survey to zone “active faults” within the State of California. An “active fault” has exhibited surface displacement with Holocene time (within the last 11,000 years) hence constituting a potential hazard to structures that may be located across it. Public school structures are required to be set-back at least 50 feet from an active fault. The active fault set-back distance is measured perpendicular from the dip of the fault plane. Based on a review of existing geologic information, no known active faults project through or toward the site. The potential for surface rupture resulting from the movement of the nearby major faults is considered remote.

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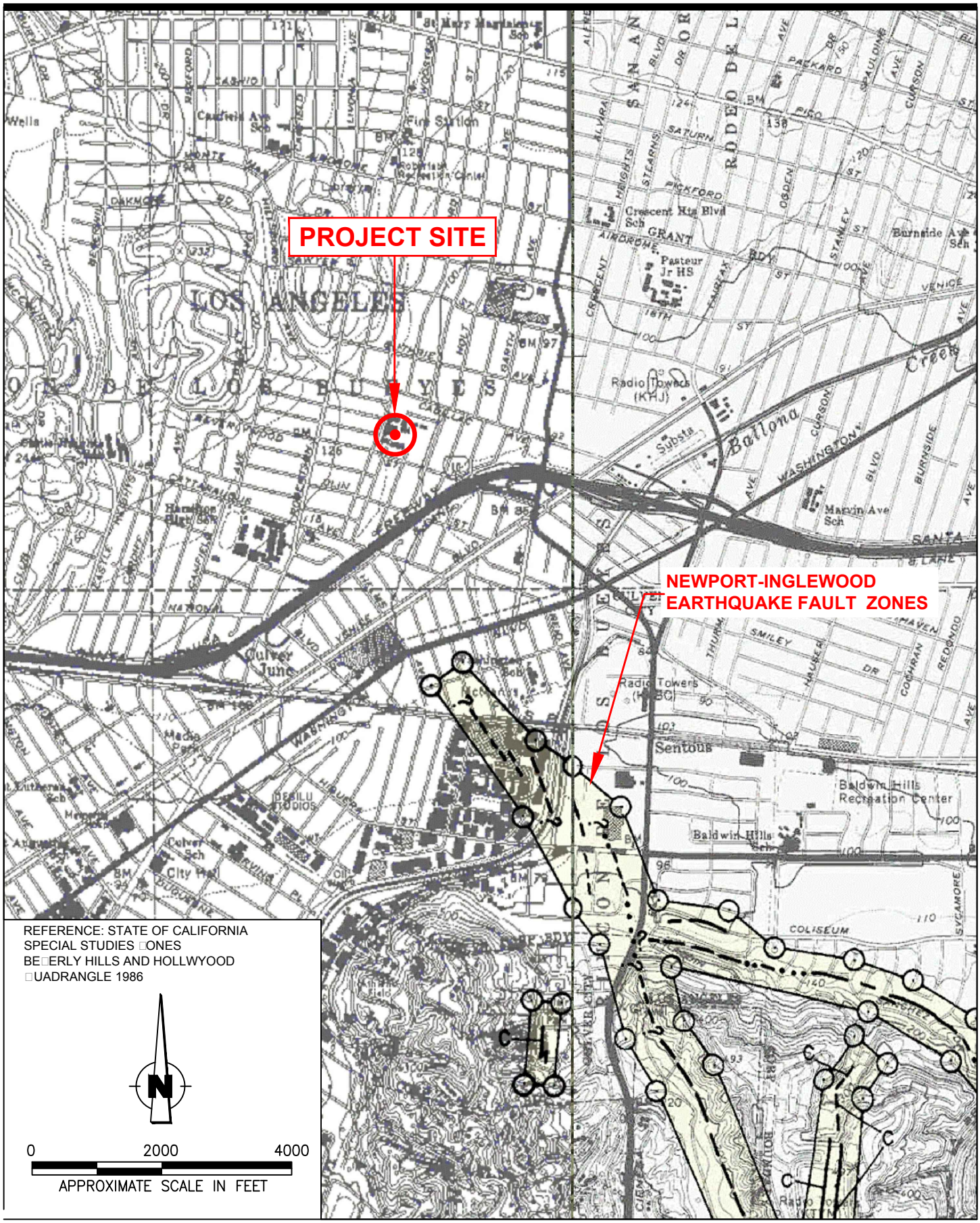

EARTHQUAKE FAULT ZONE MAP

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Project No. 17-31-113-01

Figure No. 7

5.3 Liquefaction and Seismically-Induced Settlement

Liquefaction is the sudden decrease in the strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface.

The site is located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Beverly Hills Quadrangle as shown in Figure No. 8, *Seismic Hazard Zones Map*. Liquefaction analysis was performed using *LiquefyPro,* Version 5.8n, 2012, by Civil Tech Software for the upper 51.5 feet below ground surface utilizing BH-1. The results of the liquefaction analysis and a summary of the methods used are presented in Appendix C, *Liquefaction/Seismic Settlement Analysis*.

The results of liquefaction analyses indicate the site soils are not susceptible to liquefaction and seismically-induced settlement to be negligible.

5.4 Lateral Spreading

Seismically induced lateral spreading involves primarily lateral movement of earth materials due to ground shaking. It differs from the slope failure in that complete ground failure involving large movement does not occur due to the relatively smaller gradient of the initial ground surface. Lateral spreading is demonstrated by near-vertical cracks with predominantly horizontal movement of the soil mass involved. The topography at the project site and in the immediate vicinity of the site is relatively flat, with no significant nearby slopes or embankments. Under these circumstances, the potential for lateral spreading at the subject site is considered negligible.

5.5 Seismically-Induced Slope Instability

Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The project site is gently sloping to relatively flat. In the absence of significant ground slopes, the potential for seismically induced landslides to affect the proposed site is considered to be very low.

5.6 Earthquake-Induced Flooding

Review of the Flood Insurance Rate Map (FIRM), Panel 1861 (1861F) of 2350, effective date September 26, 2008, from the Map Service Center (MSC) viewer, indicates that the site is designated as Zone “X”, “Other Flood Areas”, “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance

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N

0 2000 4000

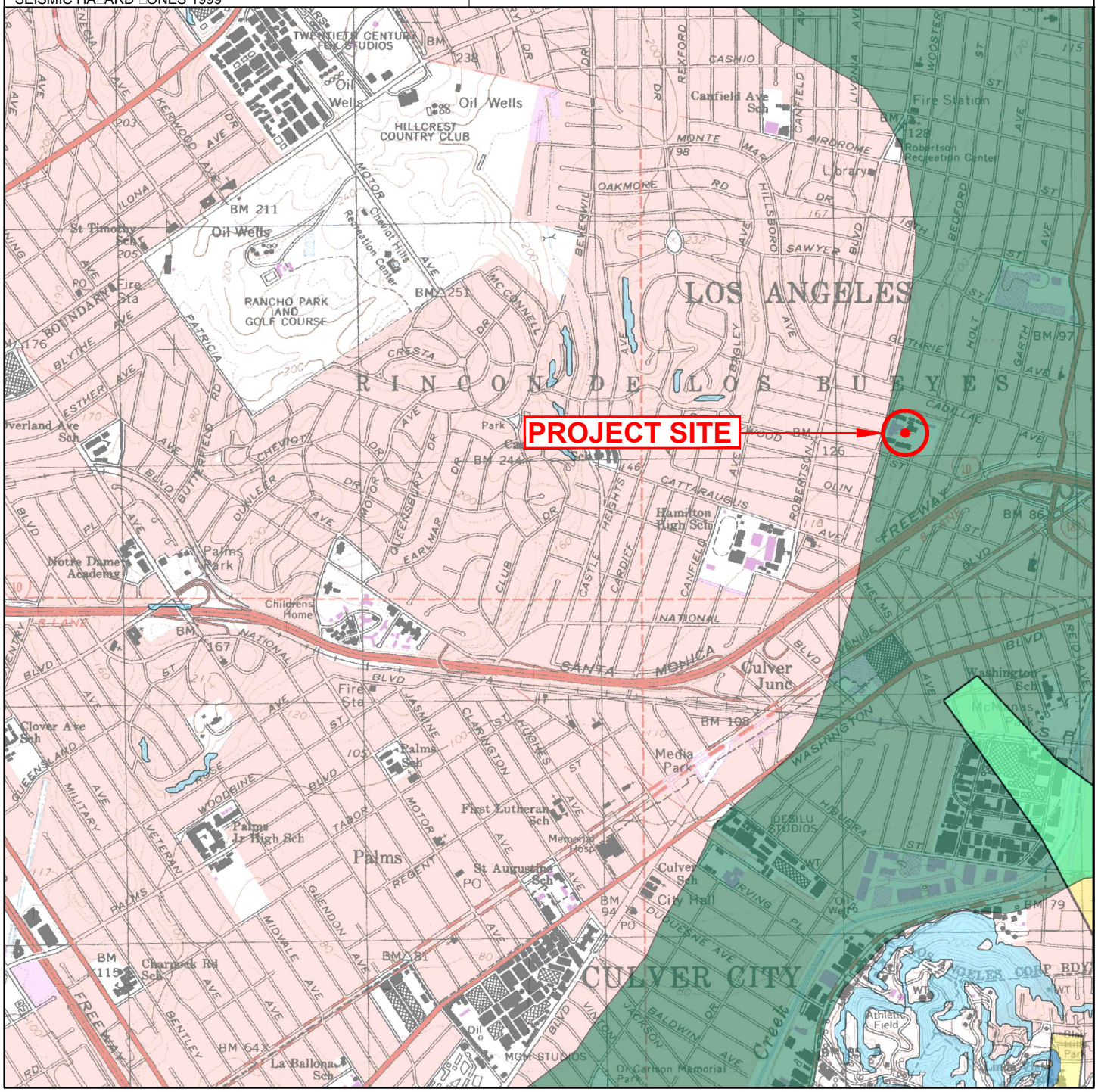
APPROXIMATE SCALE IN FEET

REFERENCE: BE□ERLY HILLS □UADRANGLE
SEISMIC HA□ARD □ONES 1999

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.



SEISMIC HAZARD ZONES MAP

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Project No. 17-31-113-01

Figure No. 8

flood." Due to the absence of groundwater at shallow depths, distance of the subject site from large bodies of water and regional flood control structures, the potential for flooding at the subject site is considered remote.

5.7 Tsunami and Seiches

Tsunamis are seismic sea waves generated by fault displacement or major ground movement. Based on the location of the site from the ocean and surface elevations, tsunamis do not pose a hazard. Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Based on site location away from dams, lakes and large reservoirs, seiches do not pose a hazard.

5.8 Volcanic Eruption Hazard

There are no known volcanoes near the site. According to Jennings (1994), the nearest potential hazards from future volcanic eruptions is the Amboy Crater-Lavic Lake area located in the Mojave Desert more than 125 miles east/northeast of the site. Volcanic eruption hazards are not present.

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6.0 SEISMIC ANALYSIS

6.1 CBC Seismic Design Parameters

Seismic parameters based on the 2016 California Building Code are calculated using the United States Geological Survey *U.S. Seismic Design Maps* website application and the site coordinates (34.0385 degrees North Latitude, 118.3840 degrees West Longitude). The seismic parameters are presented below in Table No. 2.

Table No. 2, CBC Seismic Design Parameters

Seismic Parameters	2016 CBC
Site Class	D
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_S	2.086 g
Mapped 1-second Spectral Response Acceleration, S_1	0.766 g
Site Coefficient (from Table 1613.5.3(1)), F_a	1.0
Site Coefficient (from Table 1613.5.3(2)), F_v	1.5
MCE 0.2-sec period Spectral Response Acceleration, S_{MS}	2.086 g
MCE 1-second period Spectral Response Acceleration, S_{M1}	1.149 g
Design Spectral Response Acceleration for short period, S_{DS}	1.391 g
Design Spectral Response Acceleration for 1-second period, S_{D1}	0.766 g

6.2 Site-Specific Response Spectra

The site is located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Beverly Hills Quadrangle as shown in Figure No. 8, *Seismic Hazard Zones Map*. An updated site-specific response spectrum was developed for the project for a Maximum Considered Earthquake (MCE), defined as a horizontal peak ground acceleration that has a 2 percent probability of being exceeded in 50 years (return period of approximately 2,475 years).

In accordance with ASCE 7-10, Section 21.2 the site-specific response spectra can be taken as the lesser of the probabilistic maximum rotated component of MCE ground motion and the 84th percentile of deterministic maximum rotated component of MCE ground motion response spectra. The design response spectra can be taken as 2/3 of site-specific MCE response spectra, but should not be lower than 80 percent of CBC general response spectra. The risk coefficient C_R has been incorporated at each spectral response period for which the acceleration was computed in accordance with ASCE 7-10, Section 21.2.1.1.

The 2016 CBC mapped acceleration parameters are provided in the following table. These parameters were determined using the United States Geological Survey *U.S. Seismic Design Maps* website application, and in accordance with ASCE 7-10 Sections 11.4, 11.6, 11.8 and 21.2.

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Table No. 3, 2016 CBC Mapped Acceleration Parameters

Site Class	D	Seismic Design Category	D
S_S	2.086	C_{RS}	0.975
S_1	0.766	C_{R1}	0.977
F_a	1	$0.08\ F_V/F_a$	0.120
F_v	1.5	$0.4\ F_V/F_a$	0.600
S_{MS}	2.086	T_0	0.110
S_{M1}	1.149	T_S	0.551
S_{DS}	1.391	T_L	8
S_{D1}	0.766		

A Site-Specific response analysis, using faults within 100 kilometers of the sites, was developed using the computer program EZ-FRISK by Risk Engineering (v. 7.62) and the 2008 USGS Fault Model database. Attenuation relationships proposed by Boore and Atkinson (2008), Campbell and Bozorgnia (2008), Chiou and Youngs (2008) were used in the analysis. These attenuation relationships are based on Next Generation Attenuation (NGA) project model. Maximum rotated components were determined using Huang (2008) method. An average shear wave velocity at upper 30 meters of soil profile (V_{s30}) of 270 meters per second, depth to bedrock of with a shear wave velocity 1,000 meters per second at 150 meters below grade, and depth of bedrock where the shear wave velocity is 2,500 meters per second at 3,000 meters below grade were selected for EZ-Frisk Analysis.

Applicable response spectra data are presented in the table below and on Figure No. 9, *Site-Specific Design Response Spectrum.* These curves correspond to response values obtained from above attenuation relations for horizontal elastic single-degree-of-freedom systems with equivalent viscous damping of 5 percent of critical damping.

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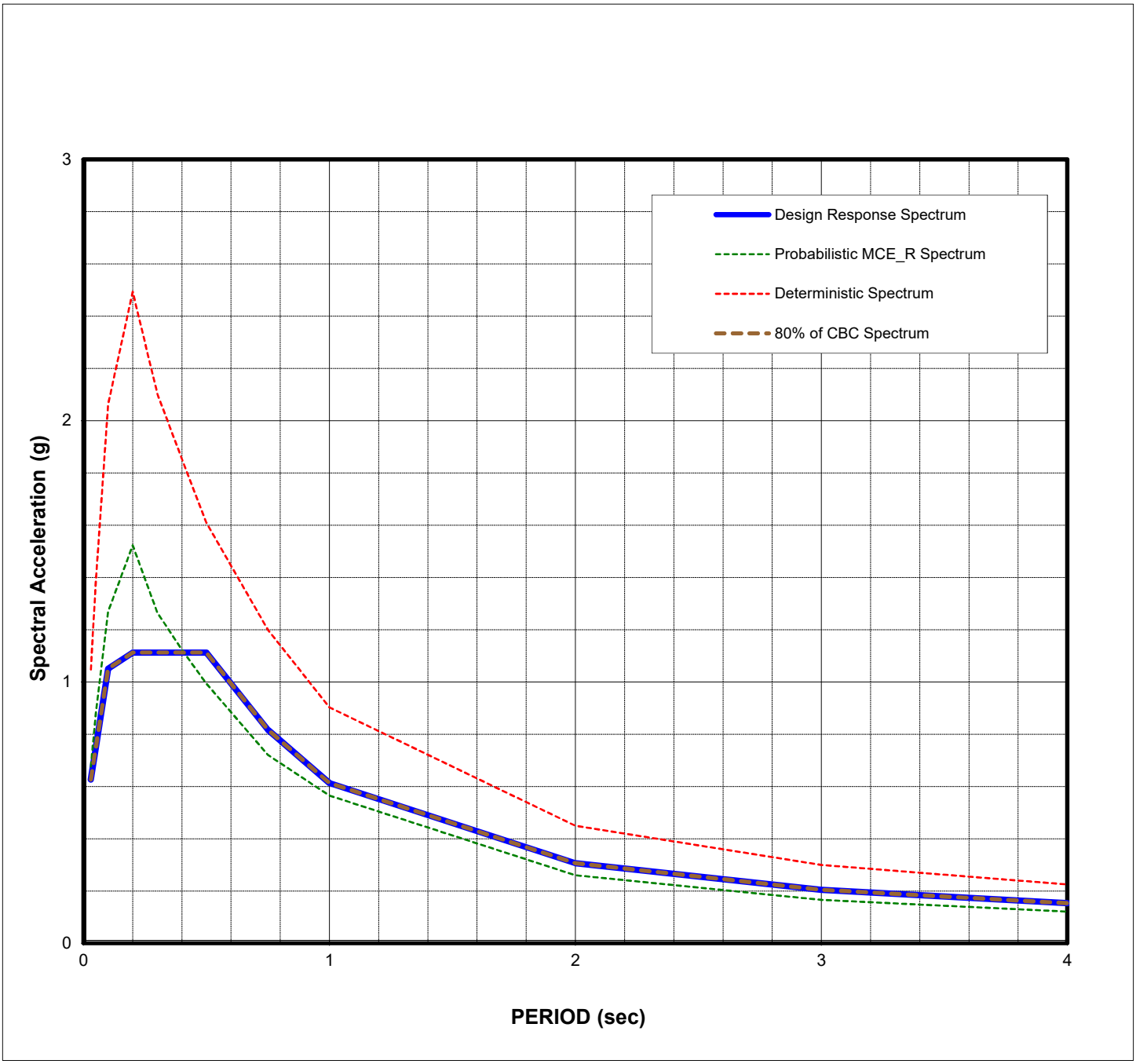

Note: Calculated using EZFRISK program Risk Engineering, version 7.62
and USGS 2008 fault model database.

SITE SPECIFIC DESIGN RESPONSE SPECTRUM

Comprehensive Modernization

Los Angeles, CA

For : Shenandoah Elementary School

Project Number:

16-31-113-01

Converse Consultants

Figure No.

9

Table No. 4, Site-Specific Response Spectrum Data

Period (sec)	2% in 50yr Probabilistic Spectral Acceleration (g)	Risk Coefficient C_R	Probabilistic MCE_R Spectral Acceleration (g)	84th Percentile Deterministic MCE Response Spectra, (g)	Deterministic CBC Lower Limit, (g)	Site Specific MCE_R Spectral Acceleration (g)	80% CBC Design Response Spectrum	Site Specific Design Spectral Acceleration (g)
0.03	0.694	0.975	0.677	1.048	0.825	0.677	0.627	0.627
0.05	0.900	0.975	0.878	1.383	0.975	0.878	0.748	0.748
0.10	1.301	0.975	1.268	2.062	1.350	1.268	1.051	1.051
0.20	1.562	0.975	1.523	2.493	1.500	1.523	1.113	1.113
0.30	1.297	0.975	1.265	2.103	1.500	1.265	1.113	1.113
0.40	1.151	0.976	1.123	1.853	1.500	1.123	1.113	1.113
0.50	1.019	0.976	0.994	1.609	1.500	0.994	1.113	1.113
0.75	0.738	0.976	0.721	1.172	1.200	0.721	0.817	0.817
1.00	0.579	0.977	0.565	0.903	0.900	0.565	0.613	0.613
2.00	0.266	0.977	0.260	0.382	0.450	0.260	0.306	0.306
3.00	0.170	0.977	0.166	0.233	0.300	0.166	0.204	0.204
4.00	0.124	0.977	0.121	0.167	0.225	0.121	0.153	0.153

Vertical acceleration at the site may be calculated using the ASCE 7-10, Section 12.4.

The site-specific design response parameters are provided in the following table. These parameters were determined from Design Response Spectra presented in table above, and following guidelines of ASCE Section 21.4.

Table No. 5, Site-Specific Seismic Design Parameters

Site-Specific Seismic Design Parameters	Design Parameters (5% Damping)	Lower Limit, 80% of CBC Design Spectra
Site-Specific 0.2-second period Spectral Response Acceleration, S_{MS}	1.669	1.669
Site-Specific1-second period Spectral Response Acceleration, S_{M1}	0.919	0.919
Site-Specific Design Spectral Response Acceleration for short period S_{DS}	1.113	1.113
Site-Specific Design Spectral Response Acceleration for 1-second period, S_{D1}	0.613	0.613

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7.0 DESIGN RECOMMENDATIONS

The proposed building structures can be supported on shallow continuous and/or isolated spread foundations founded on compacted fill provided our earthwork recommendations are incorporated in the design and construction.

Remedial grading consisting of over-excavation and compaction is required for the surficial soils and undocumented fills to provide structural support for the proposed building pads and improvements.

Undocumented fill soils ranging from 3 to 5 feet in thickness were encountered in the borings. All undocumented fill soils and on-site soils in the building structure area and to 5 feet beyond the building limits and appendages should be removed and be recompacted to provide at least three (3) feet of properly compacted fill beneath the building foundations. A minimum removal of 24 inches should be anticipated for all concrete flat work and for minor non-load bearing and lightly loaded minor structures and the paving areas for parking lots and driveways. The actual depth of fill removal and recompaction should be determined in the field by the geotechnical engineer or his representative during grading.

The upper five (5) feet of soils below the existing grade should be over-excavated and recompacted for slab support. For pavement, flatwork and hardscape, the upper 24 inches should be over-excavated and recompacted. The excavation to remove unsuitable soils should be extended to five (5) feet beyond the proposed structure limits where space is available. Localized deeper removal will be needed where firm native soils are not exposed on the excavation bottom.

The exposed bottom of the over-excavation area should be scarified at least 6 inches, moisture conditioned as needed to near optimum moisture content, and compacted to 90 percent relative compaction of the laboratory maximum density per ASTM D1557. Over-excavation and recompaction should not undermine adjacent structures or improvements. Excavation and grading should not extend within a projected 1:1 (horizontal to vertical) plane projected down from the outer edge of adjacent off-site improvements. If loose, yielding soil conditions are encountered at the excavation bottom, the following options can be considered:

1. Over-excavate until a firm bottom is reached.
2. Scarify and/or over-excavate an additional 18 inches deep, and then place at least 18-inch thick layer of compacted base material (CAB or equivalent) to bridge the soft bottom. Base material should be compacted to 95% relative compaction.
3. Over-excavate an additional 18 inches deep, and then place a layer of geofabric, (i.e. Mirafi HP570, X600 or equivalent) to bridge the soft bottom. Base should be compacted to 95% of the maximum dry density. An additional layer of geofabric may be needed on top of the base material depending on actual site conditions.

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The actual depth of removal should be based on recommendations and observations made during excavation and grading. Therefore, some variations in the depth and lateral extent of over-excavation recommended in this report should be anticipated.

7.1 Shallow Foundations

7.1.1 Vertical Capacity

The structures can be supported by conventional shallow footings in proposed area. We recommend continuous and/or square footings be founded at least 24 inches below lowest adjacent final grade entirely into compacted fill or into native soil. A minimum footing width of 24 inches is recommended for square footings and 18 inches for continuous footings. The allowable bearing value for footings with above minimum sizes founded on compacted fill and competent native soils may be designed for a net bearing pressure of 2,000 pounds per square foot (psf) for dead-plus-live-loads. The net allowable bearing pressure can be increased by 250 psf for each additional foot of excavation depth and by 250 psf for each additional foot of excavation width up to a maximum value of 4,000 psf.

The net allowable bearing values indicated above are for the dead loads and frequently applied live loads and are obtained by applying a factor of safety of 3.0 to the net ultimate bearing capacity.

7.1.2 Lateral Capacity

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.30 may be assumed with normal dead load forces. An allowable passive earth pressure of 200 psf per foot of depth up to a maximum of 3,000 psf may be used for footings poured against properly compacted fill. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

The following provisional design values may be used for any walls below grade that are less than six (6) feet high.

The earth pressure behind any buried wall depends primarily on the allowable wall movement, type of soil behind the wall, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following earth pressures are recommended for vertical walls with no hydrostatic pressure.

Table No. 6, Lateral Earth Pressures for Retaining Wall Design

Backfill Slope (H:V)	Cantilever Wall Equivalent Fluid Pressure (pcf)	Restrained Wall Equivalent Fluid Pressure (psf)
Level	45 (triangular pressure distribution)	65 (triangular pressure distribution)

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The recommended lateral pressures assume that the walls are fully back-drained to prevent build-up of hydrostatic pressure. Adequate drainage could be provided by means of permeable drainage materials wrapped in filter fabric installed behind the walls. The drainage system should consist of perforated pipe surrounded by a minimum one (1) square foot per lineal feet of free draining, uniformly graded, ¾-inch washed, crushed aggregate, and wrapped in filter fabric such as Mirafi 140N or equivalent. The filter fabric should overlap approximately 12 inches or more at the joints. The subdrain pipe should consist of perforated, four-inch diameter, rigid ABS (SDR-35) or PVC A-2,000, or equivalent, with perforations placed down. Alternatively, a prefabricated drainage composite system such as the Miradrain G100N or equivalent can be used. The subdrain should be connected to solid pipe outlets, with a maximum outlet spacing of 100 feet. Waterproofing membranes should be added to the subterranean wall levels for moisture sensitive areas to mitigate moisture migration through the walls.

In addition, walls with inclined backfill should be designed for an additional equivalent fluid pressure of one (1) pound per cubic foot for every two (2) degrees of slope inclination. Walls subjected to surcharge loads located within a distance equal to the height of the wall should be designed for an additional uniform lateral pressure equal to one-third (1/3) or one-half (1/2) the anticipated surcharge load for unrestrained or restrained walls, respectively. These values are applicable for backfill placed between the wall stem and an imaginary plane rising 45 degrees from below the edge (heel) of the wall footings.

Retaining walls taller than six (6) feet should be designed to resist additional earth pressure caused by seismic ground shaking based on Section 1615A.1.6 of CBC 2010. A seismic earth pressure 20H (psf), based on an inverted triangular distribution, can be used for design of wall.

7.1.3 Settlement

The static settlement of structures supported on continuous and/or spread footings founded on compacted fill and native soil will depend on the actual footing dimensions and the imposed vertical loads. Based on the maximum allowable net bearing pressures presented above, static settlement is anticipated to be less than 1.00 inch. Differential settlement is expected to be up to one-half of the total settlement over a 30-foot span.

The results of liquefaction analyses indicate the site soils are not susceptible to liquefaction and seismically-induced settlement to be negligible.

7.1.4 Dynamic Increases

Bearing values indicated above are for total dead load and frequently applied live loads. The above vertical bearing may be increased by 33% for short durations of loading which will include the effect of wind or seismic forces. The allowable passive pressure may be increased by 33% for lateral loading due to wind or seismic forces.

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7.2 Slabs-on-Grade

Slabs-on-grade should be supported on properly compacted fill. Compacted fill used to support slabs-on-grade should be placed and compacted in accordance with Appendix E *Earthwork Specifications*.

Structural design elements of slabs-on-grade, including but not limited to thickness, reinforcement, joint spacing, should be selected based on the analysis performed by the project structural engineer considering anticipated loading conditions and the modulus of subgrade reaction of the supporting materials.

Slabs should be designed and constructed as promulgated by the American Concrete Institute (ACI) and the Portland Cement Association (PCA). Care should be taken during concrete placement to avoid slab curling. Prior to the slab pour, all utility trenches should be properly backfilled and compacted.

The upper 12 inches of soil subgrade under slabs-on-grade should be moisture conditioned to 0 to 3 percent above optimum moisture content within 12 hours prior to placement of concrete.

Subgrade for slabs-on-grade should be firm and uniform. All loose or disturbed soils including under-slab utility trench backfill should be recompacted.

7.3 Modulus of Subgrade Reaction

For the subject project, design of the structures supported on compacted fill subgrade prepared in accordance with the recommendations provided in this report may be based on a soil modulus of subgrade reaction of (k_s) of 125 pounds per square inch per inch.

7.4 Soil Corrosivity Evaluation

Converse retained the Environmental Geotechnology Laboratory, Inc., located in Arcadia, California, to test one (1) bulk soil sample taken in the general area of the proposed structures. The tests included minimum resistivity, pH, soluble sulfates, and chloride content, with the results summarized on the following table:

Table No. 7, Soil Corrosivity Test Results

Boring No.	Sample Depth (feet)	pH (Caltrans 643)	Soluble Chlorides (Caltrans 422) ppm	Soluble Sulfate (Caltrans 417) % by Weight	Saturated Resistivity (Caltrans 532) Ohm-cm
BH-1	0-5	7.12	165	0.023	2,300

In accordance with the Caltrans Corrosive Guidelines (2012), water soluble sulfates in the soil indicate that concrete exposed has no restrictions on cement type or water-

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cement ratio. The pH value and chloride concentrations are in the “non-corrosive” range. The resistivity is greater than 1,000 Ohm-cm indicating “non-corrosive” to ferrous metals.

In general, conventional corrosion mitigation measures may include the following:

- Steel and wire concrete reinforcement should have at least three inches of concrete cover where cast against soil, unformed.
- Below-grade ferrous metals should be given a high-quality protective coating, such as 18-mil plastic tape, extruded polyethylene, coal-tar enamel, or Portland cement mortar.
- Below-grade metals should be electrically insulated (isolated) from above-grade metals by means of dielectric fittings in ferrous utilities and/or exposed metal structures breaking grade.

The test results presented herein are considered preliminary. If advanced corrosivity study is desired by the design team, a corrosion engineer can be consulted for appropriate mitigation procedures and construction design.

7.5 Site Drainage

Adequate positive drainage should be provided away from the structures to prevent ponding and to reduce percolation of water into structural backfill. We recommend that the landscape area immediately adjacent to the foundation shall be designed sloped away from the building with a minimum 5% slope gradient for at least 10 feet measured perpendicular to the face of the wall. Impervious surfaces within 10 feet of the foundation shall have a minimum 2 percent slope away from the building per 2016 CBC.

Planters and landscaped areas adjacent to the building perimeter should be designed to minimize water infiltration into the subgrade soils.

7.6 Flexible Pavement Design

The flexible pavement structural section design recommendations were performed in accordance with the method contained in the *CALTRANS Highway Design Manual*, Chapter 630 without the factor of safety. No specific traffic study was performed to determine the Traffic Index (TI) for the proposed project, therefore a wide range of TI values were evaluated.

Due to various earth materials encountered at the site, flexible pavement structural section recommendations are prepared for both subgrade soils. We recommend that the project structural engineer consider the traffic loading conditions at various locations and select the appropriate pavement sections from the following table:

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Table No. 8, Flexible Pavement Structural Sections

Design R-value	Design TI	Asphalt Concrete (AC) Over Aggregate Base (AB) Structural Sections		Full AC Structural Section
		AC (inches)	AB (inches)	AC (inches)
13	4	3.0	5.0	5.0
	5	4.5	5.0	6.5
	6	6.0	6.0	8.0
	7	7.0	7.5	10.0
	8	8.0	9.0	11.0
	9	9.0	10.5	12.5

Base material shall conform to requirements for Crushed Miscellaneous Base (CMB) or equivalent and should be placed in accordance with the requirements of the Standard Specifications for Public Works Construction (SSPWC, latest Edition).

Asphaltic materials should conform to Section 203-1, "Paving Asphalt," of the Standard Specifications for Public Works Construction (SSPWC, latest Edition) and should be placed in accordance with Section 302-5, "Asphalt Concrete Pavement," of the SSPWC, 2012 edition.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

7.7 Rigid Pavement Design

Rigid pavement design recommendations were provided in accordance with the Portland Cement Association's (PCA) Southwest Region Publication P-14, *Portland Cement Concrete Pavement (PCCP) for Light, Medium, and Heavy Traffic*. We recommend that the project structural engineer consider the loading conditions at various locations and select the appropriate pavement sections from the following table:

Table No. 9, Rigid Pavement Structural Sections

Design R-Value	Design Traffic Index (TI)	PCCP Pavement Section (inches)
13	4.0	6.80
	5.0	7.10
	6.0	7.40
	7.0	7.70
	8.0	8.00
	9.0	8.30

The above pavement section is based on a minimum 28-day Modulus of Rupture (M-R) of 550 psi and a compressive strength of 3,000 psi. The third point method of testing beams should be used to evaluate modulus of rupture. The concrete mix design should

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contain a minimum cement content of 5.5 sacks per cubic yard. Recommended maximum and minimum values of slump for pavement concrete are three inches to one inch, respectively.

Transverse contraction joints should not be spaced more than 15 feet and should be cut to a depth of ¼ the thickness of the slab. Longitudinal joints should not be spaced more than 12 feet apart. A longitudinal joint is not necessary in the pavement adjacent to the curb and gutter section.

Prior to placement of base aggregate, at least the upper 12 inches of subgrade soils below rigid pavement sections should be scarified, moisture-conditioned, if necessary, and recompacted to at least 95 percent relative compaction as defined by the ASTM D 1557 standard test method. Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

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8.0 CONSTRUCTION CONSIDERATIONS

8.1 General

Site soils should be excavatable using conventional heavy-duty excavating equipment. Temporary sloped excavation is feasible if performed in accordance with the slope ratios provided in Section 11.2, *Temporary Excavations*. Existing utilities should be accurately located and either protected or removed as required.

8.2 Temporary Excavations

Based on the silty materials encountered in the exploratory borings, sloped temporary excavations (if necessary) may be constructed according to the slope ratios presented in Table No. 10, *Slope Ratios for Temporary Excavations*. Any loose utility trench backfill or other fill encountered in excavations will be less stable than the native soils. Temporary cuts encountering loose fill or loose dry sand may have to be constructed at a flatter gradient than presented in the following table:

Table No. 10, Slope Ratios for Temporary Excavation

Soil Type	Depth of Excavation (feet)	Recommended Maximum Slope (Horizontal:Vertical)[1]
Silty Sand, Silty Clay, Clay	0-5	1:1
Sand, Silty/Sandy Clay	5-20	1½ :1

[1] Slope ratio assumed to be uniform from top to toe of slope.

Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction, should not be placed within five (5) feet of the unsupported trench edge. The above maximum slopes are based on a maximum height of six (6) feet of stockpiled soils placed at least five (5) feet from the trench edge.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

8.3 Geotechnical Services During Construction

This report has been prepared to aid in the site preparation and site grading plans and specifications, and to assist the architect, civil and structural engineers in the design of the proposed structure. It is recommended that this office be provided an opportunity to

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review final design drawings and specifications to verify that the recommendations of this report have been properly implemented.

Recommendations presented herein are based upon the assumption that adequate earthwork monitoring will be provided by Converse. Excavation bottoms should be observed by a Converse representative prior to the placement of compacted fill. Structural fill and backfill should be placed and compacted during continuous observation and testing by this office. Footing excavations should be observed by Converse prior to placement of steel and concrete so that footings are founded on satisfactory materials and excavations are free of loose and disturbed materials. During construction, the geotechnical engineer and/or their authorized representatives should be present at the site to provide a source of advice to the client regarding the geotechnical aspects of the project and to observe and test the earthwork performed. Their presence should not be construed as an acceptance of responsibility for the performance of the completed work, since it is the sole responsibility of the contractor performing the work to ensure that it complies with all applicable plans, specifications, ordinances, etc.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any recommended actions presented herein to be unsafe.

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9.0 CLOSURE

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice. We make no other warranty, either expressed or implied. Our conclusions and recommendations are based on the results of the field and laboratory investigations, combined with an interpolation and extrapolation of soil conditions between and beyond boring locations. If conditions encountered during construction appear to be different from those shown by the borings, this office should be notified.

Design recommendations given in this report are based on the assumption that the earthwork and site grading recommendations contained in this report are implemented. Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the final site grading and actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.

This report was prepared for Los Angeles Unified School District for the subject project described herein. We are not responsible for technical interpretations made by others of our exploratory information. Specific questions or interpretations concerning our findings and conclusions may require a written clarification to avoid future misunderstandings.

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Appendix A

Field Exploration

APPENDIX A: FIELD EXPLORATION

Field exploration included an initial site reconnaissance, and subsurface drilling. During the site reconnaissance, surface conditions were noted and the locations of the test borings were determined. Borings were approximately located using existing features as a guide.

Prior to field exploration, USA was notified 48 hours in advance. Any borings located within utility markings were relocated to a different location within the local proximity.

Four (4) exploratory borings (BH-1 through BH-4) and three (3) Cone Penetration Tests (CPT-1 through CPT-3) were advanced within the project site on April 13 and April 14, 2017. The borings were advanced using a truck mounted drill rig with an 8-inch diameter hollow stem auger to a maximum depth of 51.5 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils, in accordance with the Unified Soil Classification System. Field descriptions have been modified, where appropriate, to reflect laboratory test results.

Relatively undisturbed ring and bulk samples of the subsurface soils were obtained at frequent intervals in the borings. The undisturbed samples were obtained using a California Steel Sampler (2.4 inches inside diameter and 3.0 inches outside diameter) lined with thin sample rings. The sampler was driven into the bottom of the boreholes with successive drops of a 140-pound hammer falling 30 inches by means of a mechanically driven pulley. The number of successive drops of the driving weight ("blows") required for every 6-inch of penetration of the sampler are shown on the Logs of Borings in the "blows" column. The soil was retained in brass rings (2.4 inches in diameter and one inch in height). The central portion of the sample was retained and carefully sealed in waterproof plastic containers for shipment to the laboratory. Bulk soil samples were also collected in plastic bags and brought to the laboratory.

Standard Penetration Tests (SPTs) were also performed. In this test, a standard split-spoon sampler (1.4 inches inside diameter and 2.0 inches outside diameter) was driven into the ground with successive drops of a 140-pound hammer falling 30 inches by means of an automatic hammer. The number of successive drops of the driving weight ("blows") required for every 6-inch of penetration of the sampler are shown on the Logs of Borings in the "blows" column. The soil retrieved from the spoon sampler was carefully sealed in waterproof plastic containers for shipment to the laboratory.

It should be noted that the exact depths at which material changes occur cannot always be established accurately. Changes in material conditions that occur between driven samples are indicated in the logs at the top of the next drive sample. A key to soil symbols and terms is presented as Figure No. A-1, *Soil Classification Chart*. The logs of the exploratory boring are presented in Figures No. A-2 through A-5, *Log of Borings,* and *Summary of Cone Penetration Test Data*.

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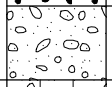
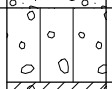
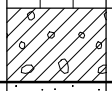
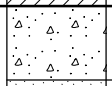
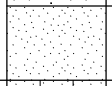
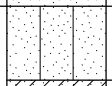
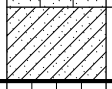
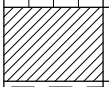
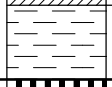
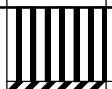
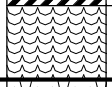
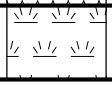
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SAMPLE TYPE

STANDARD PENETRATION TEST
Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method

DRIVE SAMPLE 2.42" I.D. sampler.

DRIVE SAMPLE No recovery

BULK SAMPLE

GRAB SAMPLE

GROUNDWATER WHILE DRILLING

GROUNDWATER AFTER DRILLING

BORING LOG SYMBOLS

LABORATORY TESTING ABBREVIATIONS

TEST TYPE
(Results shown in Appendix B)

CLASSIFICATION

Plasticity	pi
Grain Size Analysis	ma
Passing No. 200 Sieve	wa
Sand Equivalent	se
Expansion Index	ei
Compaction Curve	max
Hydrometer	h

STRENGTH

Pocket Penetrometer	p
Direct Shear	ds
Direct Shear (single point)	ds*
Unconfined Compression	uc
Triaxial Compression	tx
Vane Shear	vs
Consolidation	c
Collapse Test	col
Resistance (R) Value	r
Chemical Analysis	ca
Electrical Resistivity	er

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-1**

Log of Boring No. BH-1

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 116 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		2" ASPHALT CONCRETE WITH NO BASE						ei,ca max
		FILL (Af): **CLAY (CL):** with sand, dark brown.						
		ALLUVIUM (Qal): **SILTY CLAY (CL):** with sand, dark brown.						
5			■		4/5/6	15	116	c,ds
10			⊠		4/5/6			wa
15			■		7/12/18	18	115	
20		-brown	⊠		3/5/6			wa
25		**SAND (SP):** with gravels up to 3/8" in maximum dimension, light brown.	■		19/48/50(3")	3	103	
30			⊠		22/30/35			

Converse Consultants

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FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-2a**

Log of Boring No. BH-1

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 116 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		SAND (SP): gravels up to 1/2" in maximum dimension, light brown.	■		32/50(30")	3	108	
40		**SILTY SAND (SM):** gray.	⊠		18/37/42			wa
45		**SAND (SP):** with gravels up to 1/2" in maximum dimension, gray.	■		30/50(3")	23	117	
50			⊠		30/50(4")			
		End of boring at 51.5 feet. Groundwater encountered at 44 feet during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
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FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-2b**

Log of Boring No. BH-2

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 114 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		3" ASPHALT OVER 2 1/2" BASE						ma
		FILL (Af): **SILTY CLAY (CL):** brown.						
		ALLUVIUM (Qal): **SANDY CLAY (CL):** with gravels up to 3/8" in maximum dimension, brown.						
5			■		17/27/28	7	117	ei
			☒		6/8/17			
10		**SILTY CLAY (CL):** brown.	■		6/12/17	10	100	ds
15		-gravels up to 3/8" in maximum dimension, brown	■		11/17/25	10	100	
20			☒		7/8/8			
25		**CLAY (CL):** brown.	■		11/38/50(4")	15	109	
30		**SAND (SP):** with gravels up to 1" in maximum dimension, brown and gray.	☒		18/24/20			

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Project No. **17-31-113-01**

Figure No. **A-3a**

Log of Boring No. BH-2

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 114 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		SAND (SP): with gravels up to 1" in maximum dimension, gray.	■		50(5")	6	116	
40			☒		25/50(2")			
45			■		27/50(3')	6	117	
50			■		39/50(4")	8	116	
		End of boring at 51.5 feet. Groundwater encountered at 44 feet during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

Converse Consultants

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Project No. **17-31-113-01**

Figure No. **A-3b**

Log of Boring No. BH-3

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 112 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		1 1/2" ASPHALT CONCRETE WITH NO BASE						ma
		FILL (Af): **SILTY SAND (SM):** brown.						
5		**ALLUVIUM (Qal):** **SANDY CLAY (CL):** with gravels up to 1/2" in maximum dimension, brown.	■		5/8/11	8	105	
10		**SAND (SP):** with clay, brown.	■		6/8/12	12	115	
15			■		7/9/14	8	119	
20			■		9/50(4')	9	120	
25		-with gravels up to 1 1/2" in maximum dimension, brown	■		26/50(4")	3	116	
		End of boring at 26.5 feet. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
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LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-4**

Log of Boring No. BH-4

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 110 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		2 1/2" ASPHALT CONCRETE WITH NO BASE						
		FILL (Af): **CLAY (CL):** with sand, with gravels up to 3/8" in maximum dimension, dark brown.						
		ALLUVIUM (Qal): **SANDY CLAY (CL):** dark brown.						
5			■		4/8/12	18	105	
10			■		5/7/9	10	107	
15			■		6/10/16	15	111	
20			■		5/11/21	16	111	
25		**CLAYEY SAND (SC):** brown.	■		8/9/12	17	107	
		End of boring at 26.5 feet. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

Converse Consultants

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Project No. **17-31-113-01**

Figure No. **A-5**

Summary of Cone Penetration Test Data

Middle Earth Geo Testing, Inc.
954 North Lemon Street
Orange, CA 92867

April 14th, 2017

Woongju Mun
Converse Consultants
717 South Myrtle Avenue
Monrovia, CA, 91016

Project Name: CPT Testing at "Shenandoah ES Modernization Project"
Project No.: 17-31-113-01

Dear Mr. Mun:

Enclosed please find copies of the cone penetrometer testing (CPT) data for the above referenced project along with a copy of the corresponding invoice.

The cone penetrometer testing conducted for this project consisted of pushing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance to penetration at the cone tip and along the friction sleeve.

The cone penetrometer testing described in the report was conducted in general accordance with the current ASTM specifications (ASTM D 5778-95 and D3441-94) using an electronic cone penetrometer.

The CPT equipment operated by Middle Earth Geo Testing, Inc. (MEGT) consists of a cone assembly mounted at the end of a series of hollow sounding rods. A set of hydraulic rams is used to continuously push the cone and rods into the soil at a rate of 20-mm per second (approximately for feet per minute) while the cone tip resistance and sleeve friction resistance are recorded every 50-mm (approximately two inches) and stored in digital form. A specially designed all wheel drive 25-ton truck provides the required reaction weight for pushing the cone assembly and is also used to transport and house the test equipment.

The cone penetrometer assembly used for the project consists of a conical tip and a cylindrical friction sleeve. The conical tip has a 60° apex angle and a diameter of 35.6mm (1.40-inch), resulting in a projected cross-sectional area of 10 cm^2 (1.5 square inches). The cylindrical friction sleeve is 133-mm (5.25-inch) in length and has an outside diameter of 35.8-mm (1.41-inch), resulting in a surface area of 150 cm^2 (23 square inches)

The interior of the cone penetrometer is instrumented with strain gauges that allow simultaneous measurement of cone tip and friction sleeve resistance during penetration. Continuous electric signals from the strain gauges are transmitted by a shielded cable in the sounding rods to the PC-based data acquisition hardware in the CPT truck. The sounding log is also displayed on a monitor.

The CPT data processing is performed using the truck mounted computer based data acquisition and presentation

system. The computer generated graphical logs include cone resistance, friction resistance, friction ratio, and pore pressure ratio versus depth at a user selectable scale.

Soil Behavior type interpretations are based on the following reference: Robertson, P.K. and Campanella, R.C., 1989, "Guidelines for Geotechnical Design using the Cone Penetrometer Test and CPT with Pore Pressure Measurement." Soil Mechanics series NO. 120, Civil Engineering Department, University of British Columbia, Vancouver, B.C., V6T 1Z4, September 1989.

Interpretations and plotting has been done using MEGT's proprietary data interpretation and presentation software. It is important to note that the data is not averaged. All interpretations are point interpretations at the corresponding depth listed.

It is also important to note that the soil behavior type correlations are based on a combination of theory, field research, and research performed under laboratory conditions, and literature review. The information presented in the tabulated and /or graphical logs should, therefore, be viewed as a guideline rather than as precise measurements.

Some care is recommended when using the soil behavior type interpretations. If a tabulation depth happens to fall on a soil layer interface or a seam of soil differing from the rest of the layer, the tabulated data can be misleading. The solution to this problem is the proper use of the graphical CPT logs. The tip and sleeve penetration resistance logs are the primary source of profile description; the soil behavior type logs are supplemental. The graphical logs of the tip and sleeve resistance should be examined and layer boundaries delineated in accordance with the project requirements. The soil behavior type interpretations are only representative of the response of the soil to the large shear deformations imposed during cone penetration. This is not necessarily a prediction of the grain size distribution. However, it has been found that the interpreted soil behavior types generally will agree with the soil types defined in accordance with the grain size distribution methods such as used in the Unified Soil Classification System.

Limitations

Middle Earth Geo Testing, Inc. (MEGT) presents the attached data in accordance with ASTM Standards D5778-95 and D3441-94 and generally accepted cone penetrometer testing practices and standards. The attached data further relates only to the specific project and location discussed in the data. Judgment may be required to verify the CPT soil behavior interpretations.

The "Client" may distribute this data or excerpts therefore provided the following statement is prominently displayed and included with the distribution:

"Neither CLIENT nor MEGT make any guarantee or warranty, expressed or implied, regarding this data. THE USE OF THIS INFORMATION SHALL BE AT THE USER'S SOLE RISK REGARDLESS OF ANY FAULT OR NEGLIGENCE OF THE CLIENT OR MEGT."

Please feel free to call if you have any questions.

Respectfully submitted,

Robert Hancock
Operations Manager
Middle Earth Geo Testing, Inc.

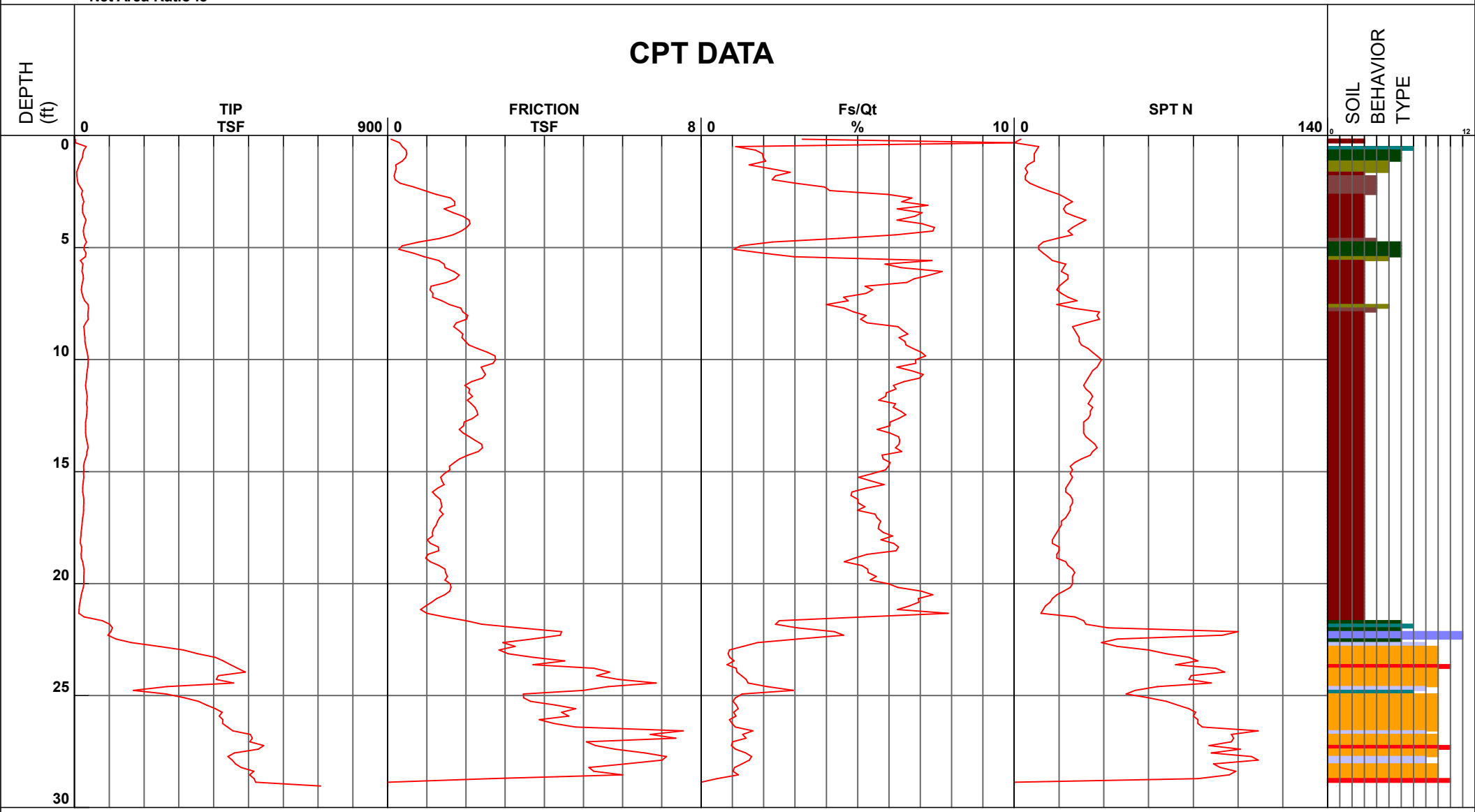
Enclosures

Converse Consultants

Project	Shenandoah ES Modernization Project	Operator	RC JM	Filename	SDF(725).cpt
Job Number	17-31-113-01	Cone Number	DDG1281	GPS	
Hole Number	CPT-01	Date and Time	4/14/2017 4:48:52 PM	Maximum Depth	29.04 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Shenandoah ES Modernization Project

Project ID: Converse Consultants
Data File: SDF(725).cpt
CPT Date: 4/14/2017 4:48:52 PM
GW During Test: 30 ft

Sounding ID: CPT-01
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR - -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
0.33	2.8	-	2.8	0.3	0.0	9.9	2	Organic SOILS - Peats	100	1.0	3	5	-	-	0.3	9.9	95	3.59	10	N/A	N/A
0.49	34.0	84.2	34.0	0.4	0.0	1.1	5	silty SAND to sandy SILT	120	3.0	11	18	47	48	-	-	17	2.15	16	N/A	N/A
0.66	26.9	90.9	26.9	0.5	0.1	1.7	5	silty SAND to sandy SILT	120	3.0	9	14	39	48	-	-	24	2.35	16	N/A	N/A
0.82	24.7	92.9	24.7	0.5	0.1	2.0	5	silty SAND to sandy SILT	120	3.0	8	13	36	48	-	-	27	2.41	16	N/A	N/A
0.98	23.0	90.8	23.0	0.5	0.1	2.0	5	silty SAND to sandy SILT	120	3.0	8	12	34	47	-	-	28	2.44	16	N/A	N/A
1.15	17.9	84.5	17.9	0.4	0.0	2.1	4	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.3	9.9	32	2.53	15	N/A	N/A
1.31	13.5	66.7	13.5	0.2	0.0	1.5	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	0.9	9.9	33	2.56	15	N/A	N/A
1.48	10.1	-	10.1	0.2	0.0	2.2	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	9.9	43	2.75	15	N/A	N/A
1.64	6.7	-	6.7	0.2	-0.1	2.9	3	silty CLAY to CLAY	115	1.5	4	7	-	-	0.5	9.9	56	2.96	15	N/A	N/A
1.80	7.1	-	7.1	0.2	-0.1	2.4	3	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	9.9	52	2.90	15	N/A	N/A
1.97	8.4	-	8.4	0.2	0.0	2.3	4	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	9.9	48	2.83	15	N/A	N/A
2.13	10.5	-	10.5	0.3	-0.8	3.1	3	silty CLAY to CLAY	115	1.5	7	11	-	-	0.7	9.9	47	2.82	15	N/A	N/A
2.30	16.9	-	16.9	0.7	-1.0	4.0	4	clayy SILT to silty CLAY	115	2.0	8	14	-	-	1.2	9.9	42	2.73	15	N/A	N/A
2.46	22.9	-	22.9	0.9	-2.5	4.1	4	clayy SILT to silty CLAY	115	2.0	11	18	-	-	1.6	9.9	38	2.65	15	N/A	N/A
2.62	20.8	-	20.7	1.2	-4.2	6.0	3	silty CLAY to CLAY	115	1.5	14	22	-	-	1.5	9.9	46	2.79	15	N/A	N/A
2.79	23.9	-	23.8	1.6	-4.1	6.8	3	silty CLAY to CLAY	115	1.5	16	26	-	-	1.7	9.9	45	2.79	15	N/A	N/A
2.95	26.7	-	26.6	1.7	-5.4	6.4	3	silty CLAY to CLAY	115	1.5	18	29	-	-	1.9	9.9	43	2.74	15	N/A	N/A
3.12	23.7	-	23.5	1.7	-7.1	7.3	3	silty CLAY to CLAY	115	1.5	16	25	-	-	1.7	9.9	47	2.82	15	N/A	N/A
3.28	23.0	-	22.8	1.4	-7.0	6.3	3	silty CLAY to CLAY	115	1.5	15	25	-	-	1.6	9.9	45	2.78	15	N/A	N/A
3.45	23.7	-	23.6	1.7	-6.8	7.1	3	silty CLAY to CLAY	115	1.5	16	25	-	-	1.7	9.9	46	2.81	15	N/A	N/A
3.61	28.2	-	28.0	1.9	-6.8	6.9	3	silty CLAY to CLAY	115	1.5	19	30	-	-	2.0	9.9	43	2.75	15	N/A	N/A
3.77	33.2	-	33.1	2.1	-4.4	6.3	3	silty CLAY to CLAY	115	1.5	22	36	-	-	2.3	9.9	39	2.67	15	N/A	N/A
3.94	29.9	-	29.8	2.1	-4.6	7.1	3	silty CLAY to CLAY	115	1.5	20	32	-	-	2.1	9.9	43	2.74	15	N/A	N/A
4.10	27.1	-	27.0	2.0	-4.8	7.5	3	silty CLAY to CLAY	115	1.5	18	29	-	-	1.9	9.9	45	2.79	15	N/A	N/A
4.27	25.4	-	25.3	1.9	-4.9	7.5	3	silty CLAY to CLAY	115	1.5	17	27	-	-	1.8	9.9	46	2.80	15	N/A	N/A
4.43	26.8	-	26.7	1.7	-5.3	6.3	3	silty CLAY to CLAY	115	1.5	18	29	-	-	1.9	9.9	42	2.73	15	N/A	N/A
4.59	30.4	157.2	30.3	1.3	-6.9	4.4	4	clayy SILT to silty CLAY	115	2.0	15	24	-	-	2.1	9.9	35	2.58	15	N/A	N/A
4.76	34.9	116.9	34.9	0.8	-0.5	2.3	5	silty SAND to sandy SILT	120	3.0	12	19	48	42	-	-	24	2.34	16	N/A	N/A
4.92	29.3	82.8	29.2	0.4	-0.4	1.3	5	silty SAND to sandy SILT	120	3.0	10	16	42	41	-	-	20	2.24	16	N/A	N/A
5.09	27.7	75.3	27.7	0.3	-0.3	1.1	5	silty SAND to sandy SILT	120	3.0	9	15	40	40	-	-	19	2.21	16	N/A	N/A
5.25	33.0	106.8	33.0	0.7	-0.3	2.0	5	silty SAND to sandy SILT	120	3.0	11	18	46	41	-	-	23	2.32	16	N/A	N/A
5.41	31.4	128.0	31.4	0.9	-0.4	3.0	4	clayy SILT to silty CLAY	115	2.0	16	25	-	-	2.2	9.9	29	2.45	15	N/A	N/A
5.58	17.6	-	17.6	1.3	0.2	7.5	3	silty CLAY to CLAY	115	1.5	12	19	-	-	1.2	9.9	53	2.92	15	N/A	N/A
5.74	24.5	-	24.5	1.4	0.1	6.0	3	silty CLAY to CLAY	115	1.5	16	26	-	-	1.7	9.9	43	2.74	15	N/A	N/A
5.91	23.0	-	23.0	1.5	-0.2	6.5	3	silty CLAY to CLAY	115	1.5	15	25	-	-	1.6	9.9	45	2.79	15	N/A	N/A
6.07	21.9	-	21.9	1.7	0.2	7.8	3	silty CLAY to CLAY	115	1.5	15	23	-	-	1.5	9.9	50	2.86	15	N/A	N/A
6.23	25.1	-	25.1	1.8	0.3	7.4	3	silty CLAY to CLAY	115	1.5	17	27	-	-	1.7	9.9	46	2.81	15	N/A	N/A
6.40	25.5	-	25.5	1.7	0.4	6.9	3	silty CLAY to CLAY	115	1.5	17	27	-	-	1.8	9.9	45	2.78	15	N/A	N/A
6.56	22.9	-	22.9	1.5	0.7	6.7	3	silty CLAY to CLAY	115	1.5	15	25	-	-	1.6	9.9	46	2.80	15	N/A	N/A
6.73	21.2	-	21.2	1.1	0.7	5.3	3	silty CLAY to CLAY	115	1.5	14	23	-	-	1.5	9.9	43	2.75	15	N/A	N/A
6.89	19.7	-	19.7	1.1	0.8	5.6	3	silty CLAY to CLAY	115	1.5	13	21	-	-	1.4	9.9	45	2.79	15	N/A	N/A
7.05	21.9	-	21.9	1.2	0.8	5.4	3	silty CLAY to CLAY	115	1.5	15	23	-	-	1.5	9.9	43	2.75	15	N/A	N/A
7.22	25.3	-	25.3	1.2	0.9	4.6	4	clayy SILT to silty CLAY	115	2.0	13	20	-	-	1.8	9.9	38	2.66	15	N/A	N/A
7.38	29.4	-	29.4	1.4	1.0	4.8	4	clayy SILT to silty CLAY	115	2.0	15	24	-	-	2.0	9.9	36	2.62	15	N/A	N/A
7.55	39.3	161.6	39.3	1.6	1.0	4.1	4	clayy SILT to silty CLAY	115	2.0	20	29	-	-	2.7	9.9	31	2.50	15	N/A	N/A
7.71	40.8	176.7	40.8	1.9	1.1	4.6	4	clayy SILT to silty CLAY	115	2.0	20	30	-	-	2.9	9.9	32	2.54	15	N/A	N/A
7.87	39.4	179.9	39.4	1.9	1.1	4.9	4	clayy SILT to silty CLAY	115	2.0	20	28	-	-	2.8	9.9	34	2.57	15	N/A	N/A
8.04	38.8	196.7	38.8	2.0	1.2	5.3	4	clayy SILT to silty CLAY	115	2.0	19	31	-	-	2.7	9.9	34	2.57	15	N/A	N/A
8.20	39.5	183.1	39.5	2.0	1.2	5.2	4	clayy SILT to silty CLAY	115	2.0	20	28	-	-	2.8	9.9	35	2.59	15	N/A	N/A
8.37	33.0	-	33.1	1.8	1.3	5.4	4	clayy SILT to silty CLAY	115	2.0	17	26	-	-	2.3	9.9	36	2.62	15	N/A	N/A
8.53	26.8	-	26.8	1.7	1.4	6.4	3	silty CLAY to CLAY	115	1.5	18	29	-	-	1.9	9.9	43	2.74	15	N/A	N/A
8.69	28.2	-	28.2	1.8	1.5	6.5	3	silty CLAY to CLAY	115	1.5	19	30	-	-	2.0	9.9	42	2.73	15	N/A	N/A
8.86	29.1	-	29.1	1.9	1.6	6.7	3	silty CLAY to CLAY	115	1.5	19	31	-	-	2.0	9.9	42	2.73	15	N/A	N/A
9.02	30.0	-	30.0	1.9	1.7	6.4	3	silty CLAY to CLAY	115	1.5	20	32	-	-	2.1	9.9	41	2.71	15	N/A	N/A
9.19	30.5	-	30.6	2.0	1.6	6.6	3	silty CLAY to CLAY	115	1.5	20	33	-	-	2.1	9.9	41	2.71	15	N/A	N/A
9.35	31.7	-	31.7	2.1	1.5	6.7	3	silty CLAY to CLAY	115	1.5	21	34	-	-	2.2	9.9	41	2.70	15	N/A	N/A
9.51	33.9	-	33.9	2.3	1.4	6.9	3	silty CLAY to CLAY	115	1.5	23	36	-	-	2.4	9.9	40	2.70	15	N/A	N/A
9.68	36.3	-	36.3	2.6	1.3	7.1	3	silty CLAY to CLAY	115	1.5	24	39	-	-	2.5	9.9	40	2.69	15	N/A	N/A
9.84	38.2	-	38.3	2.7	1.2	7.3	9	very stiff fine SOIL	120	1.0	38	61	-	-	1.3	9.9	39	2.68	30	N/A	N/A
10.01	40.2	-	40.2	2.8	1.0	7.0	9	very stiff fine SOIL	120	1.0	40	64	-	-	1.4	9.9	38	2.65	30	N/A	N/A
10.17	39.2	-	39.2	2.7	1.1	7.0	9	very stiff fine SOIL	120	1.0	39	63	-	-	1.4	9.9	38	2.66	30	N/A	N/A
10.34	38.2	-	38.2	2.4	1.1	6.4	3	silty CLAY to CLAY	115	1.5	25	41	-	-	2.7	9.9	37	2.64	15	N/A	N/A
10.50	36.3	-	36.3	2.4	1.2	6.8	3	silty CLAY to CLAY	115	1.5	24	39	-	-	2.5	9.9	39	2.67	15	N/A	N/A
10.66	35.2	-	35.2	2.5	1.2	7.2	3	silty CLAY to CLAY	115	1.5	23	38	-	-	2.4	9.9	41	2.70	15	N/A	N/A
10.83	34.7	-	34.7	2.4	1.2	7.1	3	silty CLAY to CLAY	115	1.5	23	37	-	-	2.4	9.9	41	2.70	15	N/A	N/A
10.99	33.1	-	33.1	2.1	1.2	6.6	3	silty CLAY to CLAY	115	1.5	22	35	-	-	2.3	9.9	40	2.69	15	N/A	N/A
11.16	32.1	-	32.1	2.0	1.3	6.3	3	silty CLAY to CLAY	115	1.5	21	33	-	-	2.2	9.9	40	2.69	15	N/A	N/A
11.32	33.6	-	33.6	2.1	1.3	6.3	3	silty CLAY to CLAY	115	1.5	22	34	-	-	2.3	9.9	40	2.69	15	N/A	N/A
11.48	35.1	-	35.1	2.1	1.3	6.0	3	silty CLAY to CLAY	115	1.5	23	35	-	-	2.4	9.9	38	2.66	15	N/A	N/A
11.65	36.7	-	36.7	2.2	1.3	6.0	3	silty CLAY to CLAY	115	1.5	24	36	-	-	2.5	9.9	38	2.65	15	N/A	N/A
11.81	35.8	-	35.9	2.0	1.2	5.8	3	silty CLAY to CLAY	115	1.5	24	35	-	-	2.5	9.9	38	2.65	15	N/A	N/A
11.98	34.4	-	34.4	2.1	1.2	6.3	3	silty CLAY to CLAY	115	1.5	23	33	-	-	2.4	9.9	40	2.69	15	N/A	N/A
12.14	36.3	-	36.4	2.2	1.4	6.3	3	silty CLAY to CLAY	115	1.5	24	35	-	-	2.5	9.9	39	2.68	15	N/A	N/A
12.30	35.7	-	35.7	2.3	1.4	6.5	3	silty CLAY to CLAY	115	1.5	24	34	-	-	2.5	9.9	40	2.70	15	N/A	N/A
12.47	35.2	-	35.3	2.3	1.4	6.7	3	silty CLAY to CLAY	115	1.5	23	33	-	-	2.4	9.9	41	2.72	15	N/A	N/A
12.63	34.3	-	34.3	2.2	1.4	6.4	3	silty CLAY to CLAY	115	1.5	23	31	-	-	2.4	9.9	41	2.72	15	N/A	N/A
12.80	32.4	-	32.4	2.0	1.5	6.2	3	silty CLAY to CLAY	115	1.5	22	29	-	-	2.2	9.9	42	2.72	15	N/A	N/A
12.96	32.1	-	32.2	1.9	1.5	6.2	3	silty CLAY to CLAY	115	1.5	21	29	-	-	2.2	9.9	42	2.73	15	N/A	N/A
13.12	32.4	-	32.5	1.8	1.6	5.8	3	silty CLAY to CLAY	115	1.5	22	29	-	-	2.2	9.9	41	2.71	15	N/A	N/A
13.29	31.9	-	32.0	1.9	1.6	6.2	3	silty CLAY to CLAY	115	1.5	21	28	-	-	2.2	9.9	43	2.74	15	N/A	N/A
13.45	33.1	-	33.2	2.1	1.6	6.5	3	silty CLAY to CLAY	115	1.5	22	28	-	-	2.3	9.9	43	2.75	15	N/A	N/A
13.62	35.2	-	35.2	2.2	1.6	6.5	3	silty CLAY to CLAY	115	1.5	23	30	-	-	2.4	9.9	42	2.73	15	N/A	N/A
13.78	37.9	-	38.0	2.4	1.7	6.5	3	silty CLAY to CLAY	115	1.5	25	32	-	-	2.6	9.9	41	2.71	15	N/A	N/A
13.94	39.0	-	39.0	2.4	1.7	6.3	3	silty CLAY to CLAY	115	1.5	26	32	-	-	2.7	9.9	41	2.70	15	N/A	N/A
14.11	36.1	-	36.2	2.3	1.7	6.6	3	silty CLAY to CLAY	115	1.5	24	30	-	-	2.5	9.9	43	2.74	15	N/A	N/A
14.27	35.5	-	35.5	2.1	1.8	5.9	3	silty CLAY to CLAY	115	1.5	24	29	-	-	2.4	9.9	41	2.72	15	N/A	N/A
14.44	31.6	-	31.6	1.8	1.8	6.0	3	silty CLAY to CLAY	115	1.5	21	25	-	-	2.2	9.9	44	2.76	15	N/A	N/A
14.60	28.2	-	28.3	1.7	1.9	6.2	3	silty CLAY to CLAY	115	1.5	19	22	-	-	1.9	9.9	46	2.81	15	N/A	N/A
14.76	26.4	-	26.4	1.6	1.9	6.2	3	silty CLAY to CLAY	115	1.5	18	21	-	-	1.8	9.9	48	2.83	15	N/A	N/A
14.93	27.0	-	27.0	1.6	2.0	6.1	3	silty CLAY to CLAY	115	1.5	18	21	-	-	1.8	9.9	47	2.82	15	N/A	N/A
15.09	26.5	-	26.5	1.4	2.0	5.6	3	silty CLAY to CLAY	115	1.5	18	20	-	-	1.8	9.7	47	2.81	15	N/A	N/A
15.26	26.9	-	26.9	1.4	2.1	5.2	3	silty CLAY to CLAY	115	1.5	18	20	-	-	1.8	9.8	45	2.78	15	N/A	N/A
15.42	25.6	-	25.6	1.4	2.1	5.6	3	silty CLAY to CLAY	115	1.5	17	19	-	-	1.7	9.2	48	2.83	15	N/A	N/A

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Converse Consultants
Data File: SDF(725).cpt
CPT Date: 4/14/2017 4:48:52 PM
GW During Test: 30 ft

Sounding ID: CPT-01
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	* SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* Ic SBT Indx	Nk -	* Vol Strn %	* Cycl SStn %
15.58	24.7	-	24.7	1.4	2.1	6.1	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.7	8.7	50	2.86	15	N/A	N/A
15.75	24.2	-	24.2	1.3	2.2	5.5	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.6	8.5	49	2.84	15	N/A	N/A
15.91	23.8	-	23.8	1.1	2.2	5.0	3	silty CLAY to CLAY	115	1.5	16	17	-	-	1.6	8.2	47	2.83	15	N/A	N/A
16.08	25.6	-	25.7	1.2	2.2	5.0	3	silty CLAY to CLAY	115	1.5	17	18	-	-	1.7	8.8	46	2.80	15	N/A	N/A
16.24	26.8	-	26.9	1.3	2.3	5.2	3	silty CLAY to CLAY	115	1.5	18	19	-	-	1.8	9.1	46	2.80	15	N/A	N/A
16.40	27.2	-	27.2	1.4	2.3	5.2	3	silty CLAY to CLAY	115	1.5	18	19	-	-	1.9	9.2	46	2.80	15	N/A	N/A
16.57	26.4	-	26.5	1.4	2.3	5.4	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.8	8.8	48	2.83	15	N/A	N/A
16.73	26.6	-	26.6	1.3	2.3	5.2	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.8	8.8	47	2.82	15	N/A	N/A
16.90	25.5	-	25.5	1.4	2.3	5.8	3	silty CLAY to CLAY	115	1.5	17	17	-	-	1.7	8.3	50	2.87	15	N/A	N/A
17.06	23.6	-	23.7	1.3	2.3	5.9	3	silty CLAY to CLAY	115	1.5	16	16	-	-	1.6	7.6	52	2.90	15	N/A	N/A
17.23	22.3	-	22.3	1.3	2.3	6.0	3	silty CLAY to CLAY	115	1.5	15	15	-	-	1.5	7.1	54	2.93	15	N/A	N/A
17.39	21.9	-	21.9	1.2	2.3	6.0	3	silty CLAY to CLAY	115	1.5	15	15	-	-	1.5	6.9	54	2.93	15	N/A	N/A
17.55	20.7	-	20.8	1.2	2.4	6.0	3	silty CLAY to CLAY	115	1.5	14	14	-	-	1.4	6.4	56	2.96	15	N/A	N/A
17.72	19.7	-	19.7	1.1	2.5	6.1	3	silty CLAY to CLAY	115	1.5	13	13	-	-	1.3	6.0	57	2.98	15	N/A	N/A
17.88	18.8	-	18.9	1.2	2.5	6.5	3	silty CLAY to CLAY	115	1.5	13	12	-	-	1.3	5.7	60	3.02	15	N/A	N/A
18.05	17.7	-	17.7	1.0	2.5	6.1	3	silty CLAY to CLAY	115	1.5	12	11	-	-	1.2	5.3	60	3.03	15	N/A	N/A
18.21	17.7	-	17.8	1.1	2.5	6.5	3	silty CLAY to CLAY	115	1.5	12	11	-	-	1.2	5.2	62	3.05	15	N/A	N/A
18.37	20.5	-	20.5	1.3	2.5	6.6	3	silty CLAY to CLAY	115	1.5	14	13	-	-	1.4	6.1	59	3.01	15	N/A	N/A
18.54	20.9	-	20.9	1.3	2.6	6.6	3	silty CLAY to CLAY	115	1.5	14	13	-	-	1.4	6.1	58	3.00	15	N/A	N/A
18.70	19.4	-	19.4	1.0	2.8	5.6	3	silty CLAY to CLAY	115	1.5	13	12	-	-	1.3	5.6	57	2.98	15	N/A	N/A
18.87	19.8	-	19.9	1.0	3.0	5.2	3	silty CLAY to CLAY	115	1.5	13	12	-	-	1.3	5.7	56	2.96	15	N/A	N/A
19.03	23.7	-	23.7	1.1	3.0	4.8	3	silty CLAY to CLAY	115	1.5	16	14	-	-	1.6	6.8	50	2.87	15	N/A	N/A
19.19	25.5	-	25.6	1.3	3.0	5.4	3	silty CLAY to CLAY	115	1.5	17	15	-	-	1.7	7.3	51	2.88	15	N/A	N/A
19.36	27.5	-	27.6	1.5	3.0	5.5	3	silty CLAY to CLAY	115	1.5	18	16	-	-	1.9	7.8	50	2.87	15	N/A	N/A
19.52	27.7	-	27.8	1.5	3.0	5.6	3	silty CLAY to CLAY	115	1.5	18	16	-	-	1.9	7.8	50	2.87	15	N/A	N/A
19.69	27.3	-	27.3	1.5	3.1	5.8	3	silty CLAY to CLAY	115	1.5	18	16	-	-	1.8	7.6	52	2.90	15	N/A	N/A
19.85	27.1	-	27.2	1.5	3.1	5.6	3	silty CLAY to CLAY	115	1.5	18	16	-	-	1.8	7.5	51	2.89	15	N/A	N/A
20.01	26.7	-	26.8	1.6	3.2	6.3	3	silty CLAY to CLAY	115	1.5	18	15	-	-	1.8	7.3	54	2.93	15	N/A	N/A
20.18	25.8	-	25.9	1.6	3.1	6.6	3	silty CLAY to CLAY	115	1.5	17	15	-	-	1.7	7.0	56	2.96	15	N/A	N/A
20.34	22.5	-	22.6	1.6	2.8	7.4	3	silty CLAY to CLAY	115	1.5	15	13	-	-	1.5	6.0	61	3.04	15	N/A	N/A
20.51	19.7	-	19.8	1.5	2.7	7.9	3	silty CLAY to CLAY	115	1.5	13	11	-	-	1.3	5.2	66	3.11	15	N/A	N/A
20.67	18.1	-	18.1	1.3	2.5	7.4	3	silty CLAY to CLAY	115	1.5	12	10	-	-	1.2	4.7	67	3.12	15	N/A	N/A
20.83	16.2	-	16.2	1.1	2.2	7.5	3	silty CLAY to CLAY	115	1.5	11	9	-	-	1.1	4.1	70	3.17	15	N/A	N/A
21.00	14.6	-	14.6	1.0	2.1	7.3	3	silty CLAY to CLAY	115	1.5	10	8	-	-	0.9	3.6	73	3.20	15	N/A	N/A
21.16	13.4	-	13.5	0.8	2.7	6.9	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	3.3	74	3.22	15	N/A	N/A
21.33	12.7	-	12.8	1.0	2.7	8.7	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	3.1	81	3.30	15	N/A	N/A
21.49	27.8	-	27.9	1.5	2.7	5.5	3	silty CLAY to CLAY	115	1.5	19	15	-	-	1.9	7.1	52	2.90	15	N/A	N/A
21.65	79.9	136.6	80.0	2.0	2.1	2.5	5	silty SAND to sandy SILT	120	3.0	27	23	55	38	-	-	23	2.30	16	N/A	N/A
21.82	101.5	149.9	101.5	2.4	1.8	2.4	5	silty SAND to sandy SILT	120	3.0	34	29	63	39	-	-	20	2.22	16	N/A	N/A
21.98	109.4	177.0	109.5	3.4	1.7	3.1	5	silty SAND to sandy SILT	120	3.0	36	31	65	40	-	-	22	2.28	16	N/A	N/A
22.15	104.5	207.2	104.5	4.4	1.6	4.3	4	clayy SILT to silty CLAY	115	2.0	52	45	-	-	7.3	9.9	26	2.40	15	N/A	N/A
22.31	96.7	207.5	96.7	4.4	1.7	4.6	4	clayy SILT to silty CLAY	115	2.0	48	41	-	-	6.7	9.9	28	2.45	15	N/A	N/A
22.47	119.3	185.2	119.3	3.7	1.4	3.1	5	silty SAND to sandy SILT	120	3.0	40	34	68	40	-	-	21	2.26	16	N/A	N/A
22.64	163.1	178.6	163.1	2.9	1.0	1.8	6	clean SAND to silty SAND	125	5.0	33	28	78	42	-	-	13	1.99	16	N/A	N/A
22.80	242.3	224.2	242.3	3.3	0.4	1.4	6	clean SAND to silty SAND	125	5.0	48	41	91	44	-	-	8	1.78	16	N/A	N/A
22.97	313.0	264.0	313.0	2.8	-0.6	0.9	6	clean SAND to silty SAND	125	5.0	63	53	95	45	-	-	5	1.58	16	N/A	N/A
23.13	354.4	297.8	354.4	3.1	-0.2	0.9	6	clean SAND to silty SAND	125	5.0	71	60	95	45	-	-	5	1.53	16	N/A	N/A
23.30	404.8	338.8	404.8	3.7	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	81	68	95	46	-	-	5	1.51	16	N/A	N/A
23.46	427.5	356.5	427.4	4.5	-1.6	1.1	6	clean SAND to silty SAND	125	5.0	85	71	95	46	-	-	5	1.55	16	N/A	N/A
23.62	448.3	372.4	448.2	3.7	-1.9	0.8	6	clean SAND to silty SAND	125	5.0	90	74	95	46	-	-	5	1.45	16	N/A	N/A
23.79	468.3	387.6	468.3	5.3	-1.3	1.1	6	clean SAND to silty SAND	125	5.0	94	78	95	46	-	-	5	1.55	16	N/A	N/A
23.95	491.5	405.3	491.5	5.7	-3.5	1.2	6	clean SAND to silty SAND	125	5.0	98	81	95	47	-	-	5	1.55	16	N/A	N/A
24.12	413.4	339.6	413.3	5.3	-2.2	1.3	6	clean SAND to silty SAND	125	5.0	83	68	95	46	-	-	5	1.63	16	N/A	N/A
24.28	407.8	340.9	407.8	5.9	-2.1	1.5	6	clean SAND to silty SAND	125	5.0	82	67	95	46	-	-	6	1.68	16	N/A	N/A
24.44	457.5	377.4	457.4	6.9	-1.5	1.5	6	clean SAND to silty SAND	125	5.0	91	75	95	46	-	-	5	1.66	16	N/A	N/A
24.61	266.0	261.4	266.0	5.6	0.0	2.1	6	clean SAND to silty SAND	125	5.0	53	43	92	44	-	-	11	1.92	16	N/A	N/A
24.77	169.2	215.1	169.2	5.0	0.2	3.0	5	silty SAND to sandy SILT	120	3.0	56	46	77	41	-	-	18	2.16	16	N/A	N/A
24.94	263.0	229.5	263.0	3.5	0.0	1.3	6	clean SAND to silty SAND	125	5.0	53	42	92	44	-	-	7	1.76	16	N/A	N/A
25.10	315.6	255.3	315.6	3.5	-0.7	1.1	6	clean SAND to silty SAND	125	5.0	63	51	95	44	-	-	5	1.65	16	N/A	N/A
25.26	356.2	285.5	356.2	3.6	-1.2	1.0	6	clean SAND to silty SAND	125	5.0	71	57	95	45	-	-	5	1.60	16	N/A	N/A
25.43	380.0	303.4	379.9	4.3	-1.4	1.1	6	clean SAND to silty SAND	125	5.0	76	61	95	45	-	-	5	1.61	16	N/A	N/A
25.59	405.4	322.6	405.4	4.8	-1.7	1.2	6	clean SAND to silty SAND	125	5.0	81	65	95	45	-	-	5	1.61	16	N/A	N/A
25.76	424.4	336.6	424.4	4.4	-3.0	1.0	6	clean SAND to silty SAND	125	5.0	85	67	95	46	-	-	5	1.56	16	N/A	N/A
25.92	415.9	328.8	415.9	4.6	-3.1	1.1	6	clean SAND to silty SAND	125	5.0	83	66	95	46	-	-	5	1.59	16	N/A	N/A
26.08	426.4	335.9	426.4	3.9	-3.5	0.9	6	clean SAND to silty SAND	125	5.0	85	67	95	46	-	-	5	1.51	16	N/A	N/A
26.25	425.7	334.2	425.6	4.2	-3.6	1.0	6	clean SAND to silty SAND	125	5.0	85	67	95	46	-	-	5	1.54	16	N/A	N/A
26.41	440.2	344.5	440.2	4.8	-3.8	1.1	6	clean SAND to silty SAND	125	5.0	88	69	95	46	-	-	5	1.57	16	N/A	N/A
26.58	455.0	370.8	455.0	7.5	-3.8	1.7	6	clean SAND to silty SAND	125	5.0	91	71	95	46	-	-	6	1.71	16	N/A	N/A
26.74	505.1	392.6	505.0	6.7	-4.0	1.3	6	clean SAND to silty SAND	125	5.0	100	79	95	46	-	-	5	1.61	16	N/A	N/A
26.90	511.1	396.0	511.0	7.4	-3.2	1.4	6	clean SAND to silty SAND	125	5.0	100	79	95	46	-	-	5	1.63	16	N/A	N/A
27.07	504.0	389.2	503.9	5.1	-5.0	1.0	6	clean SAND to silty SAND	125	5.0	100	78	95	46	-	-	5	1.51	16	N/A	N/A
27.23	543.6	418.4	543.5	5.3	-4.9	1.0	6	clean SAND to silty SAND	125	5.0	100	84	95	46	-	-	5	1.48	16	N/A	N/A
27.40	528.4	405.5	528.3	5.8	-4.4	1.1	6	clean SAND to silty SAND	125	5.0	100	81	95	46	-	-	5	1.53	16	N/A	N/A
27.56	459.7	355.0	459.6	6.6	-5.1	1.4	6	clean SAND to silty SAND	125	5.0	92	70	95	46	-	-	5	1.66	16	N/A	N/A
27.72	441.2	352.1	441.1	7.1	-4.7	1.6	6	clean SAND to silty SAND	125	5.0	88	67	95	45	-	-	6	1.71	16	N/A	N/A
27.89	453.2	355.7	453.1	7.0	-4.8	1.6	6	clean SAND to silty SAND	125	5.0	91	69	95	46	-	-	6	1.69	16	N/A	N/A
28.05	462.8	350.6	462.7	6.1	-5.2	1.3	6	clean SAND to silty SAND	125	5.0	93	70	95	46	-	-	5	1.63	16	N/A	N/A
28.22	479.0	361.8	478.9	5.1	-5.6	1.1	6	clean SAND to silty SAND	125	5.0	96	72	95	46	-	-	5	1.55	16	N/A	N/A
28.38	515.7	388.3	515.6	5.3	-5.9	1.0	6	clean SAND to silty SAND	125	5.0	100	78	95	46	-	-	5	1.51	16	N/A	N/A
28.54	503.6	378.1	503.5	6.0	-5.7	1.2	6	clean SAND to silty SAND	125	5.0	100	76	95	46	-	-	5	1.58	16	N/A	N/A
28.71	516.2	386.3	516.1	2.6	-5.7	0.5	7	grvly SAND to dense SAND	130	6.0	86	64	95	46	-	-	5	1.28	16	N/A	N/A

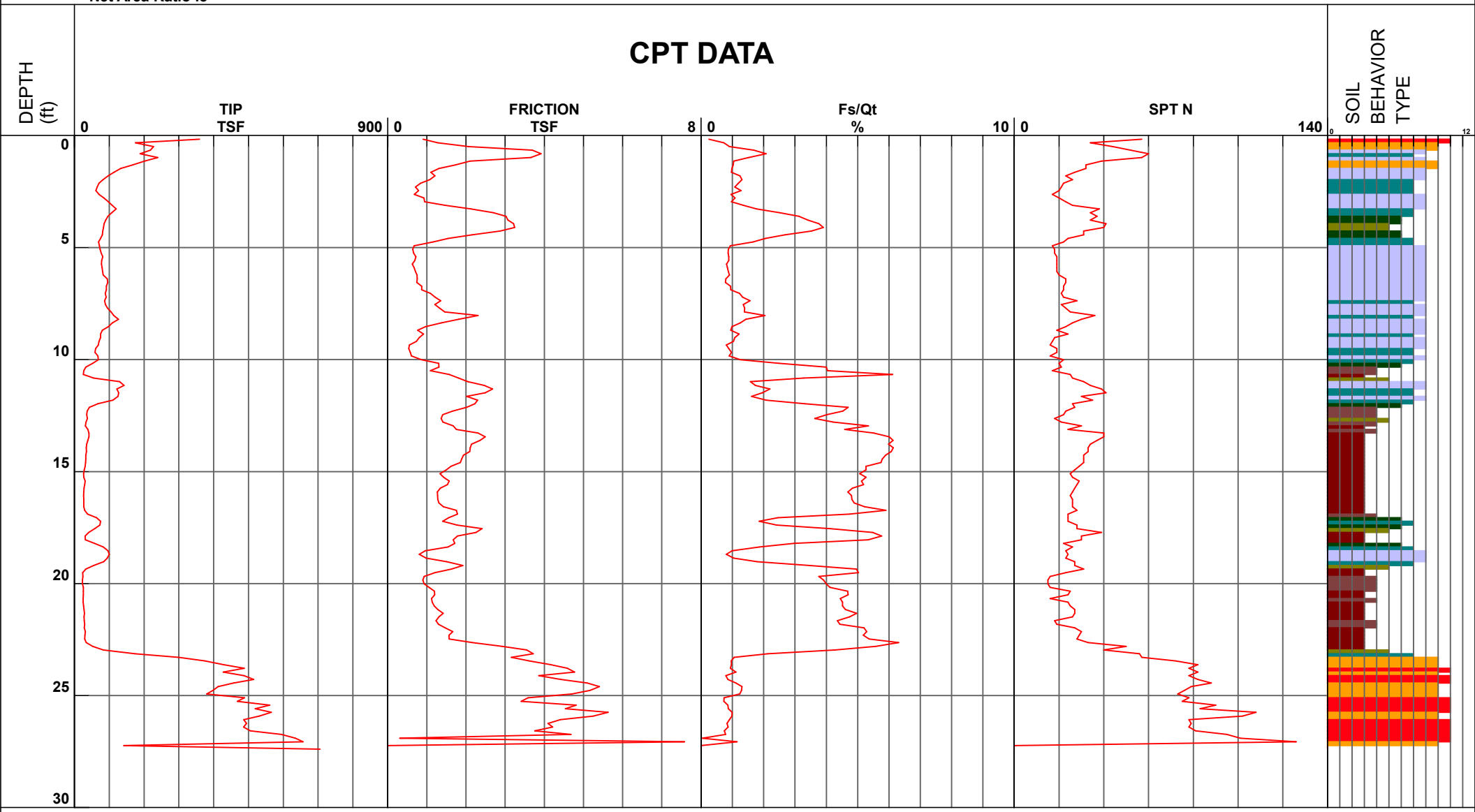
* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Converse Consultants

Project	Shenandoah ES Modernization Project	Operator	RC JM	Filename	SDF(726).cpt
Job Number	17-31-113-01	Cone Number	DDG1281	GPS	
Hole Number	CPT-02	Date and Time	4/14/2017 5:26:44 PM	Maximum Depth	27.39 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Shenandoah ES Modernization Project

Project ID: Converse Consultants
Data File: SDF(726).cpt
CPT Date: 4/14/2017 5:26:44 PM
GW During Test: 30 ft

Sounding ID: CPT-02
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
0.33	175.4	281.4	175.4	1.3	-1.3	0.7	6	clean SAND to silty SAND	125	5.0	35	56	95	48	-	-	5	1.49	16	N/A	N/A
0.49	227.3	364.5	227.3	2.1	-1.7	0.9	6	clean SAND to silty SAND	125	5.0	45	73	95	48	-	-	5	1.49	16	N/A	N/A
0.66	218.7	368.3	218.7	3.7	-1.5	1.7	6	clean SAND to silty SAND	125	5.0	44	70	95	48	-	-	6	1.72	16	N/A	N/A
0.82	188.6	341.1	188.6	3.9	-1.1	2.1	6	clean SAND to silty SAND	125	5.0	38	60	95	48	-	-	9	1.83	16	N/A	N/A
0.98	239.7	388.2	239.7	3.7	-1.3	1.5	6	clean SAND to silty SAND	125	5.0	48	77	95	48	-	-	5	1.66	16	N/A	N/A
1.15	201.4	323.0	201.4	2.1	-1.0	1.0	6	clean SAND to silty SAND	125	5.0	40	65	95	48	-	-	5	1.57	16	N/A	N/A
1.31	167.4	268.5	167.4	1.7	-0.9	1.0	6	clean SAND to silty SAND	125	5.0	33	54	95	48	-	-	5	1.61	16	N/A	N/A
1.48	132.7	216.1	132.6	1.3	-1.5	1.0	6	clean SAND to silty SAND	125	5.0	27	43	92	48	-	-	6	1.67	16	N/A	N/A
1.64	113.4	190.1	113.4	1.1	-1.4	1.0	6	clean SAND to silty SAND	125	5.0	23	36	87	48	-	-	6	1.71	16	N/A	N/A
1.80	96.7	175.8	96.7	1.2	-1.4	1.2	6	clean SAND to silty SAND	125	5.0	19	31	81	48	-	-	9	1.84	16	N/A	N/A
1.97	82.1	156.7	82.1	1.1	-1.3	1.3	6	clean SAND to silty SAND	125	5.0	16	26	76	48	-	-	10	1.90	16	N/A	N/A
2.13	70.4	136.7	70.4	0.8	-1.2	1.2	6	clean SAND to silty SAND	125	5.0	14	23	71	48	-	-	11	1.92	16	N/A	N/A
2.30	65.7	126.8	65.7	0.7	-1.2	1.1	6	clean SAND to silty SAND	125	5.0	13	21	69	48	-	-	11	1.91	16	N/A	N/A
2.46	61.9	127.0	61.9	0.8	-1.2	1.3	6	clean SAND to silty SAND	125	5.0	12	20	67	47	-	-	13	1.98	16	N/A	N/A
2.62	70.9	130.8	70.8	0.7	-1.3	1.0	6	clean SAND to silty SAND	125	5.0	14	23	71	48	-	-	9	1.86	16	N/A	N/A
2.79	85.0	154.5	85.0	0.9	-1.4	1.1	6	clean SAND to silty SAND	125	5.0	17	27	77	48	-	-	9	1.84	16	N/A	N/A
2.95	97.6	168.4	97.6	0.9	-1.5	1.0	6	clean SAND to silty SAND	125	5.0	20	31	82	48	-	-	7	1.76	16	N/A	N/A
3.12	108.4	196.3	108.4	1.5	-1.6	1.4	6	clean SAND to silty SAND	125	5.0	22	35	85	48	-	-	9	1.83	16	N/A	N/A
3.28	120.0	226.6	119.9	2.1	-1.7	1.8	6	clean SAND to silty SAND	125	5.0	24	38	89	48	-	-	10	1.89	16	N/A	N/A
3.45	107.5	233.2	107.5	2.7	-1.6	2.5	5	silty SAND to sandy SILT	120	3.0	36	57	85	48	-	-	14	2.04	16	N/A	N/A
3.61	96.6	237.8	96.6	3.0	-1.4	3.1	5	silty SAND to sandy SILT	120	3.0	32	52	81	47	-	-	17	2.14	16	N/A	N/A
3.77	90.0	237.2	89.9	3.1	-1.4	3.4	5	silty SAND to sandy SILT	120	3.0	30	48	79	47	-	-	19	2.19	16	N/A	N/A
3.94	85.5	241.9	85.5	3.2	-1.4	3.8	8	stiff SAND to clayy SAND	115	5.0	17	27	77	47	-	-	20	2.24	16	N/A	N/A
4.10	83.1	242.8	83.1	3.2	-1.4	3.9	8	stiff SAND to clayy SAND	115	5.0	17	27	76	46	-	-	21	2.26	16	N/A	N/A
4.27	81.3	227.0	81.3	2.9	-1.4	3.5	5	silty SAND to sandy SILT	120	3.0	27	43	76	46	-	-	20	2.23	16	N/A	N/A
4.43	80.5	197.1	80.4	2.2	-1.3	2.7	5	silty SAND to sandy SILT	120	3.0	27	43	75	46	-	-	17	2.14	16	N/A	N/A
4.59	75.2	169.5	75.2	1.5	-1.4	2.1	5	silty SAND to sandy SILT	120	3.0	25	40	73	45	-	-	15	2.07	16	N/A	N/A
4.76	69.4	148.9	69.4	1.2	-1.4	1.7	5	silty SAND to sandy SILT	120	3.0	23	37	71	45	-	-	14	2.03	16	N/A	N/A
4.92	71.9	131.8	71.9	0.7	-1.4	0.9	6	clean SAND to silty SAND	125	5.0	14	23	72	45	-	-	9	1.85	16	N/A	N/A
5.09	73.5	132.2	73.5	0.6	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	15	24	72	45	-	-	9	1.82	16	N/A	N/A
5.25	76.8	136.6	76.7	0.7	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	15	25	74	45	-	-	8	1.80	16	N/A	N/A
5.41	81.4	143.5	81.3	0.7	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	16	26	76	45	-	-	8	1.79	16	N/A	N/A
5.58	78.3	139.4	78.3	0.7	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	16	25	75	45	-	-	8	1.80	16	N/A	N/A
5.74	77.8	136.4	77.7	0.6	-1.5	0.8	6	clean SAND to silty SAND	125	5.0	16	25	74	44	-	-	8	1.78	16	N/A	N/A
5.91	79.5	139.8	79.5	0.7	-1.4	0.9	6	clean SAND to silty SAND	125	5.0	16	26	75	44	-	-	8	1.79	16	N/A	N/A
6.07	81.0	141.6	81.0	0.7	-1.4	0.9	6	clean SAND to silty SAND	125	5.0	16	26	75	44	-	-	8	1.79	16	N/A	N/A
6.23	82.7	143.4	82.6	0.8	-1.4	0.9	6	clean SAND to silty SAND	125	5.0	17	26	76	44	-	-	8	1.80	16	N/A	N/A
6.40	94.7	154.2	94.7	0.8	-1.4	0.8	6	clean SAND to silty SAND	125	5.0	19	29	80	45	-	-	7	1.72	16	N/A	N/A
6.56	95.6	153.2	95.6	0.7	-1.4	0.8	6	clean SAND to silty SAND	125	5.0	19	29	79	45	-	-	6	1.72	16	N/A	N/A
6.73	91.8	152.2	91.8	0.9	-1.4	0.9	6	clean SAND to silty SAND	125	5.0	18	28	78	45	-	-	8	1.79	16	N/A	N/A
6.89	91.8	150.8	91.7	0.9	-1.4	1.0	6	clean SAND to silty SAND	125	5.0	18	27	77	44	-	-	8	1.80	16	N/A	N/A
7.05	88.8	153.7	88.7	1.1	-1.3	1.2	6	clean SAND to silty SAND	125	5.0	18	26	76	44	-	-	10	1.89	16	N/A	N/A
7.22	91.2	158.5	91.2	1.2	-1.3	1.3	6	clean SAND to silty SAND	125	5.0	18	27	76	44	-	-	11	1.91	16	N/A	N/A
7.38	86.7	158.2	86.6	1.4	-1.2	1.6	6	clean SAND to silty SAND	125	5.0	17	25	74	44	-	-	12	1.98	16	N/A	N/A
7.55	89.3	154.0	89.3	1.2	-1.3	1.4	6	clean SAND to silty SAND	125	5.0	18	25	75	44	-	-	11	1.92	16	N/A	N/A
7.71	95.1	161.4	95.1	1.3	-1.3	1.4	6	clean SAND to silty SAND	125	5.0	19	27	77	44	-	-	11	1.92	16	N/A	N/A
7.87	105.2	172.6	105.2	1.5	-1.3	1.4	6	clean SAND to silty SAND	125	5.0	21	29	80	44	-	-	10	1.89	16	N/A	N/A
8.04	112.9	201.6	112.9	2.3	-1.2	2.1	5	silty SAND to sandy SILT	120	3.0	38	52	82	45	-	-	13	2.00	16	N/A	N/A
8.20	126.9	197.9	126.9	1.8	-1.2	1.4	6	clean SAND to silty SAND	125	5.0	25	35	85	45	-	-	9	1.85	16	N/A	N/A
8.37	109.0	169.4	108.9	1.4	-1.1	1.3	6	clean SAND to silty SAND	125	5.0	22	29	80	44	-	-	9	1.86	16	N/A	N/A
8.53	97.9	146.9	97.9	1.0	-1.1	1.0	6	clean SAND to silty SAND	125	5.0	20	26	76	44	-	-	9	1.82	16	N/A	N/A
8.69	80.4	124.7	80.4	0.8	-1.2	1.0	6	clean SAND to silty SAND	125	5.0	16	21	69	43	-	-	10	1.88	16	N/A	N/A
8.86	75.2	125.1	75.2	0.9	-1.2	1.2	6	clean SAND to silty SAND	125	5.0	15	20	67	42	-	-	12	1.97	16	N/A	N/A
9.02	74.8	120.2	74.8	0.8	-1.2	1.1	6	clean SAND to silty SAND	125	5.0	15	19	66	42	-	-	12	1.95	16	N/A	N/A
9.19	70.8	113.7	70.8	0.7	-1.2	1.0	6	clean SAND to silty SAND	125	5.0	14	18	64	42	-	-	12	1.96	16	N/A	N/A
9.35	68.6	104.4	68.5	0.6	-1.2	0.8	6	clean SAND to silty SAND	125	5.0	14	18	63	41	-	-	10	1.90	16	N/A	N/A
9.51	60.9	97.6	60.9	0.5	-1.2	0.9	6	clean SAND to silty SAND	125	5.0	12	15	58	41	-	-	12	1.97	16	N/A	N/A
9.68	59.4	97.8	59.4	0.6	-1.2	1.0	6	clean SAND to silty SAND	125	5.0	12	15	57	40	-	-	13	2.01	16	N/A	N/A
9.84	67.5	103.9	67.4	0.6	-1.2	0.9	6	clean SAND to silty SAND	125	5.0	13	17	61	41	-	-	12	1.95	16	N/A	N/A
10.01	68.7	114.4	68.7	0.9	-1.2	1.3	5	silty SAND to sandy SILT	120	3.0	23	28	62	41	-	-	14	2.04	16	N/A	N/A
10.17	52.3	130.5	52.3	1.3	-1.1	2.5	5	silty SAND to sandy SILT	120	3.0	17	21	52	40	-	-	24	2.33	16	N/A	N/A
10.34	32.7	144.1	32.7	1.3	-1.0	4.1	4	clayy SILT to silty CLAY	115	2.0	16	22	-	-	2.3	9.9	35	2.59	15	N/A	N/A
10.50	27.1	-	27.1	1.1	-0.9	4.1	4	clayy SILT to silty CLAY	115	2.0	14	21	-	-	1.9	9.9	36	2.61	15	N/A	N/A
10.66	25.7	-	25.7	1.6	-0.8	6.3	3	silty CLAY to CLAY	115	1.5	17	26	-	-	1.8	9.9	44	2.76	15	N/A	N/A
10.83	55.2	152.8	55.2	1.8	-0.9	3.3	4	clayy SILT to silty CLAY	115	2.0	28	33	-	-	3.9	9.9	27	2.40	15	N/A	N/A
10.99	129.4	184.2	129.4	2.0	-0.8	1.6	6	clean SAND to silty SAND	125	5.0	26	31	81	44	-	-	11	1.92	16	N/A	N/A
11.16	142.4	202.0	142.4	2.5	-1.0	1.7	6	clean SAND to silty SAND	125	5.0	28	33	84	44	-	-	11	1.92	16	N/A	N/A
11.32	121.9	193.8	121.9	2.7	-0.8	2.2	5	silty SAND to sandy SILT	120	3.0	41	47	79	43	-	-	14	2.05	16	N/A	N/A
11.48	127.4	191.0	127.4	2.5	-0.9	2.0	5	silty SAND to sandy SILT	120	3.0	42	49	80	44	-	-	13	2.00	16	N/A	N/A
11.65	125.0	176.7	125.0	2.0	-0.9	1.6	6	clean SAND to silty SAND	125	5.0	25	29	79	43	-	-	11	1.94	16	N/A	N/A
11.81	110.5	175.2	110.5	2.3	-0.8	2.1	5	silty SAND to sandy SILT	120	3.0	37	42	75	43	-	-	15	2.06	16	N/A	N/A
11.98	67.1	164.8	67.1	2.2	-0.6	3.4	4	clayy SILT to silty CLAY	115	2.0	34	38	-	-	4.7	9.9	25	2.36	15	N/A	N/A
12.14	42.9	169.6	42.9	2.0	-0.3	4.8	4	clayy SILT to silty CLAY	115	2.0	21	26	-	-	3.0	9.9	35	2.59	15	N/A	N/A
12.30	36.6	-	36.6	1.7	0.5	4.6	4	clayy SILT to silty CLAY	115	2.0	18	24	-	-	2.5	9.9	35	2.60	15	N/A	N/A
12.47	35.0	-	35.0	1.4	0.7	4.1	4	clayy SILT to silty CLAY	115	2.0	18	21	-	-	2.4	9.9	36	2.61	15	N/A	N/A
12.63	37.6	133.4	37.6	1.4	0.9	3.7	4	clayy SILT to silty CLAY	115	2.0	19	21	-	-	2.6	9.9	34	2.58	15	N/A	N/A
12.80	33.5	-	33.5	1.4	0.9	4.3	4	clayy SILT to silty CLAY	115	2.0	17	21	-	-	2.3	9.9	36	2.62	15	N/A	N/A
12.96	31.3	-	31.3	1.7	1.0	5.5	3	silty CLAY to CLAY	115	1.5	21	26	-	-	2.2	9.9	41	2.72	15	N/A	N/A
13.12	38.2	-	38.2	1.8	1.0	4.7	4	clayy SILT to silty CLAY	115	2.0	19	24	-	-	2.6	9.9	36	2.61	15	N/A	N/A
13.29	41.8	-	41.9	2.3	1.1	5.6	3	silty CLAY to CLAY	115	1.5	28	34	-	-	2.9	9.9	38	2.65	15	N/A	N/A
13.45	41.5	-	41.5	2.5	1.1	6.1	3	silty CLAY to CLAY	115	1.5	28	34	-	-	2.9	9.9	39	2.68	15	N/A	N/A
13.62	38.5	-	38.5	2.4	1.1	6.3	3	silty CLAY to CLAY	115	1.5	26	31	-	-	2.7	9.9	41	2.71	15	N/A	N/A
13.78	35.7	-	35.7	2.1	1.1	6.1	3	silty CLAY to CLAY	115	1.5	24	28	-	-	2.5	9.9	42	2.73	15	N/A	N/A
13.94	34.3	-	34.4	2.1	1.2	6.3	3	silty CLAY to CLAY	115	1.5	23	27	-	-	2.4	9.9	43	2.76	15	N/A	N/A
14.11	34.5	-	34.5	2.1	1.2	6.2	3	silty CLAY to CLAY	115	1.5	23	27	-	-	2.4	9.9	43	2.75	15	N/A	N/A
14.27	32.8	-	32.9	1.9	1.2	6.1	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.3	9.9	44	2.76	15	N/A	N/A
14.44	32.6	-	32.6	1.9	1.2	6.0	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.2	9.9	44	2.76	15	N/A	N/A
14.60	32.3	-	32.3	1.9	1.2	5.9	3	silty CLAY to CLAY	115	1.5	22	24	-	-	2.2	9.9	44	2.77	15	N/A	N/A
14.76	30.7	-	30.7	1.6	1.2	5.4	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.1	9.9	44	2.76	15	N/A	N/A
14.93	28.5	-	28.5	1.5	1.2	5.4	3	silty CLAY to CLAY	115	1.5	19	21	-	-	1.9	9.9	45	2.79	15	N/A	N/A
15.09	26.4	-	26.4	1.3	1.3	5.2	3	silty CLAY to CLAY	115	1.5	18	19	-	-	1.8	9.2	46	2.81	15	N/A	N/A
15.26	27.1	-	27.1	1.4	1.3	5.5	3	silty CLAY to CLAY	115	1.5	18	20	-	-	1.8	9.3	47	2.81	15	N/A	N/A
15.42	30.7	-	30.7	1.6	1.3	5.3	3	silty CLAY to CLAY	115	1.5	20	22	-	-	2.1	9.9	44	2.77	15	N/A	N/A

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Project ID: Converse Consultants
Data File: SDF(726).cpt
CPT Date: 4/14/2017 5:26:44 PM
GW During Test: 30 ft

Sounding ID: CPT-02
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
15.58	29.4	-	29.4	1.5	1.3	5.4	3	silty CLAY to CLAY	115	1.5	20	21	-	-	2.0	9.9	45	2.79	15	N/A	N/A
15.75	27.8	-	27.9	1.3	1.4	5.0	3	silty CLAY to CLAY	115	1.5	19	19	-	-	1.9	9.3	45	2.79	15	N/A	N/A
15.91	27.1	-	27.1	1.3	1.4	4.9	3	silty CLAY to CLAY	115	1.5	18	19	-	-	1.8	8.9	45	2.79	15	N/A	N/A
16.08	26.5	-	26.6	1.3	1.4	5.0	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.8	8.7	46	2.81	15	N/A	N/A
16.24	26.6	-	26.7	1.3	1.5	5.0	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.8	8.6	47	2.81	15	N/A	N/A
16.40	26.7	-	26.8	1.3	1.5	5.1	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.8	8.6	47	2.82	15	N/A	N/A
16.57	27.2	-	27.3	1.4	1.5	5.4	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.9	8.6	48	2.83	15	N/A	N/A
16.73	29.7	-	29.7	1.8	1.5	6.1	3	silty CLAY to CLAY	115	1.5	20	20	-	-	2.0	9.4	49	2.84	15	N/A	N/A
16.90	37.6	-	37.6	1.8	1.5	4.9	3	silty CLAY to CLAY	115	1.5	25	25	-	-	2.6	9.9	41	2.70	15	N/A	N/A
17.06	63.5	127.1	63.5	1.6	1.3	2.5	5	silty SAND to sandy SILT	120	3.0	21	20	51	38	-	-	24	2.34	16	N/A	N/A
17.23	75.5	120.6	75.6	1.4	1.1	1.9	5	silty SAND to sandy SILT	120	3.0	25	24	56	39	-	-	19	2.20	16	N/A	N/A
17.39	73.4	134.0	73.4	1.8	1.1	2.4	5	silty SAND to sandy SILT	120	3.0	24	23	55	39	-	-	22	2.29	16	N/A	N/A
17.55	58.5	161.9	58.6	2.4	1.2	4.2	4	clayy SILT to silty CLAY	115	2.0	29	28	-	-	4.1	9.9	32	2.53	15	N/A	N/A
17.72	41.2	-	41.2	2.3	1.3	5.6	3	silty CLAY to CLAY	115	1.5	27	26	-	-	2.8	9.9	42	2.73	15	N/A	N/A
17.88	30.9	-	30.9	1.8	1.7	6.0	3	silty CLAY to CLAY	115	1.5	21	19	-	-	2.1	9.1	49	2.85	15	N/A	N/A
18.05	31.4	-	31.4	1.7	1.9	5.5	3	silty CLAY to CLAY	115	1.5	21	19	-	-	2.1	9.2	47	2.82	15	N/A	N/A
18.21	57.8	132.9	57.8	1.7	1.8	3.0	4	clayy SILT to silty CLAY	115	2.0	29	27	-	-	4.0	9.9	28	2.44	15	N/A	N/A
18.37	82.5	124.6	82.6	1.5	1.4	1.9	5	silty SAND to sandy SILT	120	3.0	28	25	58	39	-	-	19	2.19	16	N/A	N/A
18.54	96.6	110.7	96.6	1.0	1.3	1.0	6	clean SAND to silty SAND	125	5.0	19	18	63	40	-	-	12	1.96	16	N/A	N/A
18.70	100.3	108.2	100.4	0.8	1.2	0.8	6	clean SAND to silty SAND	125	5.0	20	18	64	40	-	-	10	1.89	16	N/A	N/A
18.87	94.2	109.4	94.3	1.0	1.2	1.1	6	clean SAND to silty SAND	125	5.0	19	17	62	39	-	-	12	1.98	16	N/A	N/A
19.03	84.1	122.6	84.1	1.5	1.2	1.8	5	silty SAND to sandy SILT	120	3.0	28	25	58	39	-	-	18	2.17	16	N/A	N/A
19.19	55.4	141.0	55.4	1.9	1.3	3.5	4	clayy SILT to silty CLAY	115	2.0	28	25	-	-	3.8	9.9	31	2.51	15	N/A	N/A
19.36	32.9	-	32.9	1.6	1.6	5.1	3	silty CLAY to CLAY	115	1.5	22	19	-	-	2.2	9.0	46	2.81	15	N/A	N/A
19.52	24.1	-	24.1	1.2	1.9	5.3	3	silty CLAY to CLAY	115	1.5	16	14	-	-	1.6	6.4	53	2.92	15	N/A	N/A
19.69	24.7	-	24.7	0.9	2.0	4.0	3	silty CLAY to CLAY	115	1.5	16	14	-	-	1.7	6.5	48	2.83	15	N/A	N/A
19.85	22.9	-	23.0	0.9	2.0	4.1	3	silty CLAY to CLAY	115	1.5	15	13	-	-	1.5	6.0	50	2.87	15	N/A	N/A
20.01	23.4	-	23.4	0.9	2.1	4.2	3	silty CLAY to CLAY	115	1.5	16	13	-	-	1.6	6.1	50	2.87	15	N/A	N/A
20.18	25.8	-	25.8	1.1	2.0	4.3	3	silty CLAY to CLAY	115	1.5	17	14	-	-	1.7	6.7	49	2.85	15	N/A	N/A
20.34	25.6	-	25.6	1.2	2.1	4.9	3	silty CLAY to CLAY	115	1.5	17	14	-	-	1.7	6.6	52	2.89	15	N/A	N/A
20.51	25.5	-	25.6	1.2	2.2	4.9	3	silty CLAY to CLAY	115	1.5	17	14	-	-	1.7	6.5	52	2.90	15	N/A	N/A
20.67	25.2	-	25.3	1.1	2.3	4.7	3	silty CLAY to CLAY	115	1.5	17	14	-	-	1.7	6.4	51	2.89	15	N/A	N/A
20.83	25.2	-	25.3	1.1	2.3	4.8	3	silty CLAY to CLAY	115	1.5	17	13	-	-	1.7	6.3	52	2.90	15	N/A	N/A
21.00	26.3	-	26.3	1.2	2.3	4.7	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.8	6.6	51	2.88	15	N/A	N/A
21.16	27.7	-	27.8	1.3	2.4	4.8	3	silty CLAY to CLAY	115	1.5	18	15	-	-	1.9	6.9	50	2.87	15	N/A	N/A
21.33	28.6	-	28.6	1.4	2.3	5.2	3	silty CLAY to CLAY	115	1.5	19	15	-	-	1.9	7.0	51	2.89	15	N/A	N/A
21.49	27.6	-	27.7	1.3	2.3	5.0	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.9	6.7	51	2.89	15	N/A	N/A
21.65	28.4	-	28.5	1.2	2.5	4.6	3	silty CLAY to CLAY	115	1.5	19	15	-	-	1.9	6.9	49	2.86	15	N/A	N/A
21.82	29.3	-	29.4	1.3	2.5	4.6	3	silty CLAY to CLAY	115	1.5	20	15	-	-	2.0	7.1	49	2.85	15	N/A	N/A
21.98	28.3	-	28.3	1.5	2.5	5.5	3	silty CLAY to CLAY	115	1.5	19	14	-	-	1.9	6.7	53	2.91	15	N/A	N/A
22.15	31.5	-	31.5	1.7	2.7	5.5	3	silty CLAY to CLAY	115	1.5	21	16	-	-	2.1	7.5	51	2.88	15	N/A	N/A
22.31	30.3	-	30.3	1.6	2.7	5.4	3	silty CLAY to CLAY	115	1.5	20	15	-	-	2.0	7.1	52	2.89	15	N/A	N/A
22.47	29.3	-	29.4	1.6	2.8	5.6	3	silty CLAY to CLAY	115	1.5	20	15	-	-	2.0	6.9	53	2.92	15	N/A	N/A
22.64	34.3	-	34.4	2.2	2.8	6.6	3	silty CLAY to CLAY	115	1.5	23	17	-	-	2.3	8.0	53	2.91	15	N/A	N/A
22.80	52.5	-	52.6	2.9	2.8	5.7	3	silty CLAY to CLAY	115	1.5	35	26	-	-	3.6	9.9	43	2.74	15	N/A	N/A
22.97	82.9	183.1	83.0	3.6	1.9	4.4	4	clayy SILT to silty CLAY	115	2.0	41	34	-	-	5.8	9.9	30	2.48	15	N/A	N/A
23.13	174.1	193.9	174.1	3.7	1.0	2.2	5	silty SAND to sandy SILT	120	3.0	58	48	79	42	-	-	14	2.04	16	N/A	N/A
23.30	299.1	246.8	299.1	3.2	0.0	1.1	6	clean SAND to silty SAND	125	5.0	60	49	95	44	-	-	5	1.65	16	N/A	N/A
23.46	375.1	307.6	375.1	3.6	-0.8	1.0	6	clean SAND to silty SAND	125	5.0	75	62	95	45	-	-	5	1.56	16	N/A	N/A
23.62	428.9	350.3	428.8	4.2	-1.1	1.0	6	clean SAND to silty SAND	125	5.0	86	70	95	46	-	-	5	1.52	16	N/A	N/A
23.79	487.9	397.1	487.9	4.6	-1.2	0.9	6	clean SAND to silty SAND	125	5.0	98	79	95	47	-	-	5	1.48	16	N/A	N/A
23.95	427.4	346.7	427.4	4.8	-0.9	1.1	6	clean SAND to silty SAND	125	5.0	85	69	95	46	-	-	5	1.57	16	N/A	N/A
24.12	487.3	393.8	487.3	3.9	-1.2	0.8	6	clean SAND to silty SAND	125	5.0	97	79	95	46	-	-	5	1.42	16	N/A	N/A
24.28	514.9	414.7	514.9	4.4	-1.5	0.9	6	clean SAND to silty SAND	125	5.0	100	83	95	47	-	-	5	1.44	16	N/A	N/A
24.44	457.2	366.9	457.2	5.1	-0.6	1.1	6	clean SAND to silty SAND	125	5.0	91	73	95	46	-	-	5	1.56	16	N/A	N/A
24.61	412.8	329.6	412.8	5.4	-0.7	1.3	6	clean SAND to silty SAND	125	5.0	83	66	95	46	-	-	5	1.64	16	N/A	N/A
24.77	398.3	318.4	398.3	5.2	-0.5	1.3	6	clean SAND to silty SAND	125	5.0	80	63	95	45	-	-	5	1.65	16	N/A	N/A
24.94	379.9	302.1	379.9	4.7	-0.4	1.2	6	clean SAND to silty SAND	125	5.0	76	60	95	45	-	-	5	1.65	16	N/A	N/A
25.10	488.5	386.7	488.5	3.6	-1.0	0.7	6	clean SAND to silty SAND	125	5.0	98	77	95	46	-	-	5	1.40	16	N/A	N/A
25.26	467.9	369.1	467.9	3.4	-0.7	0.7	6	clean SAND to silty SAND	125	5.0	94	74	95	46	-	-	5	1.41	16	N/A	N/A
25.43	561.1	441.1	561.1	4.8	-2.4	0.9	6	clean SAND to silty SAND	125	5.0	100	88	95	47	-	-	5	1.42	16	N/A	N/A
25.59	519.7	407.2	519.6	4.5	-2.4	0.9	6	clean SAND to silty SAND	125	5.0	100	81	95	46	-	-	5	1.45	16	N/A	N/A
25.76	565.9	442.0	565.9	5.6	-2.6	1.0	6	clean SAND to silty SAND	125	5.0	100	88	95	47	-	-	5	1.47	16	N/A	N/A
25.92	531.1	413.4	531.0	5.3	-2.7	1.0	6	clean SAND to silty SAND	125	5.0	100	83	95	46	-	-	5	1.49	16	N/A	N/A
26.08	486.8	377.6	486.7	4.4	-2.7	0.9	6	clean SAND to silty SAND	125	5.0	97	76	95	46	-	-	5	1.48	16	N/A	N/A
26.25	494.8	382.6	494.7	4.1	-3.0	0.8	6	clean SAND to silty SAND	125	5.0	99	77	95	46	-	-	5	1.44	16	N/A	N/A
26.41	486.1	374.7	486.0	4.2	-3.2	0.9	6	clean SAND to silty SAND	125	5.0	97	75	95	46	-	-	5	1.47	16	N/A	N/A
26.58	505.4	388.3	505.3	3.8	-3.2	0.7	6	clean SAND to silty SAND	125	5.0	100	78	95	46	-	-	5	1.40	16	N/A	N/A
26.74	594.6	455.3	594.5	4.7	-3.9	0.8	6	clean SAND to silty SAND	125	5.0	100	91	95	47	-	-	5	1.38	16	N/A	N/A
26.90	635.2	484.9	635.1	7.6	-4.4	1.2	6	clean SAND to silty SAND	125	5.0	100	97	95	47	-	-	5	1.52	16	N/A	N/A

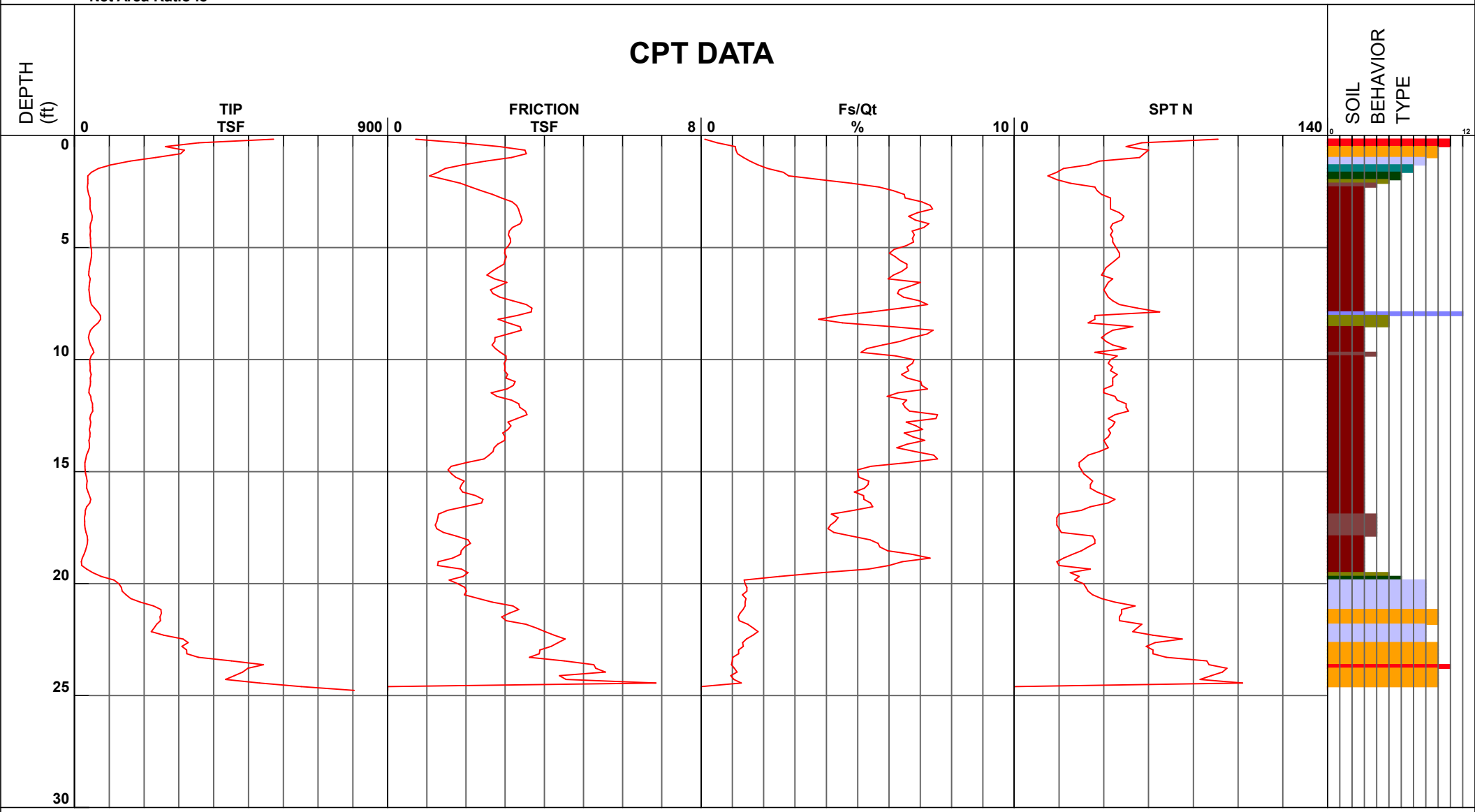
* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Converse Consultants

Project	Shenandoah ES Modernization Project	Operator	RC JM	Filename	SDF(727).cpt
Job Number	17-31-113-01	Cone Number	DDG1281	GPS	
Hole Number	CPT-03	Date and Time	4/14/2017 5:51:16 PM	Maximum Depth	24.77 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Shenandoah ES Modernization Project

Project ID: Converse Consultants
Data File: SDF(727).cpt
CPT Date: 4/14/2017 5:51:16 PM
GW During Test: 30 ft

Sounding ID: CPT-03
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	qt * PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
0.33	357.6	573.5	357.6	1.8	-2.8	0.5	7	grvly SAND to dense SAND	130	6.0	60	96	95	48	-	-	5	1.17	16	N/A	N/A
0.49	261.5	419.3	261.4	2.9	-2.2	1.1	6	clean SAND to silty SAND	125	5.0	52	84	95	48	-	-	5	1.52	16	N/A	N/A
0.66	315.8	506.5	315.8	3.5	-2.6	1.1	6	clean SAND to silty SAND	125	5.0	63	100	95	48	-	-	5	1.48	16	N/A	N/A
0.82	305.0	489.1	304.9	3.5	-2.8	1.2	6	clean SAND to silty SAND	125	5.0	61	98	95	48	-	-	5	1.50	16	N/A	N/A
0.98	233.0	373.7	233.0	3.2	-2.9	1.4	6	clean SAND to silty SAND	125	5.0	47	75	95	48	-	-	5	1.62	16	N/A	N/A
1.15	159.9	278.0	159.9	2.5	-3.3	1.6	6	clean SAND to silty SAND	125	5.0	32	51	95	48	-	-	7	1.77	16	N/A	N/A
1.31	104.8	205.7	104.8	1.9	-3.4	1.8	6	clean SAND to silty SAND	125	5.0	21	34	84	48	-	-	11	1.93	16	N/A	N/A
1.48	68.9	162.0	68.8	1.5	-3.6	2.1	5	silty SAND to sandy SILT	120	3.0	23	37	70	48	-	-	16	2.11	16	N/A	N/A
1.64	48.9	146.9	48.9	1.3	-3.5	2.6	5	silty SAND to sandy SILT	120	3.0	16	26	59	48	-	-	22	2.28	16	N/A	N/A
1.80	38.2	134.5	38.1	1.1	-3.2	2.8	5	silty SAND to sandy SILT	120	3.0	13	20	51	46	-	-	25	2.37	16	N/A	N/A
1.97	38.7	160.8	38.6	1.5	-3.5	3.8	4	clayy SILT to silty CLAY	115	2.0	19	31	-	-	2.7	9.9	29	2.46	15	N/A	N/A
2.13	38.6	183.8	38.5	1.9	-4.0	4.8	4	clayy SILT to silty CLAY	115	2.0	19	31	-	-	2.7	9.9	32	2.54	15	N/A	N/A
2.30	37.4	-	37.3	2.1	-4.2	5.7	4	clayy SILT to silty CLAY	115	2.0	19	30	-	-	2.6	9.9	36	2.60	15	N/A	N/A
2.46	38.8	-	38.7	2.4	-4.4	6.2	3	silty CLAY to CLAY	115	1.5	26	41	-	-	2.7	9.9	36	2.62	15	N/A	N/A
2.62	41.3	-	41.2	2.7	-5.2	6.5	9	very stiff fine SOIL	120	1.0	41	66	-	-	1.5	9.9	36	2.62	30	N/A	N/A
2.79	44.6	238.0	44.5	2.9	-5.5	6.5	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	35	2.60	30	N/A	N/A
2.95	45.1	-	45.0	3.2	-6.2	7.1	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	37	2.62	30	N/A	N/A
3.12	44.9	-	44.8	3.3	-6.3	7.3	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	37	2.64	30	N/A	N/A
3.28	45.2	-	45.1	3.3	-6.8	7.4	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	37	2.64	30	N/A	N/A
3.45	48.8	258.3	48.6	3.4	-6.9	6.9	9	very stiff fine SOIL	120	1.0	49	78	-	-	1.7	9.9	35	2.60	30	N/A	N/A
3.61	51.3	258.4	51.1	3.4	-8.1	6.7	9	very stiff fine SOIL	120	1.0	51	82	-	-	1.8	9.9	34	2.57	30	N/A	N/A
3.77	50.1	260.7	50.0	3.4	-8.2	6.9	9	very stiff fine SOIL	120	1.0	50	80	-	-	1.8	9.9	35	2.59	30	N/A	N/A
3.94	46.5	-	46.4	3.4	-7.6	7.3	9	very stiff fine SOIL	120	1.0	47	75	-	-	1.6	9.9	37	2.63	30	N/A	N/A
4.10	44.8	-	44.7	3.2	-7.5	7.2	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	37	2.63	30	N/A	N/A
4.27	46.1	-	45.9	3.1	-7.3	6.8	9	very stiff fine SOIL	120	1.0	46	74	-	-	1.6	9.9	36	2.60	30	N/A	N/A
4.43	45.3	-	45.1	3.1	-7.4	6.8	9	very stiff fine SOIL	120	1.0	45	73	-	-	1.6	9.9	36	2.61	30	N/A	N/A
4.59	46.3	-	46.2	3.1	-7.3	6.8	9	very stiff fine SOIL	120	1.0	46	74	-	-	1.6	9.9	35	2.60	30	N/A	N/A
4.76	46.3	-	46.2	3.1	-7.2	6.8	9	very stiff fine SOIL	120	1.0	46	74	-	-	1.6	9.9	36	2.61	30	N/A	N/A
4.92	47.1	245.9	47.0	3.1	-7.0	6.6	9	very stiff fine SOIL	120	1.0	47	76	-	-	1.7	9.9	35	2.59	30	N/A	N/A
5.09	48.6	240.6	48.4	3.0	-6.8	6.2	9	very stiff fine SOIL	120	1.0	49	78	-	-	1.7	9.9	33	2.56	30	N/A	N/A
5.25	49.6	239.6	49.5	3.0	-6.8	6.1	9	very stiff fine SOIL	120	1.0	50	80	-	-	1.7	9.9	33	2.55	30	N/A	N/A
5.41	48.9	242.4	48.8	3.0	-6.7	6.2	9	very stiff fine SOIL	120	1.0	49	78	-	-	1.7	9.9	33	2.56	30	N/A	N/A
5.58	47.0	241.5	46.9	3.0	-6.7	6.4	9	very stiff fine SOIL	120	1.0	47	75	-	-	1.7	9.9	34	2.58	30	N/A	N/A
5.74	45.2	-	45.1	3.0	-6.5	6.6	9	very stiff fine SOIL	120	1.0	45	72	-	-	1.6	9.9	35	2.60	30	N/A	N/A
5.91	42.7	-	42.6	2.8	-6.5	6.6	9	very stiff fine SOIL	120	1.0	43	68	-	-	1.5	9.9	36	2.62	30	N/A	N/A
6.07	41.5	-	41.4	2.7	-6.2	6.5	9	very stiff fine SOIL	120	1.0	42	67	-	-	1.5	9.9	36	2.62	30	N/A	N/A
6.23	41.3	-	41.2	2.5	-6.1	6.2	9	very stiff fine SOIL	120	1.0	41	66	-	-	1.4	9.9	36	2.60	30	N/A	N/A
6.40	45.8	226.4	45.6	2.7	-6.1	6.0	9	very stiff fine SOIL	120	1.0	46	72	-	-	1.6	9.9	34	2.57	30	N/A	N/A
6.56	43.5	-	43.4	3.0	-6.1	7.1	9	very stiff fine SOIL	120	1.0	44	70	-	-	1.5	9.9	37	2.63	30	N/A	N/A
6.73	42.4	-	42.3	2.8	-5.8	6.7	9	very stiff fine SOIL	120	1.0	42	68	-	-	1.5	9.9	37	2.62	30	N/A	N/A
6.89	41.5	-	41.4	2.6	-5.8	6.4	9	very stiff fine SOIL	120	1.0	42	67	-	-	1.5	9.9	36	2.61	30	N/A	N/A
7.05	42.8	-	42.7	2.7	-5.8	6.3	9	very stiff fine SOIL	120	1.0	43	69	-	-	1.5	9.9	35	2.60	30	N/A	N/A
7.22	44.3	-	44.2	2.9	-5.8	6.5	9	very stiff fine SOIL	120	1.0	44	71	-	-	1.5	9.9	36	2.60	30	N/A	N/A
7.38	45.9	-	45.8	3.2	-5.8	7.0	9	very stiff fine SOIL	120	1.0	46	74	-	-	1.6	9.9	36	2.62	30	N/A	N/A
7.55	48.9	-	48.7	3.5	-6.3	7.3	9	very stiff fine SOIL	120	1.0	49	78	-	-	1.7	9.9	36	2.62	30	N/A	N/A
7.71	57.6	253.3	57.4	3.7	-6.2	6.4	9	very stiff fine SOIL	120	1.0	58	82	-	-	2.0	9.9	33	2.56	30	N/A	N/A
7.87	67.5	246.4	67.3	3.7	-6.7	5.5	9	very stiff fine SOIL	120	1.0	67	95	-	-	2.4	9.9	29	2.46	30	N/A	N/A
8.04	74.6	228.1	74.5	3.3	-5.7	4.5	9	very stiff fine SOIL	120	1.0	75	100	-	-	2.6	9.9	25	2.37	30	N/A	N/A
8.20	75.1	206.9	75.1	2.8	-0.9	3.8	5	silty SAND to sandy SILT	120	3.0	25	35	68	43	-	-	23	2.31	16	N/A	N/A
8.37	68.1	217.7	68.0	3.1	-0.7	4.6	9	very stiff fine SOIL	120	1.0	68	93	-	-	2.4	9.9	27	2.41	30	N/A	N/A
8.53	55.4	235.3	55.4	3.4	-0.5	6.2	9	very stiff fine SOIL	120	1.0	55	75	-	-	1.9	9.9	34	2.57	30	N/A	N/A
8.69	46.1	-	46.0	3.4	-1.2	7.5	9	very stiff fine SOIL	120	1.0	46	74	-	-	1.6	9.9	37	2.64	30	N/A	N/A
8.86	42.6	-	42.6	3.1	-1.4	7.3	9	very stiff fine SOIL	120	1.0	43	68	-	-	1.5	9.9	38	2.65	30	N/A	N/A
9.02	40.8	-	40.7	2.7	-1.3	6.8	9	very stiff fine SOIL	120	1.0	41	65	-	-	1.4	9.9	37	2.64	30	N/A	N/A
9.19	43.0	-	43.0	2.7	-1.3	6.4	9	very stiff fine SOIL	120	1.0	43	69	-	-	1.5	9.9	36	2.61	30	N/A	N/A
9.35	46.0	217.2	45.9	2.7	-1.9	5.9	9	very stiff fine SOIL	120	1.0	46	68	-	-	1.6	9.9	34	2.58	30	N/A	N/A
9.51	51.9	203.8	51.9	2.8	-2.3	5.4	4	clayy SILT to silty CLAY	115	2.0	26	33	-	-	3.6	9.9	33	2.55	15	N/A	N/A
9.68	56.2	206.3	56.2	2.9	-1.2	5.2	4	clayy SILT to silty CLAY	115	2.0	28	36	-	-	3.9	9.9	32	2.52	15	N/A	N/A
9.84	48.5	-	48.5	3.0	-0.2	6.3	9	very stiff fine SOIL	120	1.0	49	69	-	-	1.7	9.9	35	2.60	30	N/A	N/A
10.01	44.4	-	44.4	3.0	-0.7	6.9	9	very stiff fine SOIL	120	1.0	44	71	-	-	1.5	9.9	36	2.62	30	N/A	N/A
10.17	44.1	-	44.1	3.0	-0.7	6.8	9	very stiff fine SOIL	120	1.0	44	71	-	-	1.5	9.9	36	2.62	30	N/A	N/A
10.34	45.6	-	45.5	3.0	-0.8	6.7	9	very stiff fine SOIL	120	1.0	46	73	-	-	1.6	9.9	36	2.60	30	N/A	N/A
10.50	45.0	-	45.0	3.0	-0.8	6.7	9	very stiff fine SOIL	120	1.0	45	71	-	-	1.6	9.9	36	2.61	30	N/A	N/A
10.66	47.8	-	47.8	3.1	-0.7	6.5	9	very stiff fine SOIL	120	1.0	48	64	-	-	1.7	9.9	37	2.63	30	N/A	N/A
10.83	45.9	-	45.8	3.0	-1.5	6.7	9	very stiff fine SOIL	120	1.0	46	70	-	-	1.6	9.9	36	2.61	30	N/A	N/A
10.99	46.4	-	46.4	3.3	-1.0	7.1	9	very stiff fine SOIL	120	1.0	46	70	-	-	1.6	9.9	37	2.64	30	N/A	N/A
11.16	45.5	-	45.5	3.2	-1.9	7.2	9	very stiff fine SOIL	120	1.0	46	68	-	-	1.6	9.9	38	2.65	30	N/A	N/A
11.32	42.1	-	42.1	3.0	-1.8	7.3	9	very stiff fine SOIL	120	1.0	42	62	-	-	1.5	9.9	39	2.68	30	N/A	N/A
11.48	42.1	-	42.0	2.6	-1.7	6.4	3	silty CLAY to CLAY	115	1.5	28	41	-	-	2.9	9.9	37	2.64	15	N/A	N/A
11.65	47.0	-	47.0	2.8	-1.6	6.0	3	silty CLAY to CLAY	115	1.5	31	40	-	-	3.3	9.9	37	2.63	15	N/A	N/A
11.81	48.2	-	48.1	3.2	-2.2	6.7	9	very stiff fine SOIL	120	1.0	48	68	-	-	1.7	9.9	36	2.62	30	N/A	N/A
11.98	51.9	-	51.9	3.3	-1.7	6.5	9	very stiff fine SOIL	120	1.0	52	64	-	-	1.8	9.9	37	2.63	30	N/A	N/A
12.14	51.8	-	51.8	3.4	-1.5	6.6	9	very stiff fine SOIL	120	1.0	52	71	-	-	1.8	9.9	36	2.61	30	N/A	N/A
12.30	52.8	-	52.8	3.5	-2.0	6.8	9	very stiff fine SOIL	120	1.0	53	72	-	-	1.8	9.9	36	2.61	30	N/A	N/A
12.47	47.1	-	47.1	3.6	-1.9	7.7	9	very stiff fine SOIL	120	1.0	47	63	-	-	1.6	9.9	40	2.69	30	N/A	N/A
12.63	44.1	-	44.0	3.3	-1.7	7.6	3	silty CLAY to CLAY	115	1.5	29	39	-	-	3.1	9.9	41	2.71	15	N/A	N/A
12.80	46.9	-	46.9	3.1	-1.6	6.7	3	silty CLAY to CLAY	115	1.5	31	41	-	-	3.3	9.9	38	2.65	15	N/A	N/A
12.96	45.9	-	45.8	3.1	-1.9	7.0	3	silty CLAY to CLAY	115	1.5	31	39	-	-	3.2	9.9	39	2.68	15	N/A	N/A
13.12	43.4	-	43.4	3.1	-2.0	7.2	3	silty CLAY to CLAY	115	1.5	29	37	-	-	3.0	9.9	41	2.71	15	N/A	N/A
13.29	45.3	-	45.3	2.9	-2.3	6.6	3	silty CLAY to CLAY	115	1.5	30	38	-	-	3.1	9.9	39	2.67	15	N/A	N/A
13.45	44.3	-	44.2	3.0	-2.4	6.9	3	silty CLAY to CLAY	115	1.5	30	37	-	-	3.1	9.9	40	2.69	15	N/A	N/A
13.62	41.8	-	41.7	3.0	-2.3	7.3	3	silty CLAY to CLAY	115	1.5	28	34	-	-	2.9	9.9	42	2.73	15	N/A	N/A
13.78	42.7	-	42.6	2.8	-2.3	6.7	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.0	9.9	41	2.70	15	N/A	N/A
13.94	43.4	-	43.4	2.7	-2.4	6.4	3	silty CLAY to CLAY	115	1.5	29	35	-	-	3.0	9.9	40	2.68	15	N/A	N/A
14.11	39.3	-	39.3	2.7	-2.4	7.0	3	silty CLAY to CLAY	115	1.5	26	31	-	-	2.7	9.9	43	2.75	15	N/A	N/A
14.27	34.9	-	34.8	2.6	-2.3	7.6	3	silty CLAY to CLAY	115	1.5	23	27	-	-	2.4	9.9	47	2.81	15	N/A	N/A
14.44	32.6	-	32.6	2.5	-2.0	7.8	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.2	9.9	48	2.84	15	N/A	N/A
14.60	30.4	-	30.4	2.0	-1.8	6.8	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.1	9.9	48	2.83	15	N/A	N/A
14.76	29.9	-	29.9	1.6	-1.5	5.6	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.1	9.9	44	2.77	15	N/A	N/A
14.93	30.8	-	30.8	1.5	-1.5	5.1	3	silty CLAY to CLAY	115	1.5	21	23	-	-	2.1	9.9	43	2.74	15	N/A	N/A
15.09	32.5	-	32.4	1.6	-1.5	5.2	3	silty CLAY to CLAY	115	1.5	22	24	-	-	2.2	9.9	42	2.73	15	N/A	N/A
15.26	34.4	-	34.4	1.7	-1.5	5.2	3	silty CLAY to CLAY	115	1.5	23	25	-	-	2.4	9.9	41	2.71	15	N/A	N/A
15.42	36.5	-	36.4	2.0	-1.4	5.5	3	silty CLAY to CLAY	115	1.5	24	26	-	-	2.5	9.9	41	2.72	15	N/A	N/A

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Converse Consultants
Data File: SDF(727).cpt
CPT Date: 4/14/2017 5:51:16 PM
GW During Test: 30 ft

Sounding ID: CPT-03
Project No: 17-31-113-01
Cone/Rig: DDG1281

Depth ft	qc PS tsf	q1ncs PS -	qt * PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT * R-N1 60%	Rel Den %	Ftn * Ang deg	Und Shr tsf	OCR -	Fin * Ic %	Ic * SBT Indx	Nk -	Vol * Strn %	Cycl * SStn %
15.58	35.4	-	35.4	1.9	-1.4	5.5	3	silty CLAY to CLAY	115	1.5	24	25	-	-	2.4	9.9	42	2.73	15	N/A	N/A
15.75	35.4	-	35.3	1.8	-1.3	5.4	3	silty CLAY to CLAY	115	1.5	24	25	-	-	2.4	9.9	42	2.73	15	N/A	N/A
15.91	39.0	-	39.0	1.9	-1.3	5.0	3	silty CLAY to CLAY	115	1.5	26	27	-	-	2.7	9.9	39	2.68	15	N/A	N/A
16.08	43.3	-	43.2	2.2	-1.4	5.3	3	silty CLAY to CLAY	115	1.5	29	30	-	-	3.0	9.9	39	2.67	15	N/A	N/A
16.24	46.8	-	46.7	2.4	-1.4	5.3	3	silty CLAY to CLAY	115	1.5	31	32	-	-	3.2	9.9	38	2.65	15	N/A	N/A
16.40	44.4	-	44.3	2.4	-1.4	5.5	3	silty CLAY to CLAY	115	1.5	30	30	-	-	3.1	9.9	39	2.68	15	N/A	N/A
16.57	35.6	-	35.6	2.0	-1.2	5.6	3	silty CLAY to CLAY	115	1.5	24	24	-	-	2.4	9.9	43	2.75	15	N/A	N/A
16.73	31.5	-	31.4	1.5	-1.0	5.0	3	silty CLAY to CLAY	115	1.5	21	21	-	-	2.2	9.9	44	2.76	15	N/A	N/A
16.90	31.1	-	31.1	1.3	-0.9	4.3	3	silty CLAY to CLAY	115	1.5	21	21	-	-	2.1	9.9	42	2.72	15	N/A	N/A
17.06	29.3	-	29.3	1.3	-0.8	4.5	3	silty CLAY to CLAY	115	1.5	20	19	-	-	2.0	9.2	44	2.76	15	N/A	N/A
17.23	29.3	-	29.3	1.3	-0.8	4.4	3	silty CLAY to CLAY	115	1.5	20	19	-	-	2.0	9.1	44	2.76	15	N/A	N/A
17.39	29.5	-	29.4	1.2	-0.8	4.3	3	silty CLAY to CLAY	115	1.5	20	19	-	-	2.0	9.1	43	2.75	15	N/A	N/A
17.55	30.9	-	30.9	1.3	-0.8	4.2	4	clayy SILT to silty CLAY	115	2.0	15	15	-	-	2.1	9.5	42	2.73	15	N/A	N/A
17.72	33.6	-	33.6	1.4	-0.8	4.4	3	silty CLAY to CLAY	115	1.5	22	21	-	-	2.3	9.9	41	2.72	15	N/A	N/A
17.88	36.5	-	36.5	1.8	-0.8	4.9	3	silty CLAY to CLAY	115	1.5	24	23	-	-	2.5	9.9	42	2.73	15	N/A	N/A
18.05	38.0	-	38.0	2.1	-0.9	5.6	3	silty CLAY to CLAY	115	1.5	25	24	-	-	2.6	9.9	43	2.75	15	N/A	N/A
18.21	37.3	-	37.3	2.1	-1.0	5.8	3	silty CLAY to CLAY	115	1.5	25	23	-	-	2.6	9.9	45	2.78	15	N/A	N/A
18.37	34.4	-	34.4	2.0	-1.0	5.9	3	silty CLAY to CLAY	115	1.5	23	21	-	-	2.4	9.9	47	2.81	15	N/A	N/A
18.54	31.5	-	31.5	1.9	-0.8	6.2	3	silty CLAY to CLAY	115	1.5	21	19	-	-	2.1	9.1	49	2.86	15	N/A	N/A
18.70	27.7	-	27.6	1.9	-1.2	7.0	3	silty CLAY to CLAY	115	1.5	18	17	-	-	1.9	7.9	54	2.94	15	N/A	N/A
18.87	22.6	-	22.6	1.7	-1.4	7.7	3	silty CLAY to CLAY	115	1.5	15	13	-	-	1.5	6.4	61	3.04	15	N/A	N/A
19.03	20.1	-	20.1	1.3	-1.1	6.8	3	silty CLAY to CLAY	115	1.5	13	12	-	-	1.3	5.6	61	3.04	15	N/A	N/A
19.19	21.2	-	21.2	1.3	-0.4	6.3	3	silty CLAY to CLAY	115	1.5	14	12	-	-	1.4	5.8	59	3.01	15	N/A	N/A
19.36	35.3	-	35.3	1.9	-0.4	5.5	3	silty CLAY to CLAY	115	1.5	24	21	-	-	2.4	9.8	46	2.80	15	N/A	N/A
19.52	53.1	147.2	53.1	2.0	-1.1	3.9	4	clayy SILT to silty CLAY	115	2.0	27	24	-	-	3.7	9.9	33	2.56	15	N/A	N/A
19.69	77.0	136.2	76.9	1.9	-1.4	2.5	5	silty SAND to sandy SILT	120	3.0	26	23	55	38	-	-	23	2.31	16	N/A	N/A
19.85	113.9	133.0	113.9	1.6	-1.2	1.4	6	clean SAND to silty SAND	125	5.0	23	20	68	40	-	-	13	2.00	16	N/A	N/A
20.01	127.5	144.2	127.5	1.8	-0.9	1.4	6	clean SAND to silty SAND	125	5.0	26	23	71	41	-	-	12	1.97	16	N/A	N/A
20.18	134.6	151.1	134.6	2.0	-0.6	1.5	6	clean SAND to silty SAND	125	5.0	27	24	73	41	-	-	12	1.97	16	N/A	N/A
20.34	137.2	152.6	137.1	2.0	-0.5	1.5	6	clean SAND to silty SAND	125	5.0	27	24	73	41	-	-	12	1.97	16	N/A	N/A
20.51	148.2	156.7	148.2	2.0	-0.4	1.3	6	clean SAND to silty SAND	125	5.0	30	26	76	42	-	-	11	1.91	16	N/A	N/A
20.67	161.6	170.2	161.6	2.3	-0.5	1.5	6	clean SAND to silty SAND	125	5.0	32	28	79	42	-	-	11	1.91	16	N/A	N/A
20.83	189.6	190.8	189.6	2.7	-0.6	1.4	6	clean SAND to silty SAND	125	5.0	38	33	84	43	-	-	9	1.86	16	N/A	N/A
21.00	227.3	219.8	227.3	3.2	-1.0	1.4	6	clean SAND to silty SAND	125	5.0	45	40	90	44	-	-	8	1.81	16	N/A	N/A
21.16	248.8	233.5	248.8	3.3	-1.1	1.4	6	clean SAND to silty SAND	125	5.0	50	43	92	44	-	-	7	1.77	16	N/A	N/A
21.33	249.9	229.7	249.9	3.1	-1.1	1.2	6	clean SAND to silty SAND	125	5.0	50	43	92	44	-	-	7	1.74	16	N/A	N/A
21.49	246.1	223.8	246.1	2.9	-1.1	1.2	6	clean SAND to silty SAND	125	5.0	49	42	92	44	-	-	7	1.73	16	N/A	N/A
21.65	247.2	225.5	247.2	3.0	-1.2	1.2	6	clean SAND to silty SAND	125	5.0	49	42	92	44	-	-	7	1.74	16	N/A	N/A
21.82	236.1	226.0	236.1	3.5	-1.2	1.5	6	clean SAND to silty SAND	125	5.0	47	40	90	44	-	-	9	1.82	16	N/A	N/A
21.98	228.9	225.1	228.9	3.8	-1.2	1.7	6	clean SAND to silty SAND	125	5.0	46	39	89	43	-	-	10	1.86	16	N/A	N/A
22.15	220.7	223.6	220.7	4.0	-1.7	1.8	6	clean SAND to silty SAND	125	5.0	44	37	88	43	-	-	11	1.91	16	N/A	N/A
22.31	257.0	245.5	257.0	4.3	-1.9	1.7	6	clean SAND to silty SAND	125	5.0	51	43	93	44	-	-	9	1.84	16	N/A	N/A
22.47	312.1	278.9	312.1	4.5	-2.6	1.5	6	clean SAND to silty SAND	125	5.0	62	52	95	45	-	-	7	1.74	16	N/A	N/A
22.64	326.9	283.4	326.8	4.4	-2.6	1.3	6	clean SAND to silty SAND	125	5.0	65	55	95	45	-	-	6	1.70	16	N/A	N/A
22.80	308.7	270.5	308.7	4.2	-2.5	1.4	6	clean SAND to silty SAND	125	5.0	62	51	95	45	-	-	6	1.72	16	N/A	N/A
22.97	322.7	272.4	322.6	3.9	-2.6	1.2	6	clean SAND to silty SAND	125	5.0	65	54	95	45	-	-	6	1.67	16	N/A	N/A
23.13	323.3	271.6	323.2	3.9	-2.7	1.2	6	clean SAND to silty SAND	125	5.0	65	53	95	45	-	-	6	1.67	16	N/A	N/A
23.30	356.2	293.6	356.2	3.6	-2.9	1.0	6	clean SAND to silty SAND	125	5.0	71	59	95	45	-	-	5	1.59	16	N/A	N/A
23.46	451.4	370.7	451.3	4.5	-3.5	1.0	6	clean SAND to silty SAND	125	5.0	90	74	95	46	-	-	5	1.52	16	N/A	N/A
23.62	543.0	444.2	542.9	5.3	-3.9	1.0	6	clean SAND to silty SAND	125	5.0	100	89	95	47	-	-	5	1.46	16	N/A	N/A
23.79	498.2	406.1	498.1	5.3	-3.9	1.1	6	clean SAND to silty SAND	125	5.0	100	81	95	47	-	-	5	1.52	16	N/A	N/A
23.95	483.5	392.7	483.5	5.6	-4.0	1.2	6	clean SAND to silty SAND	125	5.0	97	79	95	46	-	-	5	1.55	16	N/A	N/A
24.12	459.9	372.2	459.9	4.4	-3.9	1.0	6	clean SAND to silty SAND	125	5.0	92	74	95	46	-	-	5	1.50	16	N/A	N/A
24.28	434.2	350.1	434.1	4.6	-3.8	1.1	6	clean SAND to silty SAND	125	5.0	87	70	95	46	-	-	5	1.55	16	N/A	N/A
24.44	532.2	427.7	532.1	6.9	-4.5	1.3	6	clean SAND to silty SAND	125	5.0	100	86	95	47	-	-	5	1.57	16	N/A	N/A

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Appendix B

Laboratory Testing Program

APPENDIX B: LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their relevant physical characteristics and engineering properties. The amount and selection of tests were based on the geotechnical requirements of the project. Test results are presented herein and on the Logs of Borings in Appendix A, *Field Exploration*. The following is a summary of the laboratory tests conducted for this project.

B1.1 Moisture Content and Dry Density

Results of moisture content and dry density tests, performed on relatively undisturbed ring samples were used to aid in the classification of the soils and to provide quantitative measure of the *in situ* dry density. Data obtained from this test provides qualitative information on strength and compressibility characteristics of site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

B1.2 Percent Finer Than Sieve No. 200

The percent finer than sieve No. 200 test were performed on three (3) selected soil samples to aid in the classification of the on-site soils and to estimate other engineering parameters. Testing was performed in general accordance with the ASTM Standard D1140 test method. The test results are presented in the following table and boring logs.

Table No. B-1, Summary of Percent Passing Sieve #200 Test Results

Boring No.	Depth (feet)	Soil Classification	Percent Passing Sieve No. 200
BH-1	10	Silty Clay (CL)	74
BH-1	20	Silty Clay (CL)	88
BH-1	40	Silty Sand (SM)	13
BH-2*	0-5	Silty Clay (CL)	52
BH-3*	0-5	Silty Sand (SM)	45

* Results from grain-size analysis

B1.3 Grain-Size Analysis

To assist in classification of soils, mechanical grain-size analyses were performed on one (1) selected sample. Testing was performed in general accordance with the ASTM Standard C136 test method. Grain-size curves are shown in Figure No. B-1, *Grain Size Distribution Results*.

B1.4 Maximum Dry Density Test

A laboratory maximum dry density-moisture content relationship test was performed on one (1) representative bulk sample. The test was conducted in accordance with ASTM

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Standard D1557 laboratory procedure. The test result is presented on Figure No. B-2, *Moisture-Density Relationship Results*.

B1.5 Direct Shear

Direct shear tests were performed on two (2) relatively undisturbed soil samples. The test was performed at soaked moisture conditions. For this test the sample, contained in brass sampler rings, was placed directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. The sample was then sheared at a constant strain rate of 0.004 inch/minute. Shear deformation was recorded until a maximum of about 0.25-inch shear displacement was achieved. Residual strength was selected from the shear-stress deformation data and plotted to determine the shear strength parameters. For test data, including sample density and moisture content, see Figures No. B-3a and 3b, *Direct Shear Test Results,* and in the following table:

Table No. B-2, Direct Shear Test Results

Boring No.	Depth (feet)	Soil Classification	Residual Strength Parameters	
			Friction Angle (degrees)	Cohesion (psf)
BH-1	5	Silty Clay (CL)	27	120
BH-2	10	Silty Clay (CL)	27	100

B1.6 Consolidation Test

A Consolidation test was performed on one (1) relatively undisturbed sample. Data obtained from this test was used to evaluate the settlement characteristics of the foundation soils under load. Preparation for this test involved trimming the sample and placing the one-inch high brass ring into the test apparatus, which contained porous stones, both top and bottom, to accommodate drainage during testing. Normal axial loads were applied to one end of the sample through the porous stones, and the resulting deflections were recorded at various time periods. The load was increased after the sample reached a reasonable state equilibrium. Normal loads were applied at a constant load-increment ratio, successive loads being generally twice the preceding load. The sample was tested at field and submerged conditions. The test results, including sample density and moisture content, are presented in Figures No. B-4, *Consolidation Test Results*.

B1.7 Expansion Index Test

One (1) representative bulk sample was selected for Expansion Index test to evaluate the expansion potential of material encountered at the site. The tests were conducted in accordance with ASTM D4829. Test results are presented in the following table:

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Table No. B-3, Expansion Index Test Result

Boring No.	Depth (feet)	Soil Description	Expansion Index	Expansion Potential
BH-1	0-5	Clay (CL)	10	Very Low
BH-2	5	Sandy Clay (CL)	5	Very Low

B1.8 Soil Corrosivity

Converse retained the Environmental Geotechnology Laboratory, Inc., located in Arcadia, California, to test one (1) bulk soil samples taken in the general area of the proposed structure. The tests included minimum resistivity, pH, soluble sulfates, and chloride content, with the results summarized on the following table:

Table No. B-4, Soil Corrosivity Test Results

Boring No.	Sample Depth (feet)	pH (Caltrans 643)	Soluble Chlorides (Caltrans 422) ppm	Soluble Sulfate (Caltrans 417) % by Weight	Saturated Resistivity (Caltrans 532) Ohm-cm
BH-1	0-5	7.12	165	0.023	2,300

B1.9 R-value

One (1) representative bulk soil sample was tested for resistance value (R-value) in accordance with State of California Standard Method 301. This test is designed to provide a relative measure of soil strength for use in pavement design. The test result is shown in the following table, *R-value Test Results*:

Table No. B-5, R-value Test Results

Boring No.	Depth (ft)	Soil Classification	Measured R-value
BH-4	0-5	Clay (CL)	13

B1.10 Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period.

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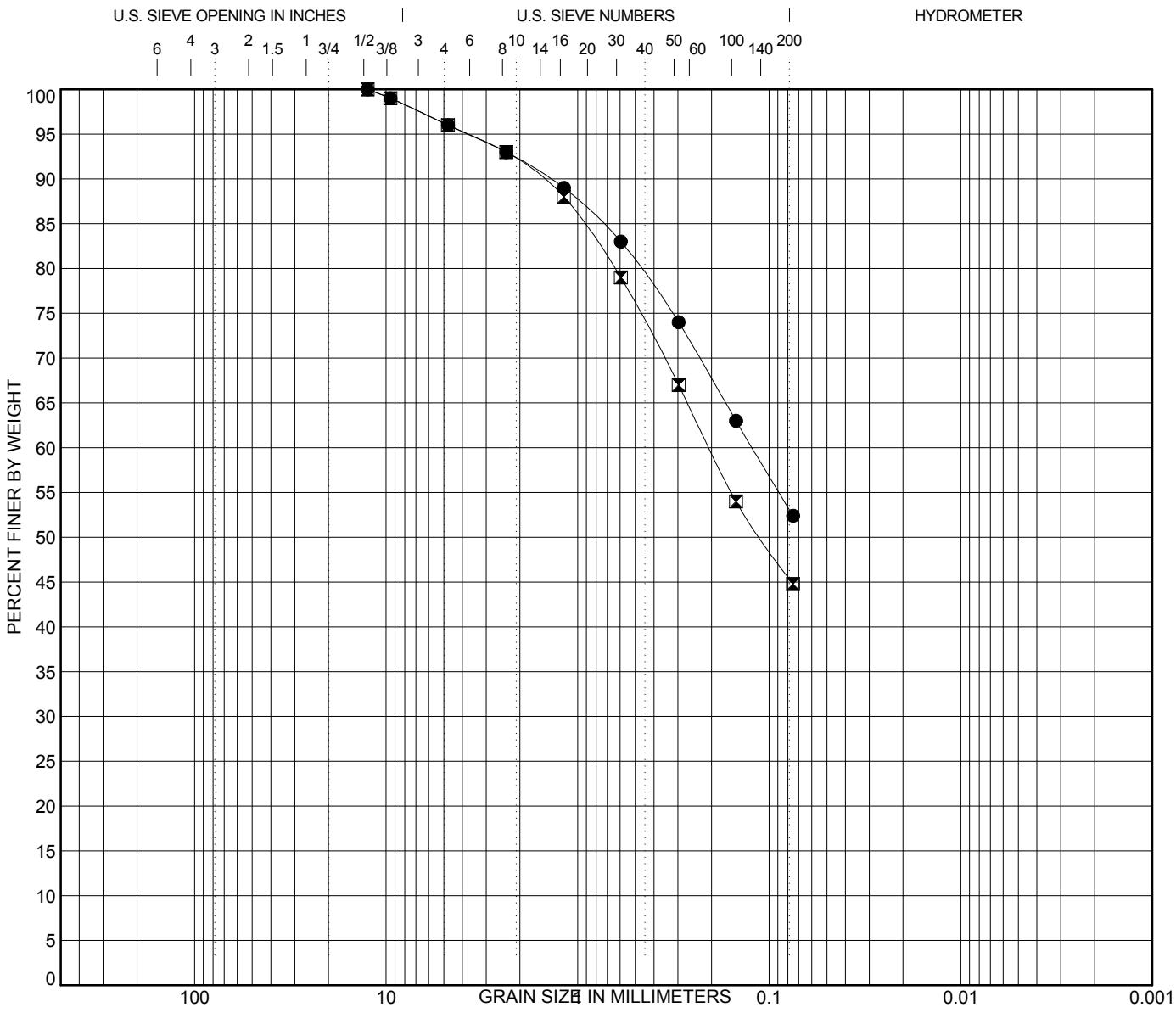


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	**BH-2**	**0-5**	**SILTY CLAY (CL)**					
⧓	**BH-3**	**0-5**	**SILTY SAND (SM)**					

	Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH-2**	**0-5**	**12.5**	**0.123**			**4.0**	**43.6**	**52.4**	
⧓	**BH-3**	**0-5**	**12.5**	**0.205**			**4.0**	**51.2**	**44.8**	

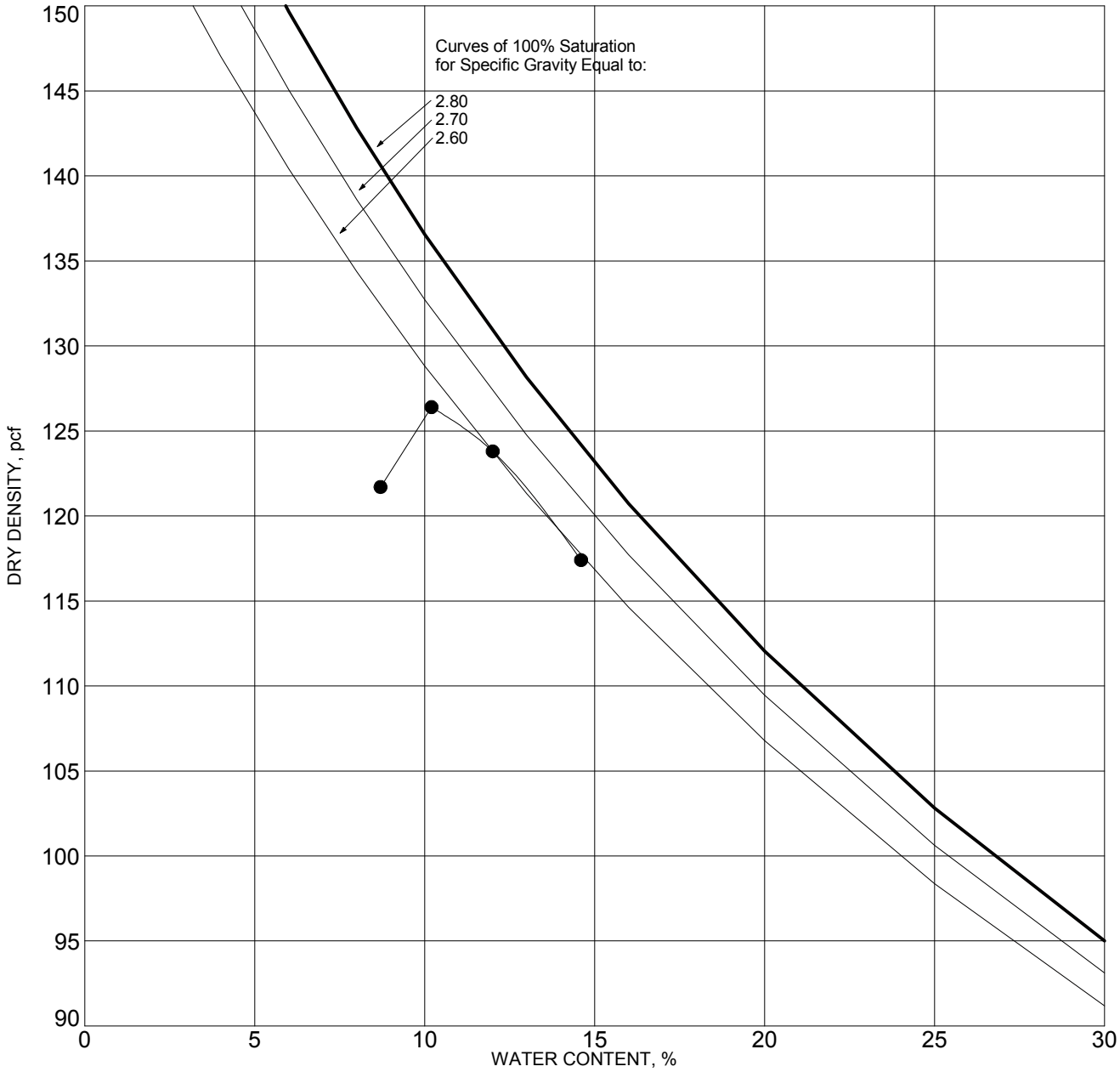
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No.
17-31-113-01

Figure No.
B-1



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	BH-1	0-5	CLAY (CL) with sand, dark brown	D1557 Method B	10.5	126.4

NOTE:

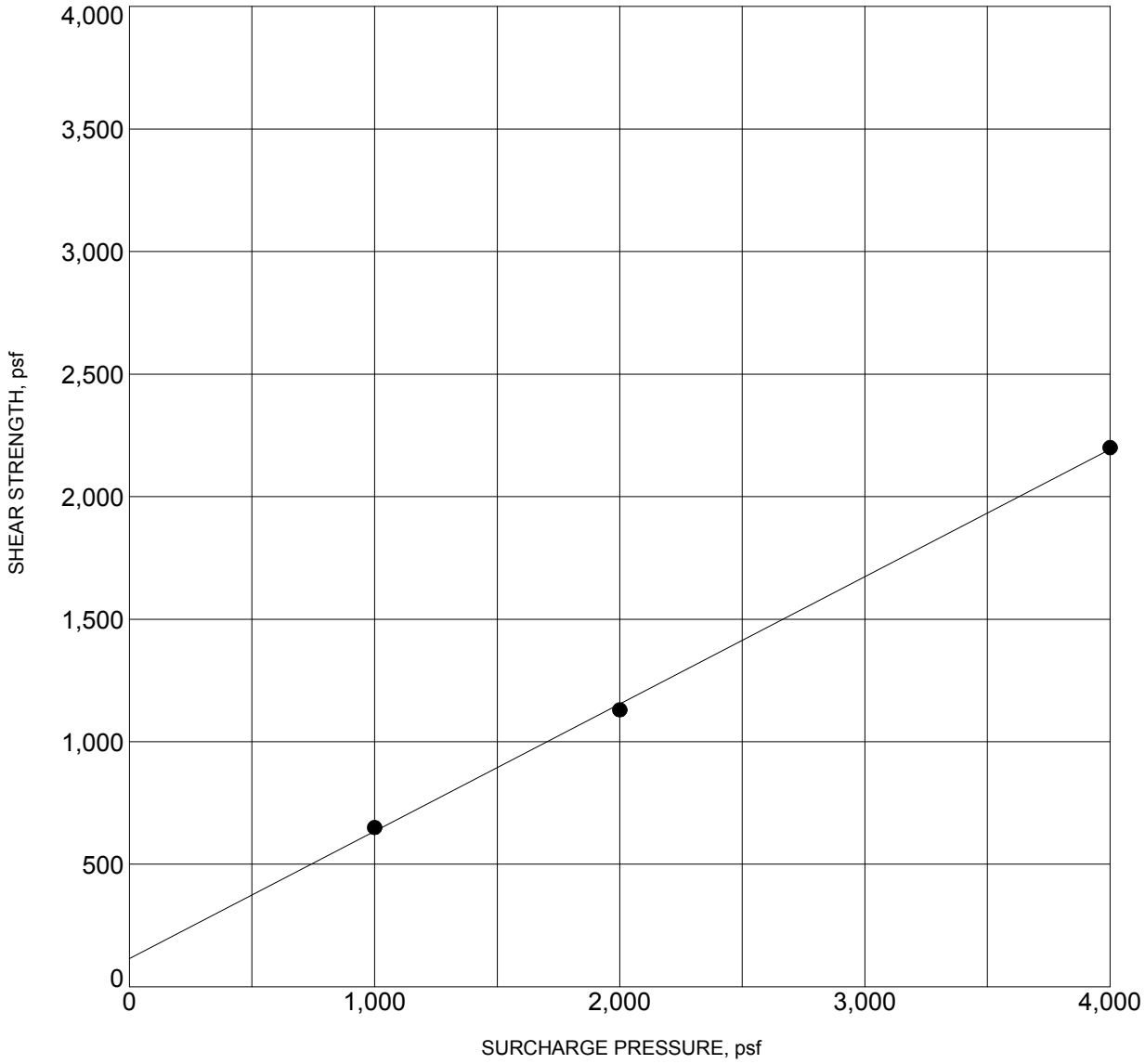
MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No.
17-31-113-01

Figure No.
B-2



BORING NO.	:	**BH-1**	DEPTH (ft)	:	**5**
DESCRIPTION	:	**SILTY CLAY (CL) with sand**			
COHESION (psf)	:	**120**	FRICTION ANGLE (degrees):		**27**
MOISTURE CONTENT (%)	:	**14.7**	DRY DENSITY (pcf)	:	**116.1**

NOTE: Ultimate Strength.

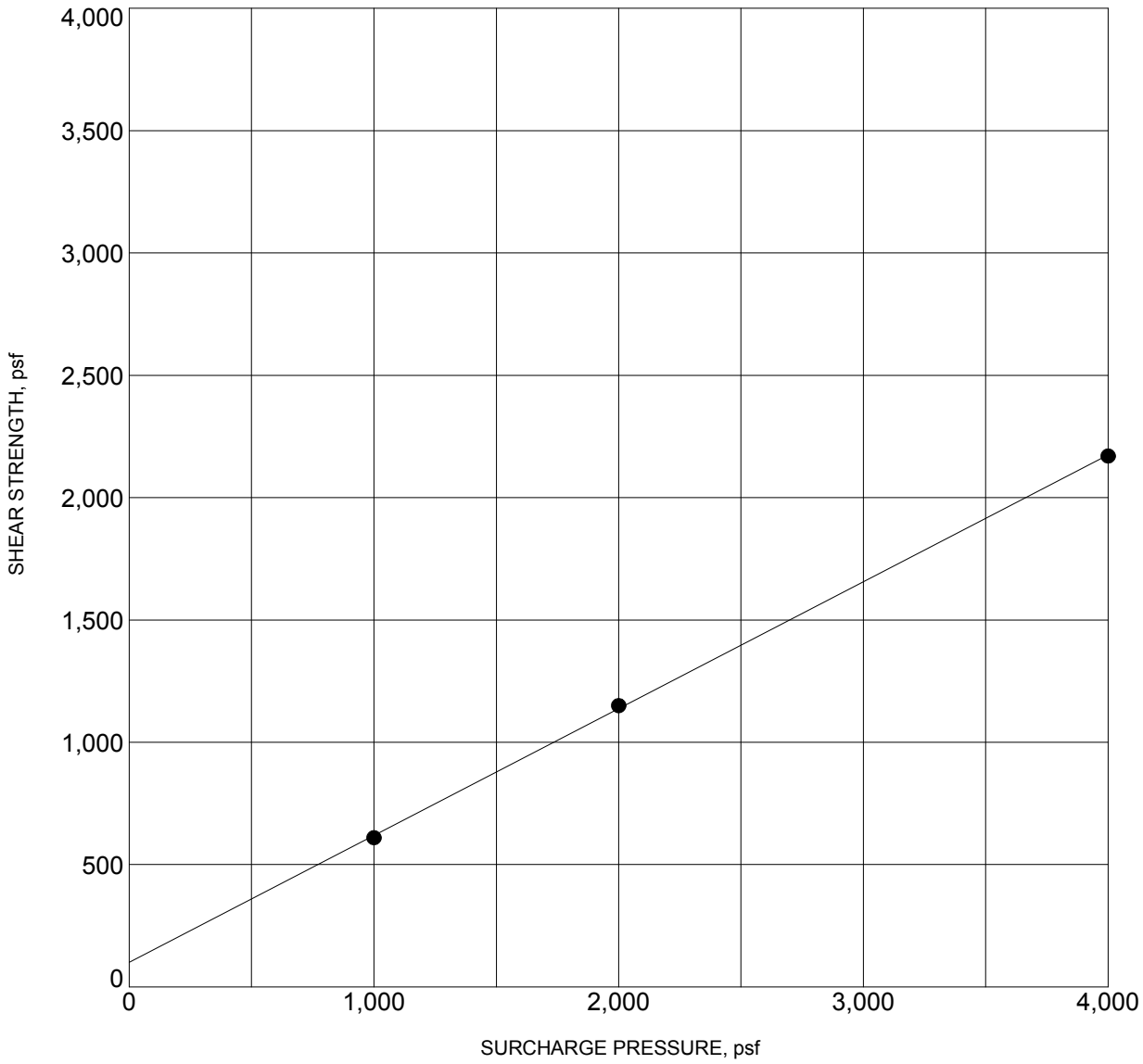
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **B-3a**



BORING NO.	:	**BH-2**	DEPTH (ft)	:	**10**
DESCRIPTION	:	**SILTY CLAY (CL)**			
COHESION (psf)	:	**100**	FRICTION ANGLE (degrees):		**27**
MOISTURE CONTENT (%)	:	**10.1**	DRY DENSITY (pcf)	:	**100.2**

NOTE: Ultimate Strength.

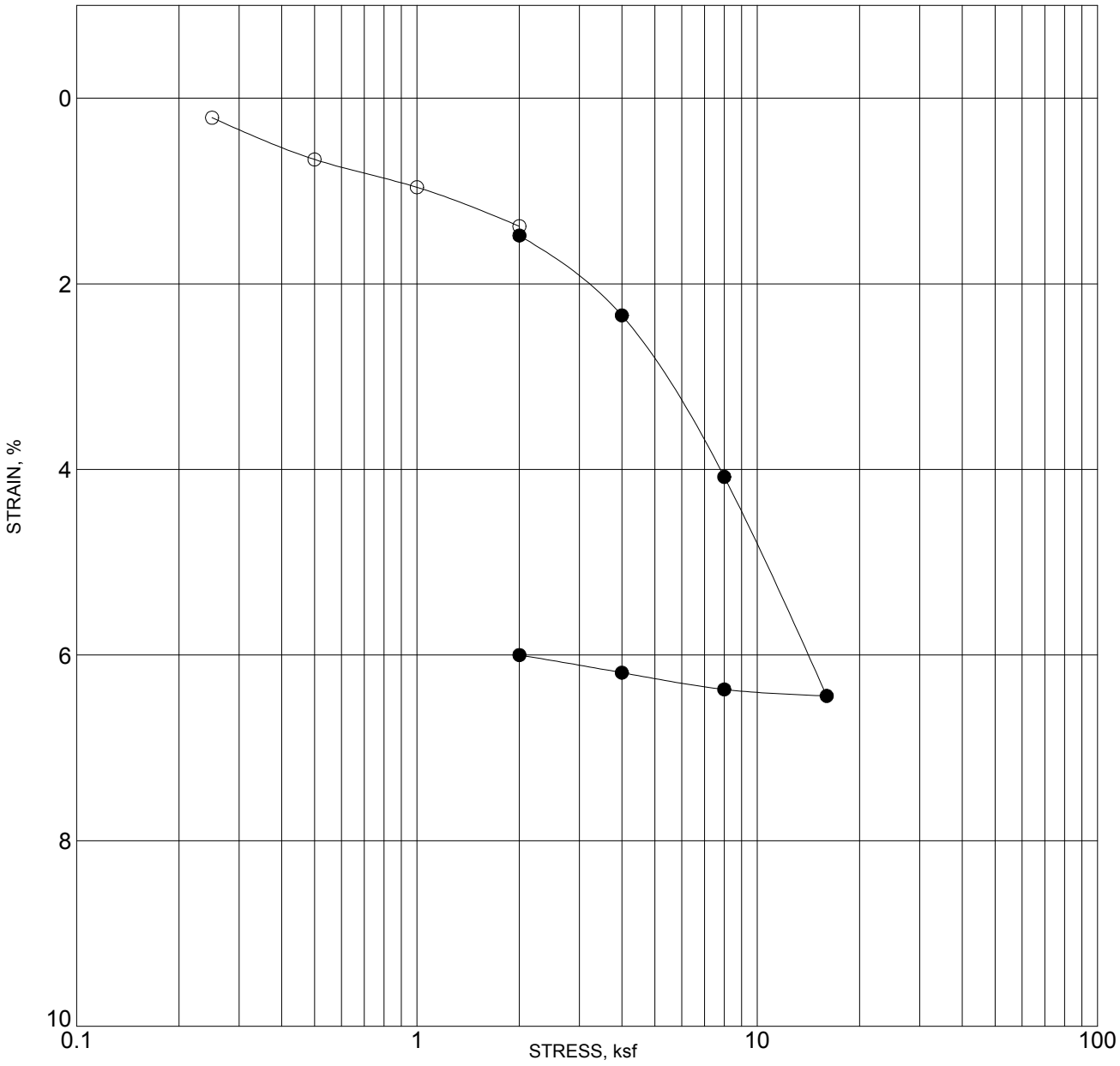
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **B-3b**



BORING NO. :	**BH-1**	DEPTH (ft) :	**5**
DESCRIPTION :	**SILTY CLAY (CL) with sand**		

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	**14.7**	**116.1**	**93**	**0.418**
FINAL				

NOTE: SOLID CIRCLES INDICATE READINGS AFTER ADDITION OF WATER

CONSOLIDATION TEST RESULTS

Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **B-4**

Appendix C

Liquefaction/Seismic Settlement Analysis

APPENDIX C: LIQUEFACTION/SEISMIC SETTLEMENT ANALYSIS

Liquefaction is defined as the phenomenon where a soil mass exhibits a substantial reduction in its shear strength. This strength reduction is due to the development of excess pore pressure in a soil mass caused by earthquake induced ground motions. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface.

Our liquefaction analyses are based on the *Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California* (9/2008), *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California* (3/1999), and *2016 California Building Code*.

The subsurface data obtained from exploratory borings and cone penetration tests (CPT) were used to evaluate the liquefaction/seismic settlement potential of the area. The Log of Borings is presented in Appendix A, *Field Exploration*. The liquefaction potential and seismic settlement analyses were performed utilizing data obtained from BH-1 and CPT-1 for the upper 51.5 feet and 28.7 feet of soil, respectively. CPT drilled for the project encountered refusal in the gravely materials. The analyses were performed using *LiquefyPro,* Version 5.8n, 2012, by Civil Tech Software. The following seismic parameters are used for liquefaction potential analyses.

Table No. C-1, Seismic Parameters Used in Liquefaction Analysis

Groundwater Depth* (feet)	Earthquake Magnitude** Mw	Peak Ground Acceleration*** (g)
15	7.20	0.770

* Based on Seismic Hazard Zone Report for the Beverly Hills 7.5-Minute Quadrangle
** Based on the 2008 NSHMP PSHA Interactive Deaggregation web site for a return period of 2475 years
******* Based on PGA_M per section 21.5 of ASCE 7-10.

The results of liquefaction analyses indicate the site soils are not susceptible to liquefaction and seismically-induced settlement to be negligible.

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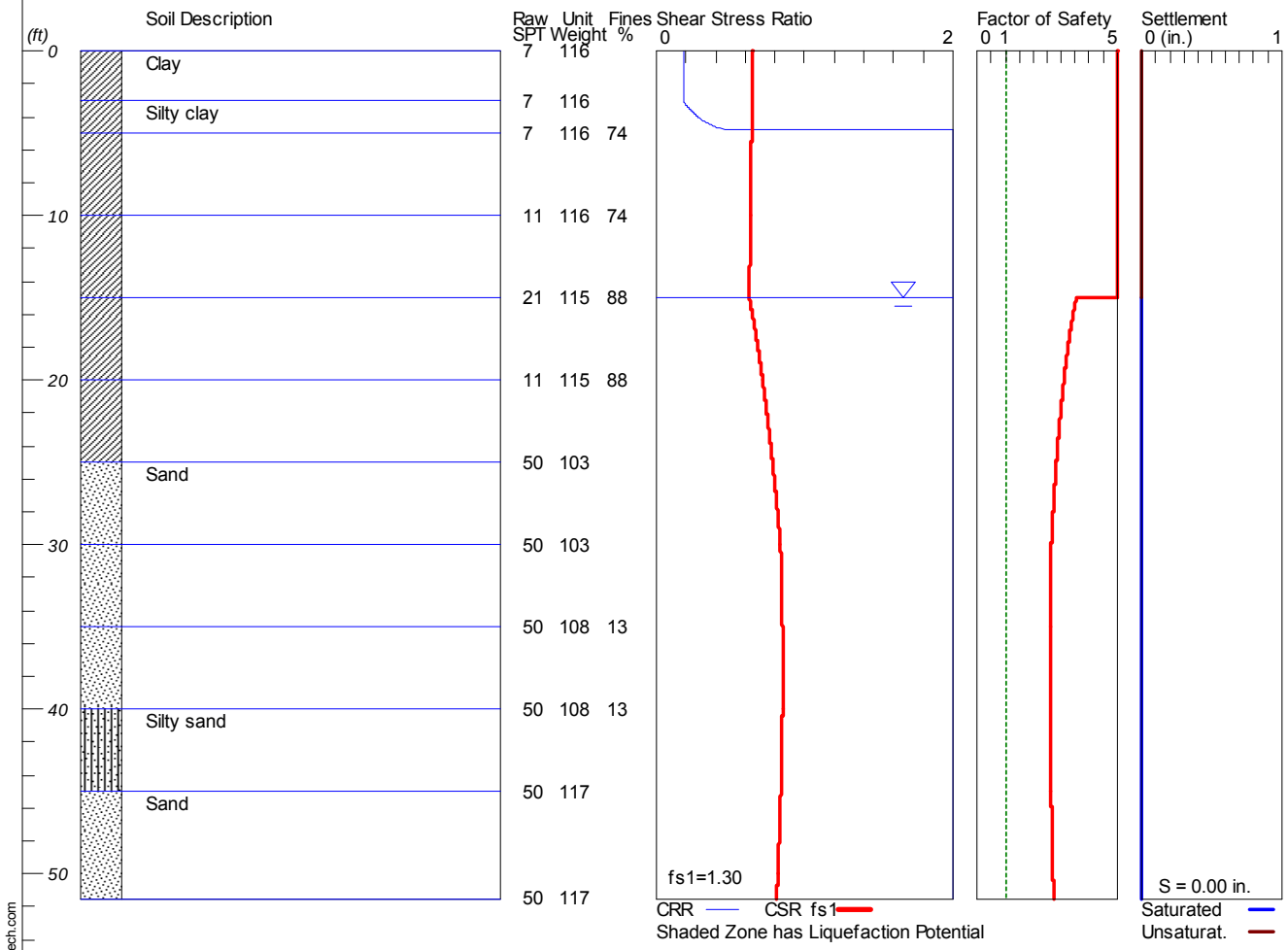
LIQUEFACTION ANALYSIS

Shenandoah ES

Hole No.=BH1 Water Depth=15 ft Surface Elev.=116

Magnitude=7.2
Acceleration=0.77g



LiquefyPro CivilTech Software USA www.civiltech.com

****

LIQUEFACTION ANALYSIS CALCULATION DETAILS

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www.civiltechsoftware.com

****

Font: Courier New, Regular, Size 8 is recommended for this report.

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Input File Name: C:\Users\wmun\OneDrive - Converse Consultants\Project Folder\18. 17-31-113-01 - LAUSD - Shenandoah ES\4. Analysis\Seismic settlement\Shenandoah ES.liq

Title: Shenandoah ES

Subtitle: 17-31-113-01

Input Data:

Surface Elev.=116

Hole No.=BH1

Depth of Hole=51.50 ft

Water Table during Earthquake= 15.00 ft

Water Table during In-Situ Testing= 0.00 ft

Max. Acceleration=0.77 g

Earthquake Magnitude=7.20

No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.

2. Settlement Analysis Method: Tokimatsu, M-correction

3. Fines Correction for Liquefaction: Modify Stark/Olson

4. Fine Correction for Settlement: During Liquefaction*

5. Settlement Calculation in: Liq. zone only

6. Hammer Energy Ratio, Ce = 1.25

7. Borehole Diameter, Cb= 1.15

8. Sampling Method, Cs= 1.2

9. User request factor of safety (apply to CSR) , User= 1.3

Plot one CSR curve (fs1=User)

10. Average two input data between two Depths: Yes*

* Recommended Options

In-Situ Test Data:

Depth	SPT	Gamma	Fines
ft		pcf	%
0.00	7.00	116.00	0.00
3.00	7.00	116.00	0.00
5.00	7.00	116.00	74.00
10.00	11.00	116.00	74.00
15.00	21.00	115.00	88.00
20.00	11.00	115.00	88.00
25.00	50.00	103.00	88.00
30.00	50.00	103.00	88.00
35.00	50.00	108.00	13.00
40.00	50.00	108.00	13.00
45.00	50.00	117.00	13.00
51.50	50.00	117.00	13.00

Output Results:

Calculation segment, dz=0.050 ft

User defined Print Interval, dp=1.00 ft

Peak Ground Acceleration (PGA), a_max = 0.77g

CSR Calculation:

Depth	gamma	sigma	gamma'	sigma'	rd	mZ	a(z)	CSR	x fs1	=CSRfs
ft	pcf	atm	pcf	atm		g	g			
0.00	116.00	0.000	116.00	0.000	1.00	0.000	0.770	0.50	1.30	0.65
1.00	116.00	0.055	116.00	0.055	1.00	0.000	0.770	0.50	1.30	0.65
2.00	116.00	0.110	116.00	0.110	1.00	0.000	0.770	0.50	1.30	0.65
3.00	116.00	0.164	116.00	0.164	0.99	0.000	0.770	0.50	1.30	0.65

4.00	116.00	0.219	116.00	0.219	0.99	0.000	0.770	0.50	1.30	0.64
5.00	116.00	0.274	116.00	0.274	0.99	0.000	0.770	0.49	1.30	0.64
6.00	116.00	0.329	116.00	0.329	0.99	0.000	0.770	0.49	1.30	0.64
7.00	116.00	0.384	116.00	0.384	0.98	0.000	0.770	0.49	1.30	0.64
8.00	116.00	0.439	116.00	0.439	0.98	0.000	0.770	0.49	1.30	0.64
9.00	116.00	0.493	116.00	0.493	0.98	0.000	0.770	0.49	1.30	0.64
10.00	116.00	0.548	116.00	0.548	0.98	0.000	0.770	0.49	1.30	0.64
11.00	115.80	0.603	115.80	0.603	0.97	0.000	0.770	0.49	1.30	0.63
12.00	115.60	0.658	115.60	0.658	0.97	0.000	0.770	0.49	1.30	0.63
13.00	115.40	0.712	115.40	0.712	0.97	0.000	0.770	0.49	1.30	0.63
14.00	115.20	0.767	115.20	0.767	0.97	0.000	0.770	0.48	1.30	0.63
15.00	115.00	0.821	52.60	0.821	0.97	0.000	0.770	0.48	1.30	0.63
16.00	115.00	0.875	52.60	0.846	0.96	0.000	0.770	0.50	1.30	0.65
17.00	115.00	0.930	52.60	0.871	0.96	0.000	0.770	0.51	1.30	0.67
18.00	115.00	0.984	52.60	0.896	0.96	0.000	0.770	0.53	1.30	0.68
19.00	115.00	1.038	52.60	0.920	0.96	0.000	0.770	0.54	1.30	0.70
20.00	115.00	1.093	52.60	0.945	0.95	0.000	0.770	0.55	1.30	0.72
21.00	112.60	1.147	50.20	0.970	0.95	0.000	0.770	0.56	1.30	0.73
22.00	110.20	1.199	47.80	0.993	0.95	0.000	0.770	0.57	1.30	0.75
23.00	107.80	1.251	45.40	1.015	0.95	0.000	0.770	0.58	1.30	0.76
24.00	105.40	1.301	43.00	1.036	0.94	0.000	0.770	0.59	1.30	0.77
25.00	103.00	1.350	40.60	1.056	0.94	0.000	0.770	0.60	1.30	0.78
26.00	103.00	1.399	40.60	1.075	0.94	0.000	0.770	0.61	1.30	0.80
27.00	103.00	1.448	40.60	1.094	0.94	0.000	0.770	0.62	1.30	0.81
28.00	103.00	1.496	40.60	1.113	0.93	0.000	0.770	0.63	1.30	0.82
29.00	103.00	1.545	40.60	1.132	0.93	0.000	0.770	0.64	1.30	0.83
30.00	103.00	1.594	40.60	1.152	0.93	0.000	0.770	0.64	1.30	0.84
31.00	104.00	1.643	41.60	1.171	0.92	0.000	0.770	0.65	1.30	0.84
32.00	105.00	1.692	42.60	1.191	0.91	0.000	0.770	0.65	1.30	0.84
33.00	106.00	1.742	43.60	1.211	0.91	0.000	0.770	0.65	1.30	0.85
34.00	107.00	1.792	44.60	1.232	0.90	0.000	0.770	0.65	1.30	0.85
35.00	108.00	1.843	45.60	1.253	0.89	0.000	0.770	0.65	1.30	0.85
36.00	108.00	1.894	45.60	1.275	0.88	0.000	0.770	0.66	1.30	0.85
37.00	108.00	1.945	45.60	1.296	0.87	0.000	0.770	0.66	1.30	0.85

38.00	108.00	1.996	45.60	1.318	0.86	0.000	0.770	0.66	1.30	0.85
39.00	108.00	2.047	45.60	1.339	0.86	0.000	0.770	0.66	1.30	0.85
40.00	108.00	2.098	45.60	1.361	0.85	0.000	0.770	0.65	1.30	0.85
41.00	109.80	2.150	47.40	1.383	0.84	0.000	0.770	0.65	1.30	0.85
42.00	111.60	2.202	49.20	1.406	0.83	0.000	0.770	0.65	1.30	0.85
43.00	113.40	2.255	51.00	1.429	0.82	0.000	0.770	0.65	1.30	0.85
44.00	115.20	2.309	52.80	1.454	0.82	0.000	0.770	0.65	1.30	0.84
45.00	117.00	2.364	54.60	1.479	0.81	0.000	0.770	0.65	1.30	0.84
46.00	117.00	2.419	54.60	1.505	0.80	0.000	0.770	0.64	1.30	0.84
47.00	117.00	2.474	54.60	1.531	0.79	0.000	0.770	0.64	1.30	0.83
48.00	117.00	2.530	54.60	1.557	0.78	0.000	0.770	0.64	1.30	0.83
49.00	117.00	2.585	54.60	1.583	0.78	0.000	0.770	0.63	1.30	0.82
50.00	117.00	2.640	54.60	1.608	0.77	0.000	0.770	0.63	1.30	0.82
51.00	117.00	2.696	54.60	1.634	0.76	0.000	0.770	0.63	1.30	0.81

CSR is based on water table at 15.00 during earthquake

CRR Calculation from SPT or BPT data:

Depth ft	SPT	Cebs	Cr	sigma' atm	Cn	(N1)60	Fines %	d(N1)60	(N1)60f	CRR7.5
0.00	7.00	1.73	0.75	0.000	1.70	15.40	0.00	0.00	15.40	0.17
1.00	7.00	1.73	0.75	0.025	1.70	15.40	0.00	0.00	15.40	0.17
2.00	7.00	1.73	0.75	0.051	1.70	15.40	0.00	0.00	15.40	0.17
3.00	7.00	1.73	0.75	0.076	1.70	15.40	0.00	0.00	15.40	0.17
4.00	7.00	1.73	0.75	0.101	1.70	15.40	37.00	7.68	23.08	0.25
5.00	7.00	1.73	0.75	0.127	1.70	15.40	74.00	16.56	31.96	2.00
6.00	7.80	1.73	0.75	0.152	1.70	17.16	74.00	16.56	33.72	2.00
7.00	8.60	1.73	0.75	0.177	1.70	18.91	74.00	16.56	35.47	2.00
8.00	9.40	1.73	0.75	0.203	1.70	20.67	74.00	16.56	37.23	2.00
9.00	10.20	1.73	0.85	0.228	1.70	25.42	74.00	16.56	41.98	2.00
10.00	11.00	1.73	0.85	0.253	1.70	27.42	74.00	16.56	43.98	2.00
11.00	13.00	1.73	0.85	0.279	1.70	32.40	76.80	17.23	49.64	2.00
12.00	15.00	1.73	0.85	0.304	1.70	37.39	79.60	17.90	55.29	2.00

13.00	17.00	1.73	0.85	0.329	1.70	42.37	82.40	18.58	60.95	2.00
14.00	19.00	1.73	0.85	0.354	1.68	46.83	85.20	19.25	66.08	2.00
15.00	21.00	1.73	0.95	0.379	1.62	55.92	88.00	19.92	75.84	2.00
16.00	19.00	1.73	0.95	0.404	1.57	49.01	88.00	19.92	68.93	2.00
17.00	17.00	1.73	0.95	0.428	1.53	42.56	88.00	19.92	62.48	2.00
18.00	15.00	1.73	0.95	0.453	1.49	36.51	88.00	19.92	56.43	2.00
19.00	13.00	1.73	0.95	0.478	1.45	30.81	88.00	19.92	50.73	2.00
20.00	11.00	1.73	0.95	0.503	1.41	25.42	88.00	19.92	45.34	2.00
21.00	18.80	1.73	0.95	0.527	1.38	42.42	88.00	19.92	62.34	2.00
22.00	26.60	1.73	0.95	0.551	1.35	58.75	88.00	19.92	78.67	2.00
23.00	34.40	1.73	0.95	0.573	1.32	74.50	88.00	19.92	94.42	2.00
24.00	42.20	1.73	0.95	0.594	1.30	89.76	88.00	19.92	109.68	2.00
25.00	50.00	1.73	0.95	0.613	1.28	104.63	88.00	19.92	124.55	2.00
26.00	50.00	1.73	0.95	0.632	1.26	103.03	88.00	19.92	122.95	2.00
27.00	50.00	1.73	0.95	0.652	1.24	101.50	88.00	19.92	121.42	2.00
28.00	50.00	1.73	1.00	0.671	1.22	105.30	88.00	19.92	125.22	2.00
29.00	50.00	1.73	1.00	0.690	1.20	103.83	88.00	19.92	123.75	2.00
30.00	50.00	1.73	1.00	0.709	1.19	102.42	88.00	19.92	122.34	2.00
31.00	50.00	1.73	1.00	0.729	1.17	101.04	73.00	16.32	117.36	2.00
32.00	50.00	1.73	1.00	0.749	1.16	99.69	58.00	12.72	112.41	2.00
33.00	50.00	1.73	1.00	0.769	1.14	98.36	43.00	9.12	107.48	2.00
34.00	50.00	1.73	1.00	0.790	1.13	97.06	28.00	5.52	102.58	2.00
35.00	50.00	1.73	1.00	0.811	1.11	95.77	13.00	1.92	97.70	2.00
36.00	50.00	1.73	1.00	0.833	1.10	94.53	13.00	1.92	96.45	2.00
37.00	50.00	1.73	1.00	0.854	1.08	93.33	13.00	1.92	95.25	2.00
38.00	50.00	1.73	1.00	0.876	1.07	92.17	13.00	1.92	94.09	2.00
39.00	50.00	1.73	1.00	0.897	1.06	91.06	13.00	1.92	92.98	2.00
40.00	50.00	1.73	1.00	0.919	1.04	89.98	13.00	1.92	91.90	2.00
41.00	50.00	1.73	1.00	0.941	1.03	88.93	13.00	1.92	90.85	2.00
42.00	50.00	1.73	1.00	0.963	1.02	87.87	13.00	1.92	89.79	2.00
43.00	50.00	1.73	1.00	0.987	1.01	86.81	13.00	1.92	88.73	2.00
44.00	50.00	1.73	1.00	1.012	0.99	85.75	13.00	1.92	87.67	2.00
45.00	50.00	1.73	1.00	1.037	0.98	84.70	13.00	1.92	86.62	2.00
46.00	50.00	1.73	1.00	1.063	0.97	83.66	13.00	1.92	85.58	2.00

47.00	50.00	1.73	1.00	1.089	0.96	82.67	13.00	1.92	84.59	2.00
48.00	50.00	1.73	1.00	1.114	0.95	81.70	13.00	1.92	83.62	2.00
49.00	50.00	1.73	1.00	1.140	0.94	80.77	13.00	1.92	82.69	2.00
50.00	50.00	1.73	1.00	1.166	0.93	79.87	13.00	1.92	81.79	2.00
51.00	50.00	1.73	1.00	1.192	0.92	79.01	13.00	1.92	80.93	2.00

CRR is based on water table at 0.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.20:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.00	0.00	0.17	1.00	0.17	1.11	0.18	0.65	5.00
1.00	0.02	0.17	1.00	0.17	1.11	0.18	0.65	5.00
2.00	0.03	0.17	1.00	0.17	1.11	0.18	0.65	5.00
3.00	0.05	0.17	1.00	0.17	1.11	0.18	0.65	5.00
4.00	0.07	0.25	1.00	0.25	1.11	0.28	0.64	5.00
5.00	0.08	2.00	1.00	2.00	1.11	2.22	0.64	5.00
6.00	0.10	2.00	1.00	2.00	1.11	2.22	0.64	5.00
7.00	0.12	2.00	1.00	2.00	1.11	2.22	0.64	5.00
8.00	0.13	2.00	1.00	2.00	1.11	2.22	0.64	5.00
9.00	0.15	2.00	1.00	2.00	1.11	2.22	0.64	5.00
10.00	0.16	2.00	1.00	2.00	1.11	2.22	0.64	5.00
11.00	0.18	2.00	1.00	2.00	1.11	2.22	0.63	5.00
12.00	0.20	2.00	1.00	2.00	1.11	2.22	0.63	5.00
13.00	0.21	2.00	1.00	2.00	1.11	2.22	0.63	5.00
14.00	0.23	2.00	1.00	2.00	1.11	2.22	0.63	5.00
15.00	0.25	2.00	1.00	2.00	1.11	2.22	0.63	3.53
16.00	0.26	2.00	1.00	2.00	1.11	2.22	0.65	3.42
17.00	0.28	2.00	1.00	2.00	1.11	2.22	0.67	3.33
18.00	0.29	2.00	1.00	2.00	1.11	2.22	0.68	3.24
19.00	0.31	2.00	1.00	2.00	1.11	2.22	0.70	3.16
20.00	0.33	2.00	1.00	2.00	1.11	2.22	0.72	3.10
21.00	0.34	2.00	1.00	2.00	1.11	2.22	0.73	3.03

22.00	0.36	2.00	1.00	2.00	1.11	2.22	0.75	2.98
23.00	0.37	2.00	1.00	2.00	1.11	2.22	0.76	2.92
24.00	0.39	2.00	1.00	2.00	1.11	2.22	0.77	2.88
25.00	0.40	2.00	1.00	2.00	1.11	2.22	0.78	2.83
26.00	0.41	2.00	1.00	2.00	1.11	2.22	0.80	2.79
27.00	0.42	2.00	1.00	2.00	1.11	2.22	0.81	2.75
28.00	0.44	2.00	1.00	2.00	1.11	2.22	0.82	2.71
29.00	0.45	2.00	1.00	2.00	1.11	2.22	0.83	2.68
30.00	0.46	2.00	1.00	2.00	1.11	2.22	0.84	2.65
31.00	0.47	2.00	1.00	2.00	1.11	2.22	0.84	2.64
32.00	0.49	2.00	1.00	2.00	1.11	2.22	0.84	2.63
33.00	0.50	2.00	1.00	2.00	1.11	2.22	0.85	2.62
34.00	0.51	2.00	1.00	2.00	1.11	2.22	0.85	2.61
35.00	0.53	2.00	1.00	2.00	1.11	2.22	0.85	2.61
36.00	0.54	2.00	1.00	2.00	1.11	2.22	0.85	2.61
37.00	0.56	2.00	1.00	2.00	1.11	2.22	0.85	2.60
38.00	0.57	2.00	1.00	2.00	1.11	2.22	0.85	2.60
39.00	0.58	2.00	1.00	2.00	1.11	2.22	0.85	2.61
40.00	0.60	2.00	1.00	2.00	1.11	2.22	0.85	2.61
41.00	0.61	2.00	1.00	2.00	1.11	2.22	0.85	2.61
42.00	0.63	2.00	1.00	2.00	1.11	2.22	0.85	2.62
43.00	0.64	2.00	1.00	2.00	1.11	2.22	0.85	2.62
44.00	0.66	2.00	1.00	2.00	1.11	2.22	0.84	2.63
45.00	0.67	2.00	1.00	2.00	1.11	2.22	0.84	2.64
46.00	0.69	2.00	1.00	2.00	1.11	2.22	0.84	2.65
47.00	0.71	2.00	1.00	2.00	1.11	2.22	0.83	2.67
48.00	0.72	2.00	1.00	2.00	1.11	2.22	0.83	2.68
49.00	0.74	2.00	1.00	2.00	1.11	2.22	0.82	2.69
50.00	0.76	2.00	1.00	2.00	1.11	2.22	0.82	2.71
51.00	0.77	2.00	1.00	2.00	1.11	2.22	0.81	2.72

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* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)

^ No-liquefiable Soils or above Water Table.

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:

Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.00	-	-	-	15.40	0.00	0.00	15.40
1.00	-	-	-	15.40	0.00	0.00	15.40
2.00	-	-	-	15.40	0.00	0.00	15.40
3.00	-	-	-	15.40	0.00	0.00	15.40
4.00	-	-	-	23.08	37.00	0.00	23.08
5.00	-	-	-	31.96	74.00	0.00	31.96
6.00	-	-	-	33.72	74.00	0.00	33.72
7.00	-	-	-	35.47	74.00	0.00	35.47
8.00	-	-	-	37.23	74.00	0.00	37.23
9.00	-	-	-	41.98	74.00	0.00	41.98
10.00	-	-	-	43.98	74.00	0.00	43.98
11.00	-	-	-	49.64	76.80	0.00	49.64
12.00	-	-	-	55.29	79.60	0.00	55.29
13.00	-	-	-	60.95	82.40	0.00	60.95
14.00	-	-	-	66.08	85.20	0.00	66.08
15.00	-	-	-	75.84	88.00	0.00	75.84
16.00	-	-	-	68.93	88.00	0.00	68.93
17.00	-	-	-	62.48	88.00	0.00	62.48
18.00	-	-	-	56.43	88.00	0.00	56.43
19.00	-	-	-	50.73	88.00	0.00	50.73
20.00	-	-	-	45.34	88.00	0.00	45.34
21.00	-	-	-	62.34	88.00	0.00	62.34
22.00	-	-	-	78.67	88.00	0.00	78.67
23.00	-	-	-	94.42	88.00	0.00	94.42
24.00	-	-	-	100.00	88.00	0.00	100.00
25.00	-	-	-	100.00	88.00	0.00	100.00
26.00	-	-	-	100.00	88.00	0.00	100.00

27.00	-	-	-	100.00	88.00	0.00	100.00
28.00	-	-	-	100.00	88.00	0.00	100.00
29.00	-	-	-	100.00	88.00	0.00	100.00
30.00	-	-	-	100.00	88.00	0.00	100.00
31.00	-	-	-	100.00	73.00	0.00	100.00
32.00	-	-	-	100.00	58.00	0.00	100.00
33.00	-	-	-	100.00	43.00	0.00	100.00
34.00	-	-	-	100.00	28.00	0.00	100.00
35.00	-	-	-	97.70	13.00	0.00	97.70
36.00	-	-	-	96.45	13.00	0.00	96.45
37.00	-	-	-	95.25	13.00	0.00	95.25
38.00	-	-	-	94.09	13.00	0.00	94.09
39.00	-	-	-	92.98	13.00	0.00	92.98
40.00	-	-	-	91.90	13.00	0.00	91.90
41.00	-	-	-	90.85	13.00	0.00	90.85
42.00	-	-	-	89.79	13.00	0.00	89.79
43.00	-	-	-	88.73	13.00	0.00	88.73
44.00	-	-	-	87.67	13.00	0.00	87.67
45.00	-	-	-	86.62	13.00	0.00	86.62
46.00	-	-	-	85.58	13.00	0.00	85.58
47.00	-	-	-	84.59	13.00	0.00	84.59
48.00	-	-	-	83.62	13.00	0.00	83.62
49.00	-	-	-	82.69	13.00	0.00	82.69
50.00	-	-	-	81.79	13.00	0.00	81.79
51.00	-	-	-	80.93	13.00	0.00	80.93

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.

Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:

Settlement Analysis Method: Tokimatsu, M-correction

Depth	CSRsf	/ MSF*	=CSRm	F.S.	Fines	(N1)60s	Dr	ec	dsz	dsp	S
ft					%		%	%	in.	in.	in.

51.45	0.81	1.11	0.73	2.73	13.00	80.54	100.00	0.000	0.0E0	0.000	0.000
51.00	0.81	1.11	0.73	2.72	13.00	80.93	100.00	0.000	0.0E0	0.000	0.000
50.00	0.82	1.11	0.74	2.71	13.00	81.79	100.00	0.000	0.0E0	0.000	0.000
49.00	0.82	1.11	0.74	2.69	13.00	82.69	100.00	0.000	0.0E0	0.000	0.000
48.00	0.83	1.11	0.75	2.68	13.00	83.62	100.00	0.000	0.0E0	0.000	0.000
47.00	0.83	1.11	0.75	2.67	13.00	84.59	100.00	0.000	0.0E0	0.000	0.000
46.00	0.84	1.11	0.75	2.65	13.00	85.58	100.00	0.000	0.0E0	0.000	0.000
45.00	0.84	1.11	0.76	2.64	13.00	86.62	100.00	0.000	0.0E0	0.000	0.000
44.00	0.84	1.11	0.76	2.63	13.00	87.67	100.00	0.000	0.0E0	0.000	0.000
43.00	0.85	1.11	0.76	2.62	13.00	88.73	100.00	0.000	0.0E0	0.000	0.000
42.00	0.85	1.11	0.76	2.62	13.00	89.79	100.00	0.000	0.0E0	0.000	0.000
41.00	0.85	1.11	0.77	2.61	13.00	90.85	100.00	0.000	0.0E0	0.000	0.000
40.00	0.85	1.11	0.77	2.61	13.00	91.90	100.00	0.000	0.0E0	0.000	0.000
39.00	0.85	1.11	0.77	2.61	13.00	92.98	100.00	0.000	0.0E0	0.000	0.000
38.00	0.85	1.11	0.77	2.60	13.00	94.09	100.00	0.000	0.0E0	0.000	0.000
37.00	0.85	1.11	0.77	2.60	13.00	95.25	100.00	0.000	0.0E0	0.000	0.000
36.00	0.85	1.11	0.77	2.61	13.00	96.45	100.00	0.000	0.0E0	0.000	0.000
35.00	0.85	1.11	0.77	2.61	13.00	97.70	100.00	0.000	0.0E0	0.000	0.000
34.00	0.85	1.11	0.77	2.61	28.00	100.00	100.00	0.000	0.0E0	0.000	0.000
33.00	0.85	1.11	0.76	2.62	43.00	100.00	100.00	0.000	0.0E0	0.000	0.000
32.00	0.84	1.11	0.76	2.63	58.00	100.00	100.00	0.000	0.0E0	0.000	0.000
31.00	0.84	1.11	0.76	2.64	73.00	100.00	100.00	0.000	0.0E0	0.000	0.000
30.00	0.84	1.11	0.75	2.65	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
29.00	0.83	1.11	0.75	2.68	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
28.00	0.82	1.11	0.74	2.71	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
27.00	0.81	1.11	0.73	2.75	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
26.00	0.80	1.11	0.72	2.79	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
25.00	0.78	1.11	0.71	2.83	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
24.00	0.77	1.11	0.70	2.88	88.00	100.00	100.00	0.000	0.0E0	0.000	0.000
23.00	0.76	1.11	0.68	2.92	88.00	94.42	100.00	0.000	0.0E0	0.000	0.000
22.00	0.75	1.11	0.67	2.98	88.00	78.67	100.00	0.000	0.0E0	0.000	0.000
21.00	0.73	1.11	0.66	3.03	88.00	62.34	100.00	0.000	0.0E0	0.000	0.000
20.00	0.72	1.11	0.65	3.10	88.00	45.34	100.00	0.000	0.0E0	0.000	0.000

19.00	0.70	1.11	0.63	3.16	88.00	50.73	100.00	0.000	0.0E0	0.000	0.000
18.00	0.68	1.11	0.62	3.24	88.00	56.43	100.00	0.000	0.0E0	0.000	0.000
17.00	0.67	1.11	0.60	3.33	88.00	62.48	100.00	0.000	0.0E0	0.000	0.000
16.00	0.65	1.11	0.58	3.42	88.00	68.93	100.00	0.000	0.0E0	0.000	0.000
15.00	0.63	1.11	0.57	3.53	88.00	75.84	100.00	0.000	0.0E0	0.000	0.000

No Settlement of Saturated Sands

Settlement of Saturated Sands=0.000 in.

qc1 and (N1)60 is after fines correction in liquefaction analysis

dsz is per each segment, dz=0.05 ft

dsp is per each print interval, dp=1.00 ft

S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Settlement of Unsaturated Sands=0 due to Option 5, Calculation settlement only in liquefied zone.

Depth	sigma'	sigC'	(N1)60s	CSRsf	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec	ec	dsz	dsp	S
ft	atm	atm			atm			%		%	in.	in.	in.
14.95	0.38	0.25	75.63	0.63	935.51	2.5E-4	0.0808	0.0256	0.98	0.0251	0.00E0	0.000	0.000
14.00	0.35	0.23	66.08	0.63	865.91	2.6E-4	0.0882	0.0279	0.98	0.0274	0.00E0	0.000	0.000
13.00	0.33	0.21	60.95	0.63	812.60	2.6E-4	0.0844	0.0267	0.98	0.0262	0.00E0	0.000	0.000
12.00	0.30	0.20	55.29	0.63	756.05	2.5E-4	0.0821	0.0260	0.98	0.0255	0.00E0	0.000	0.000
11.00	0.28	0.18	49.64	0.63	698.47	2.5E-4	0.0798	0.0252	0.98	0.0248	0.00E0	0.000	0.000
10.00	0.25	0.16	43.98	0.64	639.71	2.5E-4	0.0777	0.0246	0.98	0.0242	0.00E0	0.000	0.000
9.00	0.23	0.15	41.98	0.64	597.58	2.4E-4	1.0000	0.3162	0.98	0.3109	0.00E0	0.000	0.000
8.00	0.20	0.13	37.23	0.64	541.32	2.4E-4	1.0000	0.3808	0.98	0.3743	0.00E0	0.000	0.000
7.00	0.18	0.12	35.47	0.64	498.26	2.3E-4	0.4398	0.1864	0.98	0.1833	0.00E0	0.000	0.000
6.00	0.15	0.10	33.72	0.64	453.56	2.1E-4	0.1724	0.0807	0.98	0.0794	0.00E0	0.000	0.000
5.00	0.13	0.08	31.96	0.64	406.72	2.0E-4	0.0809	0.0416	0.98	0.0409	0.00E0	0.000	0.000
4.00	0.10	0.07	23.08	0.64	326.41	2.0E-4	0.0803	0.0657	0.98	0.0646	0.00E0	0.000	0.000
3.00	0.08	0.05	15.40	0.65	247.04	2.0E-4	0.0761	0.1053	0.98	0.1035	0.00E0	0.000	0.000
2.00	0.05	0.03	15.40	0.65	201.71	1.6E-4	0.0341	0.0471	0.98	0.0463	0.00E0	0.000	0.000
1.00	0.03	0.02	15.40	0.65	142.65	1.2E-4	0.0245	0.0339	0.98	0.0334	0.00E0	0.000	0.000

0.00	0.00	0.00	15.40	0.65	2.83	2.3E-6	0.0010	0.0014	0.98	0.0014	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.

dsz is per each segment, dz=0.05 ft

dsp is per each print interval, dp=1.00 ft

S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.000 in.

Differential Settlement=0.000 to 0.000 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)

1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ
CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig

CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=MSF, based on Item 2 of Page C.
MSF	Magnitude scaling factor from M=7.5 to user input M
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp
Gmax	Shear Modulus at low strain

g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

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1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for

Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

2. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING AND SEISMIC SITE RESPONSE EVALUATION, Paper No. SPL-2, PROCEEDINGS: Fourth

International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

3. RECENT ADVANCES IN SOIL LIQUEFACTION ENGINEERING: A UNIFIED AND CONSISTENT FRAMEWORK, Earthquake Engineering Research Center,

Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

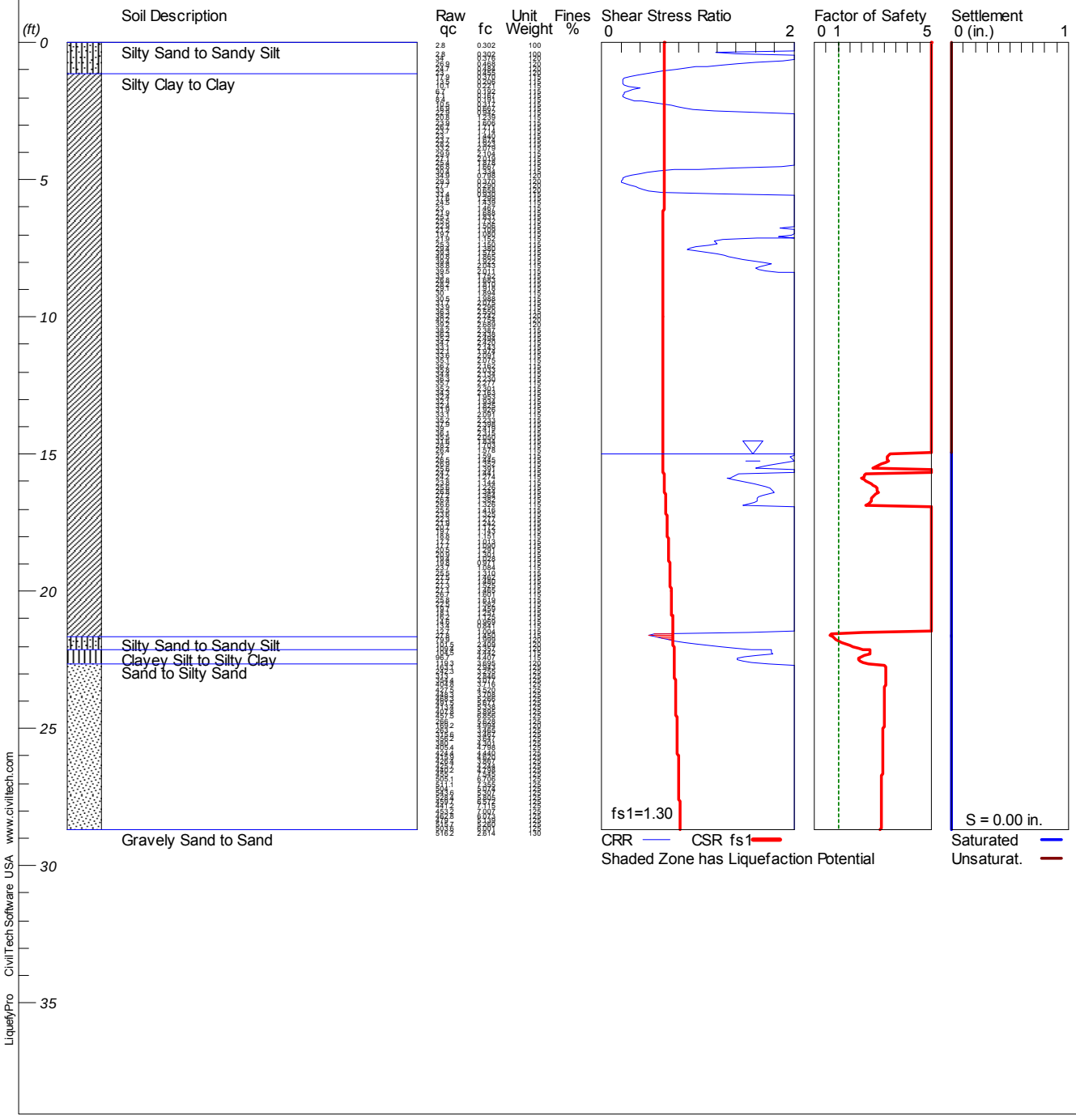
Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

LIQUEFACTION ANALYSIS

Shenandoah ES

Hole No.=CPT1 Water Depth=15 ft Surface Elev.=116

Magnitude=7.2
Acceleration=0.77g



LiquefyPro CivilTech Software USA www.civiltech.com

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LIQUEFACTION ANALYSIS CALCULATION DETAILS

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Font: Courier New, Regular, Size 8 is recommended for this report.

Licensed to , 5/18/2017 10:09:03 AM

Input File Name: C:\Users\wmun\OneDrive - Converse Consultants\Project Folder\18. 17-31-113-01 - LAUSD - Shenandoah ES\4. Analysis\Seismic settlement\Shenandoah ES CPT.liq

Title: Shenandoah ES

Subtitle: 17-31-113-01

Input Data:

Surface Elev.=116

Hole No.=CPT1

Depth of Hole=28.71 ft

Water Table during Earthquake= 15.00 ft

Water Table during In-Situ Testing= 0.00 ft

Max. Acceleration=0.77 g

Earthquake Magnitude=7.20

No-Liquefiable Soils: Based on Analysis

1. CPT Calulation Method: Modify Robertson*

2. Settlement Analysis Method: Tokimatsu, M-correction

3. Fines Correction for Liquefaction: Stark/Olson et al.*

4. Fine Correction for Settlement: During Liquefaction*

5. Settlement Calculation in: Liq. zone only

9. User request factor of safety (apply to CSR) , User= 1.3

Plot one CSR curve (fs1=User)

10. Average two input data between two Depths: Yes*

* Recommended Options

In-Situ Test Data:

Depth	qc	fs	Rf	Gamma	Fines	D50

ft	atm	atm	%	pcf	%	mm
0.00	2.80	0.30	10.79	100.00	0.00	0.50
1.15	17.90	0.37	2.07	115.00	0.00	0.50
2.13	10.50	0.32	3.02	115.00	0.00	0.50
3.12	23.70	1.71	7.23	115.00	0.00	0.50
4.10	27.10	2.02	7.45	115.00	0.00	0.50
5.09	27.70	0.29	1.05	120.00	0.00	0.50
6.07	21.90	1.69	7.71	115.00	0.00	0.50
7.05	21.90	1.15	5.26	115.00	0.00	0.50
8.04	38.80	2.04	5.27	115.00	0.00	0.50
9.02	30.00	1.89	6.31	115.00	0.00	0.50
10.01	40.20	2.75	6.85	120.00	0.00	0.50
10.99	33.10	2.14	6.47	115.00	0.00	0.50
11.98	34.40	2.13	6.20	115.00	0.00	0.50
12.96	32.10	1.93	6.02	115.00	0.00	0.50
13.94	39.00	2.42	6.20	115.00	0.00	0.50
14.93	27.00	1.59	5.89	115.00	0.00	0.50
15.91	23.80	1.14	4.81	115.00	0.00	0.50
16.90	25.50	1.42	5.55	115.00	0.00	0.50
17.88	18.80	1.15	6.12	115.00	0.00	0.50
18.87	19.80	0.97	4.90	115.00	0.00	0.50
19.85	27.10	1.47	5.41	115.00	0.00	0.50
20.83	16.20	1.13	6.94	115.00	0.00	0.50
21.82	101.50	2.41	2.37	120.00	0.00	0.50
22.80	242.30	3.26	1.34	125.00	0.00	0.50
23.79	468.30	5.27	1.12	125.00	0.00	0.50
24.77	169.20	4.99	2.95	120.00	0.00	0.50
25.76	424.40	4.44	1.05	125.00	0.00	0.50
26.74	505.10	6.71	1.33	125.00	0.00	0.50
27.72	441.20	7.11	1.61	125.00	0.00	0.50
28.71	516.20	2.61	0.51	130.00	0.00	0.50

Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Calculation segment, dz=0.050 ft

User defined Print Interval, dp=1.00 ft

Peak Ground Acceleration (PGA), a_max = 0.77g

CSR Calculation:

Depth	gamma	sigma	gamma'	sigma'	rd	mZ	a(z)	CSR	x fs1	=CSRfs
ft	pcf	atm	pcf	atm		g	g			
0.00	100.00	0.000	100.00	0.000	1.00	0.000	0.770	0.50	1.30	0.65
1.00	119.41	0.053	119.41	0.053	1.00	0.000	0.770	0.50	1.30	0.65
2.00	115.00	0.107	115.00	0.107	1.00	0.000	0.770	0.50	1.30	0.65
3.00	115.00	0.162	115.00	0.162	0.99	0.000	0.770	0.50	1.30	0.65
4.00	115.00	0.216	115.00	0.216	0.99	0.000	0.770	0.50	1.30	0.64
5.00	120.00	0.271	120.00	0.271	0.99	0.000	0.770	0.49	1.30	0.64
6.00	115.00	0.326	115.00	0.326	0.99	0.000	0.770	0.49	1.30	0.64
7.00	115.00	0.380	115.00	0.380	0.98	0.000	0.770	0.49	1.30	0.64
8.00	115.00	0.435	115.00	0.435	0.98	0.000	0.770	0.49	1.30	0.64
9.00	115.00	0.489	115.00	0.489	0.98	0.000	0.770	0.49	1.30	0.64
10.00	120.00	0.544	120.00	0.544	0.98	0.000	0.770	0.49	1.30	0.64
11.00	115.00	0.599	115.00	0.599	0.97	0.000	0.770	0.49	1.30	0.63
12.00	115.00	0.653	115.00	0.653	0.97	0.000	0.770	0.49	1.30	0.63
13.00	115.00	0.708	115.00	0.708	0.97	0.000	0.770	0.49	1.30	0.63
14.00	115.00	0.762	115.00	0.762	0.97	0.000	0.770	0.48	1.30	0.63
15.00	115.00	0.816	52.60	0.816	0.97	0.000	0.770	0.48	1.30	0.63
16.00	115.00	0.871	52.60	0.841	0.96	0.000	0.770	0.50	1.30	0.65
17.00	115.00	0.925	52.60	0.866	0.96	0.000	0.770	0.51	1.30	0.67
18.00	115.00	0.979	52.60	0.891	0.96	0.000	0.770	0.53	1.30	0.69
19.00	115.00	1.034	52.60	0.916	0.96	0.000	0.770	0.54	1.30	0.70
20.00	115.00	1.088	52.60	0.941	0.95	0.000	0.770	0.55	1.30	0.72
21.00	115.00	1.142	52.60	0.965	0.95	0.000	0.770	0.56	1.30	0.73

22.00	119.41	1.198	57.01	0.991	0.95	0.000	0.770	0.57	1.30	0.75
23.00	125.00	1.255	62.60	1.019	0.95	0.000	0.770	0.58	1.30	0.76
24.00	125.00	1.314	62.60	1.048	0.94	0.000	0.770	0.59	1.30	0.77
25.00	125.00	1.372	62.60	1.078	0.94	0.000	0.770	0.60	1.30	0.78
26.00	125.00	1.431	62.60	1.107	0.94	0.000	0.770	0.61	1.30	0.79
27.00	125.00	1.491	62.60	1.137	0.94	0.000	0.770	0.61	1.30	0.80
28.00	125.00	1.550	62.60	1.166	0.93	0.000	0.770	0.62	1.30	0.81

CSR is based on water table at 15.00 during earthquake

CRR Calculation from CPT data, using Modify Robertson's Method:

(Fines content is determined by qc and fric.)

Depth	qc	fric.	n	Q	Rf	Ic	Cq	Fines	Kc	qc1n	qc1f	CRR7.5
ft	atm	atm						%		atm	atm	
0.00			1.00	2.80E5	10.79	3.00						
0.00	2.80	0.30	1.00	2.80E5	10.79	3.00	1.00	NoLiq	1.00	2.80	2.80	2.08
1.00			1.00	9.66E2	1.99	1.59						
1.00			0.50	1.47E2	1.99	2.00						
1.00	22.40	0.44	0.50	1.47E2	1.99	2.00	6.58	12.97	0.21	147.31	187.10	0.69
2.00			1.00	1.80E2	2.47	2.02						
2.00			0.50	4.01E1	2.47	2.47						
2.00	8.79	0.21	0.50	4.01E1	2.47	2.47	4.56	29.25	0.65	40.06	113.61	0.22
3.00			1.00	3.51E2	6.67	2.24						
3.00			0.50	9.55E1	6.67	2.53						
3.00	25.82	1.71	0.50	9.55E1	6.67	2.53	3.70	32.02	0.72	95.53	343.03	2.08
4.00			1.00	2.92E2	7.24	2.31						
4.00			0.50	9.22E1	7.24	2.57						
4.00	28.85	2.07	0.50	9.22E1	7.24	2.57	3.20	33.78	0.77	92.21	397.97	2.08
5.00			1.00	2.29E2	1.18	1.70						
5.00			0.50	8.12E1	1.18	2.02						
5.00	28.55	0.33	0.50	8.12E1	1.18	2.02	2.85	13.62	0.23	81.24	105.54	0.19
6.00			1.00	1.48E2	7.22	2.45						
6.00			0.50	5.80E1	7.22	2.69						

6.00			0.70	8.48E1	7.22	2.59						
6.00	22.38	1.59	0.70	8.48E1	7.22	2.59	3.79	34.76	0.79	84.79	412.61	2.08
7.00			1.00	1.20E2	5.42	2.40						
7.00			0.50	5.09E1	5.42	2.63						
7.00			0.70	7.21E1	5.42	2.53						
7.00	21.21	1.13	0.70	7.21E1	5.42	2.53	3.40	32.19	0.73	72.14	263.14	1.77
8.00			1.00	1.94E2	5.23	2.27						
8.00			0.50	8.73E1	5.23	2.47						
8.00	38.94	2.01	0.50	8.73E1	5.23	2.47	2.24	29.32	0.65	87.32	248.93	1.51
9.00			1.00	1.31E2	6.45	2.44						
9.00			0.50	6.32E1	6.45	2.63						
9.00			0.70	8.52E1	6.45	2.55						
9.00	29.89	1.90	0.70	8.52E1	6.45	2.55	2.85	32.85	0.74	85.25	332.41	2.08
10.00			1.00	1.59E2	6.96	2.42						
10.00			0.50	8.03E1	6.96	2.59						
10.00	40.08	2.75	0.50	8.03E1	6.96	2.59	2.00	34.84	0.80	80.31	395.30	2.08
11.00			1.00	1.18E2	6.57	2.47						
11.00			0.50	6.31E1	6.57	2.63						
11.00			0.70	8.16E1	6.57	2.57						
11.00	33.04	2.13	0.70	8.16E1	6.57	2.57	2.47	33.69	0.77	81.65	348.80	2.08
12.00			1.00	1.13E2	6.31	2.47						
12.00			0.50	6.33E1	6.31	2.62						
12.00			0.70	8.06E1	6.31	2.55						
12.00	34.64	2.15	0.70	8.06E1	6.31	2.55	2.33	33.20	0.75	80.56	326.02	2.08
13.00			1.00	9.70E1	6.06	2.49						
13.00			0.50	5.65E1	6.06	2.64						
13.00			0.70	7.08E1	6.06	2.58						
13.00	32.18	1.91	0.70	7.08E1	6.06	2.58	2.20	34.19	0.78	70.77	320.65	2.08
14.00			1.00	1.07E2	6.40	2.49						
14.00			0.50	6.43E1	6.40	2.62						
14.00			0.70	7.93E1	6.40	2.56						
14.00	37.98	2.38	0.70	7.93E1	6.40	2.56	2.09	33.61	0.76	79.32	336.09	2.08
15.00			1.00	6.94E1	5.88	2.57						
15.00			0.50	4.38E1	5.88	2.70						

15.00			0.70	5.33E1	5.88	2.65						
15.00	26.78	1.53	0.70	5.33E1	5.88	2.65	1.99	37.60	0.80	53.31	266.54	1.84
16.00			1.00	5.99E1	4.97	2.56						
16.00			0.50	3.92E1	4.97	2.68						
16.00			0.70	4.71E1	4.97	2.63						
16.00	24.75	1.19	0.70	4.71E1	4.97	2.63	1.90	36.70	0.80	47.10	235.51	1.29
17.00			1.00	5.52E1	5.81	2.63						
17.00	24.31	1.36	1.00	5.52E1	5.81	2.63	1.00	NoLiq	1.00	24.31	24.31	2.08
18.00			1.00	3.80E1	6.18	2.76						
18.00	18.02	1.05	1.00	3.80E1	6.18	2.76	1.00	NoLiq	1.00	18.02	18.02	2.08
19.00			1.00	4.63E1	4.85	2.62						
19.00	22.97	1.06	1.00	4.63E1	4.85	2.62	1.00	NoLiq	1.00	22.97	22.97	2.08
20.00			1.00	5.14E1	6.21	2.67						
20.00	26.73	1.59	1.00	5.14E1	6.21	2.67	1.00	NoLiq	1.00	26.73	26.73	2.08
21.00			1.00	2.57E1	7.20	2.93						
21.00	14.60	0.97	1.00	2.57E1	7.20	2.93	1.00	NoLiq	1.00	14.60	14.60	2.08
22.00			1.00	1.96E2	3.24	2.09						
22.00			0.50	1.47E2	3.24	2.17						
22.00	108.82	3.48	0.50	1.47E2	3.24	2.17	1.35	17.87	0.34	146.88	223.80	1.12
23.00			1.00	5.54E2	0.90	1.38						
23.00			0.50	4.22E2	0.90	1.45						
23.00	320.75	2.89	0.50	4.22E2	0.90	1.45	1.32	2.13	0.00	422.46	422.46	2.08
24.00			1.00	7.71E2	1.19	1.42						
24.00			0.50	6.02E2	1.19	1.47						
24.00	468.57	5.57	0.50	6.02E2	1.19	1.47	1.28	2.41	0.00	500.00	500.00	2.08
25.00			1.00	4.43E2	1.23	1.55						
25.00			0.50	3.55E2	1.23	1.60						
25.00	282.69	3.47	0.50	3.55E2	1.23	1.60	1.25	4.38	0.00	354.70	354.70	2.08
26.00			1.00	6.31E2	1.01	1.40						
26.00			0.50	5.17E2	1.01	1.44						
26.00	421.14	4.24	0.50	5.17E2	1.01	1.44	1.23	2.02	0.00	500.00	500.00	2.08
27.00			1.00	7.28E2	1.19	1.43						
27.00			0.50	6.08E2	1.19	1.47						
27.00	506.93	6.01	0.50	6.08E2	1.19	1.47	1.20	2.37	0.00	500.00	500.00	2.08

28.00			1.00	6.33E2	1.39	1.52						
28.00			0.50	5.40E2	1.39	1.55						
28.00	459.79	6.37	0.50	5.40E2	1.39	1.55	1.18	3.56	0.00	500.00	500.00	2.08

Fines have been calculated, and correction is made by Modify Robertson Method.

Fines=NoLiq means the soils are not liquefiable.

CRR is based on water table at 0.00 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.20:

Depth ft	sigC' atm	CRR7.5	x Ksig	=CRRv	x MSF	=CRRm	CSRfs	F.S.=CRRm/CSRfs
0.00	0.00	2.08	1.00	2.08	1.11	2.00	0.65	5.00 ^
1.00	0.02	0.69	1.00	0.69	1.11	0.76	0.65	5.00
2.00	0.03	0.22	1.00	0.22	1.11	0.24	0.65	5.00
3.00	0.05	2.08	1.00	2.08	1.11	2.31	0.65	5.00
4.00	0.06	2.08	1.00	2.08	1.11	2.31	0.64	5.00
5.00	0.08	0.19	1.00	0.19	1.11	0.21	0.64	5.00
6.00	0.10	2.08	1.00	2.08	1.11	2.31	0.64	5.00
7.00	0.11	1.77	1.00	1.77	1.11	1.97	0.64	5.00
8.00	0.13	1.51	1.00	1.51	1.11	1.68	0.64	5.00
9.00	0.15	2.08	1.00	2.08	1.11	2.31	0.64	5.00
10.00	0.16	2.08	1.00	2.08	1.11	2.31	0.64	5.00
11.00	0.18	2.08	1.00	2.08	1.11	2.31	0.63	5.00
12.00	0.19	2.08	1.00	2.08	1.11	2.31	0.63	5.00
13.00	0.21	2.08	1.00	2.08	1.11	2.31	0.63	5.00
14.00	0.23	2.08	1.00	2.08	1.11	2.31	0.63	5.00
15.00	0.24	1.84	1.00	1.84	1.11	2.04	0.63	3.25
16.00	0.26	1.29	1.00	1.29	1.11	1.44	0.65	2.22
17.00	0.28	2.08	1.00	2.08	1.11	2.00	0.67	5.00 ^
18.00	0.29	2.08	1.00	2.08	1.11	2.00	0.69	5.00 ^
19.00	0.31	2.08	1.00	2.08	1.11	2.00	0.70	5.00 ^
20.00	0.32	2.08	1.00	2.08	1.11	2.00	0.72	5.00 ^
21.00	0.34	2.08	1.00	2.08	1.11	2.00	0.73	5.00 ^

22.00	0.36	1.12	1.00	1.12	1.11	1.25	0.75	1.67
23.00	0.37	2.08	1.00	2.08	1.11	2.31	0.76	3.04
24.00	0.39	2.08	1.00	2.08	1.11	2.31	0.77	3.00
25.00	0.41	2.08	1.00	2.08	1.11	2.31	0.78	2.96
26.00	0.43	2.08	1.00	2.08	1.11	2.31	0.79	2.92
27.00	0.45	2.08	1.00	2.08	1.11	2.31	0.80	2.89
28.00	0.47	2.08	1.00	2.08	1.11	2.31	0.81	2.86

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* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)

^ No-liquefiable Soils or above Water Table.

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:

Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 atm	(N1)60	Fines %	d(N1)60	(N1)60s
0.00	3.00	2.96	2.80	0.95	NoLiq	0.00	0.95
1.00	2.00	4.80	187.10	38.95	12.97	0.00	38.95
2.00	2.47	3.94	113.61	28.83	29.25	0.00	28.83
3.00	2.53	3.83	343.03	89.66	32.02	0.00	89.66
4.00	2.57	3.76	397.97	100.00	33.78	0.00	100.00
5.00	2.02	4.76	105.54	22.18	13.62	0.00	22.18
6.00	2.59	3.72	412.61	100.00	34.76	0.00	100.00
7.00	2.53	3.82	263.14	68.90	32.19	0.00	68.90
8.00	2.47	3.94	248.93	63.22	29.32	0.00	63.22
9.00	2.55	3.79	332.41	87.64	32.85	0.00	87.64
10.00	2.59	3.72	395.30	100.00	34.84	0.00	100.00
11.00	2.57	3.76	348.80	92.77	33.69	0.00	92.77
12.00	2.55	3.78	326.02	86.27	33.20	0.00	86.27
13.00	2.58	3.74	320.65	85.73	34.19	0.00	85.73
14.00	2.56	3.76	336.09	89.32	33.61	0.00	89.32
15.00	2.65	3.61	266.54	73.78	37.60	0.00	73.78

16.00	2.63	3.65	235.51	64.60	36.70	0.00	64.60
17.00	2.63	3.64	24.31	6.68	NoLiq	0.00	6.68
18.00	2.76	3.40	18.02	5.30	NoLiq	0.00	5.30
19.00	2.62	3.65	22.97	6.29	NoLiq	0.00	6.29
20.00	2.67	3.56	26.73	7.51	NoLiq	0.00	7.51
21.00	2.93	3.09	14.60	4.72	NoLiq	0.00	4.72
22.00	2.17	4.50	223.80	49.76	17.87	0.00	49.76
23.00	1.45	5.82	422.46	72.53	2.13	0.00	72.53
24.00	1.47	5.79	500.00	86.42	2.41	0.00	86.42
25.00	1.60	5.54	354.70	64.01	4.38	0.00	64.01
26.00	1.44	5.84	500.00	85.62	2.02	0.00	85.62
27.00	1.47	5.79	500.00	86.34	2.37	0.00	86.34
28.00	1.55	5.64	500.00	88.70	3.56	0.00	88.70

(N1)60s has been fines corrected in liquefaction analysis, therefore d(N1)60=0.

(N1)60 is converted from qc1, (N1)60s is after fines correction

Fines=NoLiq means the soils are not liquefiable.

Settlement of Saturated Sands:

Settlement Analysis Method: Tokimatsu, M-correction

Depth	CSRsf	/ MSF*	=CSRm	F.S.	Fines	(N1)60s	Dr	ec	dsz	dsp	S
ft					%		%	%	in.	in.	in.
28.65	0.81	1.11	0.73	2.84	0.37	81.91	100.00	0.000	0.0E0	0.000	0.000
28.00	0.81	1.11	0.73	2.86	3.56	88.70	100.00	0.000	0.0E0	0.000	0.000
27.00	0.80	1.11	0.72	2.89	2.37	86.34	100.00	0.000	0.0E0	0.000	0.000
26.00	0.79	1.11	0.71	2.92	2.02	85.62	100.00	0.000	0.0E0	0.000	0.000
25.00	0.78	1.11	0.70	2.96	4.38	64.01	100.00	0.000	0.0E0	0.000	0.000
24.00	0.77	1.11	0.69	3.00	2.41	86.42	100.00	0.000	0.0E0	0.000	0.000
23.00	0.76	1.11	0.68	3.04	2.13	72.53	100.00	0.000	0.0E0	0.000	0.000
22.00	0.75	1.11	0.67	1.67	17.87	49.76	100.00	0.000	0.0E0	0.000	0.000
21.00	0.73	1.11	0.66	5.00	NoLiq	4.72	35.86	4.127	0.0E0	0.001	0.001
20.00	0.72	1.11	0.65	5.00	NoLiq	7.51	44.15	3.004	0.0E0	0.000	0.001

19.00	0.70	1.11	0.63	5.00	NoLiq	6.29	40.70	3.479	0.0E0	0.000	0.001
18.00	0.69	1.11	0.62	5.00	NoLiq	5.30	37.71	3.865	0.0E0	0.000	0.001
17.00	0.67	1.11	0.60	5.00	NoLiq	6.68	41.84	3.325	0.0E0	0.000	0.001
16.00	0.65	1.11	0.58	2.22	36.70	64.60	100.00	0.000	0.0E0	0.000	0.001
15.00	0.63	1.11	0.57	3.25	37.60	73.78	100.00	0.000	0.0E0	0.000	0.001

Settlement of Saturated Sands=0.001 in.

qc1 and (N1)60 is after fines correction in liquefaction analysis

(N1)60s is converted from qc1 and after fines correction

dsz is per each segment, dz=0.05 ft

dsp is per each print interval, dp=1.00 ft

S is cumulated settlement at this depth

Settlement of Unsaturated Sands:

Settlement of Unsaturated Sands=0 due to Option 5, Calculation settlement only in liquefied zone.

Depth	sigma'	sigC'	(N1)60s	CSRsf	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec	ec	dsz	dsp	S
ft	atm	atm			atm			%		%	in.	in.	in.
14.95	0.37	0.24	74.59	0.63	925.34	2.5E-4	0.0801	0.0253	0.98	0.0249	0.00E0	0.000	0.000
14.00	0.35	0.23	89.32	0.63	950.96	2.3E-4	0.0537	0.0170	0.98	0.0167	0.00E0	0.000	0.000
13.00	0.32	0.21	85.73	0.63	904.04	2.3E-4	0.0503	0.0159	0.98	0.0156	0.00E0	0.000	0.000
12.00	0.30	0.19	86.27	0.63	870.54	2.2E-4	0.0453	0.0143	0.98	0.0141	0.00E0	0.000	0.000
11.00	0.27	0.18	92.77	0.63	854.04	2.0E-4	0.0399	0.0126	0.98	0.0124	0.00E0	0.000	0.000
10.00	0.25	0.16	100.00	0.64	833.98	1.9E-4	0.0368	0.0116	0.98	0.0114	0.00E0	0.000	0.000
9.00	0.22	0.15	87.64	0.64	756.41	1.9E-4	0.0479	0.0151	0.98	0.0149	0.00E0	0.000	0.000
8.00	0.20	0.13	63.22	0.64	639.64	2.0E-4	0.0755	0.0239	0.98	0.0235	0.00E0	0.000	0.000
7.00	0.17	0.11	68.90	0.64	615.73	1.8E-4	0.0432	0.0136	0.98	0.0134	0.00E0	0.000	0.000
6.00	0.15	0.10	100.00	0.64	645.36	1.5E-4	0.0288	0.0091	0.98	0.0089	0.00E0	0.000	0.000
5.00	0.12	0.08	22.18	0.64	355.57	2.2E-4	0.3069	0.2642	0.98	0.2597	0.00E0	0.000	0.000
4.00	0.10	0.06	100.00	0.64	522.83	1.2E-4	0.0225	0.0071	0.98	0.0070	0.00E0	0.000	0.000
3.00	0.07	0.05	89.66	0.65	435.49	1.1E-4	0.0225	0.0071	0.98	0.0070	0.00E0	0.000	0.000
2.00	0.05	0.03	28.83	0.65	242.42	1.3E-4	0.0238	0.0144	0.98	0.0141	0.00E0	0.000	0.000
1.00	0.02	0.02	38.95	0.65	185.63	8.1E-5	0.0142	0.0048	0.98	0.0047	0.00E0	0.000	0.000

0.00	0.00	0.00	0.95	0.65	1.12	5.8E-6	0.0010	0.0048	0.98	0.0047	0.00E0	0.000	0.000

Settlement of Unsaturated Sands

Settlement of Unsaturated Sands=0.000 in.

(N1)60s is converted from qc1 and after fines correction

dsz is per each segment, dz=0.05 ft

dsp is per each print interval, dp=1.00 ft

S is cumulated settlement at this depth

Total Settlement of Saturated and Unsaturated Sands=0.001 in.

Differential Settlement=0.000 to 0.000 in.

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1.0581 tsf(1 tsf = 1 ton/ft2 = 2 kip/ft2)

1 atm (atmosphere) = 101.325 kPa(1 kPa = 1 kN/m2 = 0.001 Mpa)

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT) [atm (tsf)]
fs	Friction from CPT testing [atm (tsf)]
Rf	Ratio of fs/qc (%)
gamma	Total unit weight of soil
gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [atm]
sigma'	Effective vertical stress [atm]
sigC'	Effective confining pressure [atm]
rd	Acceleration reduction coefficient by Seed
a_max.	Peak Ground Acceleration (PGA) in ground surface
mZ	Linear acceleration reduction coefficient X depth
a_min.	Minimum acceleration under linear reduction, mZ

CRRv	CRR after overburden stress correction, CRRv=CRR7.5 * Ksig
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksig	Overburden stress correction factor for CRR7.5
CRRm	After magnitude scaling correction CRRm=CRRv * MSF
MSF	Magnitude scaling factor from M=7.5 to user input M
CSR	Cyclic stress ratio induced by earthquake
CSRfs	CSRfs=CSR*fs1 (Default fs1=1)
fs1	First CSR curve in graphic defined in #9 of Advanced page
fs2	2nd CSR curve in graphic defined in #9 of Advanced page
F.S.	Calculated factor of safety against liquefaction F.S.=CRRm/CSRsf
Cebs	Energy Ratio, Borehole Dia., and Sampling Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qc1n	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
CSRm	After magnitude scaling correction for Settlement calculation CSRm=CSRsf / MSF*
CSRfs	Cyclic stress ratio induced by earthquake with user inputed fs
MSF*	Scaling factor from CSR, MSF*=MSF, based on Item 2 of Page C.
MSF	Magnitude scaling factor from M=7.5 to user input M
ec	Volumetric strain for saturated sands
dz	Calculation segment, dz=0.050 ft
dsz	Settlement in each segment, dz
dp	User defined print interval
dsp	Settlement in each print interval, dp

Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for unsaturated sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

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1. NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

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International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, San Diego, CA, March 2001.

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Report No. EERC 2003-06 by R.B Seed and etc. April 2003.

Note: Print Interval you selected does not show complete results. To get complete results, you should select 'Segment' in Print Interval (Item 12, Page C).

Appendix D

Earthwork Specifications

APPENDIX D: EARTHWORK SPECIFICATIONS

D1.1 Scope of Work

The work includes all labor, supplies and construction equipment required to construct the building pads in a good, workman-like manner, as shown on the drawings and herein specified. The major items of work covered in this section include the following:

- Site Inspection
- Authority of Geotechnical Engineer
- Site Clearing
- Excavations
- Preparation of Fill Areas
- Placement and Compaction of Fill
- Observation and Testing

D1.2 Site Inspection

- The Contractor shall carefully examine the site and make all inspections necessary, in order to determine the full extent of the work required to make the completed work conform to the drawings and specifications. The Contractor shall satisfy himself as to the nature and location of the work, ground surface and the characteristics of equipment and facilities needed prior to and during prosecution of the work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the drawings, or between the drawings and specifications must be brought to the Owner's attention in order to clarify the exact nature of the work to be performed.

- This *Geotechnical Study Report* by Converse Consultants may be used as a reference to the surface and subsurface conditions on this project. The information presented in this report is intended for use in design and is subject to confirmation of the conditions encountered during construction. The exploration logs and related information depict subsurface conditions only at the particular time and location designated on the boring logs. Subsurface conditions at other locations may differ from conditions encountered at the exploration locations. In addition, the passage of time may result in a change in subsurface conditions at the exploration locations. Any review of this information shall not relieve the Contractor from performing such independent investigation and evaluation to satisfy himself as to the nature of the surface and subsurface conditions to be encountered and the procedures to be used in performing his work.

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D1.3 Authority of the Geotechnical Engineer

- The Geotechnical Engineer will observe the placement of compacted fill and will take sufficient tests to evaluate the uniformity and degree of compaction of filled ground.

- As the Owner's representative, the Geotechnical Engineer will (a) have the authority to cause the removal and replacement of loose, soft, disturbed and other unsatisfactory soils and uncontrolled fill; (b) have the authority to approve the preparation of native ground to receive fill material; and (c) have the authority to approve or reject soils proposed for use in building areas.

- The Civil Engineer and/or Owner will decide all questions regarding (a) the interpretation of the drawings and specifications, (b) the acceptable fulfillment of the contract on the part of the Contractor and (c) the matters of compensation.

D1.4 Site Clearing

- Clearing and grubbing shall consist of the removal from building areas to be graded of all existing structures, pavement, utilities, and vegetation.

- Organic and inorganic materials resulting from the clearing and grubbing operations shall be hauled away from the areas to be graded.

D1.5 Excavations

- Based on observations made during our field explorations, the surficial soils can be excavated with conventional earthwork equipment.

D1.6 Preparation of Fill Areas

- All organic material, organic soils, incompetent alluvium, undocumented fill soils and debris should be removed from the proposed building areas.

- In order to provide uniform support for the new structures, the minimum depth of over-excavation should be five (5) feet below the existing grade, or 36 inches below proposed foundations whichever is deeper. Deeper over-excavation will be needed if soft, yielding soils are exposed on the excavation bottom. The actual depth of removal should be determined based on observations made during grading. Over-excavation should extend at least three (3) feet beyond the limits of footings, or equal distance of over-excavation depth, whichever is greater, or as limited by the existing structures. Excavation activities should not disturb existing utilities, buildings, and remaining structures. Existing utilities should be removed and adequately capped at the project boundary line, or salvaged/rerouted as designed for sidewalks and flatwork area, at least the upper 24 inches of existing

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soils should be scarified and recompacted to at least 90 percent of compaction. Deeper over-excavation will be needed if soft, yielding soils are exposed on the excavation bottom. The excavation should be extended to at least 12 inches beyond the driveway and flatwork limit where space is permitted.

- The subgrade in all areas to receive fill shall be scarified to a minimum depth of six inches, the soil moisture adjusted within three (3) percent above optimum, and then compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method.

- Compacted fill may be placed on native soils that have been properly scarified and re-compacted as discussed above.

- All areas to receive compacted fill will be observed and approved by the Geotechnical Engineer before the placement of fill.

D1.7 Placement and Compaction of Fill

- Compacted fill placed for the support of footings, slabs-on-grade, exterior concrete flatwork, and driveways will be considered structural fill. Structural fill may consist of approved on-site soils or imported fill that meets the criteria indicated below.

- Fill consisting of selected on-site earth materials or imported soils approved by the Geotechnical Engineer shall be placed in layers on approved earth materials. Soils used as compacted structural fill shall have the following characteristics:

    - All fill soil particles shall not exceed three (3) inches in nominal size, and shall be free of organic matter and miscellaneous inorganic debris and inert rubble.

    - Imported fill materials shall have an Expansion Index (EI) less than 20. All imported fill should be compacted to at least 90 percent of the laboratory maximum dry density (ASTM Standard D1557) at about to three percent above optimum moisture.

- Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer.

- All fill placed at the site shall be compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. The on-site soils shall be moisture conditioned at approximate three (3) percent above the optimum moisture content.

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- Representative samples of materials being used, as compacted fill will be analyzed in the laboratory by the Geotechnical Engineer to obtain information on their physical properties. Maximum laboratory density of each soil type used in the compacted fill will be determined by the ASTM Standard D1557 compaction method.

- Fill materials shall not be placed, spread or compacted during unfavorable weather conditions. When site grading is interrupted by heavy rain, filling operations shall not resume until the Geotechnical Engineer approves the moisture and density conditions of the previously placed fill.

- It shall be the Grading Contractor's obligation to take all measures deemed necessary during grading to provide erosion control devices in order to protect slope areas and adjacent properties from storm damage and flood hazard originating on this project. It shall be the contractor's responsibility to maintain slopes in their as-graded form until all slopes are in satisfactory compliance with job specifications, all berms have been properly constructed, and all associated drainage devices meet the requirements of the Civil Engineer.

D1.8 Trench Backfill

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

- Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials at the time of backfill placement.

- Trench backfill shall be compacted to a minimum relative compaction of 90 percent as per ASTM Standard D1557 test method.

- Rocks larger than one inch should not be placed within 12 inches of the top of the pipeline or within the upper 12 inches of pavement or structure subgrade. No more than 30 percent of the backfill volume shall be larger than 3/4-inch in largest dimension. Rocks shall be well mixed with finer soil.

- The pipe design engineer should select bedding material for the pipe. Bedding materials generally should have a Sand Equivalent (SE) greater than or equal to 30, as determined by the ASTM Standard D2419 test method.

- Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The backfill materials shall be brought to between optimum and three percent above optimum, then placed in horizontal layers. The thickness of uncompacted layers should not exceed eight inches. Each layer shall be evenly

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spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.

- The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work.

- The field density of the compacted soil shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent.

- Observation and field tests should be performed by Converse during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained.

- It should be the responsibility of the Contractor to maintain safe conditions during cut and/or fill operations.

- Trench backfill shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

D1.9 Observation and Testing

- During the progress of grading, the Geotechnical Engineer will provide observation of the fill placement operations.

- Field density tests will be made during grading to provide an opinion on the degree of compaction being obtained by the contractor. Where compaction of less than specified herein is indicated, additional compactive effort with adjustment of the moisture content shall be made as necessary, until the required degree of compaction is obtained

- A sufficient number of field density tests will be performed to provide an opinion to the degree of compaction achieved. In general, density tests will be performed on each one-foot lift of fill, but not less than one for each 500 cubic yards of fill placed.

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Appendix E

Fault Study Evaluation

Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

April 1, 2019

Ms. Cristina Cho
AE Services-Structural
Los Angeles Unified School District
333 South Beaudry Avenue, 22nd Floor
Los Angeles, California 90017

Subject: **CONE PENETRATION TEST (CPT) FAULT STUDY EVALUATION**
Shenandoah Elementary School
2450 South Shenandoah Street, Los Angeles, California 90034
Assessors ID No. 4301-018-900
Converse Project No. 17-31-113-02

Dear Ms. Cho:

Converse Consultants (Converse) has prepared this geologic study report to present the findings of our Cone Penetration Test (CPT) Fault Study Evaluation for the proposed two-story Classroom Building 300 project located at Shenandoah Elementary School in Los Angeles, California.

Based on the results of our field explorations, geologic analysis, judgment and experience with similar projects, it is our opinion that the subject site is suitable for the proposed Classroom Building 300 project from an engineering geologic standpoint provided that the recommendations presented herein are incorporated in the design and construction of the project.

We appreciate the opportunity to be of service to Los Angeles Unified School District. Should you have any questions, please do not hesitate to contact us at (626) 930-1200.

CONVERSE CONSULTANTS

Mark B. Schluter, CEG 1415
Senior Engineering Geologist

Jordan Cooper
Staff Geologist

Dist: 1/Addressee
MBS/JC:jjl

DRAFT

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE AND PROJECT DESCRIPTION 2

2.1 SITE DESCRIPTION 2
2.2 PROJECT DESCRIPTION 2

3.0 WEST PICO FAULT ZONE 3

4.0 SUBSURFACE EXPLORATION 5

5.0 FINDINGS 6

6.0 CONCLUSIONS AND RECOMMENDATIONS 8

7.0 CLOSURE 8

8.0 REFERENCES 10

Drawings

Drawing No. 1, *Earthquake Fault Zone Boundary Map*
Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings*
Drawing No. 3, *West Pico Fault LIDAR Scarp Location Map*
Drawing No. 4, *CPT Cross Section - Row 1*
Drawing No. 5, *CPT Cross Section - Column Line D and Row 5*
Drawing No. 6, *CPT Cross Section - Northeast*
Drawing No. 7, *CPT Cross Section - Row 8*
Drawing No. 8, *Upper and Lower Sand Marker Beds and Refusal Layer Contour Maps*
Drawing No. 9, *Sediment Map at 10 Feet and 20 Feet Depths*

Appendices

Appendix A, *Field Exploration Data*
Soil Boring Logs
Cone Penetration Test (CPT) Soundings

DRAFT

1.0 INTRODUCTION

On January 11, 2018, the California Geologic Survey (CGS) released the revised Earthquake Zones of Required Investigation for the Beverly Hills Quadrangle map which extended the Newport Inglewood fault zone northward along the east and west sides of the Shenandoah Elementary School site. The revised Beverly Hills Quadrangle map shows the Newport Inglewood fault branching into two (2) separate fault traces identified as the "Inglewood Fault" on the west side of the school site and the West Pico Fault on the east side of the school site. The fault traces are shown with dashed lines indicating they are approximately located. Both fault traces are considered to be active by the CGS during Holocene time (past 11,000 years) and are delineated with new earthquake fault zone boundaries which require investigations to determine if active faulting is present beneath the project site that may present a potential hazard to structures from surface faulting and fault creep. A map showing the new extended fault zone boundaries for the Newport Inglewood fault zone and subject school site is shown on Drawing No. 1, *Earthquake Fault Zone Boundary Map*. This geologic report was prepared in accordance with our proposal dated October 12, 2018.

The January 11, 2018, revised Earthquake Zones of Required Investigation for the Beverly Hills Quadrangle map shows the school site is located between two separate fault strands, the "Inglewood Fault" on the west side and "West Pico Fault" on the east side. The new Earthquake Fault Zone Boundary for the West Pico Fault trace runs through the eastern side of the Shenandoah Elementary School site. The CGS establishes the Earthquake Fault Zone Boundary lines for active faults approximately 500 feet on either side of an active fault trace. The two (2) closest mapped active fault traces of the West Pico Fault are shown to be located approximately 300 feet east of the east side of the school property and approximately 200 feet north of the northeast corner of the school property. No active fault traces are shown to be mapped within the school property, however, the new fault zone boundary lines run through the east and west sides of the school site.

Based on subsurface borings and records from the California Department of Conservation for local oil wells, the project site area is underlain by alluvial sediments that extend to depths approximately 30 to 45 feet below ground surface of the site. Prior to urban development in the general site area, the area was covered by alluvial sediments deposited by Ballona Creek stream tributaries which once drained southwestward across the local site area towards the Pacific Ocean. Alluvial stream-deposited materials and floodplain deposits and features were expected to be encountered in the subsurface stratigraphic profile.

It was determined that in order to evaluate whether any active faulting has occurred within a 50-foot setback from the proposed classroom building, a CPT fault study evaluation was the preferred method of investigation in order to cover the largest area and greatest depth possible without damaging the existing school facility or disrupting school activities. Eighty (80) CPT soundings were performed in a measured grid pattern with 20-foot spacings. The cone penetration test data and ground surface elevations supplied by Los

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Angeles Unified School District were combined using the Surfer 8 Version computer program to create three-dimensional topographic maps of the subsurface marker layers and stratigraphic cross sections of the underlying alluvial sediment deposits. This subsurface stratigraphic layer information is used to evaluate if any offset or deformation can be detected in the underlying alluvial sediments which would indicate if the West Pico Fault underlies the proposed project site.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

Shenandoah Elementary School is located at 2450 South Shenandoah Street between Cadillac Avenue and Beverlywood Street in west Los Angeles as shown on Drawing No. 1, *Earthquake Fault Zone Boundary Map*. The elementary school site covers an approximate area of 6.3 acres. The existing school site has been previously graded and developed with a mix of permanent and temporary buildings. The existing ground surface elevations range from approximately 118 feet on the north end of the site to 106 feet along the south end of the site. The surface gradients slope gently to the south. The current proposed plan is to build a new two-story building that has two possible building footprints which overlap on the southern side of the school grounds. The approximate location of the proposed building footprints is shown on Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Sounding and Soil Borings*.

The site coordinates for the proposed project are:

North Latitude: 34.0385 degrees
West Longitude: -118.3840 degrees

2.2 Project Description

The proposed project study includes a Cone Penetration Test (CPT) fault study for the proposed new Classroom Building 300 structure at the existing Shenandoah Elementary School site located at 2450 South Shenandoah Street in City of Los Angeles, Los Angeles County, California. The proposed new classroom building will be located along the southern side of the school site on an existing paved playground area. The playground area is currently covered with asphalt concrete pavement, playground equipment, handball courts, basketball courts and storage containers. The site is currently an active school site, and because of this, it was decided that a CPT fault study would be done in lieu of more disruptive trench excavation exploration methods.

The footprints of the proposed Classroom Building 300 and proposed Alternate Building Location are shown on Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings.* The new classroom building is located southeast of the main school building. The approximate location of the western Fault Zone Boundary

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for the West Pico Fault was projected across the Shenandoah Elementary School site. Most of the new proposed Classroom Building 300 footprint location and that of the proposed Alternate Building Location are located west and outside of the projected Fault Zone Boundary for the West Pico Fault. A small corner section of the proposed building footprints (approximately 6 to 7 feet long) are shown crossing on and into the Fault Zone Boundary near the Row 6, Column E, CPT test location.

The purpose of the CPT fault study was to evaluate the subsurface conditions along the east side of the proposed Classroom Building 300 and proposed Alternate Building locations for evidence of recent subsurface faulting within 50 feet of the proposed structure. Converse performed seventy-two (72) CPT sounding locations for the study with LAUSD recommending an additional eight (8) CPT soundings for a total of eighty (80) CPT soundings in order to have a large coverage for the area under investigation. The subsurface CPT test data was used in conjunction with computer software Surfer 8 for contouring and 3D surface mapping to evaluate subsurface marker beds and stratigraphic cross sections.

3.0 WEST PICO FAULT ZONE

The West Pico Fault Zone is considered to be part of a complex series of faults which form the northern end of the Newport-Inglewood Fault Zone. The Newport-Inglewood Fault Zone is approximately 47 miles long and extends southward from its northern terminus at the Santa Monica Fault to Newport Beach where it goes offshore and becomes the Rose Canyon Fault. The Newport-Inglewood fault zone forms a northwest trending series of right-stepping en-echelon fault segments. The faults are thought to be right-lateral transform faults with localized components of reverse movement. Movement on these faults have created a series of north-west trending hills and anticlinal folding. Several large oil and gas fields have formed along the Newport-Inglewood Fault Zone by a combination of tectonic deformation and stratigraphic folding mechanisms including the Beverly Hills Oil Field located north of the project site and the Inglewood Oil Field to the south.

The CGS's evidence for the location of the fault is limited in this region. It is based on three pieces of evidence. The first is a report by Erickson and Spaulding (1975) on oil field-induced subsidence and seismicity in the region. The report itself places the West Pico Fault as a water barrier with elevated groundwater levels on the east side of the fault. The report also mentions that the fault separates complex geology to the west from less complex geology in the east. No other literature could be found that referred to the West Pico Fault. The second piece of evidence is the location of the Ballona Creek wetland habitat. The Newport-Inglewood Fault System is a known groundwater barrier which has caused groundwater to be found shallower to the east of the fault in the Ballona Gap region. In a report from Dark et al (2011) the historic boundaries of the wetlands were recreated from data from the 1800's. It is assumed that the western extent of the wetlands was controlled by a fault which the CGS believes is the West Pico Fault. The third piece of evidence is an east facing 2.5-meter scarp that was reported to have been

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found using airborne Light Detection and Ranging (LIDAR) sensing imagery surveys performed by Los Angeles County in 2006. According to the CGS report the scarp approximately borders the historic edge of the Ballona Creek wetlands and approximately aligns with the interpreted West Pico Fault trace as shown on Drawing No. 3, *West Pico Fault LIDAR Scarp Location Map* from the CGS. The West Pico Fault scarp is located approximately 300 feet east of the school site.

The location of the project site and proposed classroom building pad(s) in relation to the mapped trace of the West Pico Fault are shown on Drawing No. 1, *Earthquake Fault Zone Boundary Map* and Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings*. The school site ground surface is relatively flat lying and shows no evidence of scarps or lineaments within the school grounds.

Historical streams and rivers which once flowed through the region towards the Pacific Ocean were intermittent with the exception of Ballona Creek. Ballona Creek is a likely source for much of the stream sediments and wetland deposits in the area. Ballona Creek is approximately 8.8 miles long and drains a watershed area of approximately 130 square miles in the coastal Los Angeles basin extending from the Santa Monica Mountains on the north, the Harbor Freeway (110 Fwy) on the east, and the Baldwin Hills on the south. It flows from the west Los Angeles area through Culver City and the Del Rey district before draining into Santa Monica Bay between Marina del Rey and Playa del Rey districts. At the time of Spanish settlement, the Los Angeles River reportedly turned to the west just south of the present-day Bunker Hill in downtown Los Angeles, joining Ballona Creek just to the west of its current channel. However, during a major flood in 1825, the Los Angeles River's course changed to its present channel, and Ballona Creek became a completely distinct waterway. The Ballona Creek channel was lined with concrete as part of the flood-control project undertaken by the United States Army Corps of Engineers following the catastrophic flooding in the Los Angeles Basin in 1938.

The location of the school site and proposed classroom building pad area with respect to the mapped trace of the West Pico Fault Zone is shown on Drawing No. 1, *Earthquake Fault Zone Boundary Map.* This drawing is an enlarged portion of the State of California Earthquake Fault Zone map for the Beverly Hills Quadrangle overlaid on a Google Earth aerial photograph. The 2018 State earthquake fault zone map was prepared using a 1966 USGS 7.5-minute topographic map that was photo revised in 1981.

The 2018 California Geological Survey State Earthquake Zones of Required Investigation for the Beverly Hills Quadrangle shows the West Pico Fault as a dashed, "approximately located fault", in the northeast corner of the school site before it steps to the east heading southeast. The two (2) closest mapped active fault traces of the West Pico Fault are shown to be located approximately 300 feet east of the east side of the school property and approximately 200 feet north of the northeast corner of the school property. No active fault traces are shown to be mapped within the school property; however, the new Fault Zone Boundary line runs through the east side of the school site. The area of investigation for the West Pico Fault extends along the southeast area of the school site as shown on

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Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings.*

4.0 SUBSURFACE EXPLORATION

Subsurface exploration at the project site was performed using eighty (80) cone penetration test (CPT) soundings. The cone penetration tests were performed to delineate the subsurface stratigraphy across the proposed building sites and to provide additional data on the engineering characteristics of the subsurface soil conditions. Boring and laboratory test results from Converse Consultants Preliminary Soils Report dated May 18, 2017 was also used to characterize the nature and thickness of alluvial sediments beneath the site, to confirm CPT-estimated soil classifications, and used to confirm CPT-estimated engineering properties. The location of the 2018 cone penetration test (CPT) soundings and 2017 soil borings are shown on Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings.*

The CPT device is an instrumented electronic cone system that is pushed into the ground at the end of series 3.2-foot-long by 1.4-inch diameter threaded steel rods. The instrumented cone tip is equipped with electronic load cells that measure the soils resistance at the cone tip and the soils frictional resistance along the sides of the cone. The cone system is pushed hydraulically through the subsurface earth materials using a 30-ton (4-axle) truck-mounted CPT rig. The instrumented cone transmits tip and frictional resistance as it is pushed into the ground through a wire in the center of the rods. The wire is connected to a computer which monitors, records and processes the data for on-screen monitoring and printing in graphical log form. When the CPT sounding is completed to the desired depth, the steel rods and cone are pulled out, the steel rods disassembled, and the small test hole filled with bentonite clay chips. The cone penetration tests are performed in accordance with revised (2002) ASTM specification ASTM D5778-95 and D3441-94.

CPT test soundings were conducted in a grid pattern with a 20-foot spacing interval with ten (10) rows (Row 1 through Row 10) and ten (10) columns (Column AA through Column I) . The CPT lines were oriented to cover an area within a radius of approximately 50 feet of the proposed classroom building footprint along the fault zone boundary designated for the West Pico Fault. This would allow comparison of the sediments in order to see if any linear or offset features could be detected. The CPT lines were selected and located based on the proposed Classroom Building 300 building footprints and existing school structures and improvements.

The CPT exploration program was performed during November 19th, 2018 to November 21st, 2018; December 17th, 2018 to December 17th, 2018; and January 2nd, 2018 when the school was closed for holiday periods. The original testing program called for each of the CPT soundings to penetrate to a maximum depth of 70 feet with a test hole spacing of 20 feet. The planned maximum depth of penetration was not achieved for the soundings as the 30-ton (4-axle) CPT rig encountered refusal to penetration in harder

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"sand and silty sand" materials at depths ranging from 25 feet to 43 feet below ground surface. The harder and more resistant sand and silty sand deposits are believed to be Pleistocene-aged shallow marine and detrital sediments mapped by Hoot (1931) and Thomas W. Dibblee, Jr. (1991). The CPT test data and field survey information were compiled in Microsoft Excel program and then processed in the Surfer 8 version graphic computer program by Golden Software to create three-dimensional contour maps of subsurface marker beds and stratigraphic cross sections of the underlying alluvial sediment deposits.

Groundwater was not encountered during the CPT investigation. Groundwater was encountered during drilling of Boring No. 2 at a depth of approximately 44 feet below ground surface during our Preliminary Soils investigation on April 13th, 2017. Review of the Historically Highest Groundwater Map, Plate No. 1.2 in the Seismic Hazard Zone Report for the Beverly Hills 7.5-minute Quadrangle (1998) indicates the historic high groundwater level is interpreted at approximately 15 feet below ground surface.

Logs of the CPT soundings are presented in Appendix A. Interpreted stratigraphic profiles for CPT Row 1, Column Line D, Row 5, Northeast Diagonal Section and Row 8 are presented on Drawing Nos. 4, 5, 6, and 7.

5.0 FINDINGS

The project site is located on a fluvial cut wetland basin underlain by alluvial sediments deposited over time by local streams and rivers. Alluvial plain surfaces develop into planer landforms by deposition, erosion and reworking of alluvium by streams and rivers. As the river and streams migrate back and forth across the plain, their flows gradually plane off the ground surface to relatively flat surfaces. Lateral migrations of the stream channels against the bases of the valley side slopes make the valley bottoms broader. During times of high water, additional deposition may take place as the river rises and spills out over the valley floor depositing sediment loads. Localized irregularities can develop in the alluvial sediments as they are deposited and reworked including channels, embankments, meanders, sediment bars, levees, fans, ponds and deltas. These complex stream features and erosion processes have been gradually recorded into the subsurface stratigraphic sequence of deposited sediments underlying the project site.

The western margin of the Ballona Creek wetland basin has been delineated by a 2.5-foot escarpment formed across the Ballona Creek waterway course by movement on the West Pico Fault located east of the project site. The fault segments form a northwest trending series of side-stepping fault segments that are considered part of the Newport-Inglewood Fault System. The West Pico Fault serves as a structural boundary separating highly complex geology to the west from less complicated geology on the east. The fault trace also affects shallow groundwater levels across the Ballona Creek gap. The mapped trace of the West Pico Fault is located about 200 to 300 feet northeast and east of the proposed classroom building locations as shown on Drawing No. 1, *Earthquake Fault Zone*

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Boundary Map and Drawing No. 2, *Site Plan and Location of Cone Penetration Test (CPT) Soundings and Soil Borings.*

The project site and vicinity has undergone growth and development during the past 100 years. Residential and commercial development has covered the surrounding area with structures. Topographic and geomorphic expressions of active fault related features have been removed and obscured by grading and development along the "West Pico Fault " zone.

The City of Los Angeles has permitted urban oil production in the Beverly Hills (East) oilfield since it was discovered in 1964, provided subsidence control measures are implemented and monitored. The oilfield production zones ranged from 3,200 feet to 8,000 feet below ground surface. The ground surface changes in the oilfield production areas were monitored with precise leveling surveys as a means of determining subtle changes in surface elevations before damage to surface improvements could occur. Water injection programs were implemented to minimize the amounts of subsidence which may be attributed to subsurface fluid withdrawals from the oilfield. Oilfield production reached its peak between 1967 and 1969. Subsequent precise leveling data recorded decreasing rates of subsidence as a result of declining oilfield production and the initiation of a pressure maintenance program.

The cone penetration test (CPT) is a useful tool to characterize the stratigraphic sequence of sediments deposited beneath graded fill soils and developed sites. The CPT soundings were used to interpret stratigraphic sequences of sediments 25 feet to 43 feet below the ground surface of the proposed Classroom Building 300 project and to evaluate possible fault-related offset and deformation within the sediments.

Review of the stratigraphic profiles beneath both CPT Cross Section Row 5 and Column line D presented on Drawing No. 5 shows two major distinct sedimentary layers and sequences of sedimentary units that correlate well across the length of CPT Row 5 and Column line D. These sedimentary units do not appear to have been offset or disturbed by recent fault movement. No significant vertical displacement can be observed. Localized variations and irregularities in the thickness and elevations of the sedimentary marker units do occur along CPT Row 5 and Column line D and are likely the result of stream erosion, deposition and reworking of alluvial sediments. A distinct marker layer of silty sand and sand at least 10 feet thick was encountered along CPT Row 5 and Column line D at a depth of 18 to 22 feet below ground surface. This sedimentary unit appears to be relative planar and continuous along the length CPT Cross Section Row 5 and Column line D.

The CPT cross section plot results also show the presence of another silty sand layer that occurs at a shallower depth. This sediment layer is approximately 5 to 10 feet thick and in the 10-foot 3-D surface contour map appears to be representative of original deposits that were cut by fluvial stream and flood plain processes.

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Review of the three-dimensional contour maps at for the Upper Sand marker bed, Lower Sand marker bed and Refusal Layer surface do not show any major anomalies that can be associated with linear fault features as shown on Drawing No. 8, *Upper and Lower Sand Mark Beds and Refusal Layer Maps*. Three-dimensional contour maps for the upper sediment stratigraphy at 10 feet and 20 feet were also modeled and reviewed. The sediment contours at these two depths depict the outline of a stream channel feature that can be seen with a southwest trend as shown on Drawing No. 9, *Sediment Map at 10 feet and 20 feet Depths*. The stream channel feature does not appear to be offset at either of these two depths.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our field explorations, geologic analysis, judgment and experience with similar projects, it is our opinion that the subject site is suitable for the proposed Classroom Building 300 project from an engineering geologic standpoint provided that the recommendations presented herein are incorporated in the design and construction of the project.

The northeast corner of the proposed building footprint for the proposed Classroom Building 300 project is approximately located on and in an Alquist-Priolo Earthquake Fault Zone Boundary designated for the nearby West Pico Fault. The West Pico Fault is considered to be active and as such the project should anticipate strong ground shaking and possible ground disturbance during its design life. The building footprint corner should be moved westward outside of the Fault Zone Boundary for the West Pico Fault. A more detailed precise site survey should be performed by a California Licensed Land Surveyor to accurately determine the location of the Fault Zone Boundary line with respect to the proposed building corner. Additional building design measures to minimize and mitigate hazards and impacts associated with nearby faulting within an earthquake fault zone should be incorporated into the building's design and construction. These measures would include strengthened foundations and floor slabs, seismic engineering design, flexible utility connections, automatic gas shut-off and other appropriate design measures.

No significant evidence of stratigraphic offset or anomalies were observed along the profiles of CPT Cross Section Row 5 and Column Line D (Line E) within the proposed Classroom Building 300 building footprint. The proposed location for Classroom Building 300 is located about 200 to 300 feet southwest of the current mapped trace of the West Pico Fault. The proposed Classroom Building 300 and Alternate Building Location shown on Drawing No. 2 are acceptable from a geologic hazards standpoint, provided the building is moved westward outside of the Fault Zone Boundary for the West Pico Fault.

7.0 CLOSURE

This report has been prepared for the sole benefit and exclusive use of Los Angeles Unified School District in accordance with the terms and conditions attached to our proposal under which these services have been provided. Any reliance on this report by

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third parties shall be at third party's sole risk. Our services have been performed in accordance with applicable state and local ordinances, and generally accepted practices within our profession. No other warranty, either expressed or implied, is made.

Converse Consultants is not responsible or liable for any claims or damages associated with interpretation of available information provided by others. Site exploration identifies actual soil conditions only at those points where samples are taken, when they are taken. Data derived through sampling and analytical testing are extrapolated by Converse employees who then render an opinion about the overall soil conditions. The recommendations presented are not considered final because they are developed principally from judgment and opinion. Actual conditions in areas not sampled may differ. In the event that changes to the property occur, or additional, relevant information about the property is brought to our attention, the recommendations contained in this report may not be valid unless these changes and additional relevant information are reviewed, and the recommendations of this report are modified or verified in writing. In addition, the recommendations can be finalized only by observing actual subsurface conditions revealed during construction. Converse cannot assume responsibility or liability for the recommendations if we are not afforded the opportunity to perform construction observation.

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8.0 REFERENCES

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Drawings

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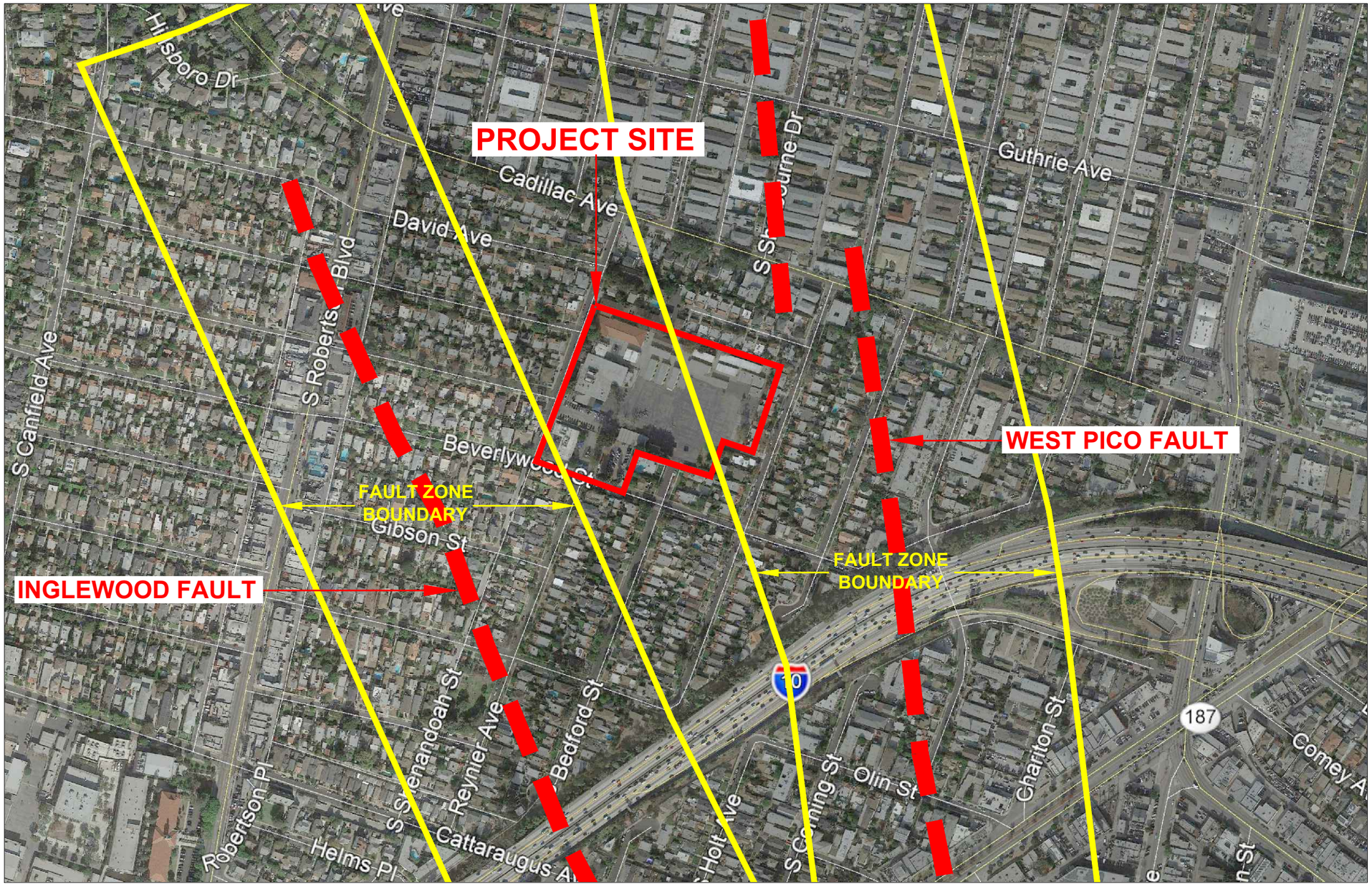

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BE□ERLY HILLS □UADRANGLE□
RE□ISED OFFICIAL MAP RELEASED □ANUARY 11□2018

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APPROXIMATE SCALE IN FEET

EARTHQUAKE FAULT ZONE BOUNDARY MAP

Converse Consultants

SHENANDOAH ELEMENTARY SCHOOL PRO□ECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES□CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

PROJECT NO. 17-31-113-02

DRAWING NO. 1

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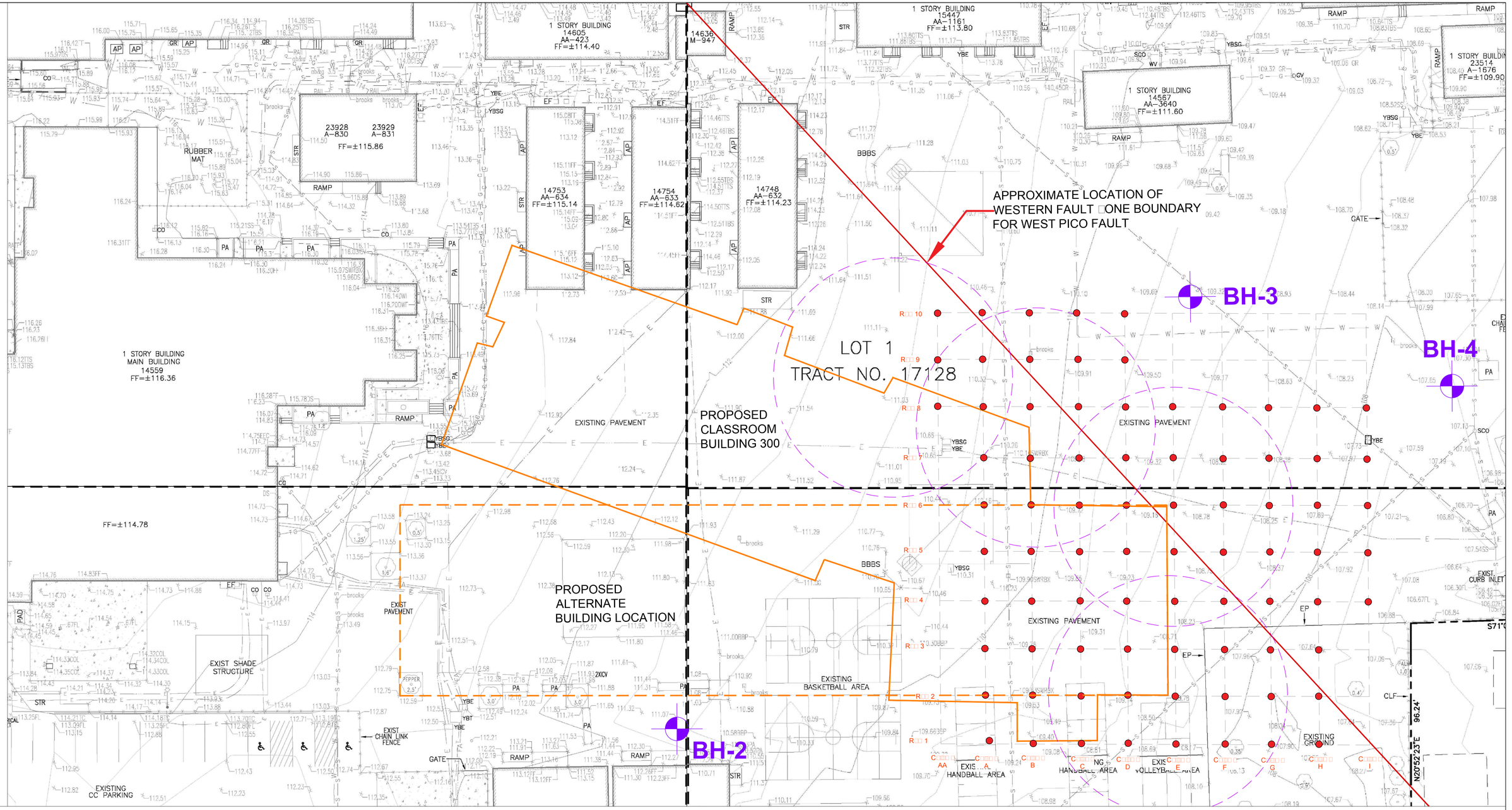

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- CPT SOUNDINGS
- BORINGS 2017
- FAULT ZONE BOUNDARY
- 50' RADIUS FROM BUILDING CORNER
- PROPOSED CLASSROOM BUILDING FOOTPRINT

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APPROXIMATE SCALE IN FEET

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SITE PLAN AND LOCATION OF CONE PENETRATION TEST (CPT) SOUNDINGS AND SOIL BORINGS

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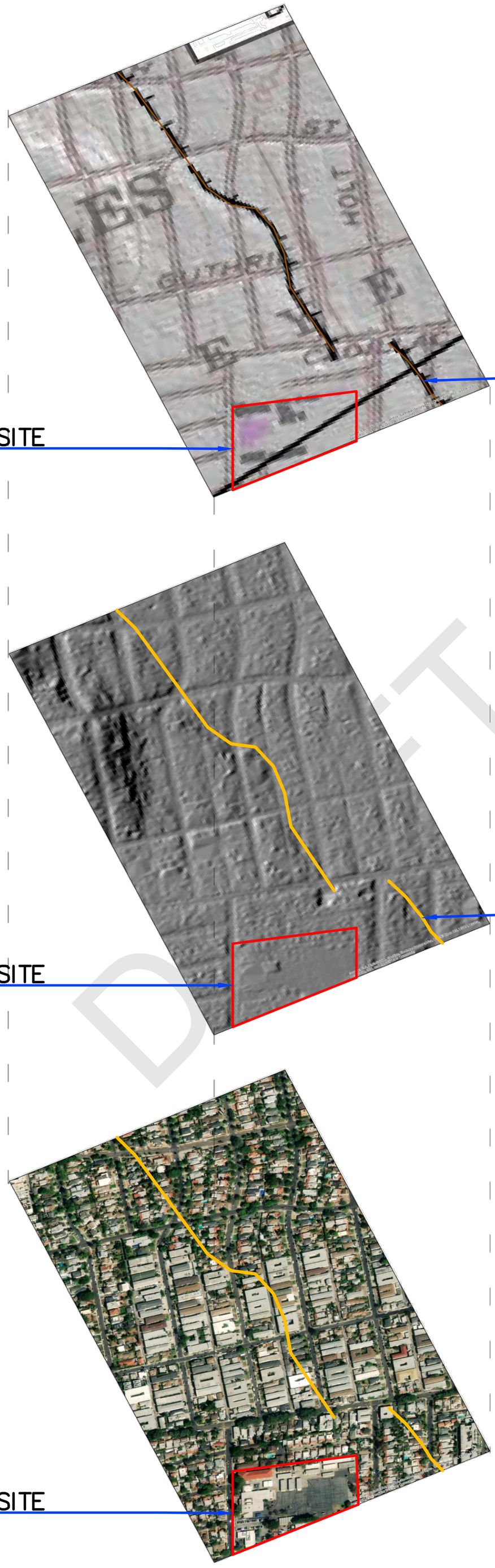
SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. 17-31-113-02

Drawing No. 2



BALLONA CREEK WETLANDS AND FAULT SCARP MAP

MAPPED FAULT TRACE

LOS ANGELES COUNTY (2006) LIDAR IMAGE MAP WITH 2.5 METER FAULT SCARP

WEST PICO FAULT SCARP

PRESENT DAY DEVELOPMENT WITH FAULT SCARP TRACE OVERLAY.

WEST PICO FAULT LIDAR SCARP LOCATION MAP

LEGEND

SCHOOL

"SCARP TRACE"

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LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. 17-31-113-02

Drawing No. 3

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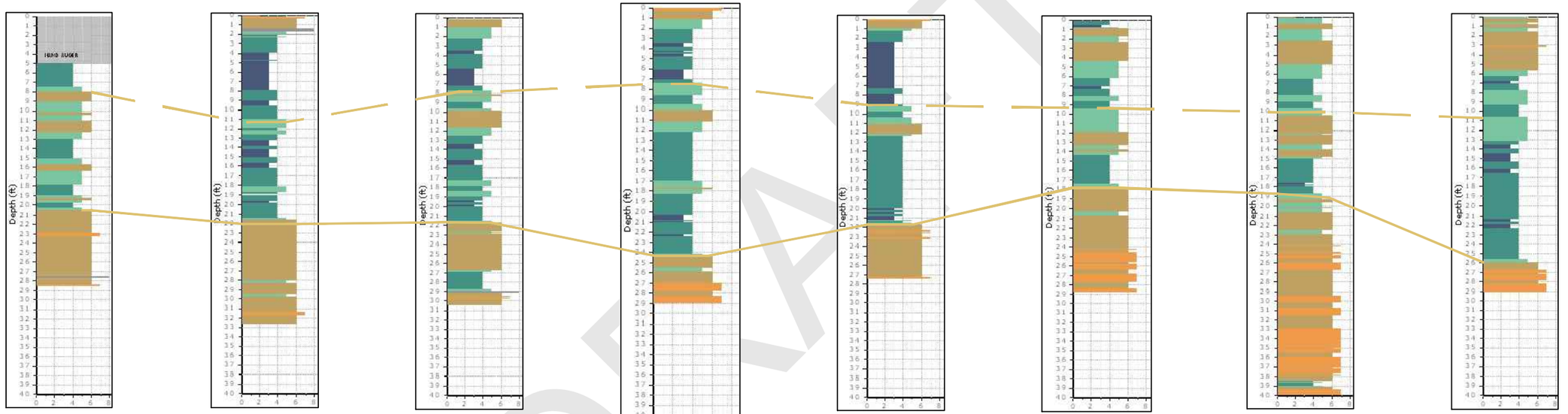
ROW 1



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LEGEND

LOWER SAND BOUNDARY

UPPER SAND BOUNDARY

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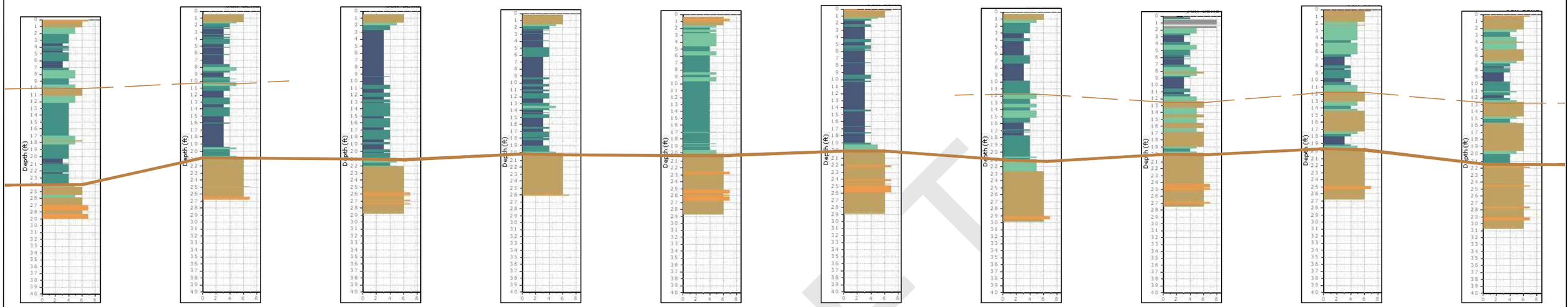
CPT CROSS SECTION–ROW 1

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

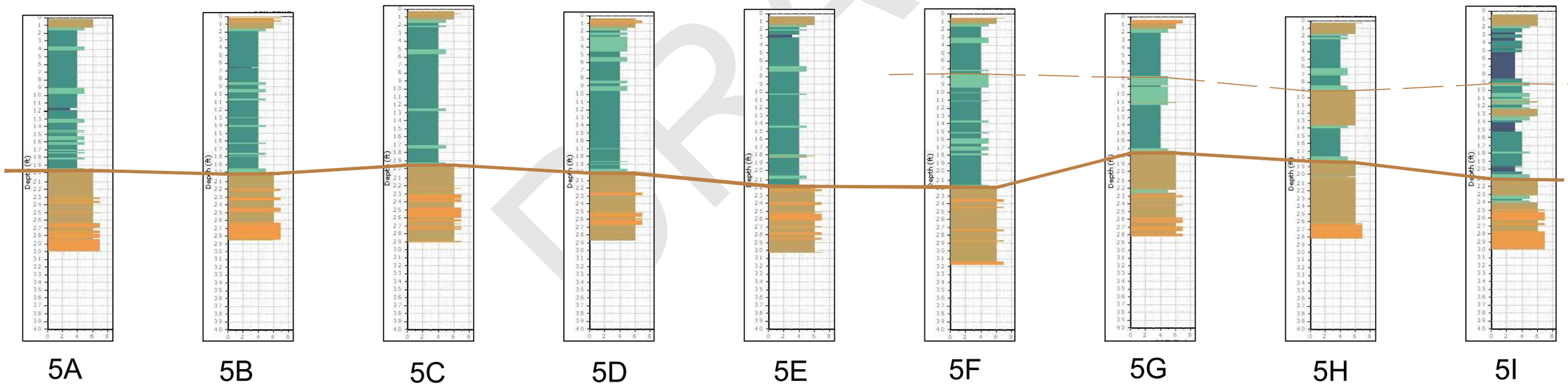
PROJECT NO. 17–31–113–02

DRAWING NO. 4

COLUMN LINE D



ROW 5



LEGEND

LOWER SAND BOUNDARY

UPPER SAND BOUNDARY

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CPT CROSS SECTIONS - COLUMN LINE D AND ROW 5

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

PROJECT NO. 17-31-113-02

DRAWING NO. 5

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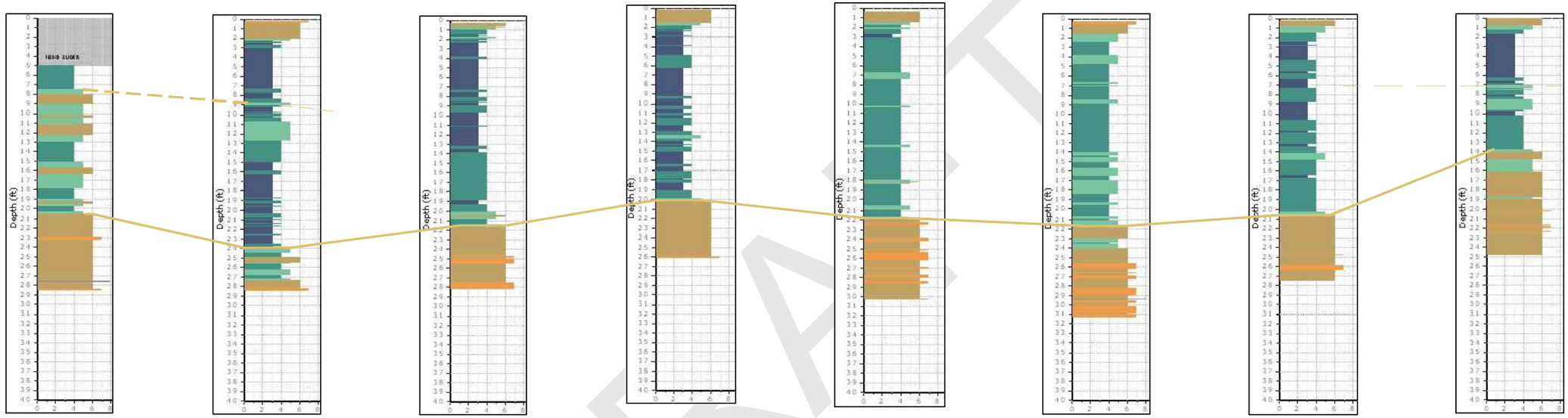
NORTH EAST DIAGONAL SECTION



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LEGEND

LOWER SAND BOUNDARY

UPPER SAND BOUNDARY

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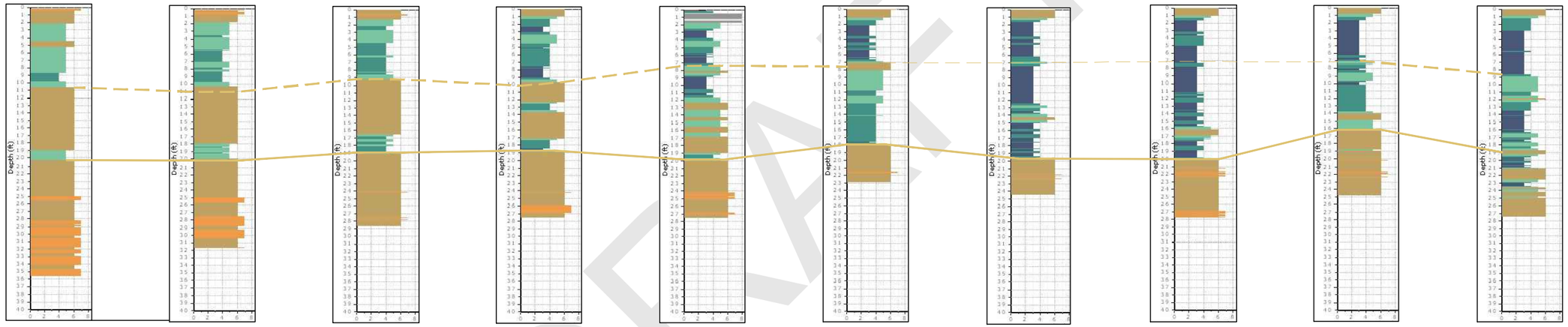
CPT CROSS SECTION – NORTHEAST

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

PROJECT NO. 17–31–113–02

DRAWING NO. 6

ROW 8



8AA 8A 8B 8C 8D 8E 8F 8G 8H 8I

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LEGEND

LOWER SAND BOUNDARY

UPPER SAND BOUNDARY

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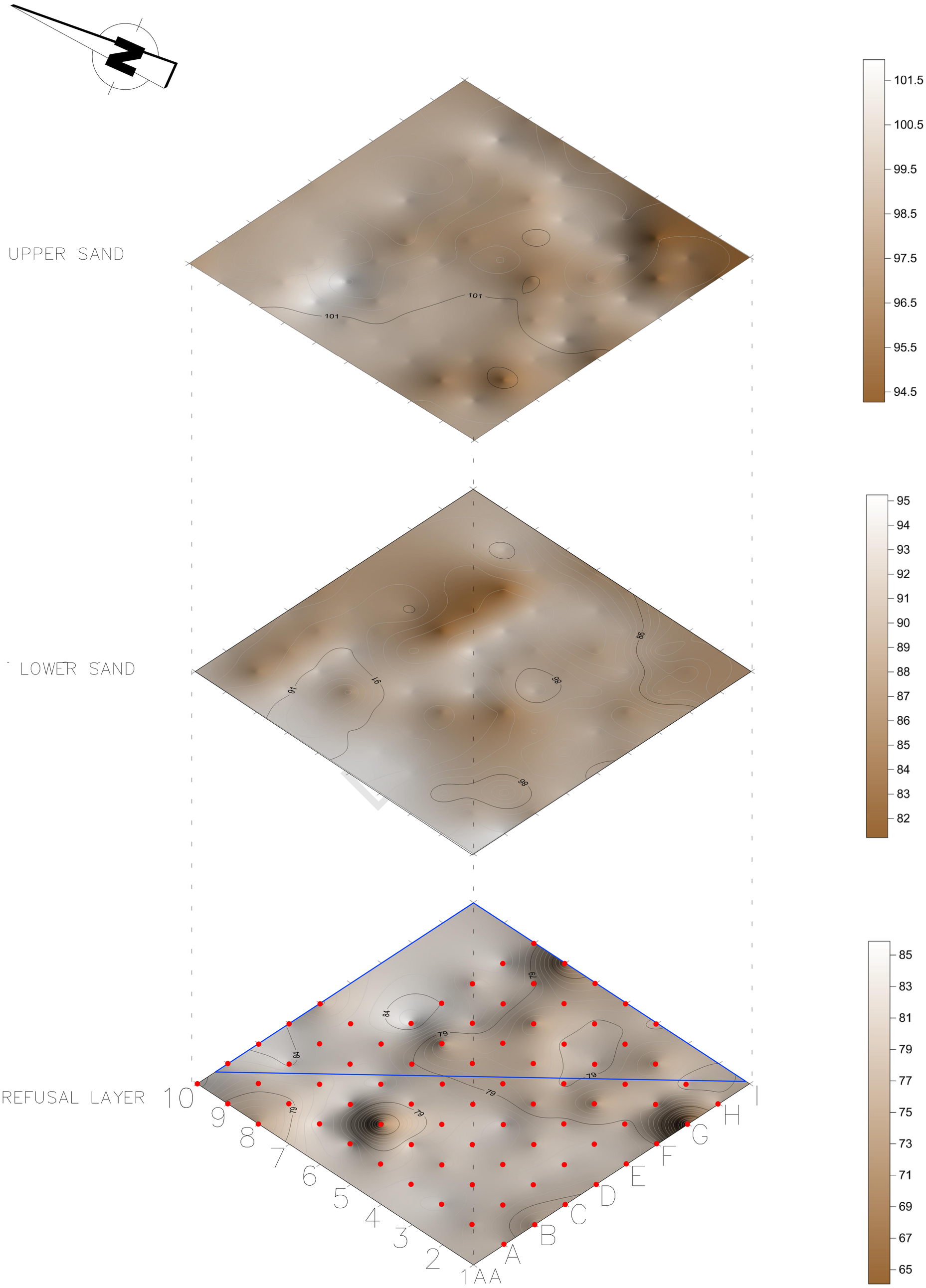
CPT CROSS SECTION– ROW 8

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

PROJECT NO. 17–31–113–02

DRAWING NO. 7



UPPER AND LOWER SAND MARKER BEDS AND REFUSAL LAYER CONTOUR MAPS

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LEGEND .

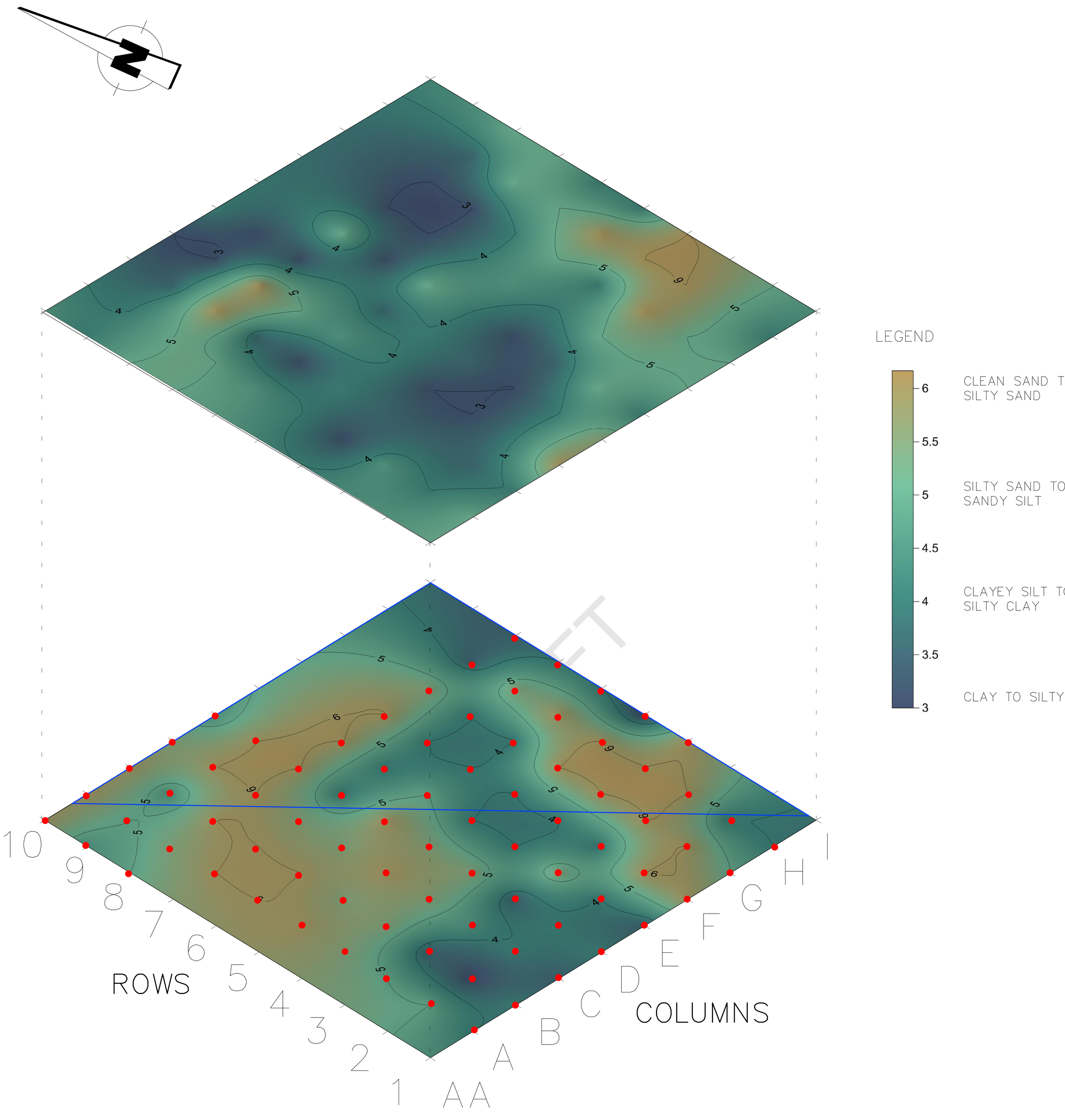
FAULT ZONE BOUNDARY

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No.
17-31-113-02

Drawing No.
8

I:\ACADDRAWINGS\17\31\113\3DSURFACES.DWG



SEDIMENT MAP AT 10 FEET AND 20 FEET DEPTHS

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LEGEND .

FAULT ZONE BOUNDARY

SHENANDOAH ELEMENTARY SCHOOL
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No.
17-31-113-02

Drawing No.
9

:\ACADDRAWINGS\17\31\113\3DSURFACES.DWG

Appendix A

Field Exploration Data

- Soil Boring Logs
- Cone Penetration Test (CPT) Soundings

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Soil Boring Logs

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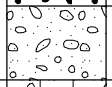
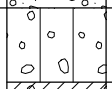
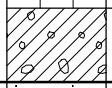
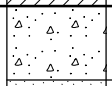
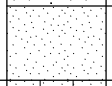
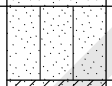
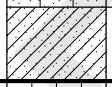
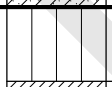
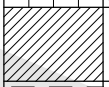
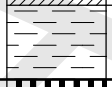
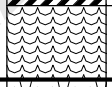
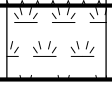
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SAMPLE TYPE

STANDARD PENETRATION TEST
Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method

DRIVE SAMPLE 2.42" I.D. sampler.

DRIVE SAMPLE No recovery

BULK SAMPLE

GRAB SAMPLE

GROUNDWATER WHILE DRILLING

GROUNDWATER AFTER DRILLING

BORING LOG SYMBOLS

LABORATORY TESTING ABBREVIATIONS

TEST TYPE
(Results shown in Appendix B)

CLASSIFICATION

Plasticity	pi
Grain Size Analysis	ma
Passing No. 200 Sieve	wa
Sand Equivalent	se
Expansion Index	ei
Compaction Curve	max
Hydrometer	h

STRENGTH

Pocket Penetrometer	p
Direct Shear	ds
Direct Shear (single point)	ds*
Unconfined Compression	uc
Triaxial Compression	tx
Vane Shear	vs
Consolidation	c
Collapse Test	col
Resistance (R) Value	r
Chemical Analysis	ca
Electrical Resistivity	er

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UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-1**

Log of Boring No. BH-1

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 116 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		2" ASPHALT CONCRETE WITH NO BASE						ei,ca max
		FILL (Af): **CLAY (CL):** with sand, dark brown.						
		ALLUVIUM (Qal): **SILTY CLAY (CL):** with sand, dark brown.						
5			■		4/5/6	15	116	c,ds
10			⊠		4/5/6			wa
15			■		7/12/18	18	115	
20		-brown	⊠		3/5/6			wa
25		**SAND (SP):** with gravels up to 3/8" in maximum dimension, light brown.	■		19/48/50(3")	3	103	
30			⊠		22/30/35			

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-2a**

Log of Boring No. BH-1

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 116 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		SAND (SP): gravels up to 1/2" in maximum dimension, light brown.	■		32/50(30")	3	108	
40		**SILTY SAND (SM):** gray.	☒		18/37/42			wa
45		**SAND (SP):** with gravels up to 1/2" in maximum dimension, gray.	■		30/50(3")	23	117	
50			☒		30/50(4")			
		End of boring at 51.5 feet. Groundwater encountered at 44 feet during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-2b**

Log of Boring No. BH-2

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 114 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		3" ASPHALT OVER 2 1/2" BASE						ma
		FILL (Af): **SILTY CLAY (CL):** brown.						
		ALLUVIUM (Qal): **SANDY CLAY (CL):** with gravels up to 3/8" in maximum dimension, brown.						
5			■		17/27/28	7	117	ei
			☒		6/8/17			
10		**SILTY CLAY (CL):** brown.	■		6/12/17	10	100	ds
15		-gravels up to 3/8" in maximum dimension, brown	■		11/17/25	10	100	
20			☒		7/8/8			
25		**CLAY (CL):** brown.	■		11/38/50(4")	15	109	
30		**SAND (SP):** with gravels up to 1" in maximum dimension, brown and gray.	☒		18/24/20			

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-3a**

Log of Boring No. BH-2

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 114 Depth to Water (ft): 44

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		SAND (SP): with gravels up to 1" in maximum dimension, gray.	■		50(5")	6	116	
40			☒		25/50(2")			
45			■		27/50(3')	6	117	
50			■		39/50(4")	8	116	
		End of boring at 51.5 feet. Groundwater encountered at 44 feet during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-3b**

Log of Boring No. BH-3

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 112 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		1 1/2" ASPHALT CONCRETE WITH NO BASE						ma
		FILL (Af): **SILTY SAND (SM):** brown.						
5		**ALLUVIUM (Qal):** **SANDY CLAY (CL):** with gravels up to 1/2" in maximum dimension, brown.	■		5/8/11	8	105	
10		**SAND (SP):** with clay, brown.	■		6/8/12	12	115	
15			■		7/9/14	8	119	
20			■		9/50(4')	9	120	
25		-with gravels up to 1 1/2" in maximum dimension, brown	■		26/50(4")	3	116	
		End of boring at 26.5 feet. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

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Converse Consultants

Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-4**

Log of Boring No. BH-4

Dates Drilled: 4/13/2017 Logged by: MJ Checked By: SKS

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 110 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6"	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		2 1/2" ASPHALT CONCRETE WITH NO BASE						r
		FILL (Af): **CLAY (CL):** with sand, with gravels up to 3/8" in maximum dimension, dark brown.						
		ALLUVIUM (Qal): **SANDY CLAY (CL):** dark brown.						
5			■		4/8/12	18	105	
10			■		5/7/9	10	107	
15			■		6/10/16	15	111	
20			■		5/11/21	16	111	
25		**CLAYEY SAND (SC):** brown.	■		8/9/12	17	107	
		End of boring at 26.5 feet. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings, tamped and patched with cold asphalt concrete on 4-13-17.						

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Project Name
SHENANDOAH ELEMENTARY SCHOOL PROJECT NO. 10368165
2450 SHENANDOAH STREET
LOS ANGELES, CALIFORNIA
FOR: LOS ANGELES UNIFIED SCHOOL DISTRICT

Project No. **17-31-113-01**

Figure No. **A-5**

Cone Penetration Test (CPT) Soundings

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SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

Shenandoah Street Elementary School
Los Angeles, CA
November 19-21, December 17-21, 2018 & January 2, 2019

Prepared for:

Mr. Jordan Cooper
Converse Consultants
717 S. Myrtle Avenue
Monrovia, CA 91016
Office (626) 930-1200 / Fax (626) 930-1212

DRAFT

Prepared by:

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

TABLE OF CONTENTS

1. **INTRODUCTION**
2. **SUMMARY OF FIELD WORK**
3. **FIELD EQUIPMENT & PROCEDURES**
4. **CONE PENETRATION TEST DATA & INTERPRETATION**

APPENDIX

- CPT Plots
- CPT Classification/Soil Behavior Chart
- CPT Data Files (sent via email)

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SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the Shenandoah Street Elementary School project located in Los Angeles, California. The work was performed by Kehoe Testing & Engineering (KTE) on November 19-21, December 17-21, 2018 & January 2, 2019. The scope of work was performed as directed by Converse Consultants personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at 80 locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
C-1A	28	Refusal
C-1C	30	Refusal
C-1D	29	Refusal
C-1E	27	Refusal
C-2A	29	Refusal
C-2C	28	Refusal
C-2D	27	Refusal
C-2E	27	Refusal
C-3A	26	Refusal
C-3C	28	Refusal
C-3D	29	Refusal
C-3E	28	Refusal
C-4A	27	Refusal
C-4F	28	Refusal
C-4G	27	Refusal
C-4H	29	Refusal
C-4I	29	Refusal
C-5A	30	Refusal
C-5B	28	Refusal
C-5C	29	Refusal
C-5D	29	Refusal

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LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
C-5E	30	Refusal
C-5F	32	Refusal
C-5G	28	Refusal
C-5H	28	Refusal
C-5I	30	Refusal
C-6A	27	Refusal
C-6B	42	Refusal
C-6C	29	Refusal
C-6D	29	Refusal
C-6E	31	Refusal
C-6F	31	Refusal
C-6G	34	Refusal
C-6H	31	Refusal
C-6I	32	Refusal
C-7A	27	Refusal
C-7B	27	Refusal
C-7C	25	Refusal
C-7D	30	Refusal
C-7E	33	Refusal
C-7F	27	Refusal
C-7G	27	Refusal
C-7H	29	Refusal
C-7I	37	Refusal
C-8A	32	Refusal
C-8AA	36	Refusal
C-8B	29	Refusal
C-8C	27	Refusal
C-8D	27	Refusal
C-8E	23	Refusal
C-8F	24	Refusal
C-8G	28	Refusal
C-8H	25	Refusal
C-8I	28	Refusal
C-9A	30	Refusal
C-9AA	32	Refusal
C-9B	25	Refusal
C-9C	27	Refusal
C-9D	27	Refusal
C-10A	27	Refusal
C-10AA	25	Refusal
C-10B	25	Refusal
C-10C	26	Refusal
C-10D	31	Refusal
C-B1	33	Refusal
C-B2	28	Refusal
C-B3	28	Refusal
C-B4	29	Refusal

DRAFT

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
C-C4	27	Refusal
C-D4	26	Refusal
C-E4	31	Refusal
C-F1	29	Refusal
C-F2	28	Refusal
C-F3	33	Refusal
C-G1	43	Refusal
C-G2	29	Refusal
C-G3	30	Refusal
C-H1	29	Refusal
C-H2	27	Refusal
C-H3	32	Refusal

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone and recorded the following parameters at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil classification on the CPT plots is derived from the attached CPT Classification Chart (Robertson) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

DRAFT

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Steven P. Kehoe

Steven P. Kehoe
President

01/09/19-hh-9881-3

DRAFT

APPENDIX

DRAFT

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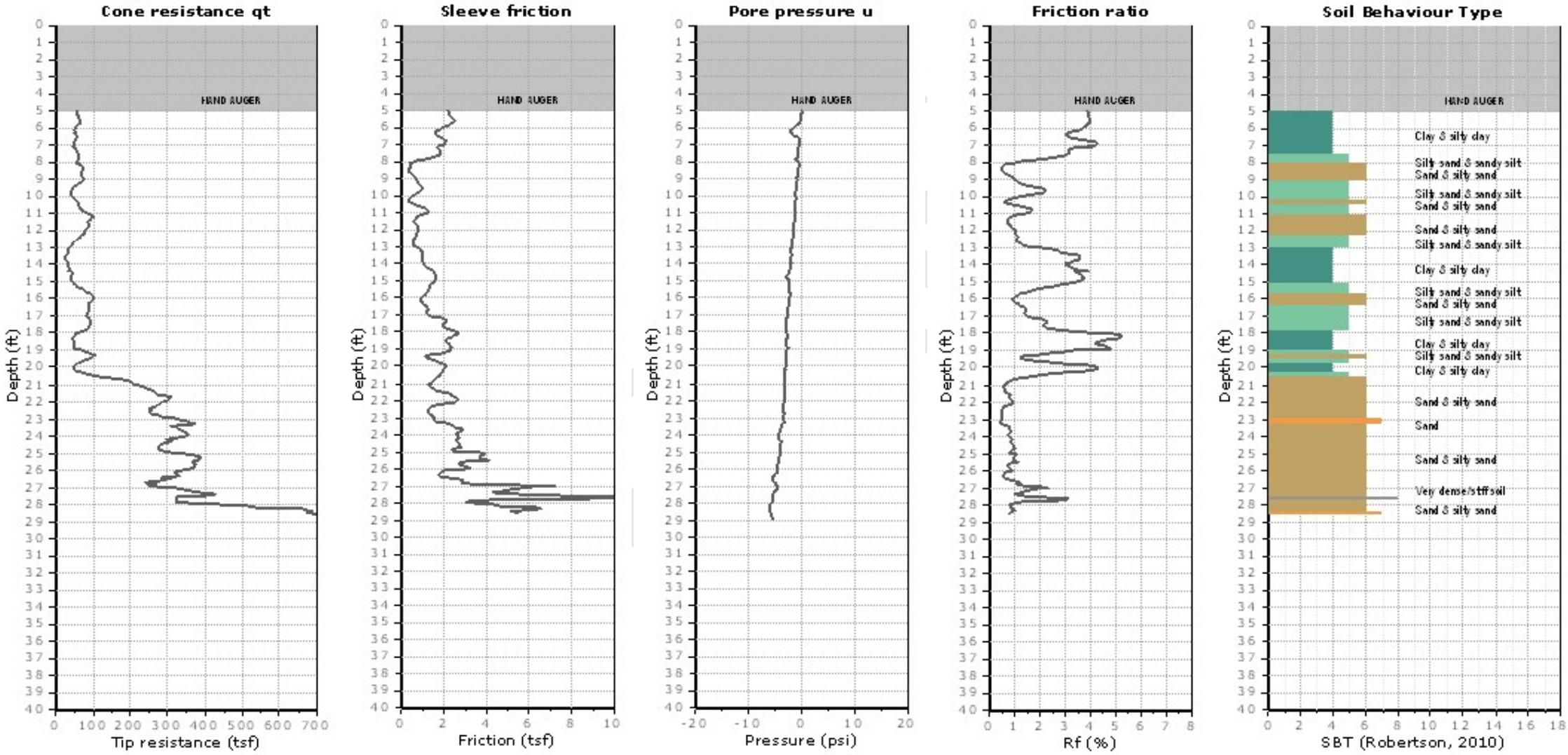
C-1A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.95 ft, Date: 11/21/2018
Cone Type: Vertek



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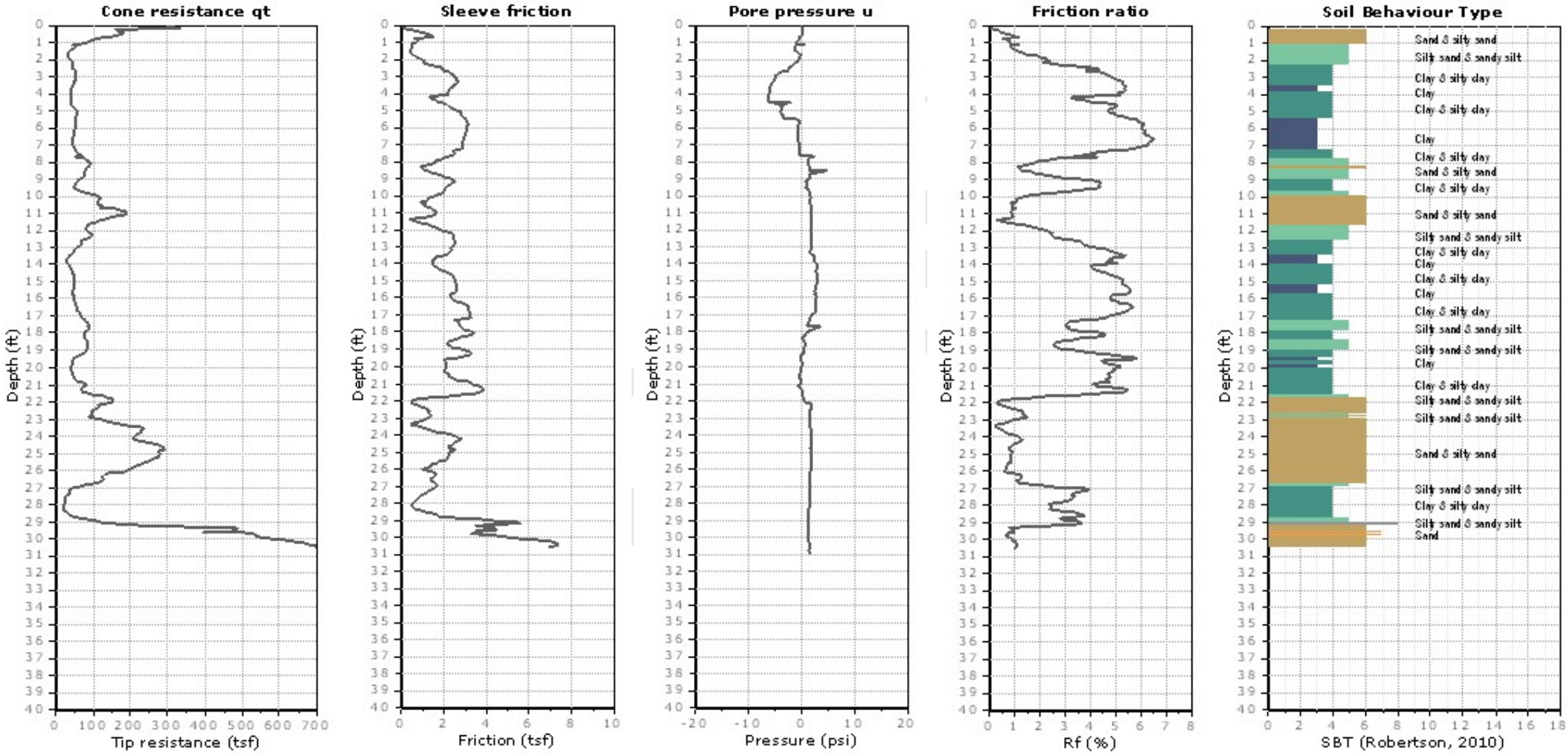
C-1C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.91 ft, Date: 12/20/2018
Cone Type: Vertek



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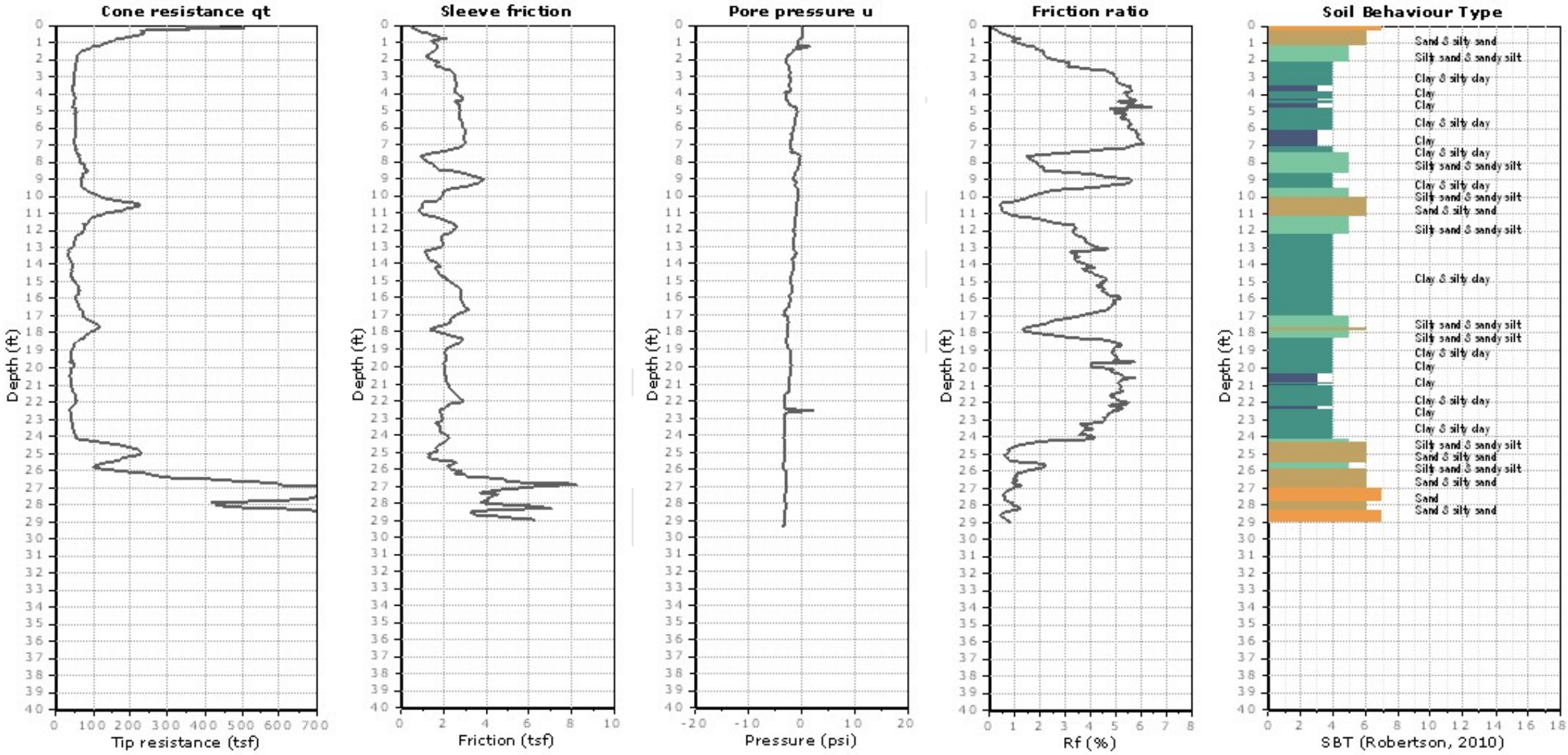
C-1D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.41 ft, Date: 12/21/2018
Cone Type: Vertek



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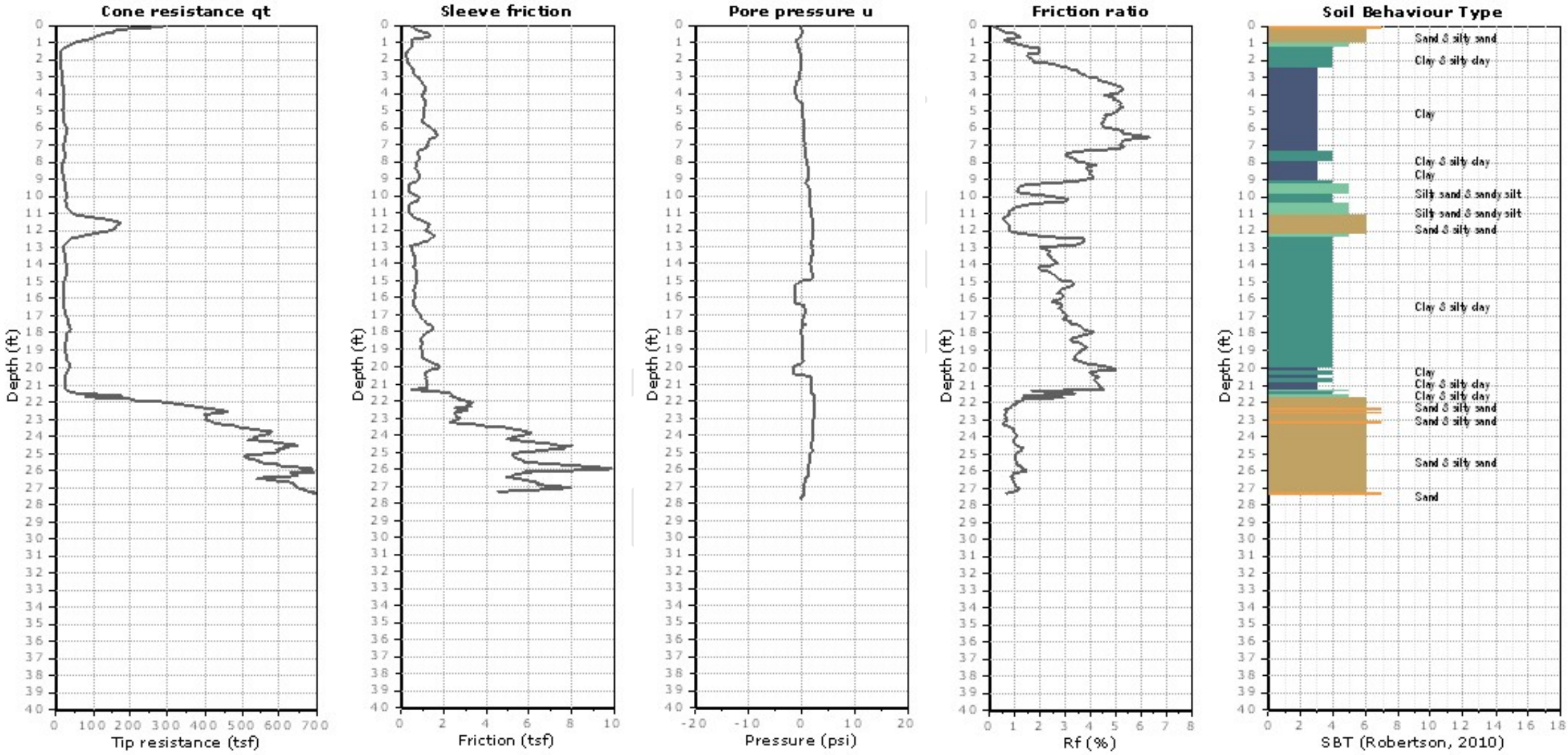
C-1E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.76 ft, Date: 12/21/2018
Cone Type: Vertek



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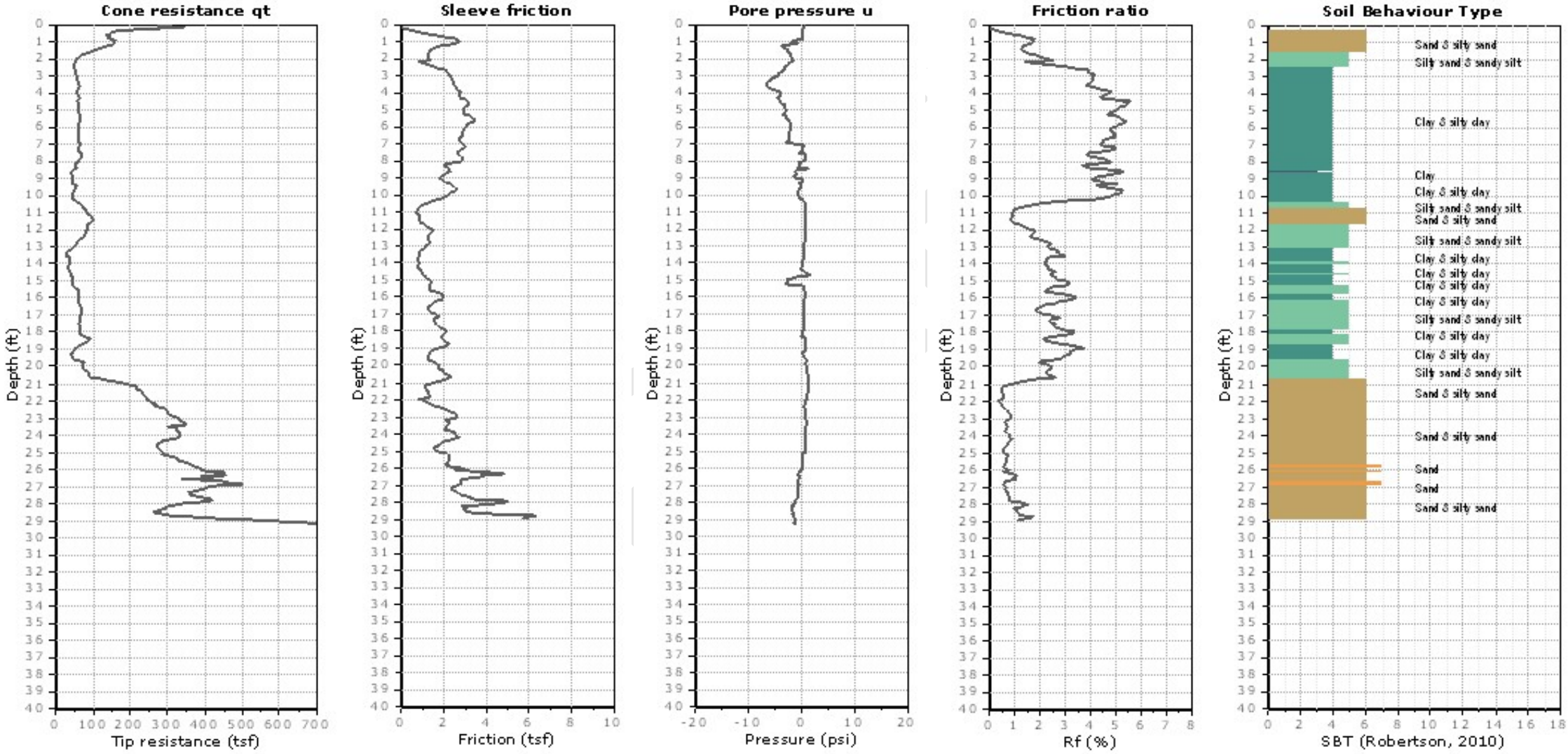
C-2A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.33 ft, Date: 11/21/2018
Cone Type: Vertek



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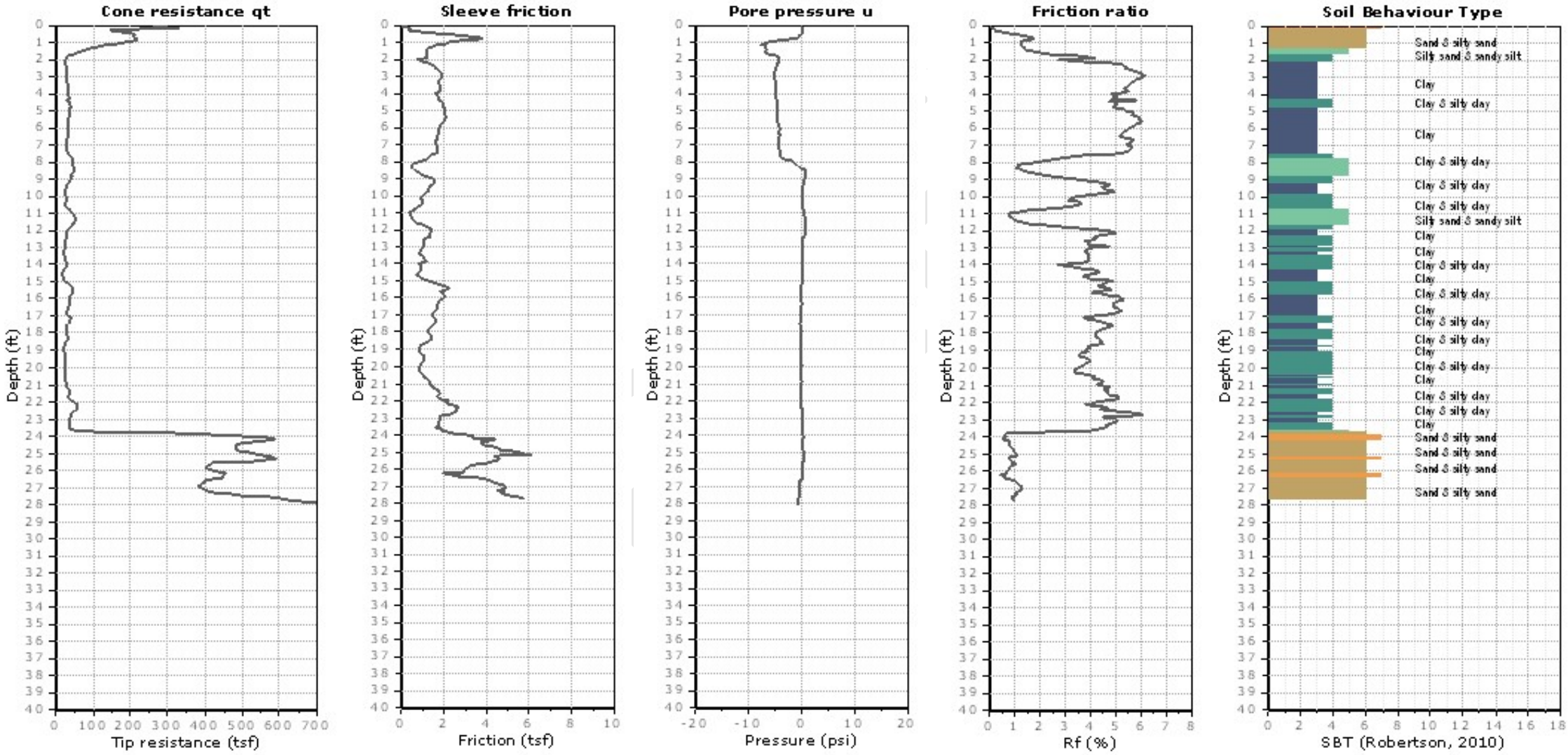
C-2C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.10 ft, Date: 12/20/2018
Cone Type: Vertek



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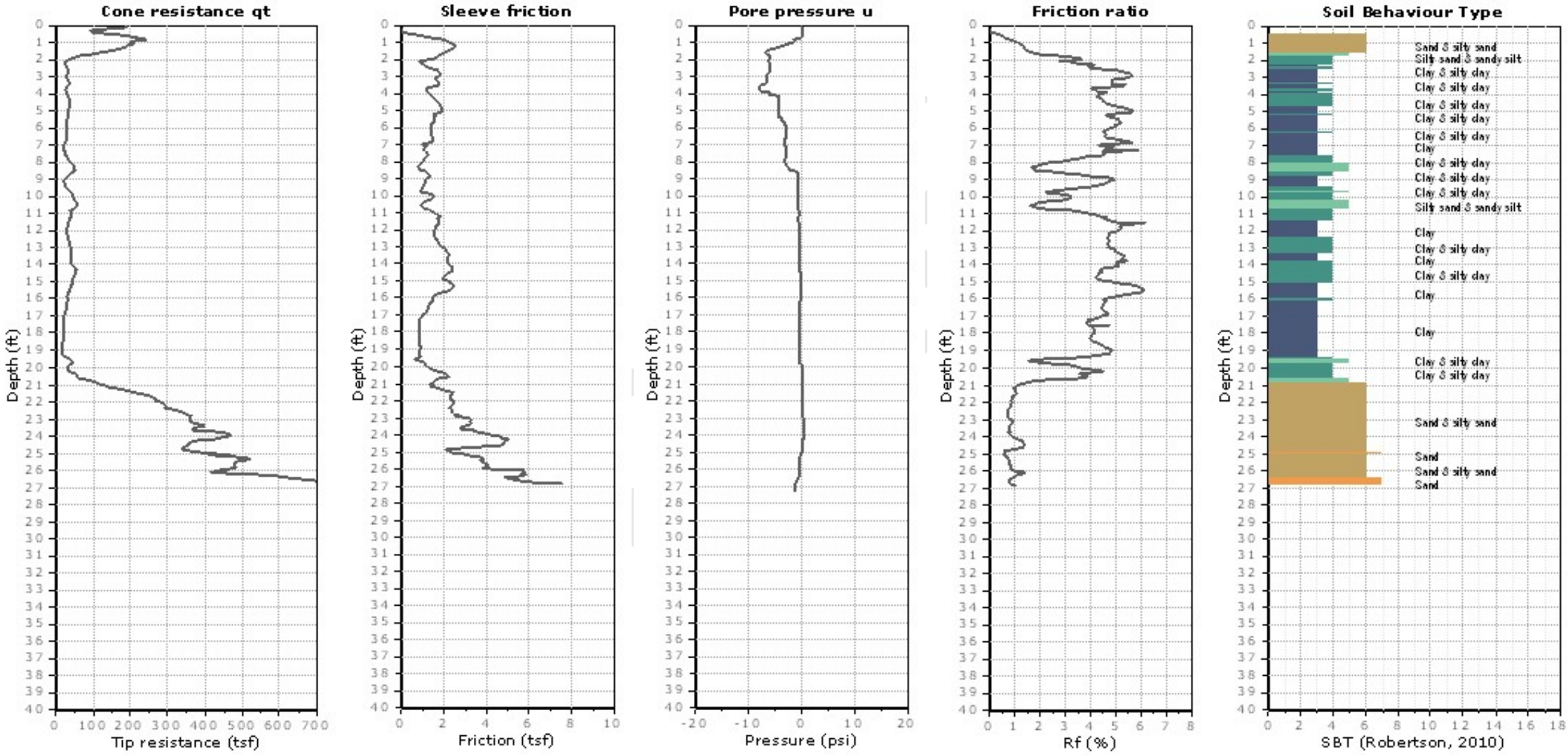
C-2D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.32 ft, Date: 12/20/2018
Cone Type: Vertek



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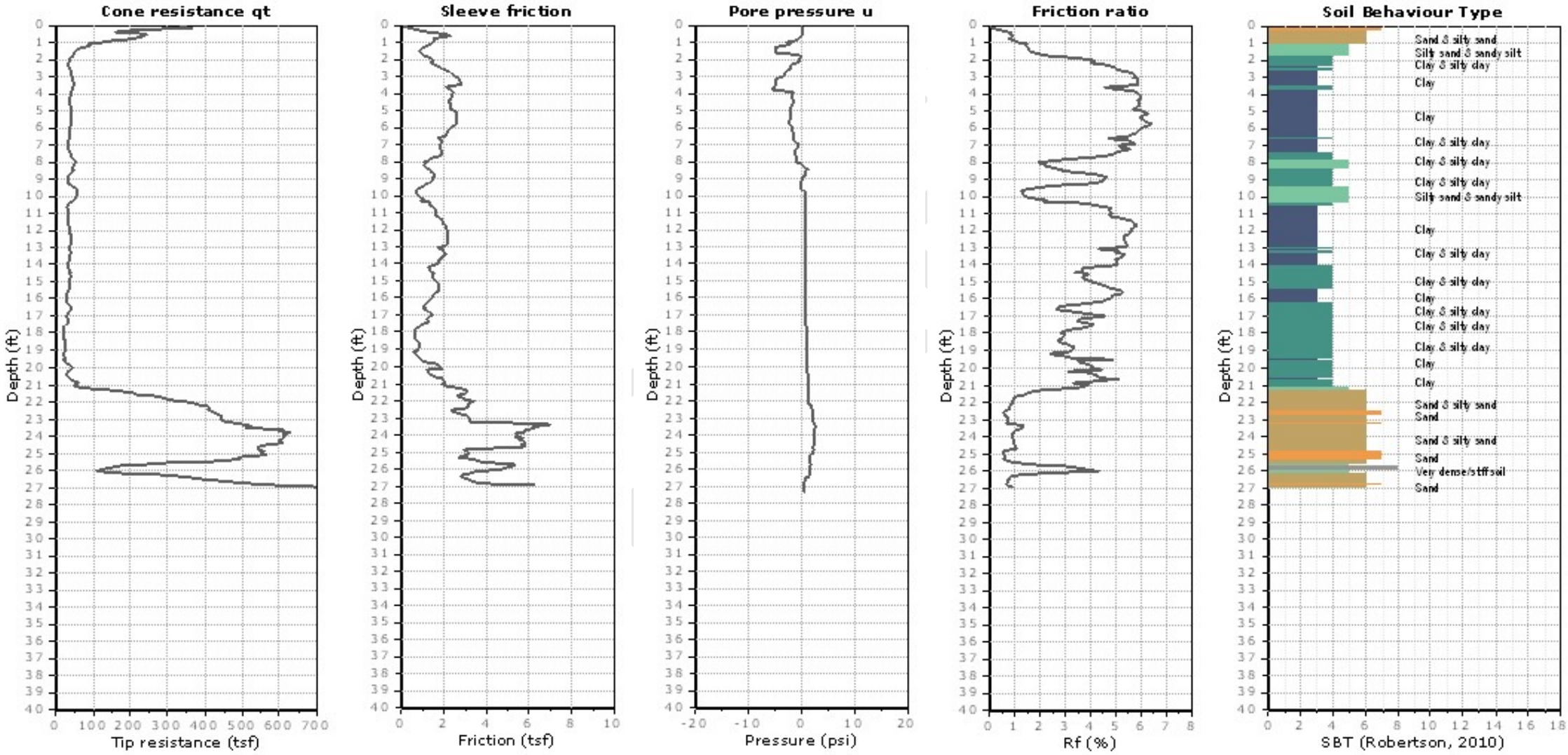
C-2E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.37 ft, Date: 12/20/2018
Cone Type: Vertek



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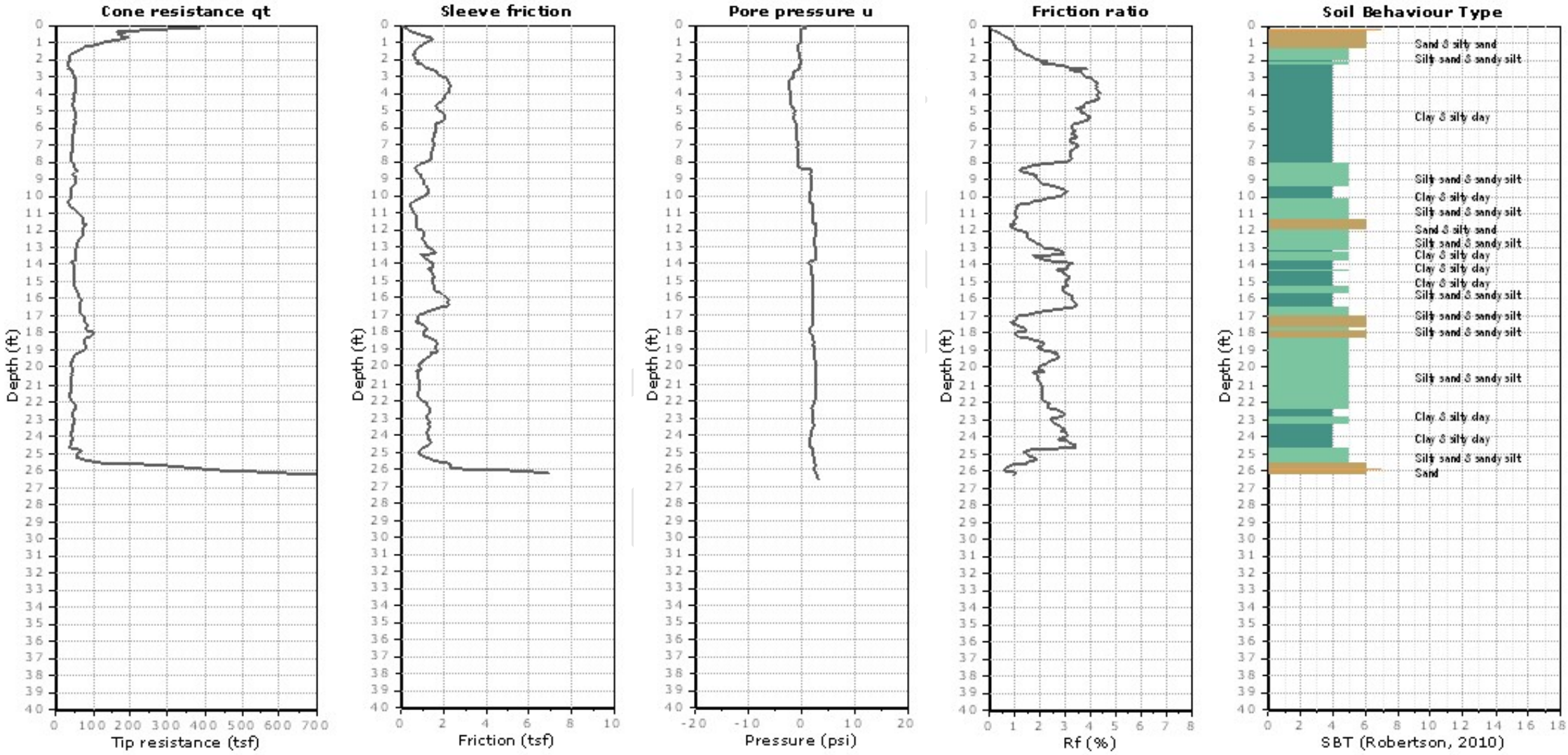
C-3A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 26.65 ft, Date: 11/21/2018
Cone Type: Vertek



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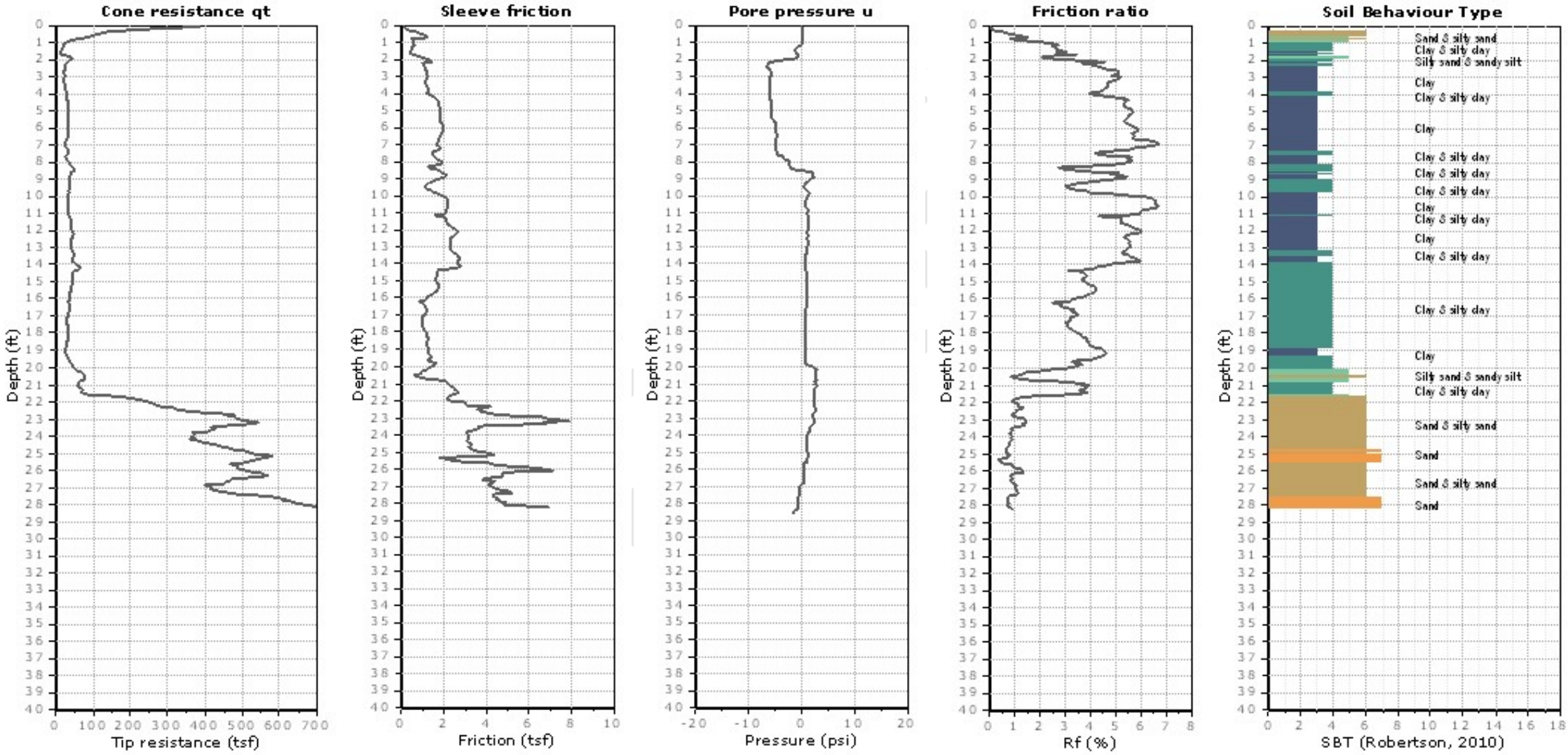
C-3C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.63 ft, Date: 12/20/2018
Cone Type: Vertek



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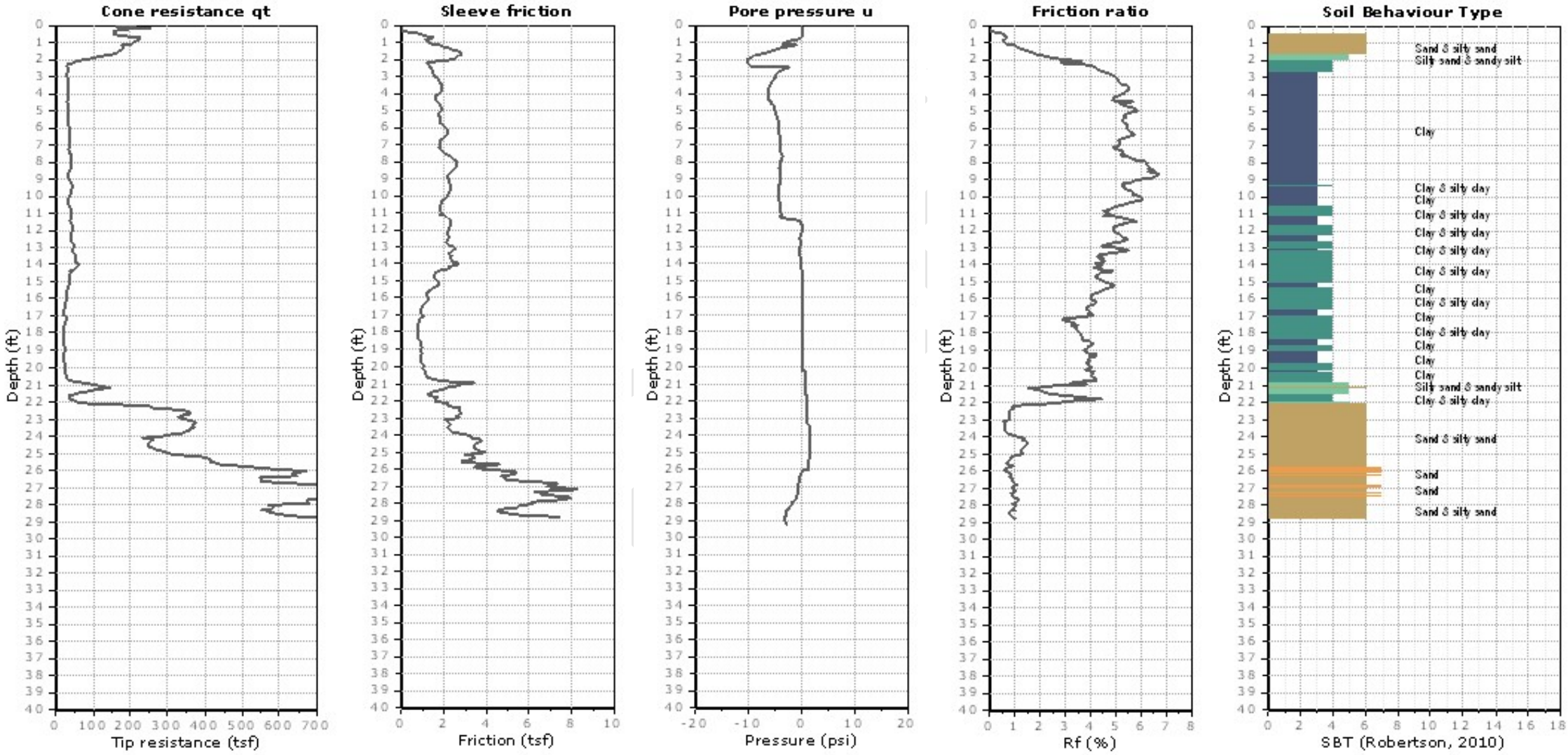
C-3D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.22 ft, Date: 12/20/2018
Cone Type: Vertek



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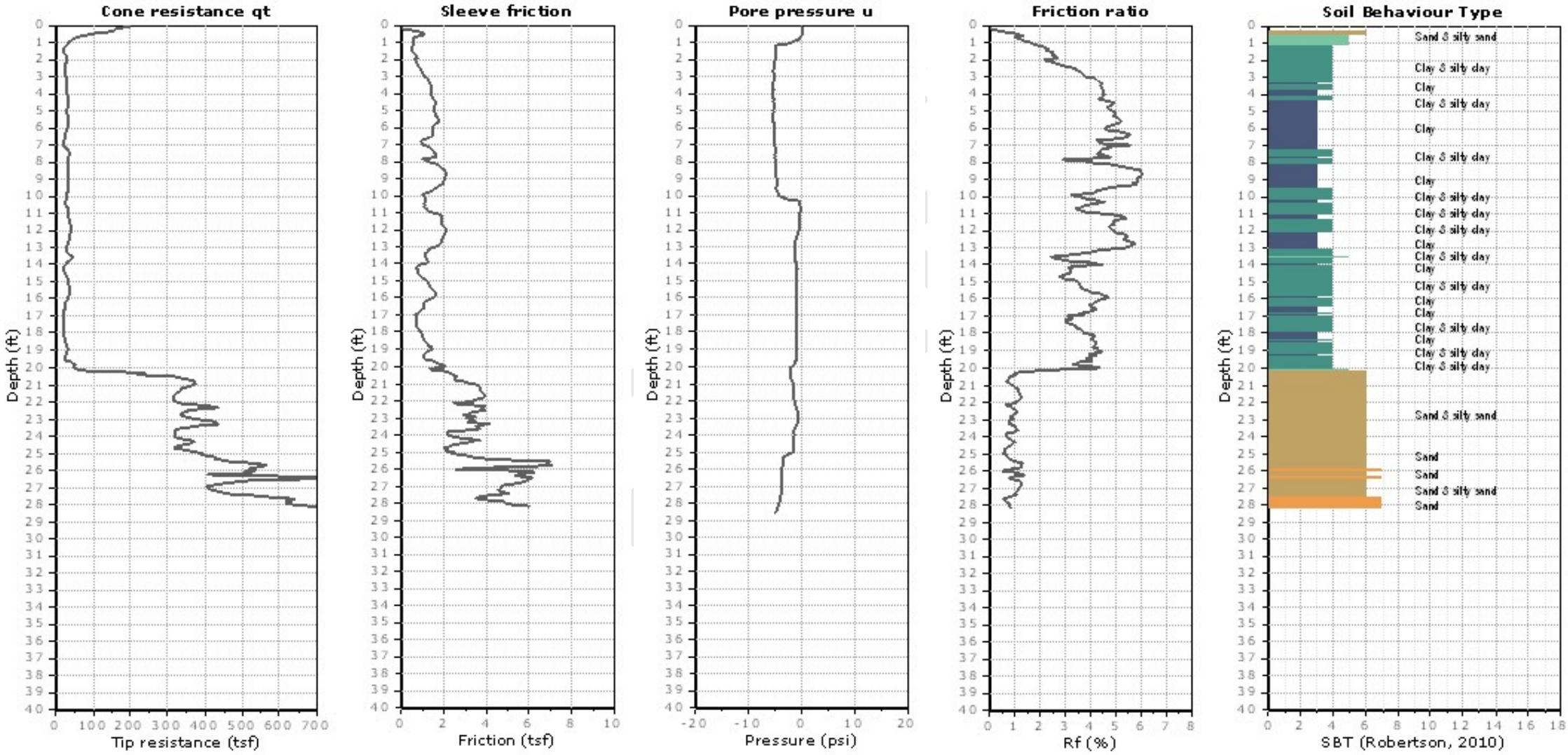
C-3E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.56 ft, Date: 12/20/2018
Cone Type: Vertek



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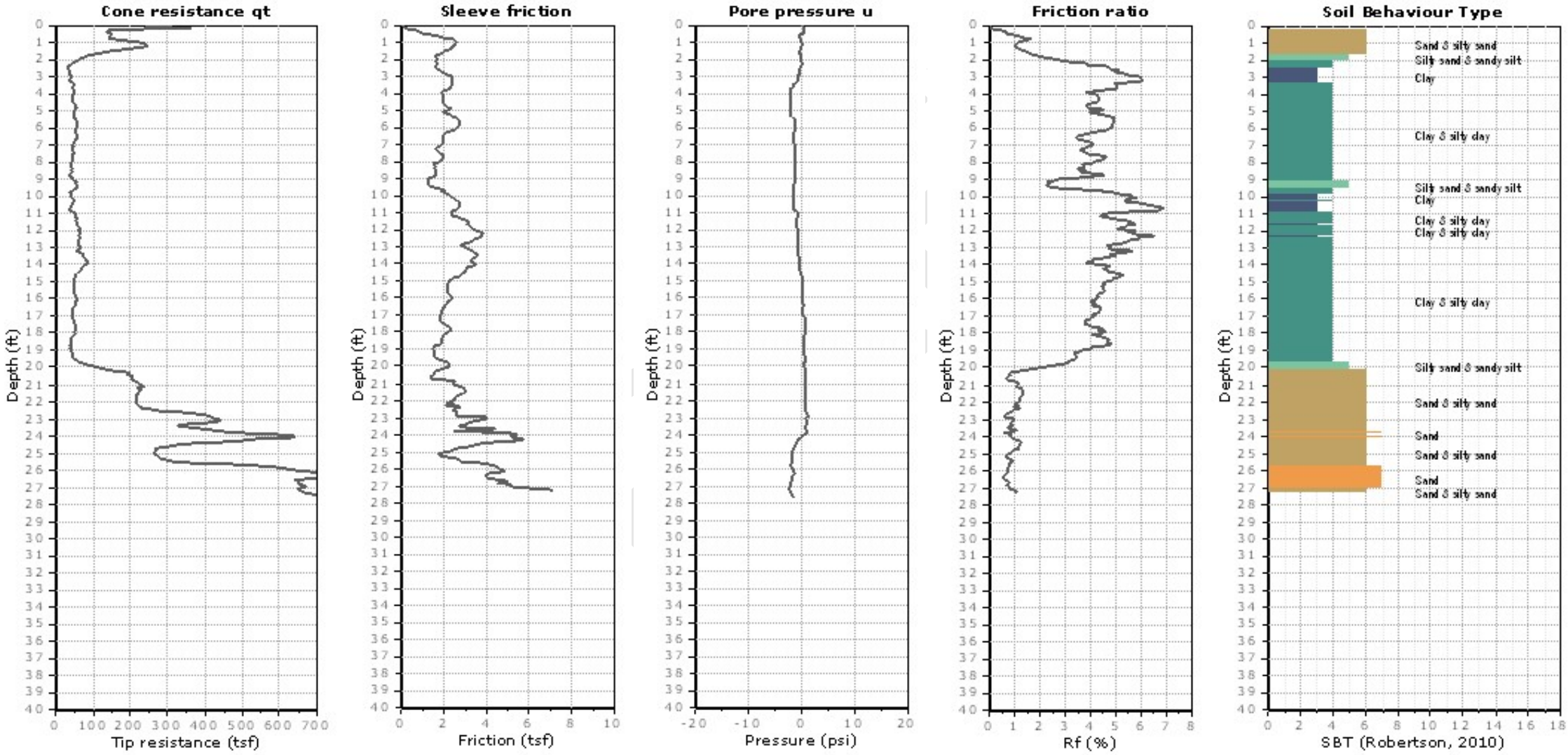
C-4A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.63 ft, Date: 11/21/2018
Cone Type: Vertek



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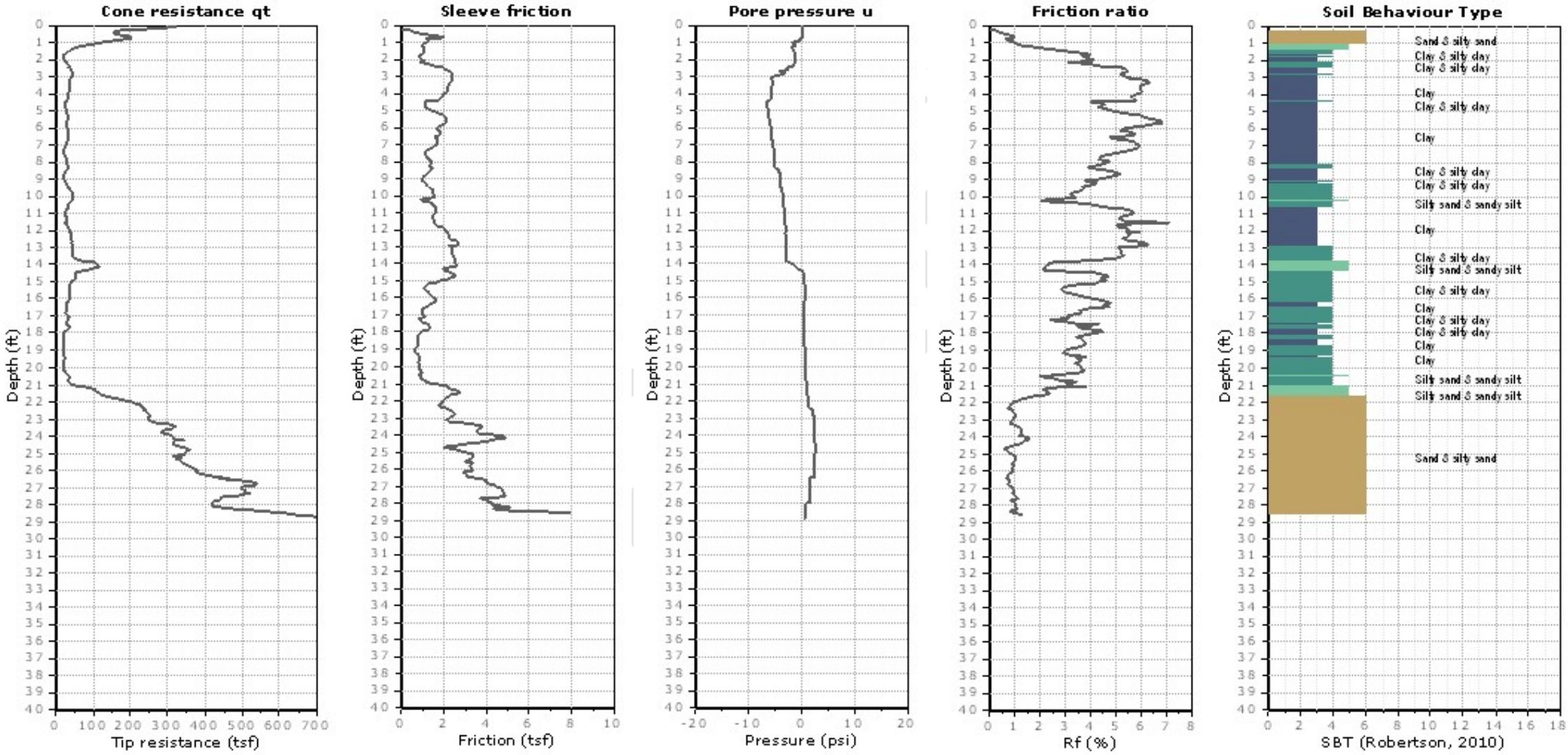
C-4F

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.94 ft, Date: 12/20/2018
Cone Type: Vertek



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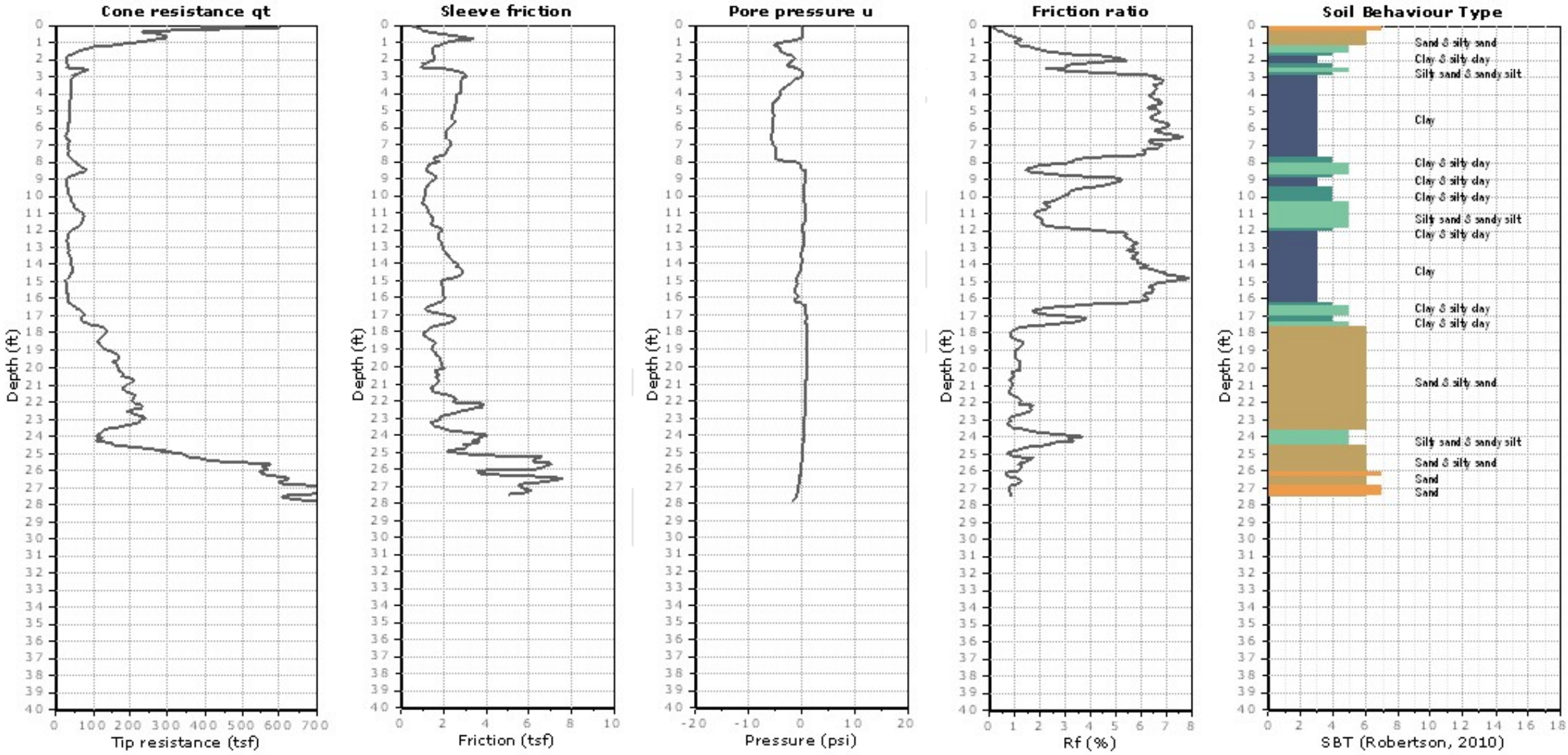
C-4G

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.90 ft, Date: 12/20/2018
Cone Type: Vertek



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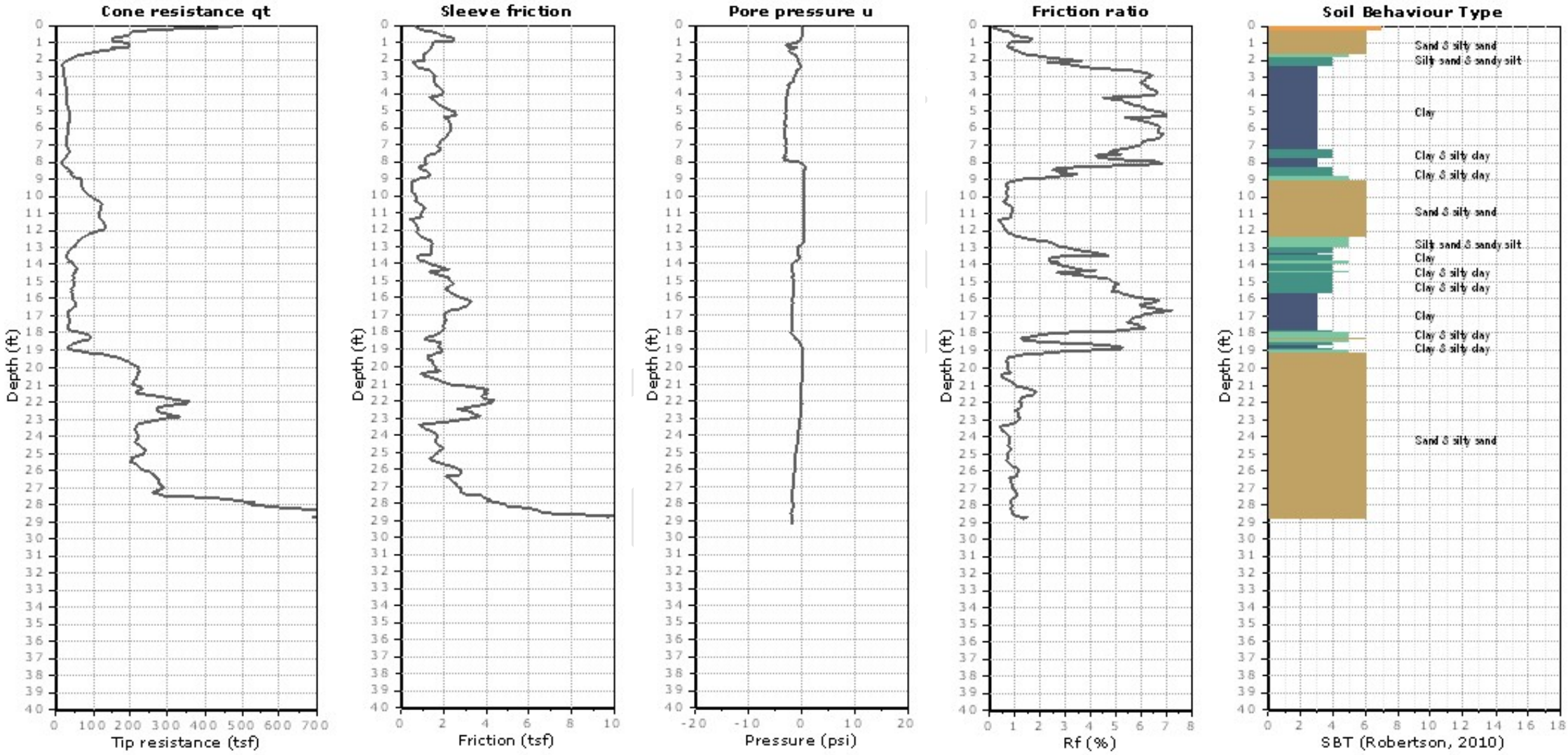
C-4H

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.22 ft, Date: 12/20/2018
Cone Type: Vertek



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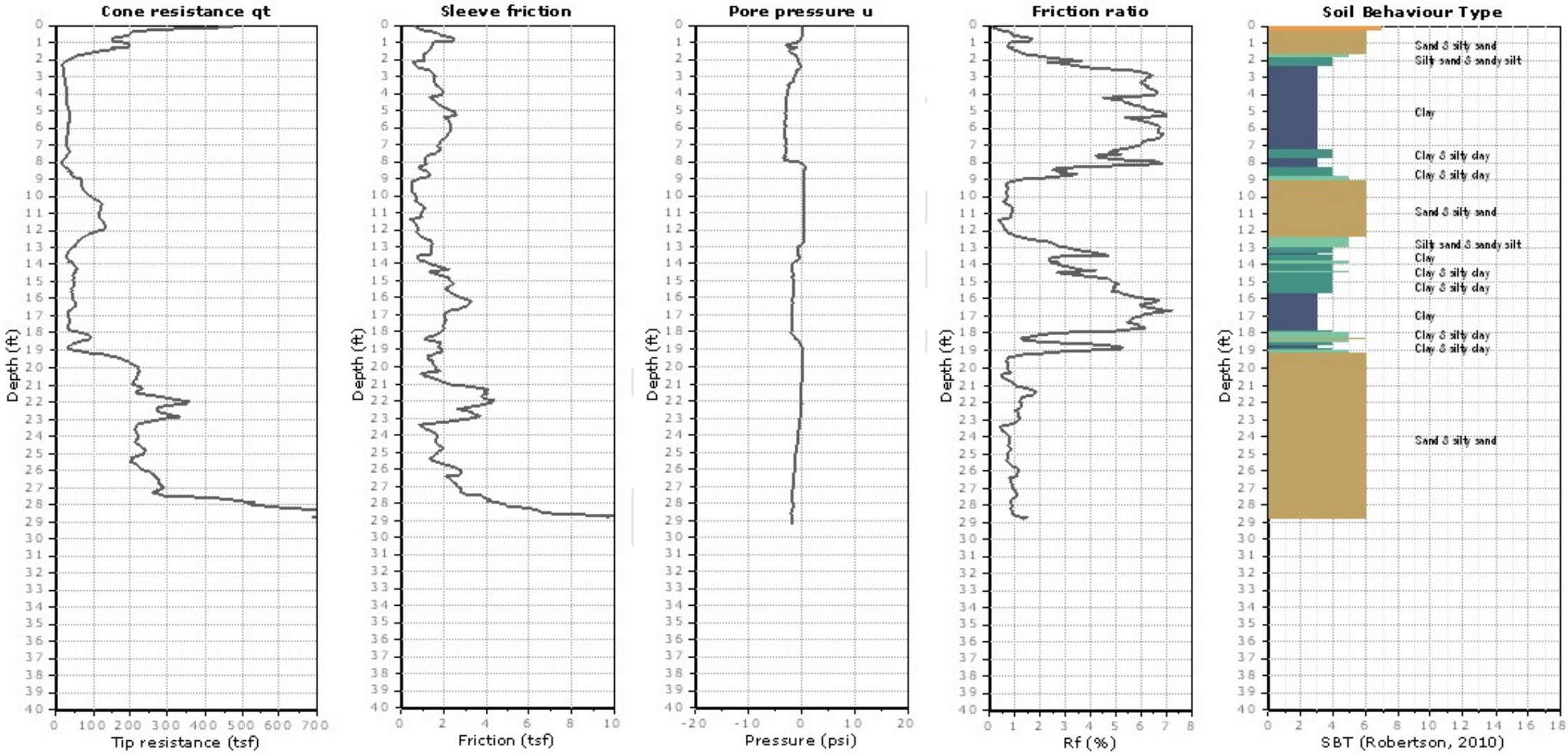
C-4I

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.22 ft, Date: 12/20/2018
Cone Type: Vertek



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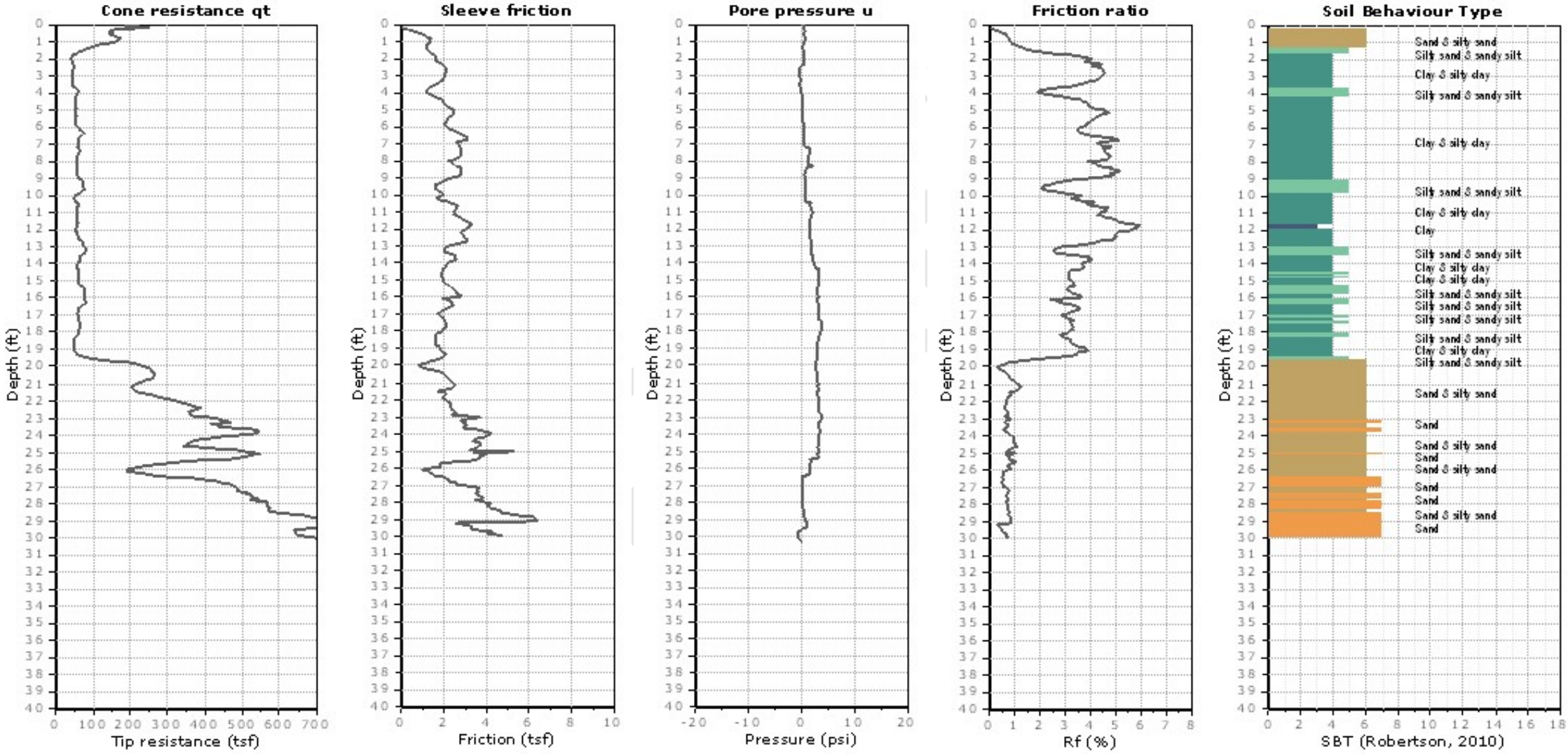
C-5A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.32 ft, Date: 11/21/2018
Cone Type: Vertek



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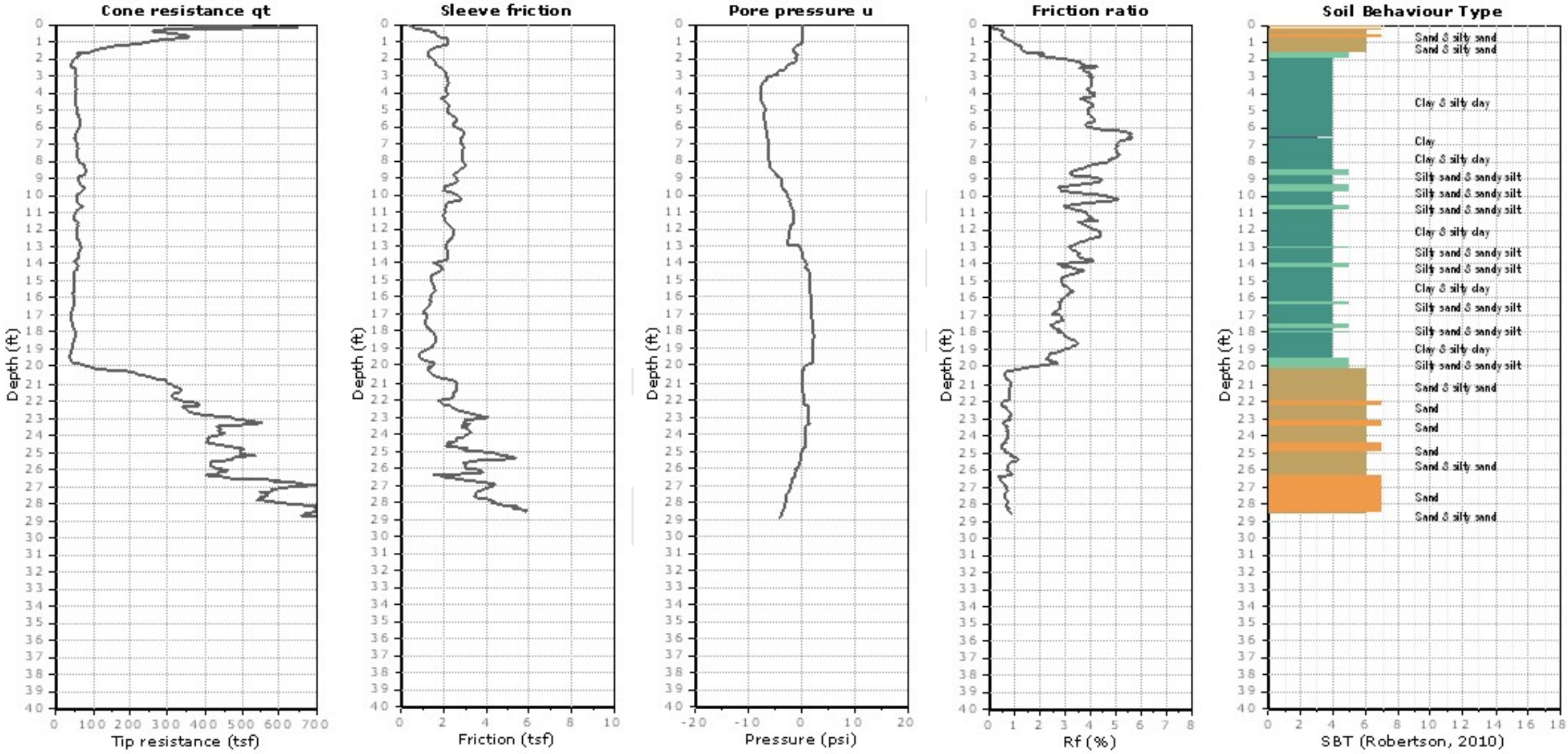
C-5B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.94 ft, Date: 11/21/2018
Cone Type: Vertek



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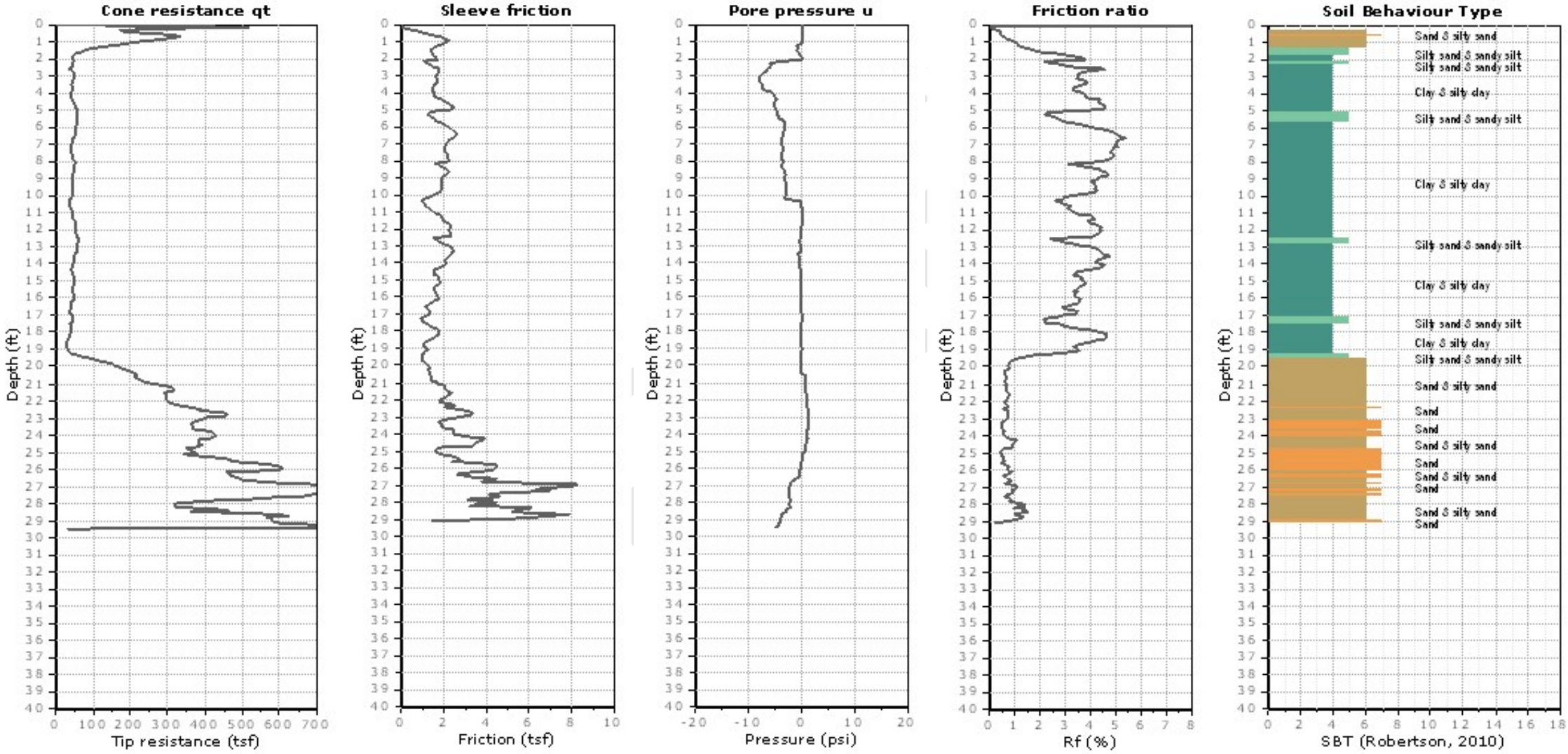
C-5C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.47 ft, Date: 11/21/2018
Cone Type: Vertek



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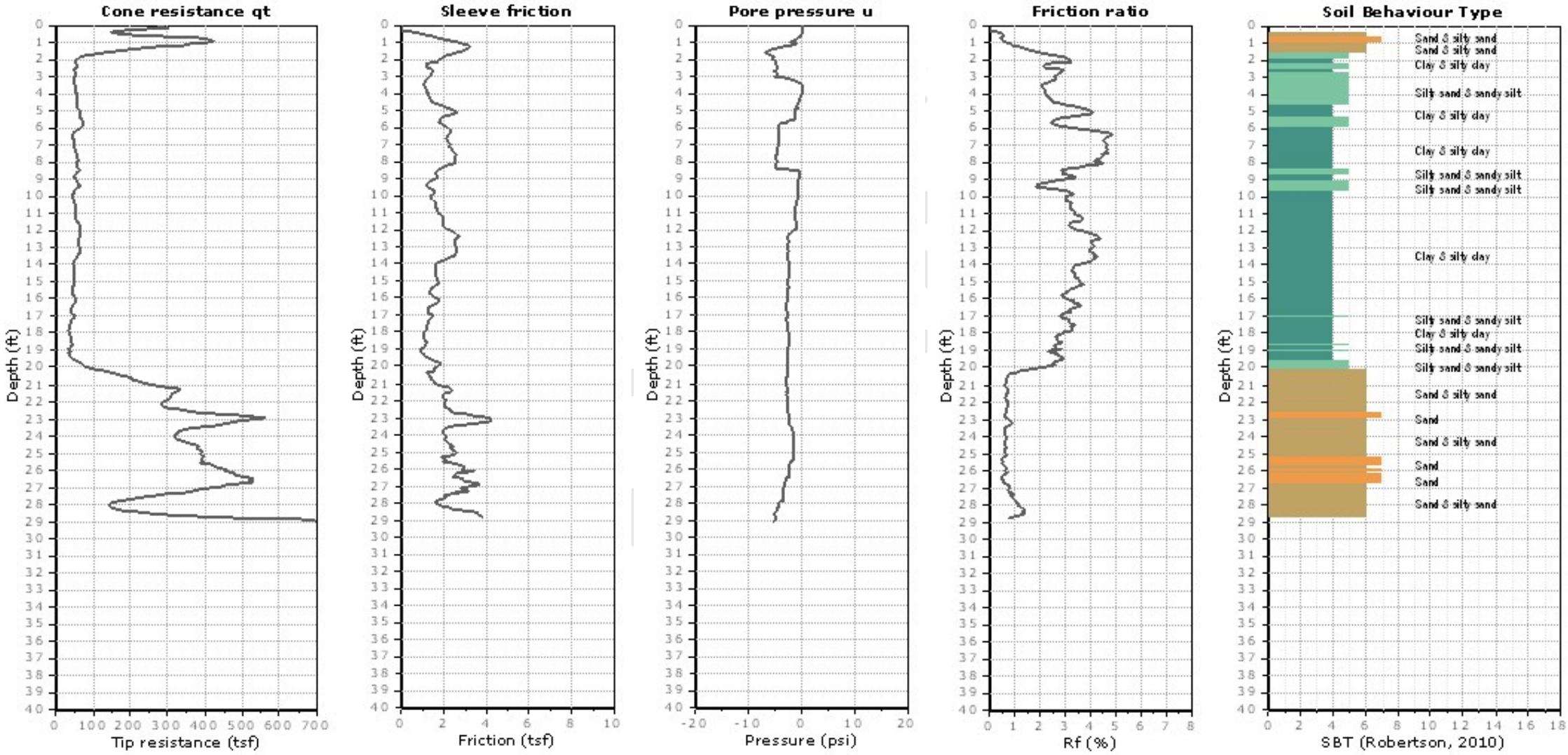
C-5D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.14 ft, Date: 11/21/2018
Cone Type: Vertek



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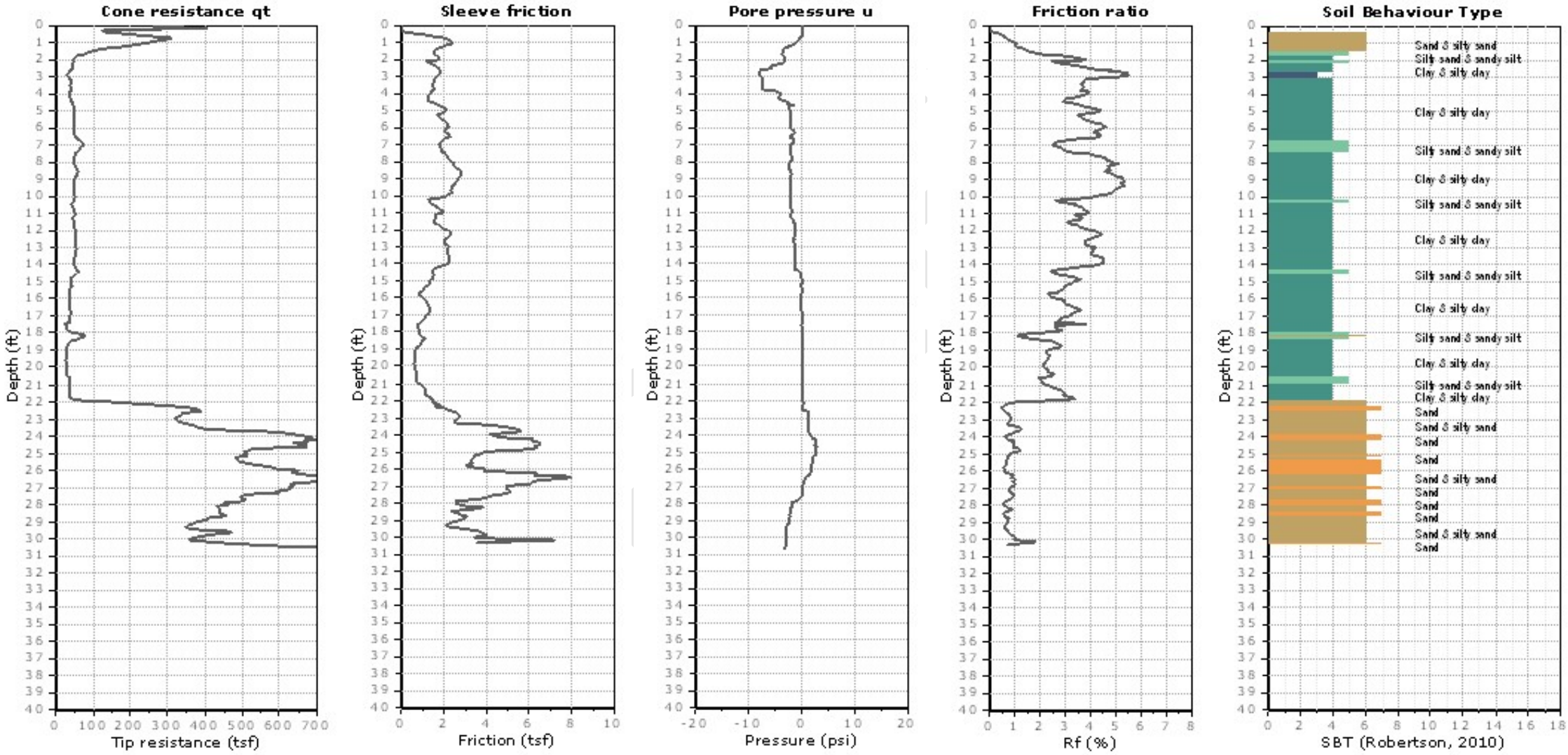
C-5E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.73 ft, Date: 11/21/2018
Cone Type: Vertek



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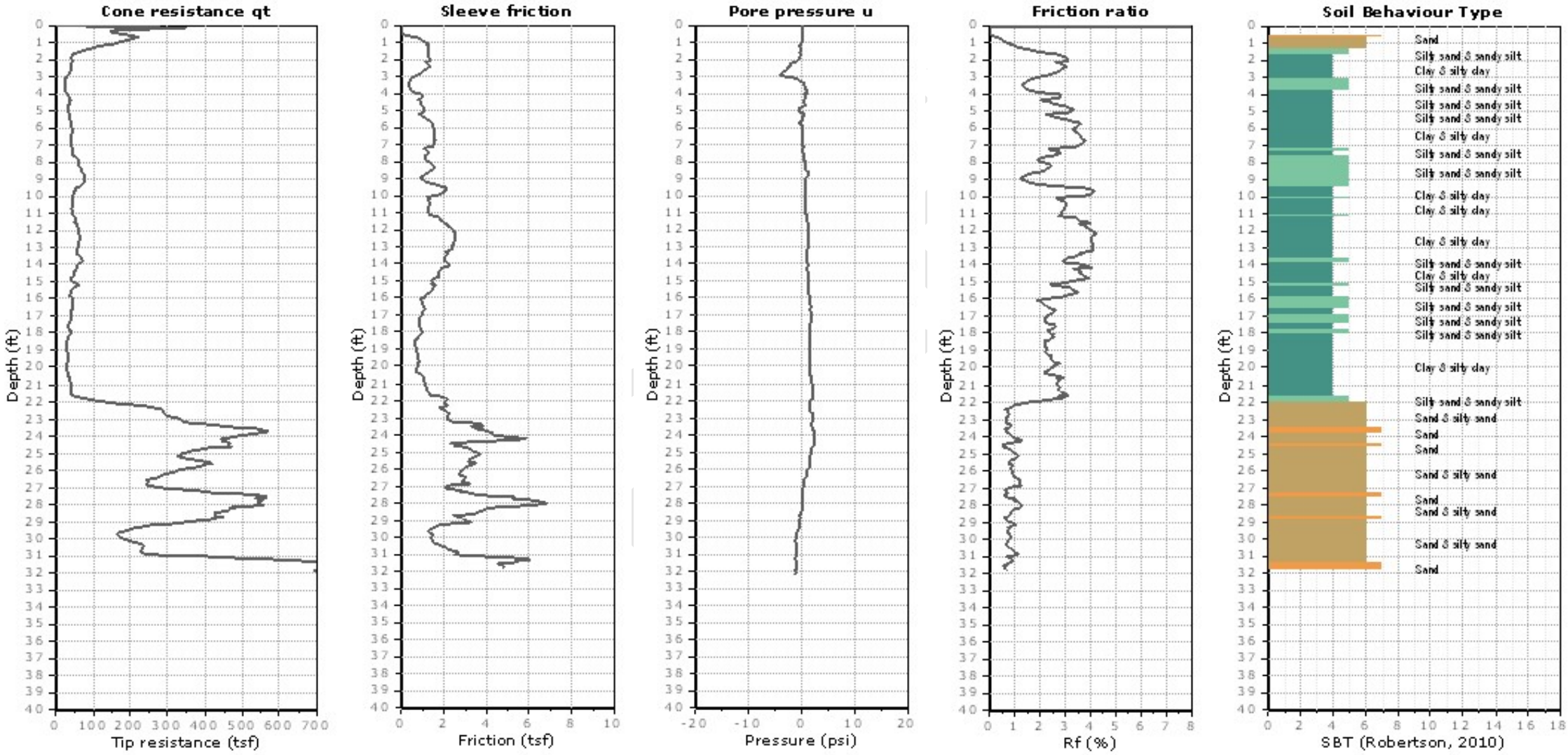
C-5F

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 32.16 ft, Date: 11/21/2018
Cone Type: Vertek



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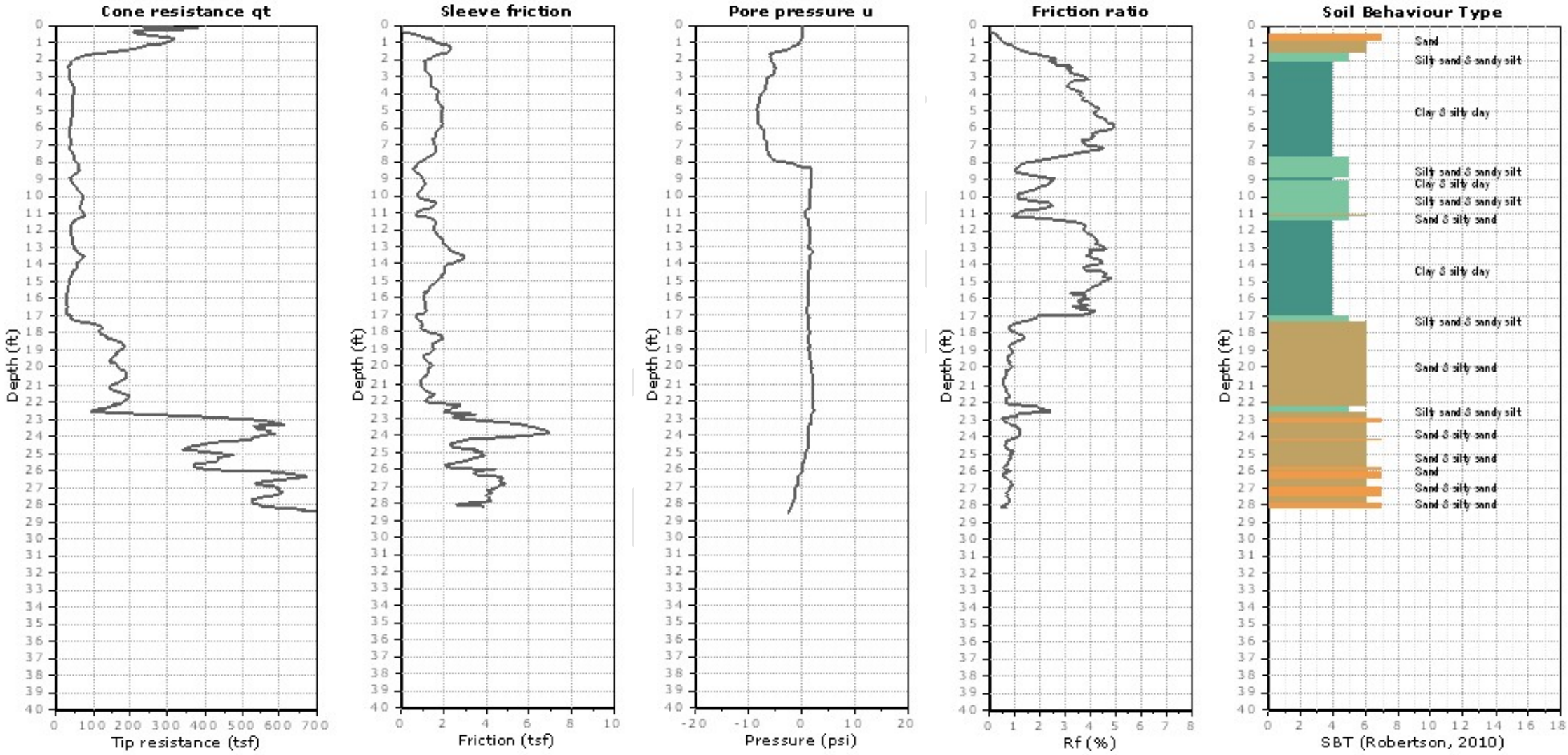
C-5G

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.55 ft, Date: 11/21/2018
Cone Type: Vertek



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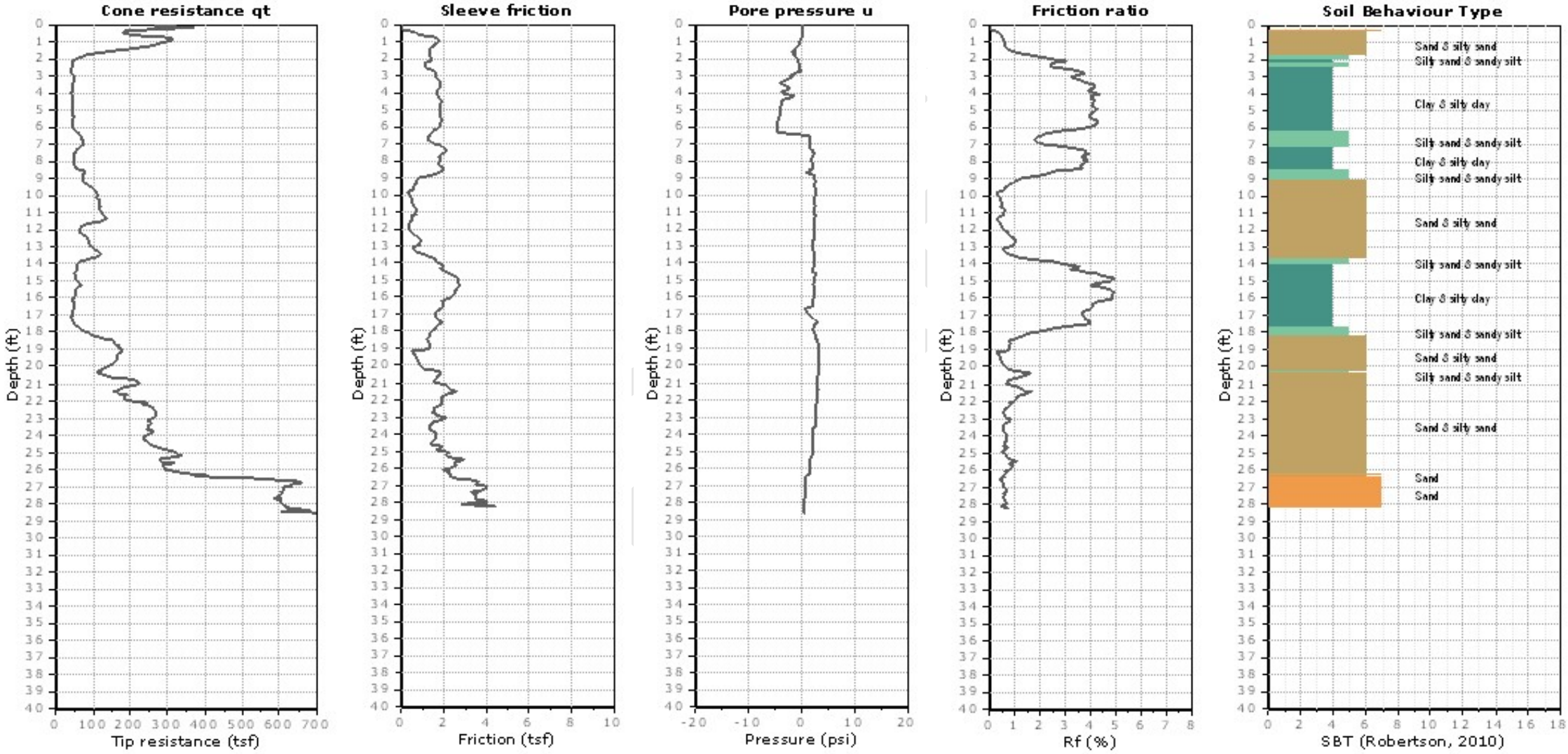
C-5H

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.62 ft, Date: 11/21/2018
Cone Type: Vertek



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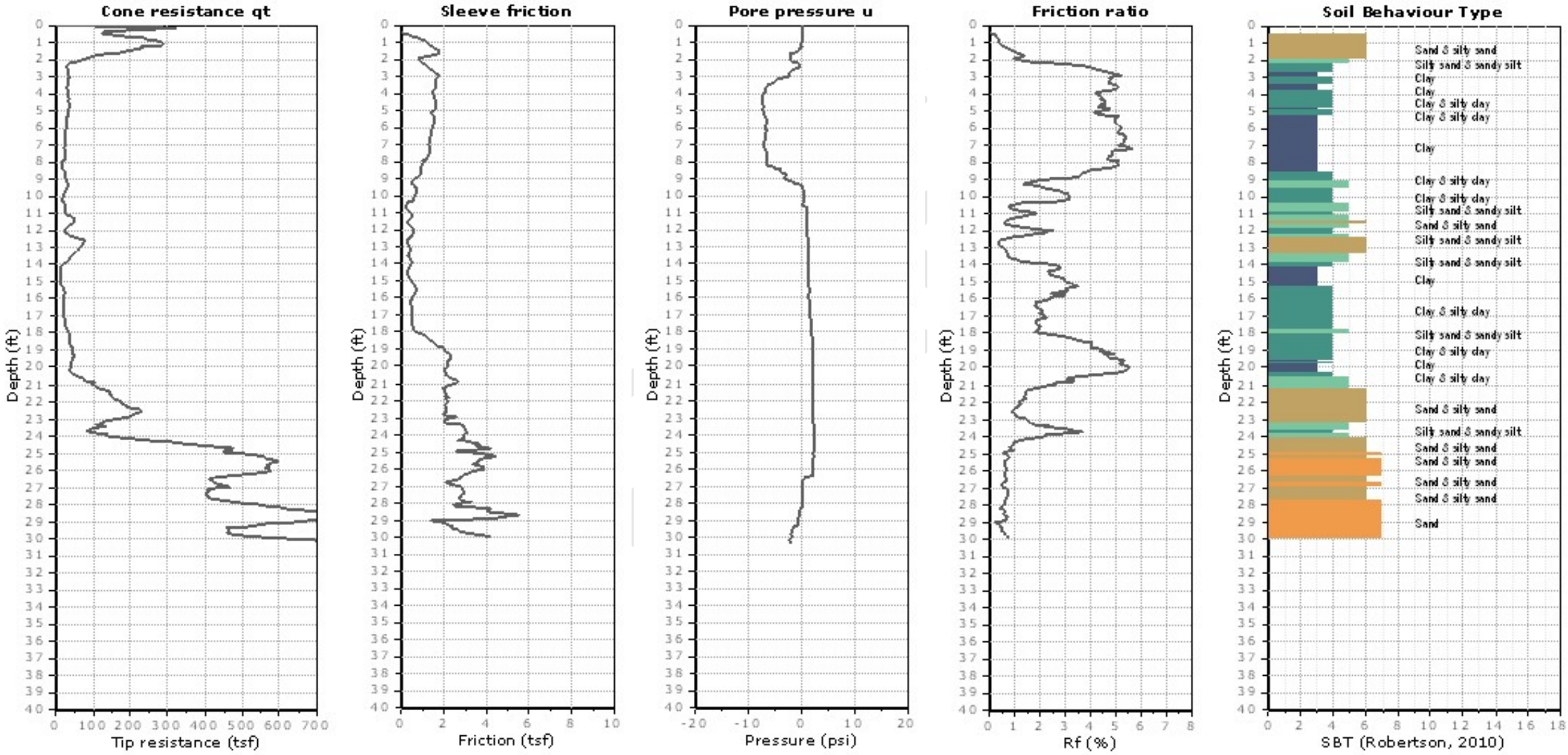
C-5I

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.32 ft, Date: 11/21/2018
Cone Type: Vertek



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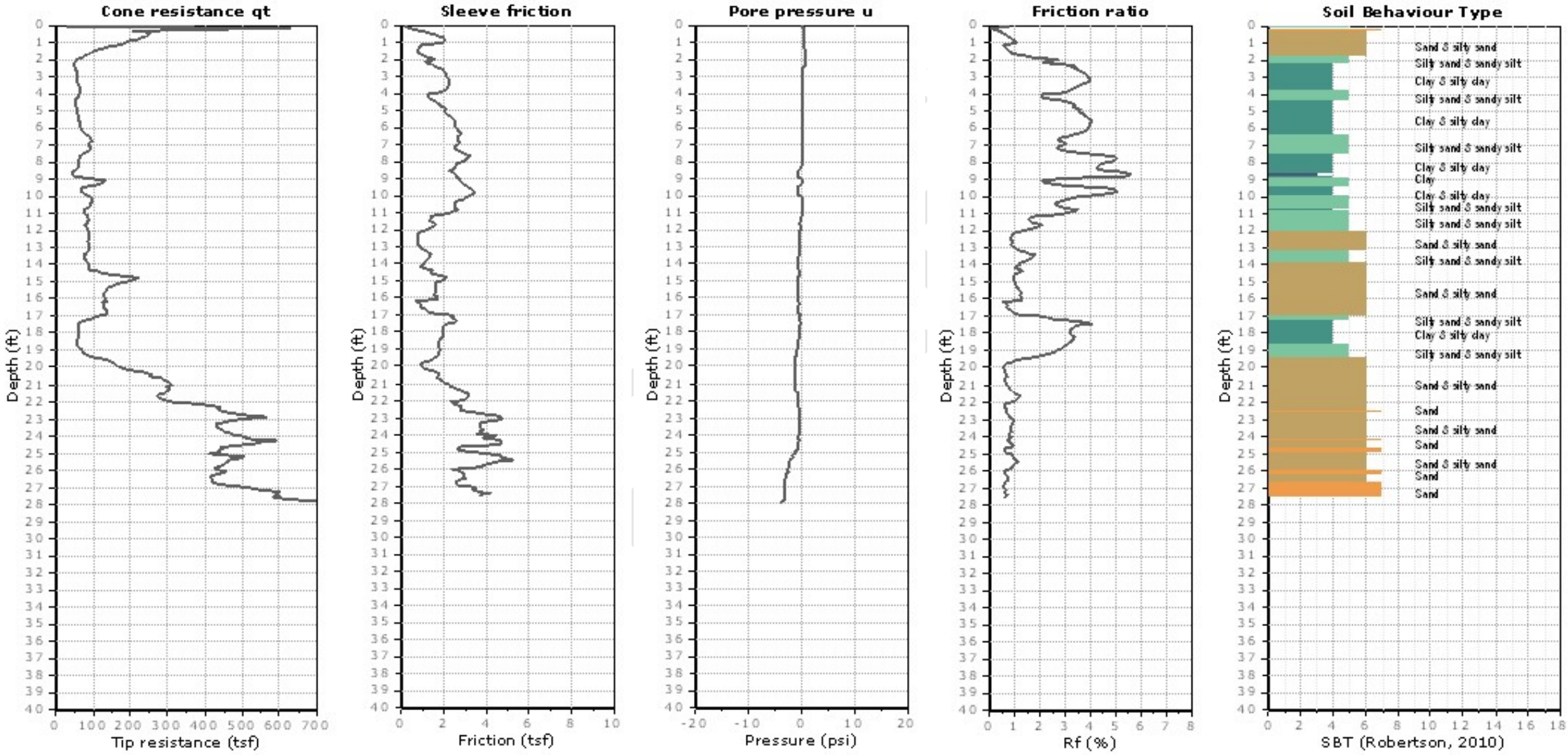
C-6A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.96 ft, Date: 11/21/2018
Cone Type: Vertek



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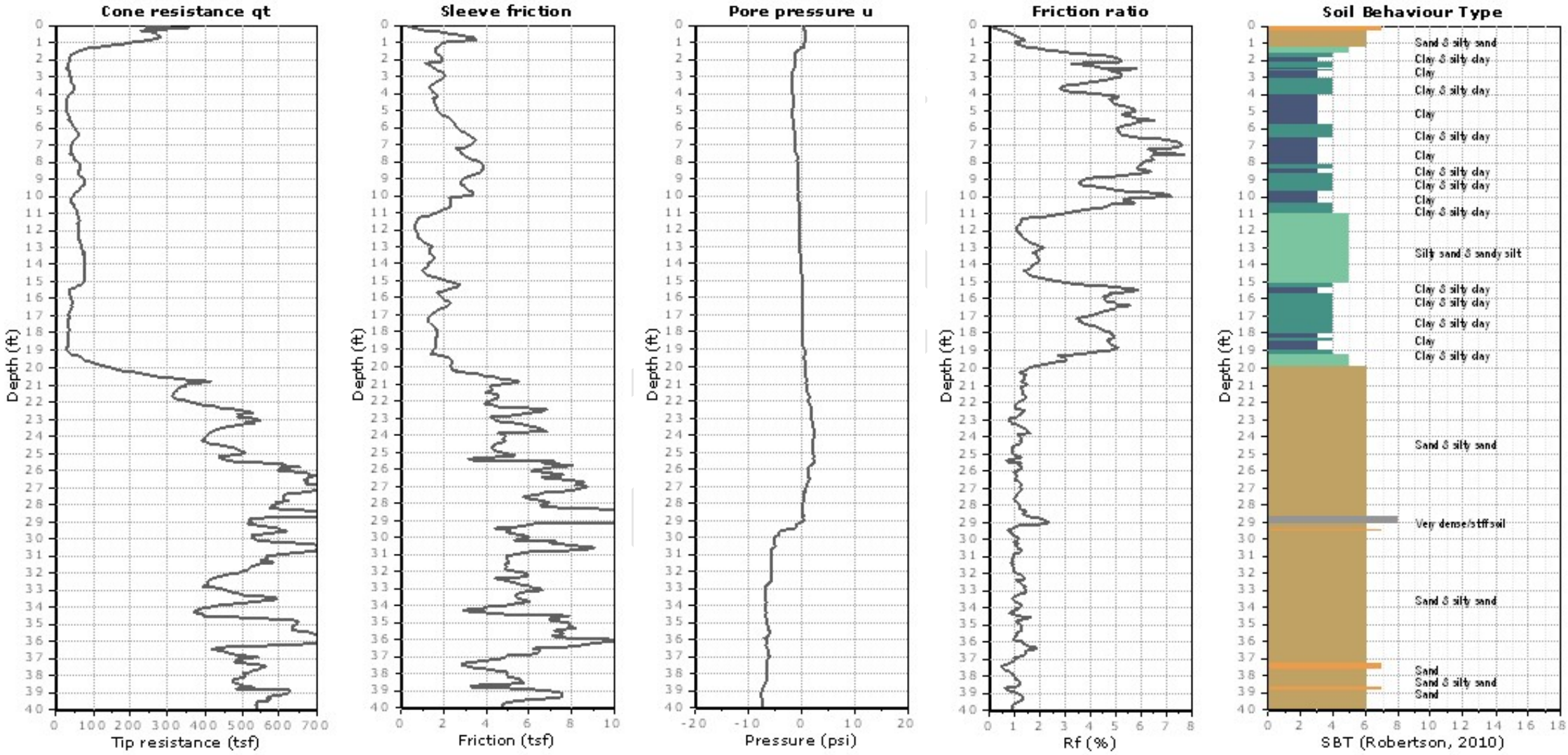
C-6B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 42.00 ft, Date: 12/17/2018
Cone Type: Vertek



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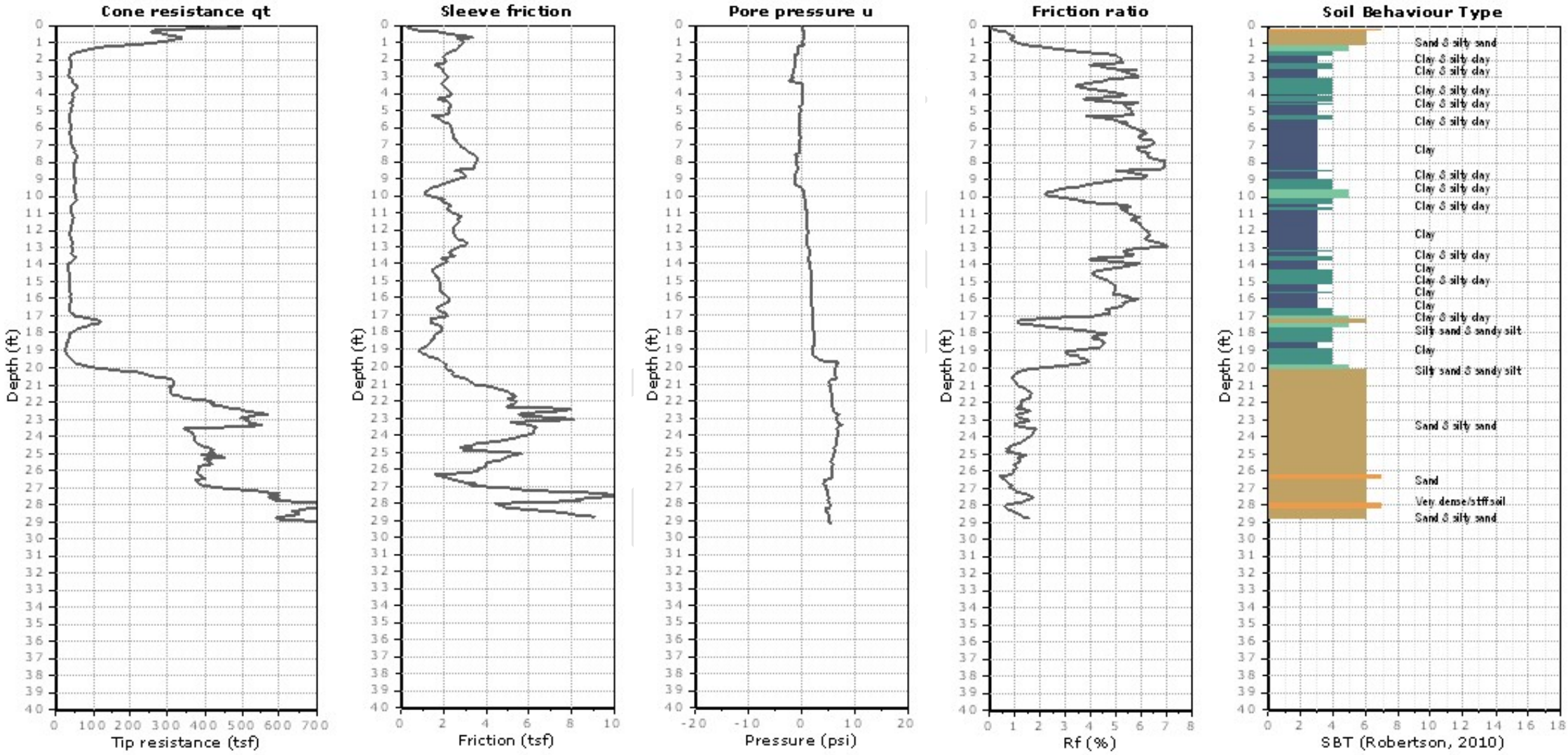
C-6C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.20 ft, Date: 12/17/2018
Cone Type: Vertek



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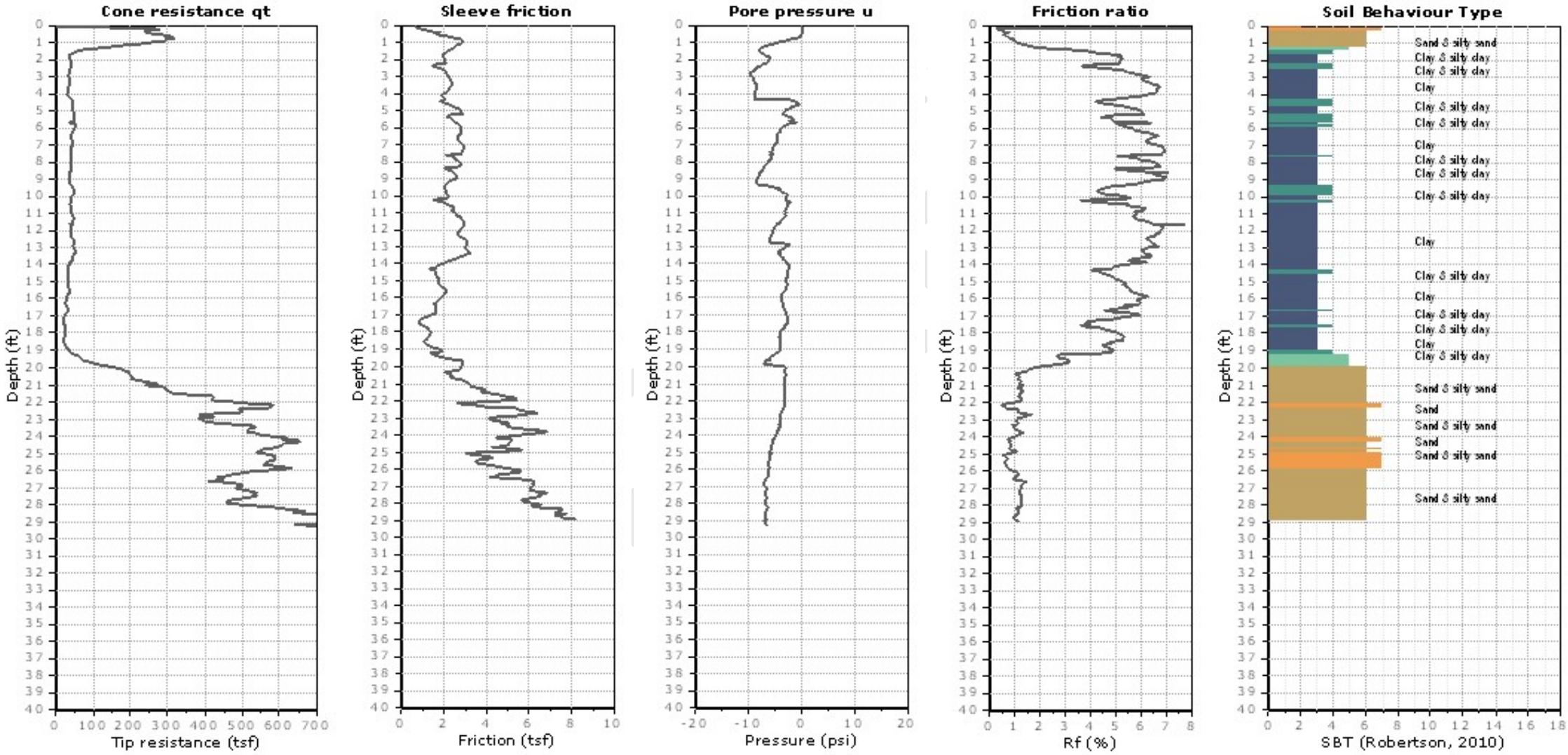
C-6D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.34 ft, Date: 12/17/2018
Cone Type: Vertek



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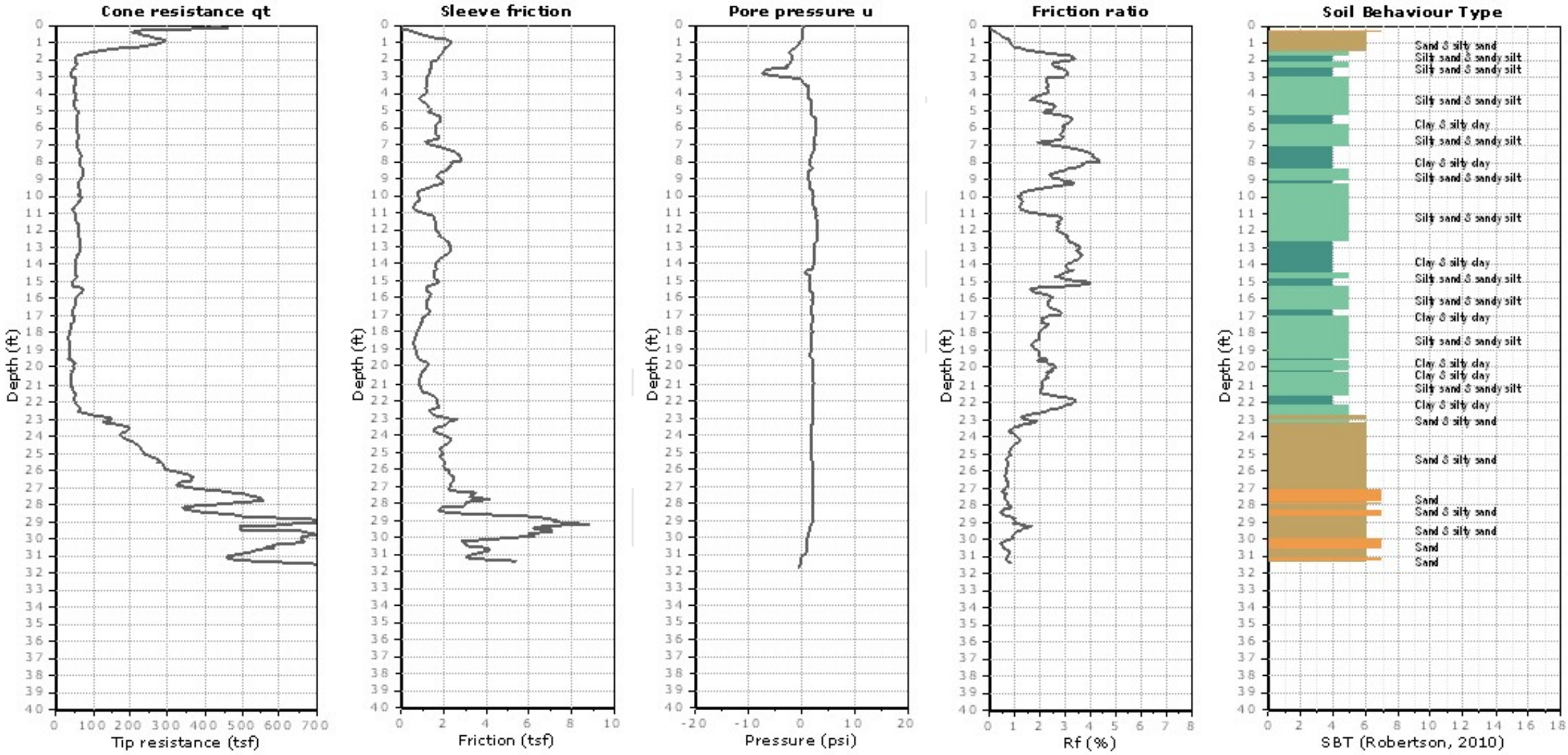
C-6E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 31.77 ft, Date: 11/21/2018
Cone Type: Vertek



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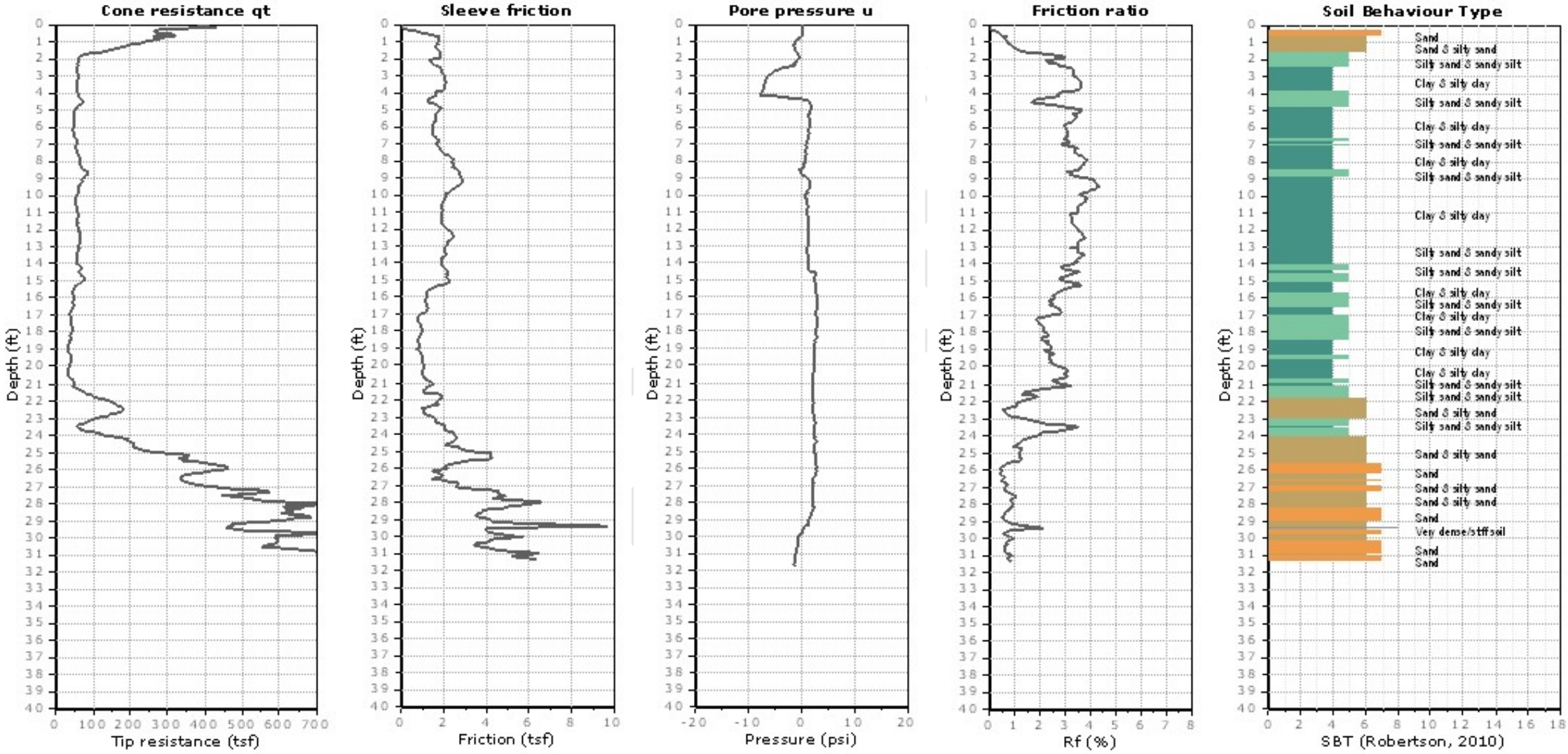
steve@kehoetesting.com
www.kehoetesting.com

C-6F

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 31.71 ft, Date: 11/21/2018
Cone Type: Vertek



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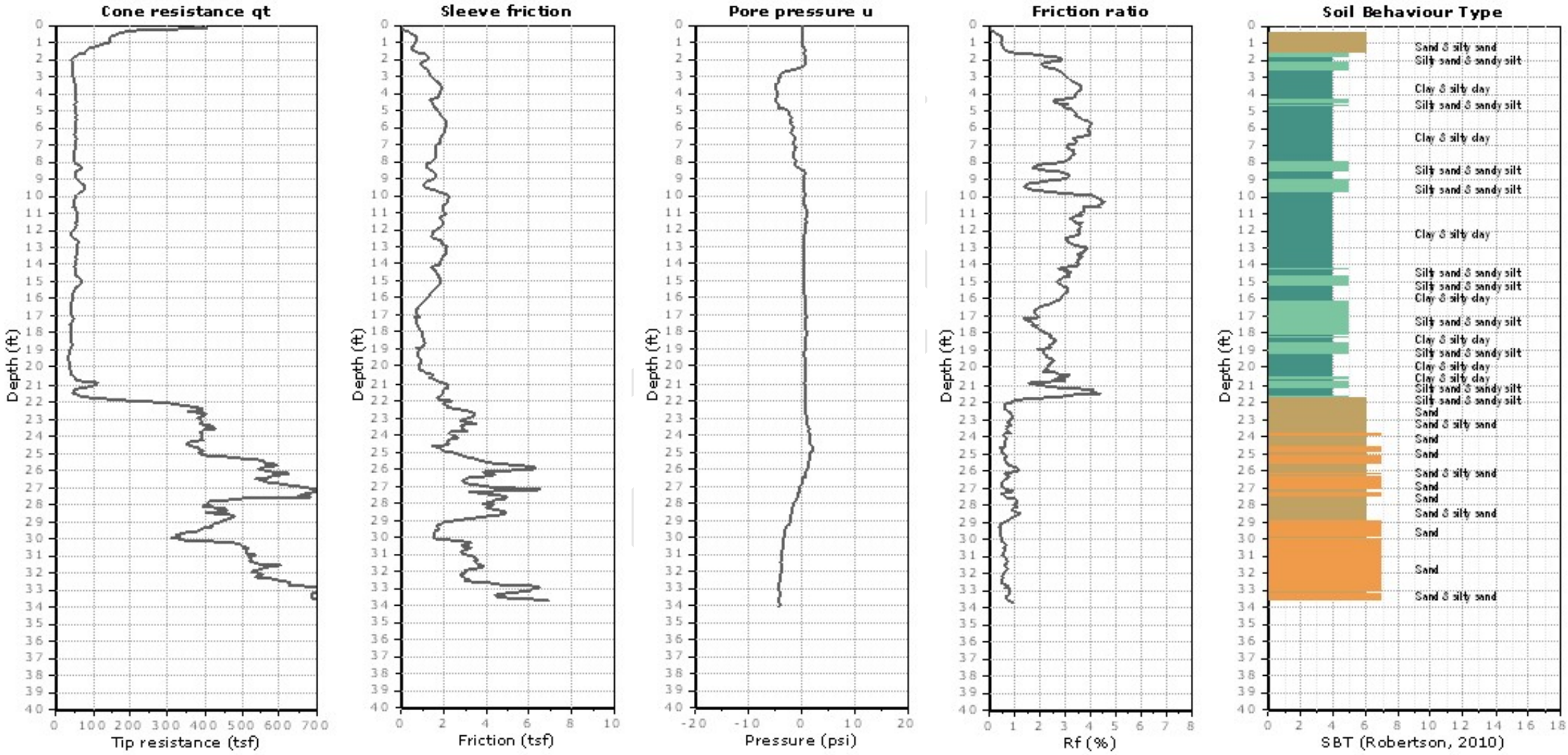
C-6G

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 34.06 ft, Date: 11/21/2018
Cone Type: Vertek



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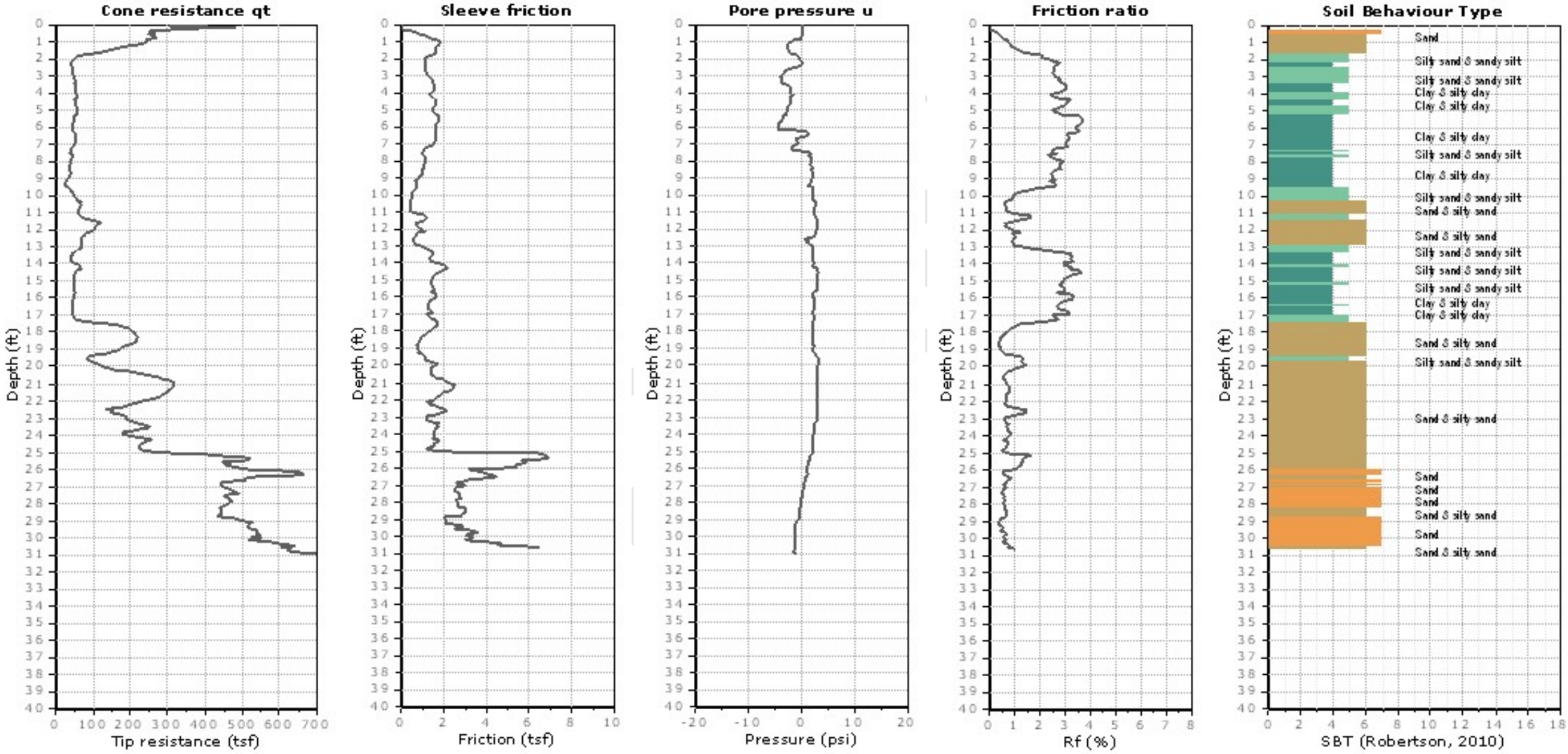
C-6H

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 31.04 ft, Date: 11/21/2018
Cone Type: Vertek



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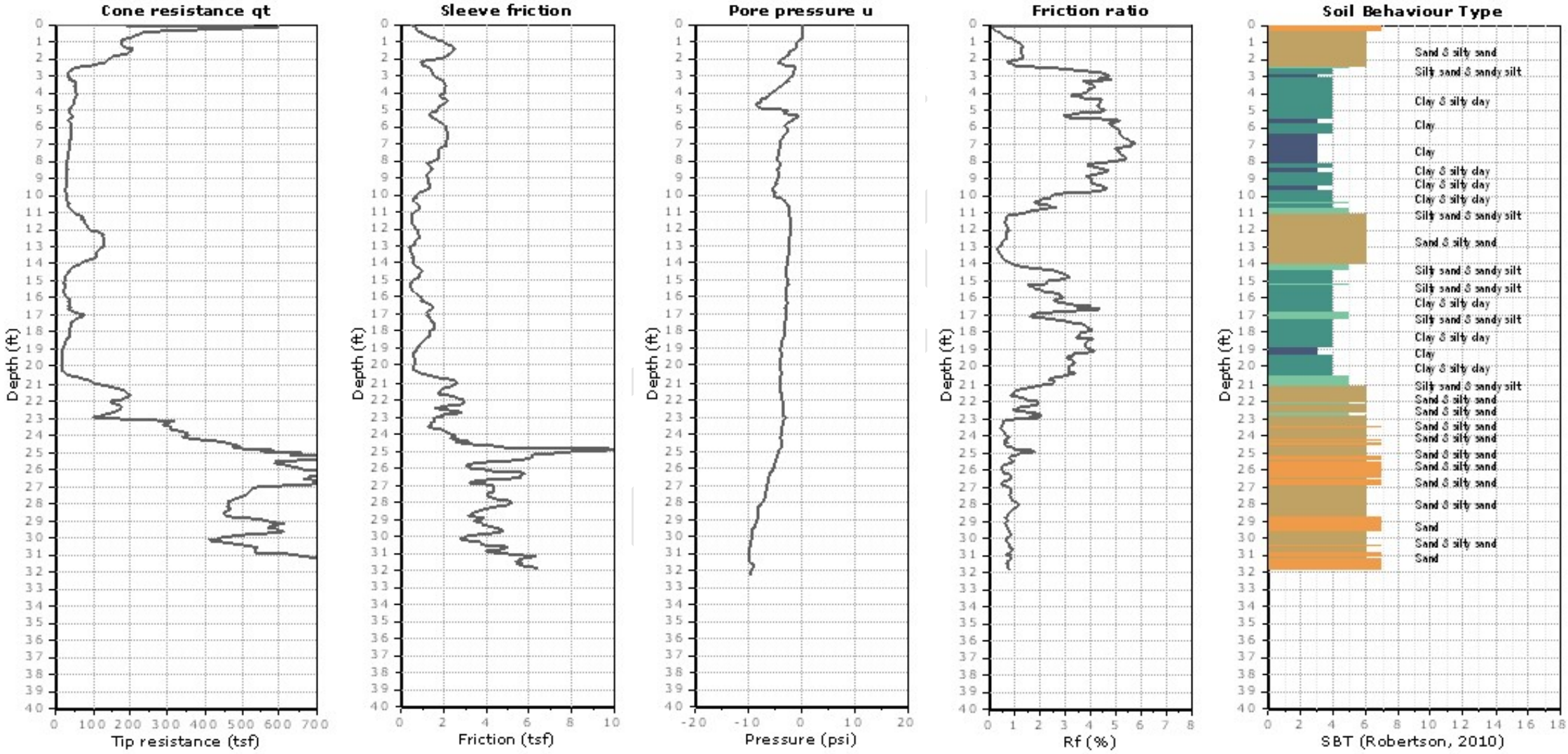
C-6I

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 32.23 ft, Date: 11/21/2018
Cone Type: Vertek



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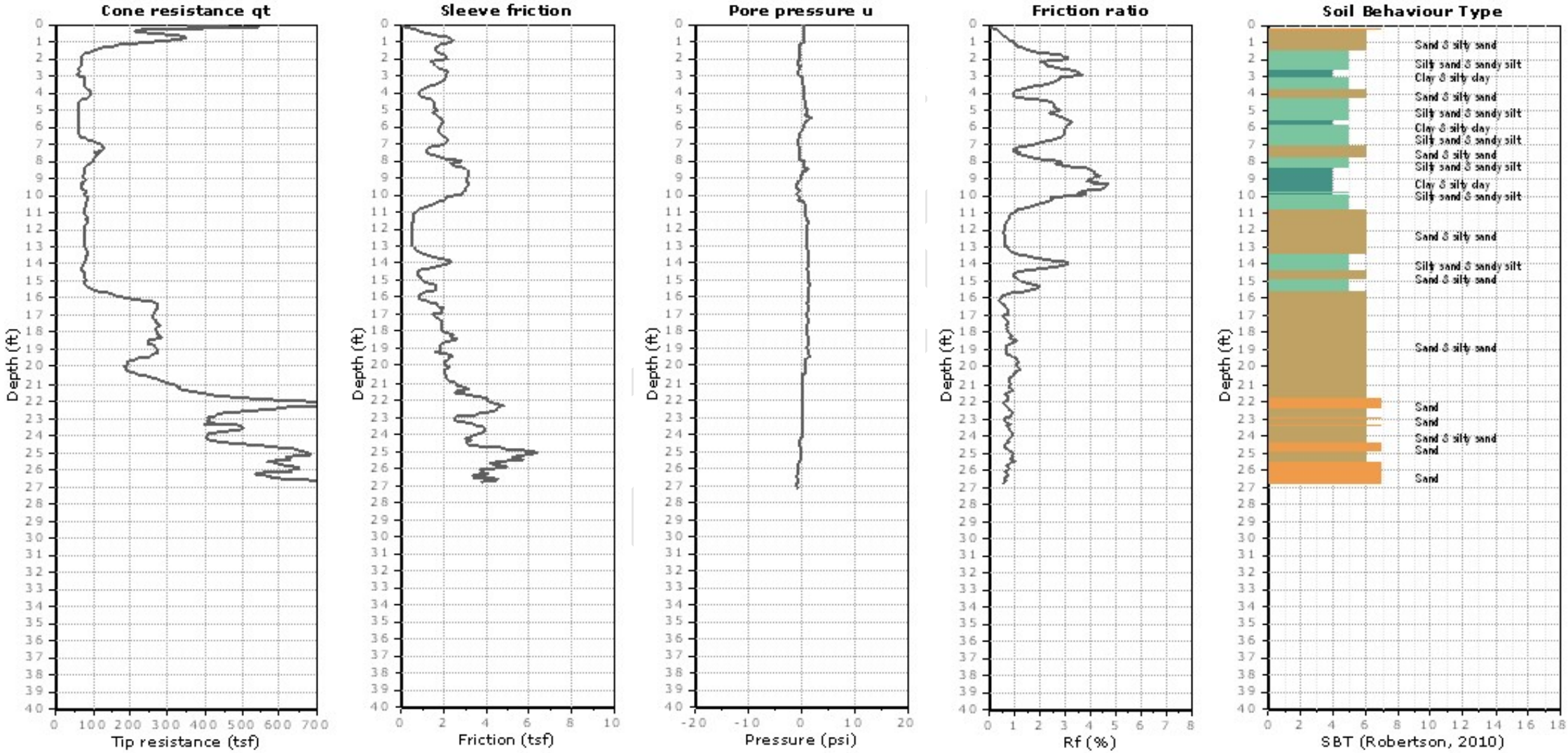
C-7A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.17 ft, Date: 11/21/2018
Cone Type: Vertek



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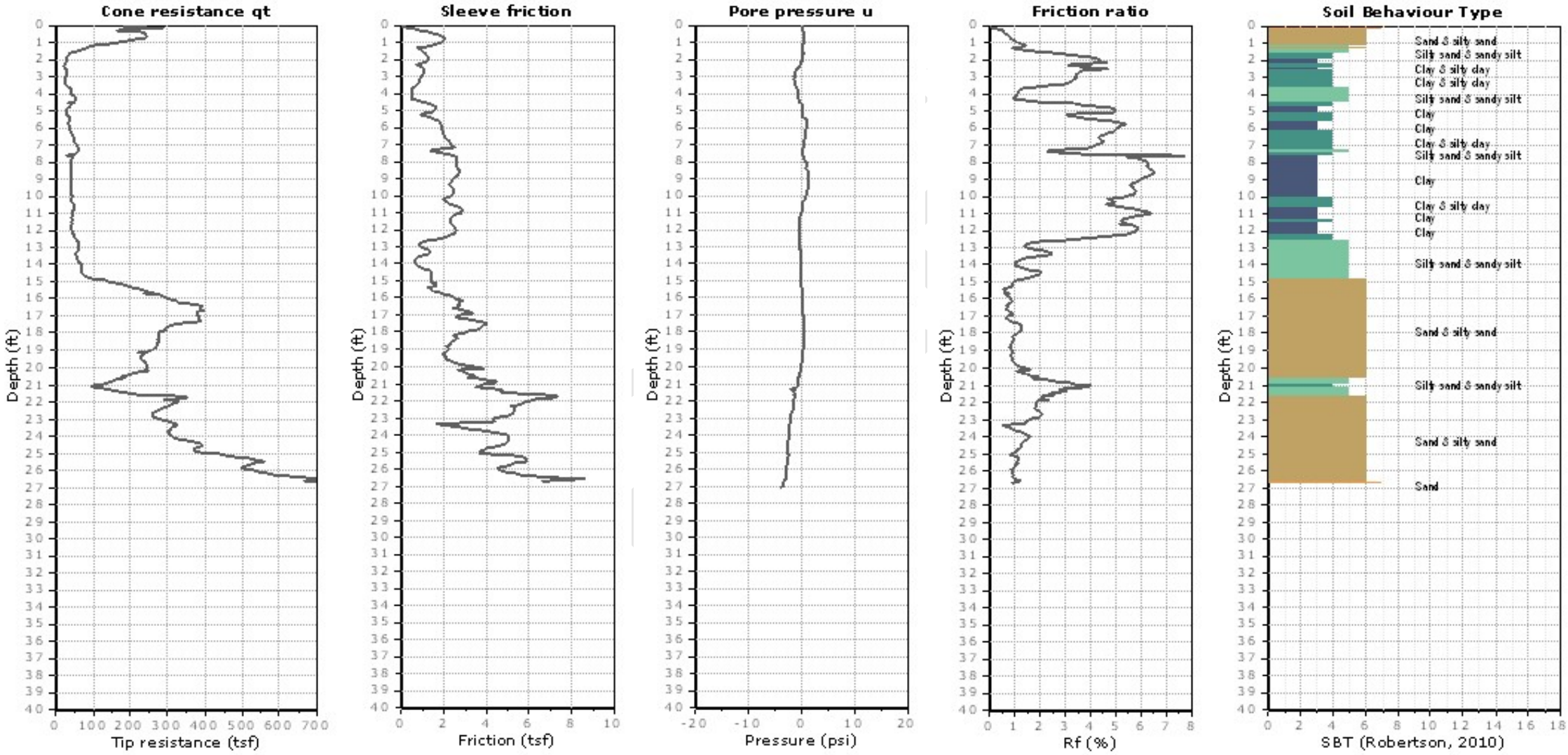
C-7B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.11 ft, Date: 12/17/2018
Cone Type: Vertek



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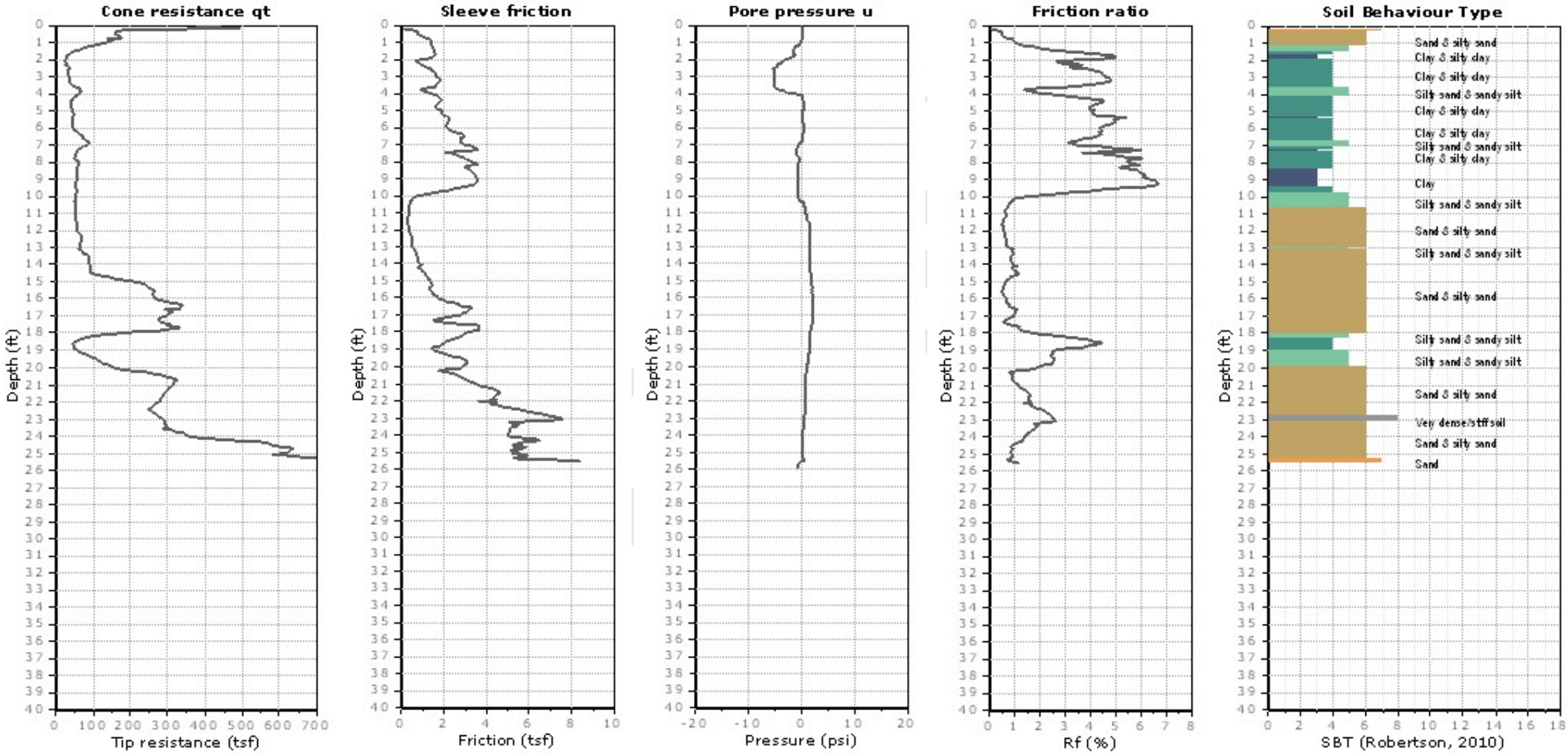
C-7C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 25.93 ft, Date: 12/17/2018
Cone Type: Vertek



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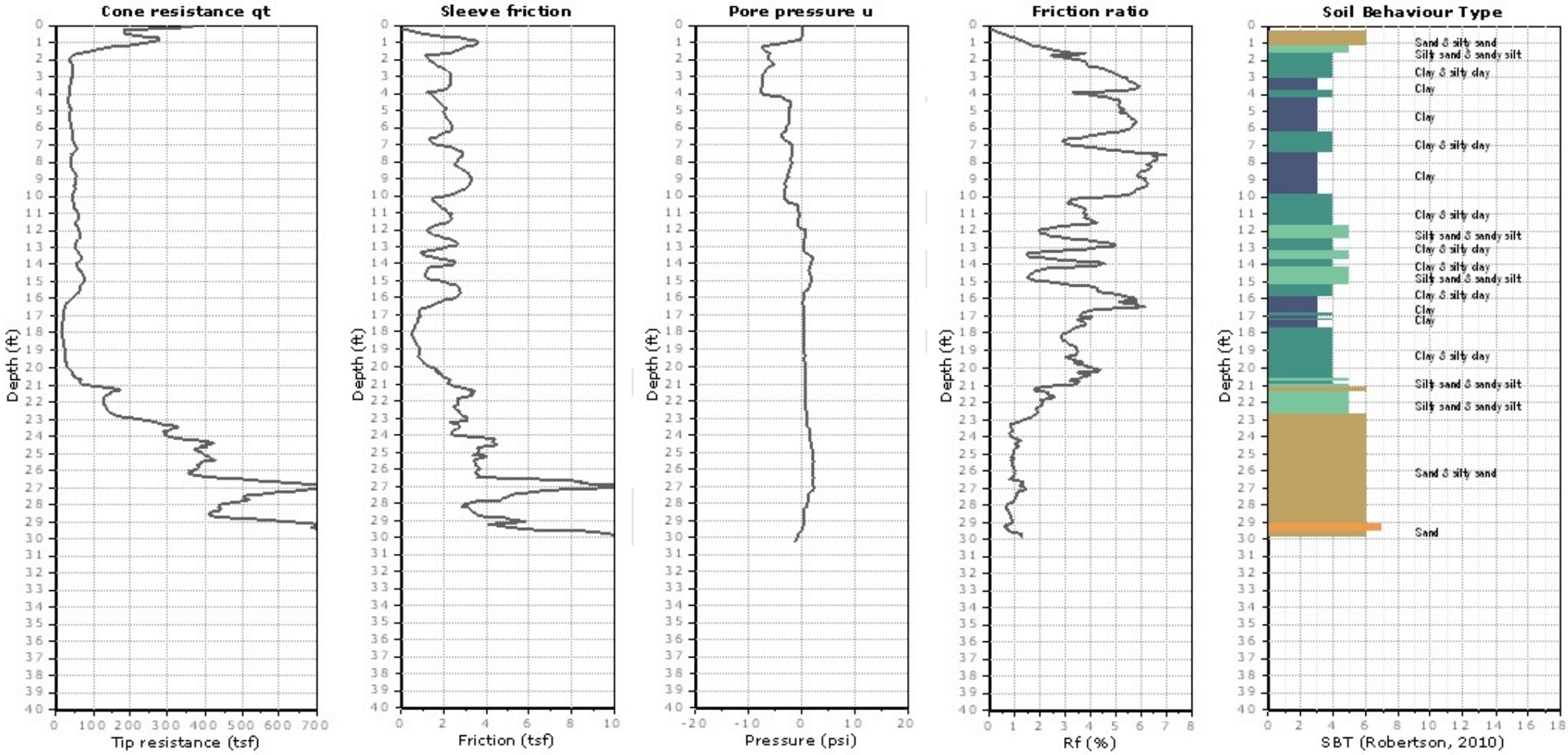
C-7D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.27 ft, Date: 12/17/2018
Cone Type: Vertek



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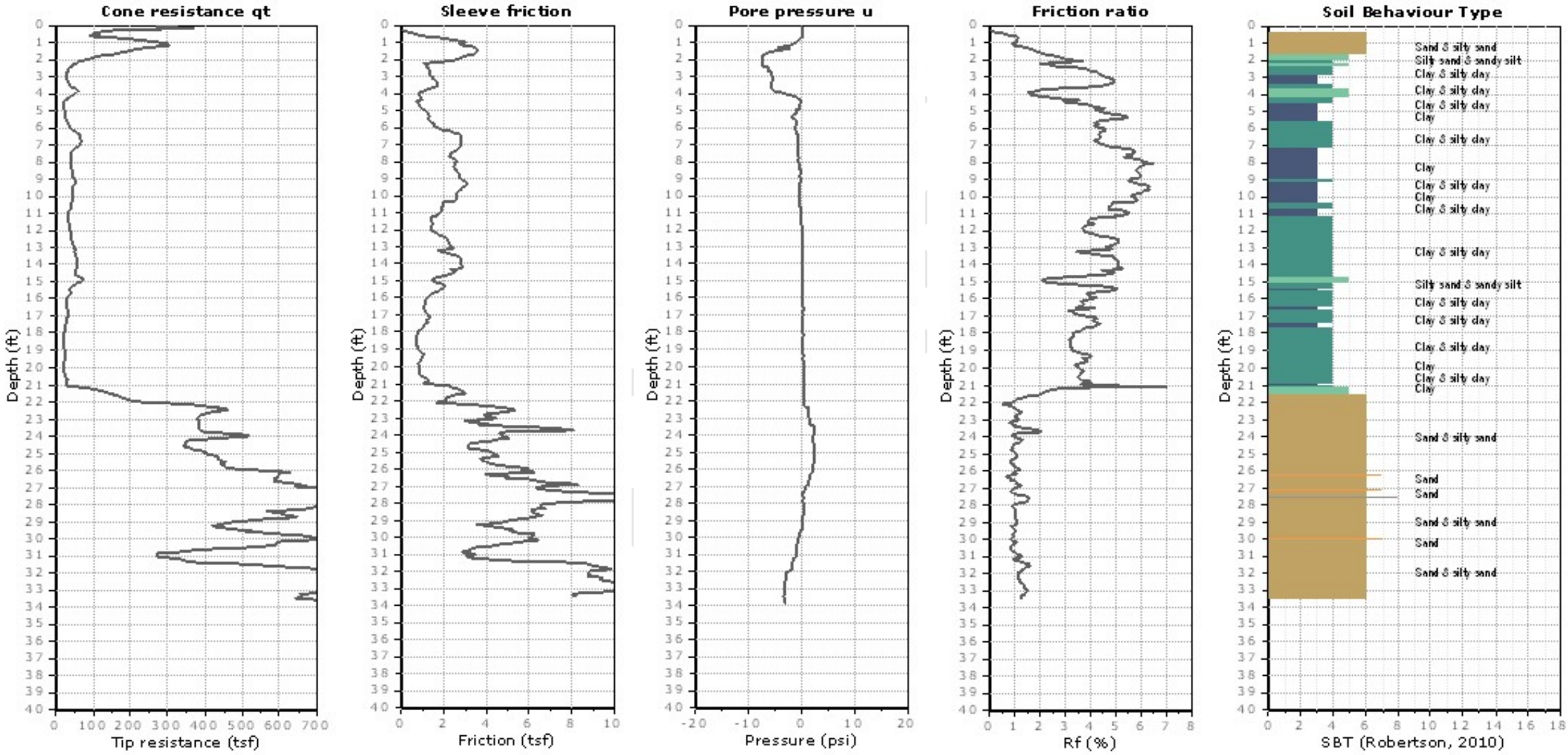
C-7E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 33.87 ft, Date: 12/17/2018
Cone Type: Vertek



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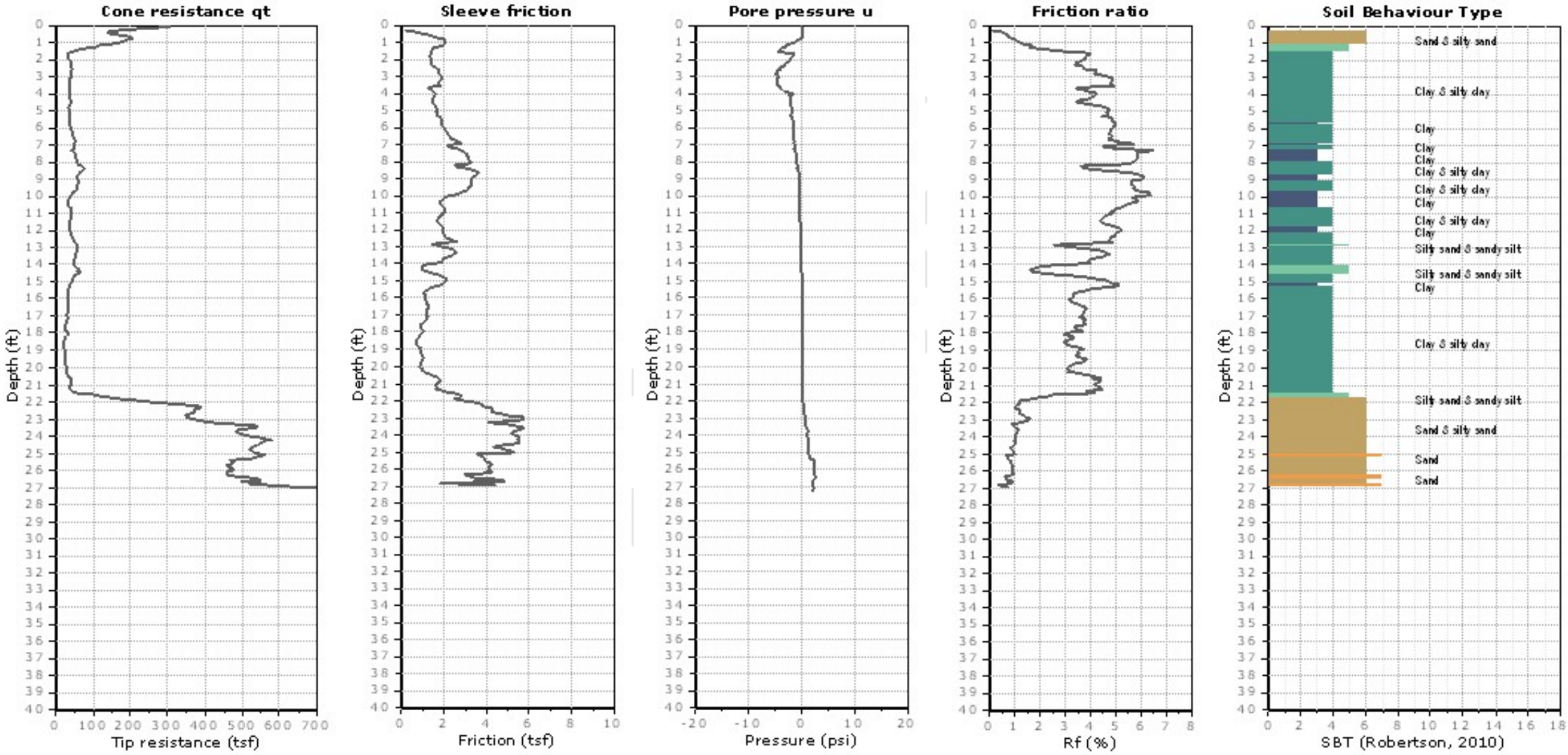
C-7F

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.36 ft, Date: 12/17/2018
Cone Type: Vertek



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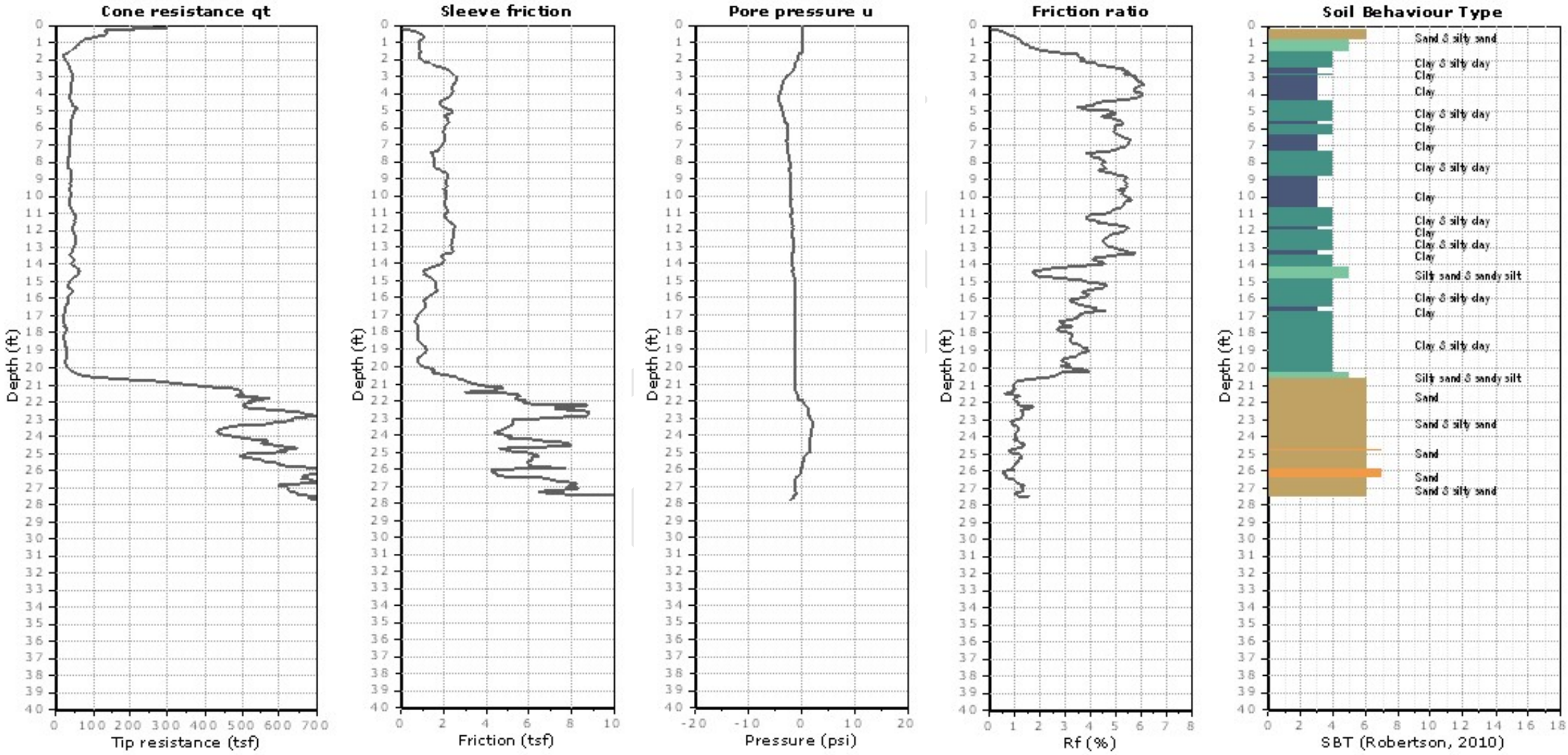
C-7G

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.89 ft, Date: 12/17/2018
Cone Type: Vertek



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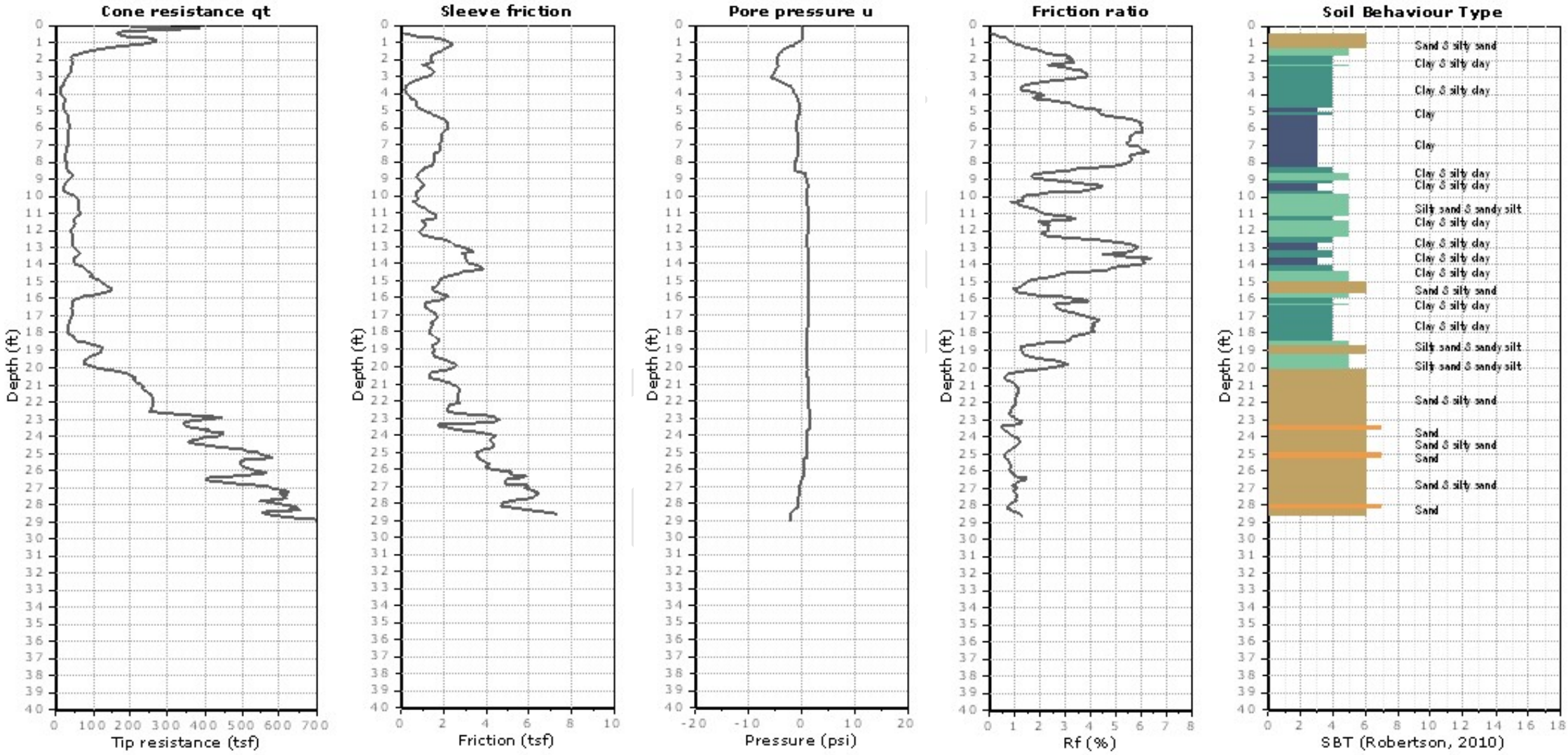
C-7H

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.01 ft, Date: 12/17/2018
Cone Type: Vertek



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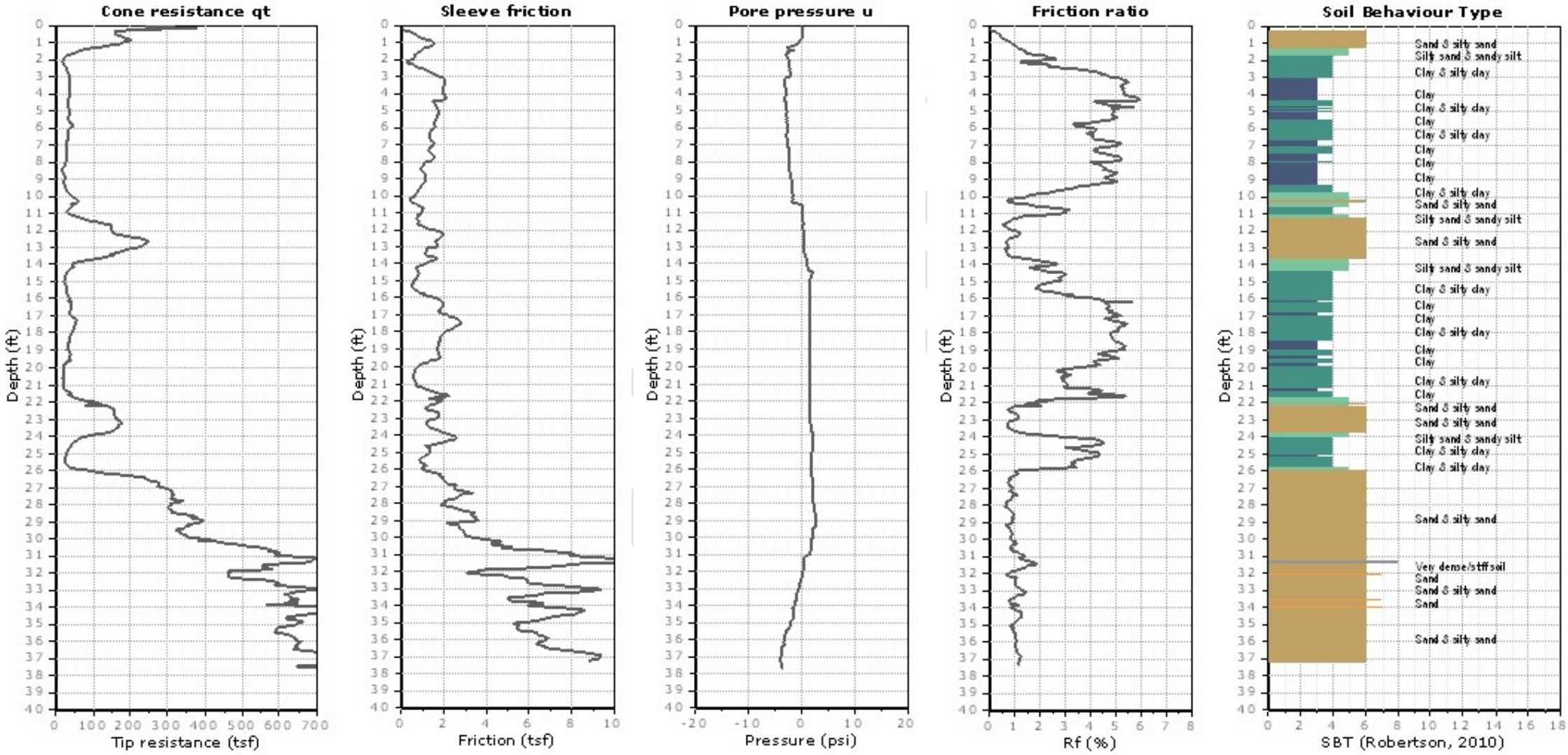
C-7I

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 37.67 ft, Date: 12/17/2018
Cone Type: Vertek



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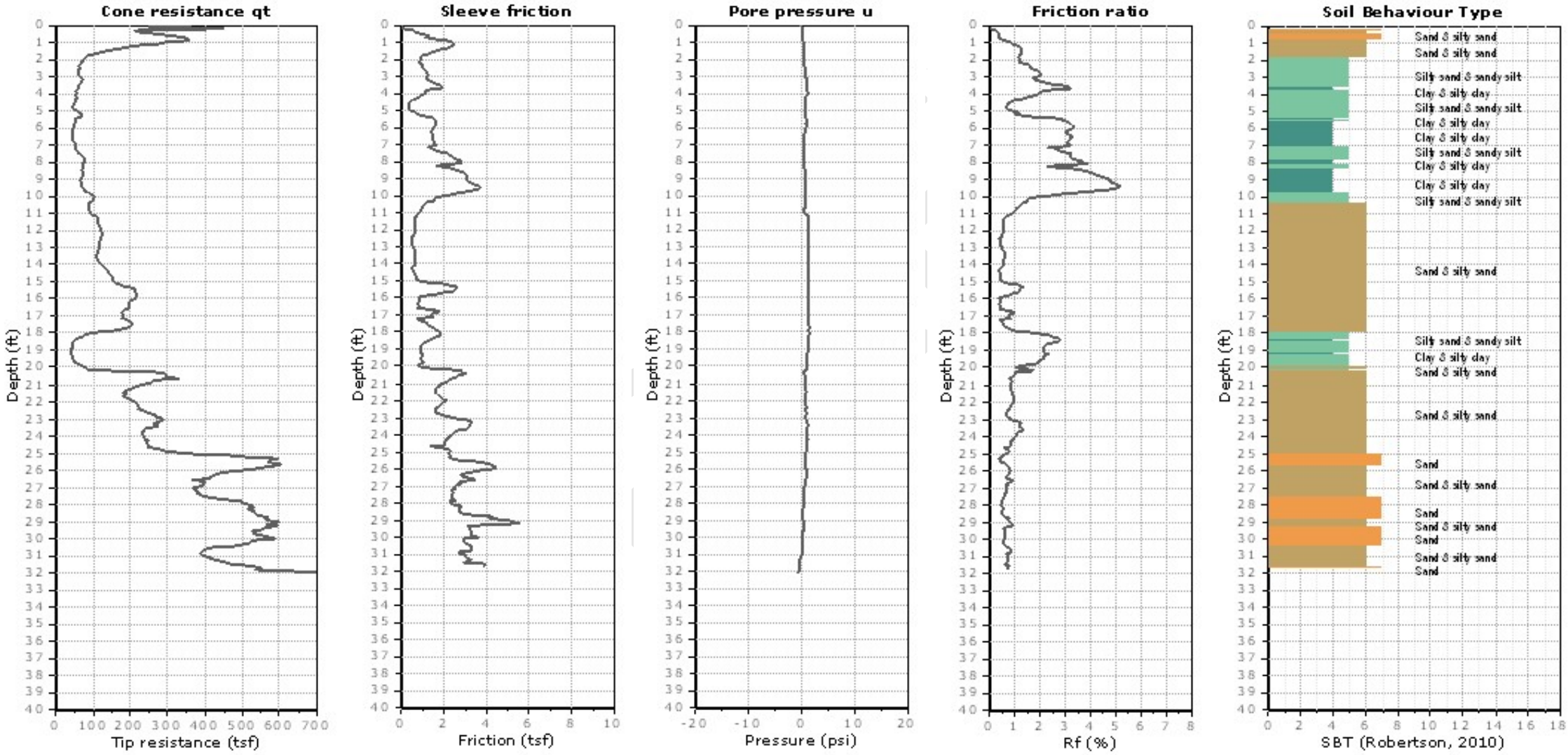
C-8A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 32.09 ft, Date: 11/21/2018
Cone Type: Vertek



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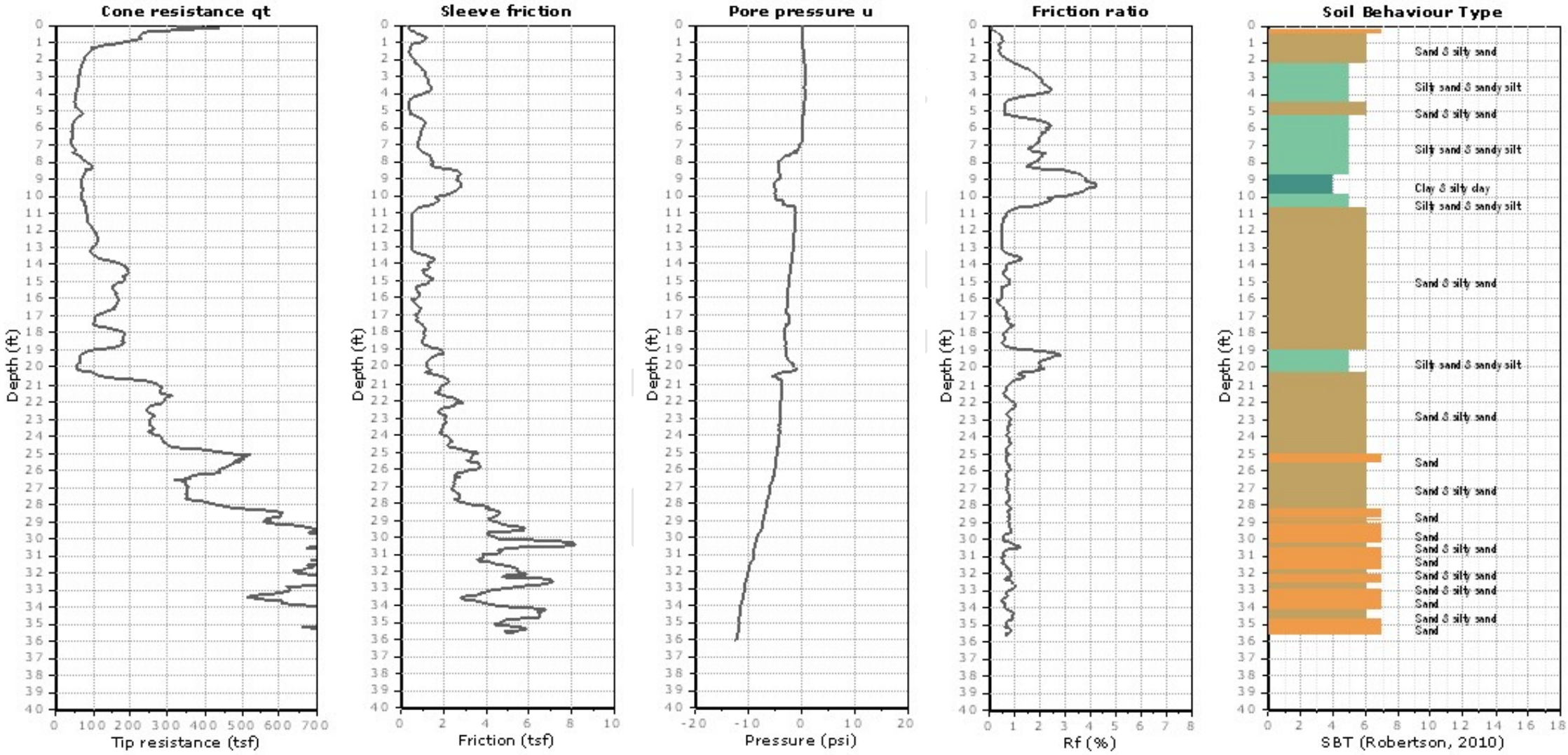
C-8AA

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 36.04 ft, Date: 11/21/2018
Cone Type: Vertek



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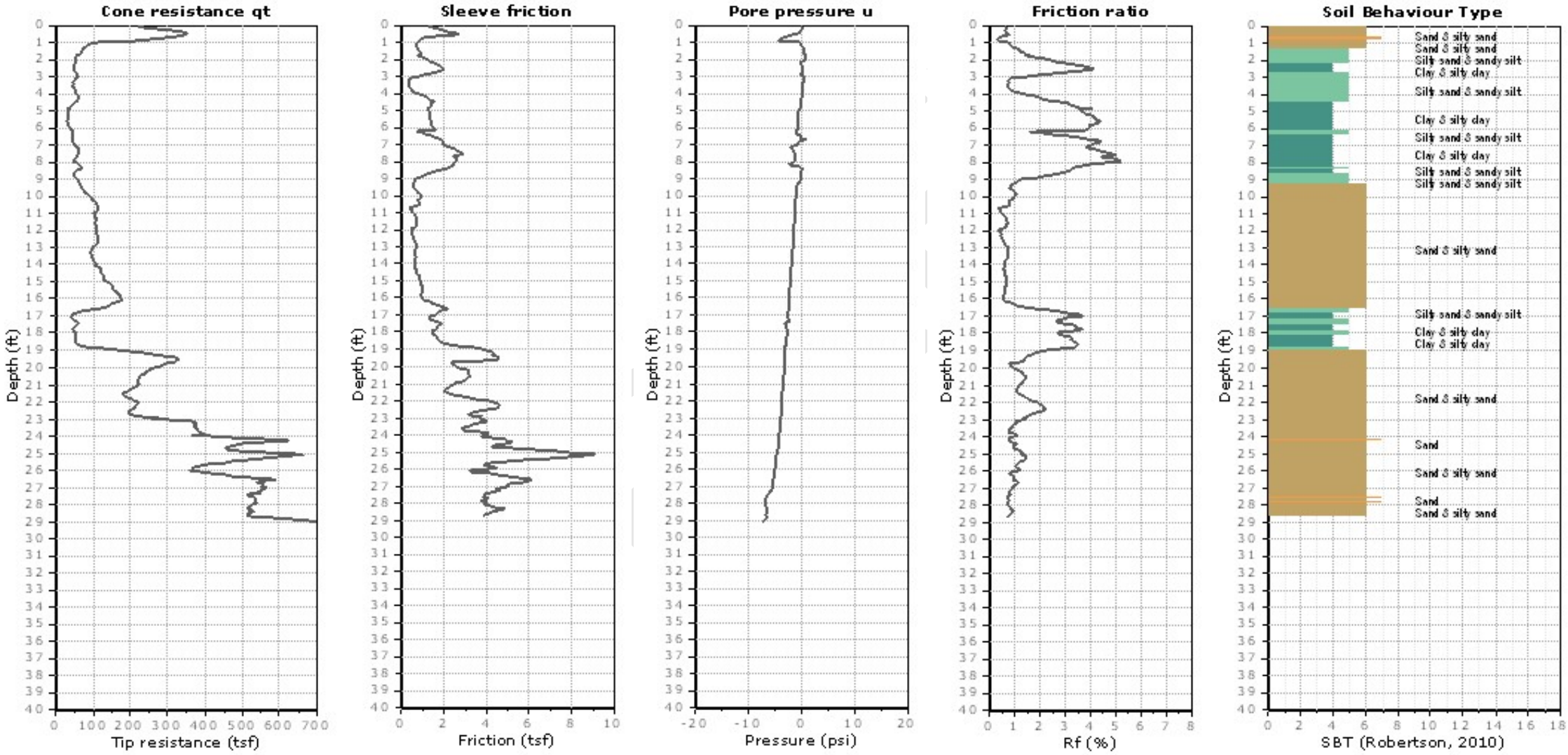
C-8B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 29.09 ft, Date: 12/18/2018
Cone Type: Vertek



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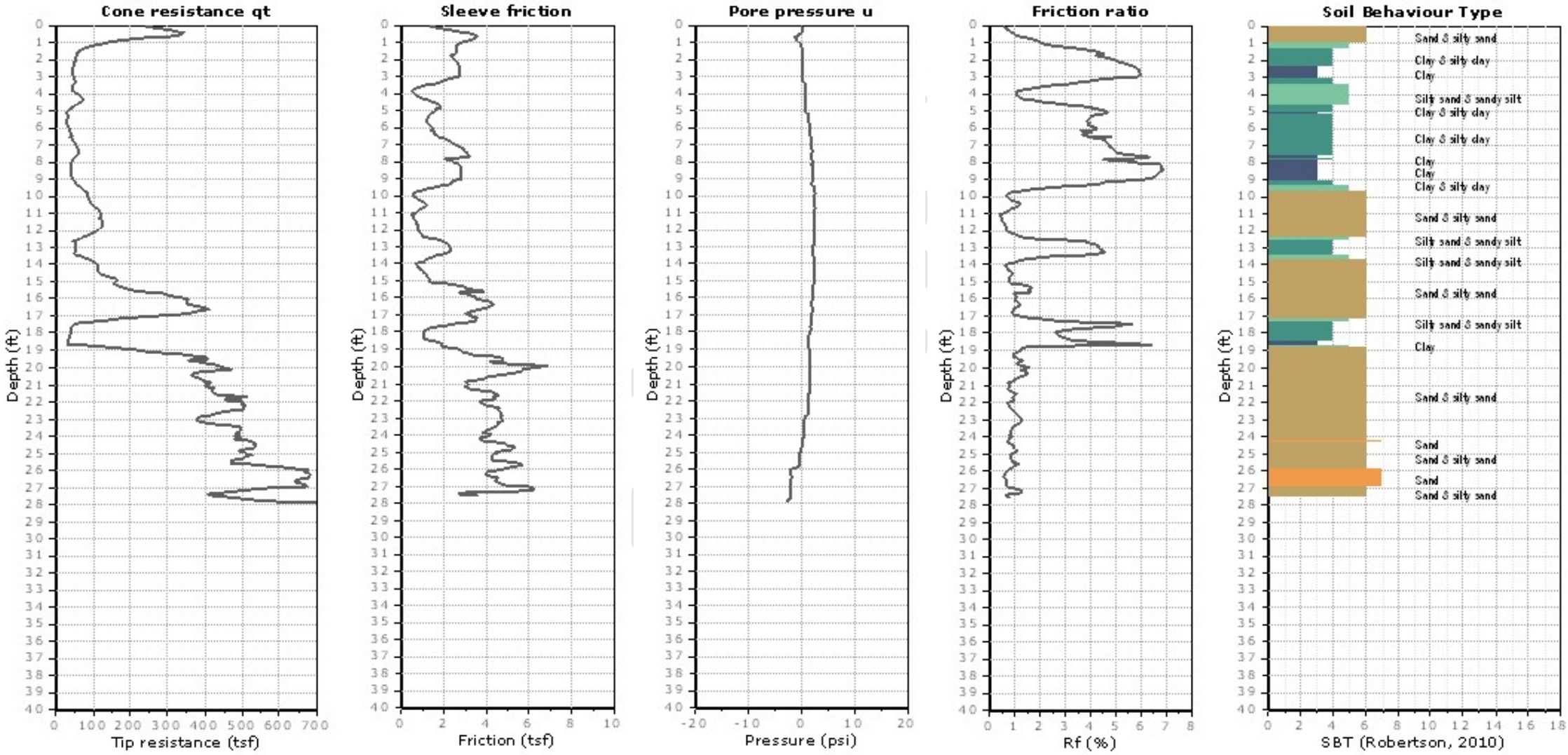
C-8C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.97 ft, Date: 12/18/2018
Cone Type: Vertek



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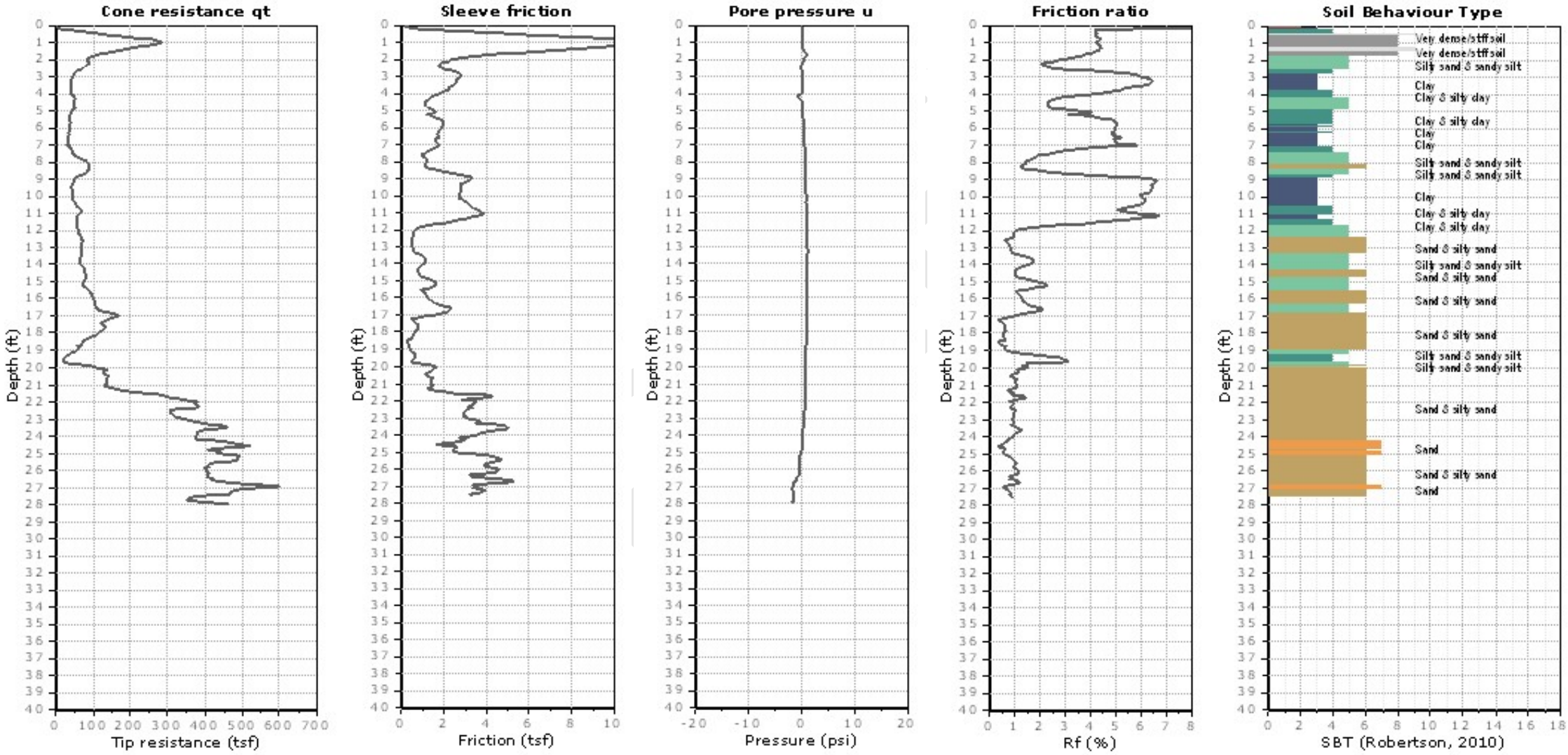
C-8D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.97 ft, Date: 12/18/2018
Cone Type: Vertek



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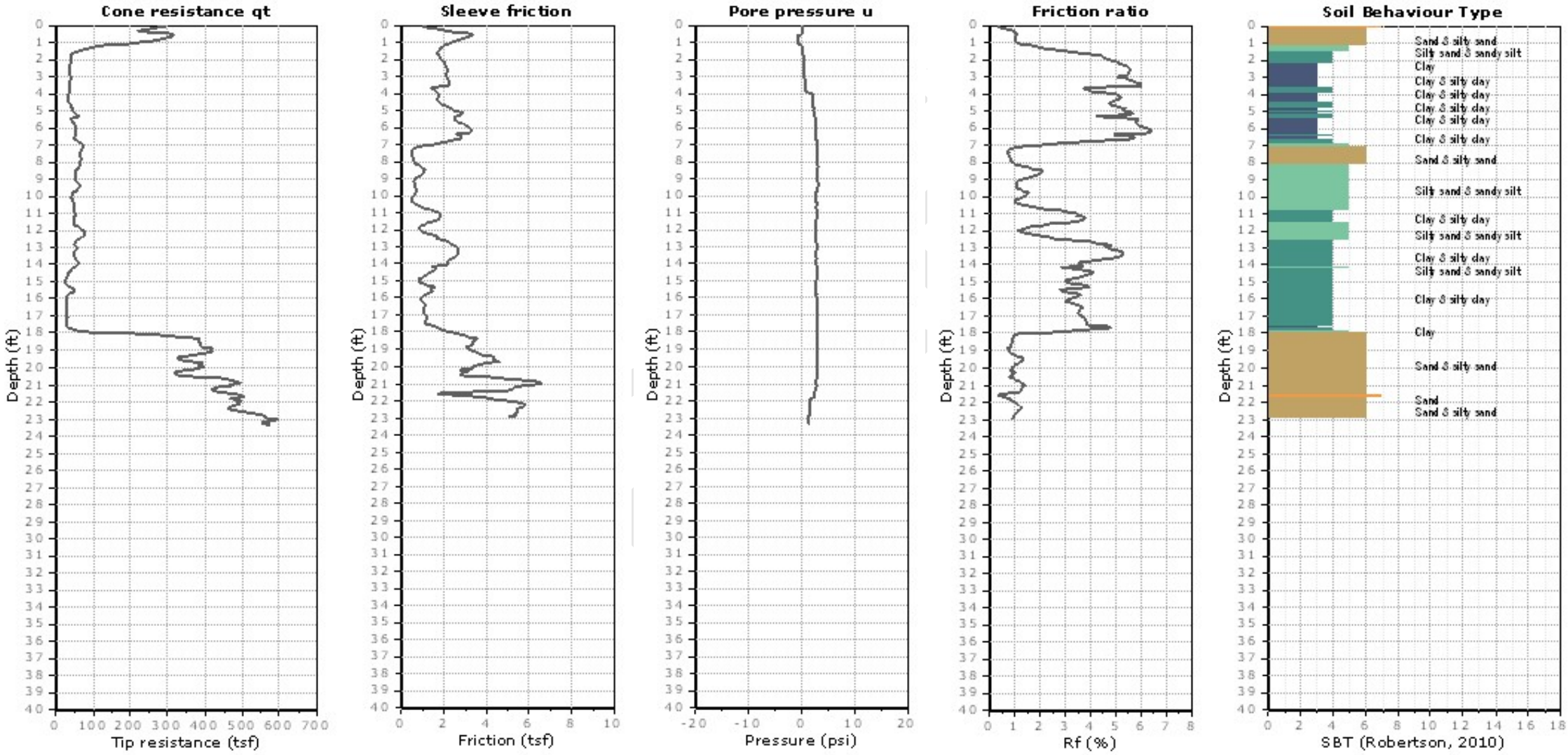
C-8E

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 23.36 ft, Date: 12/18/2018
Cone Type: Vertek



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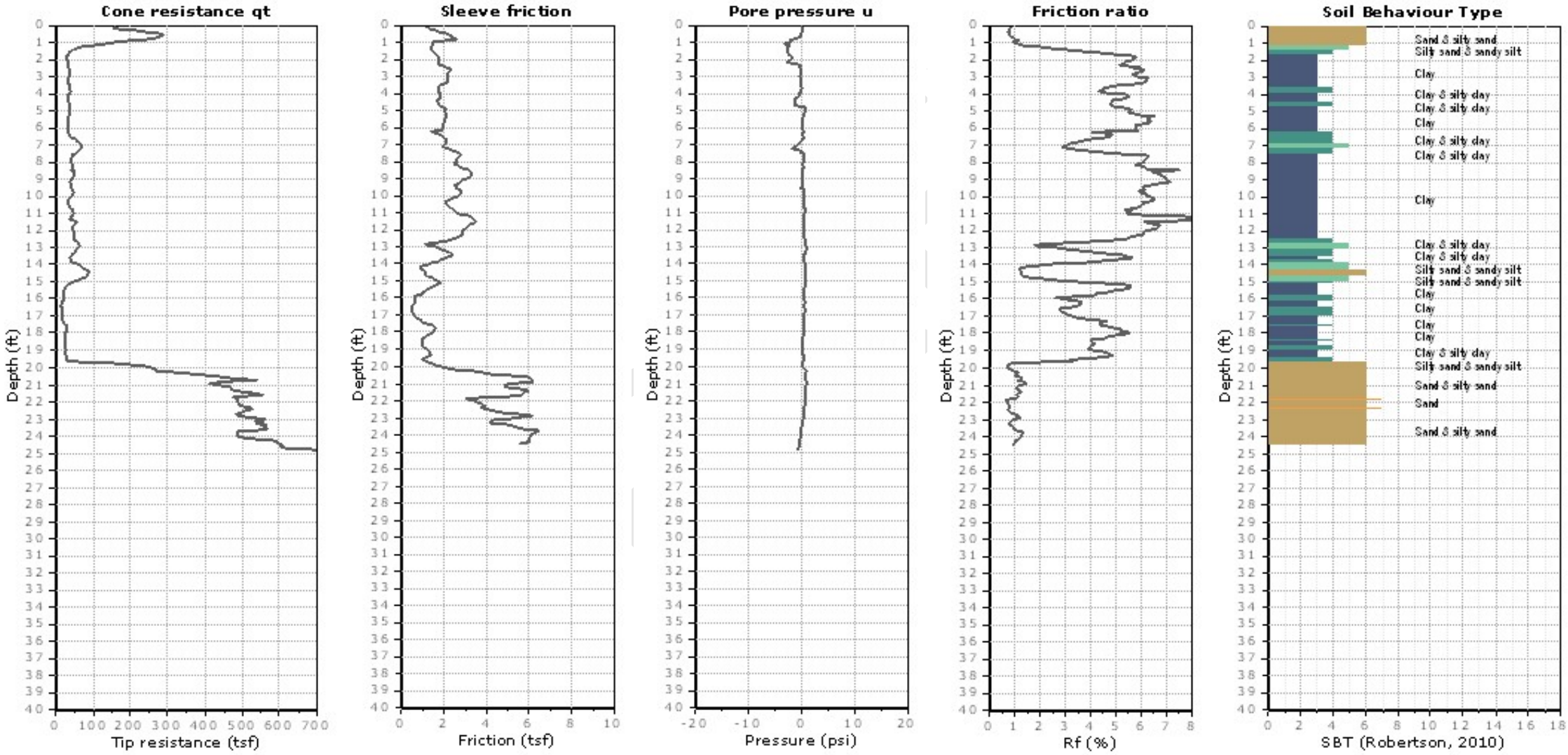
C-8F

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 24.87 ft, Date: 12/18/2018
Cone Type: Vertek



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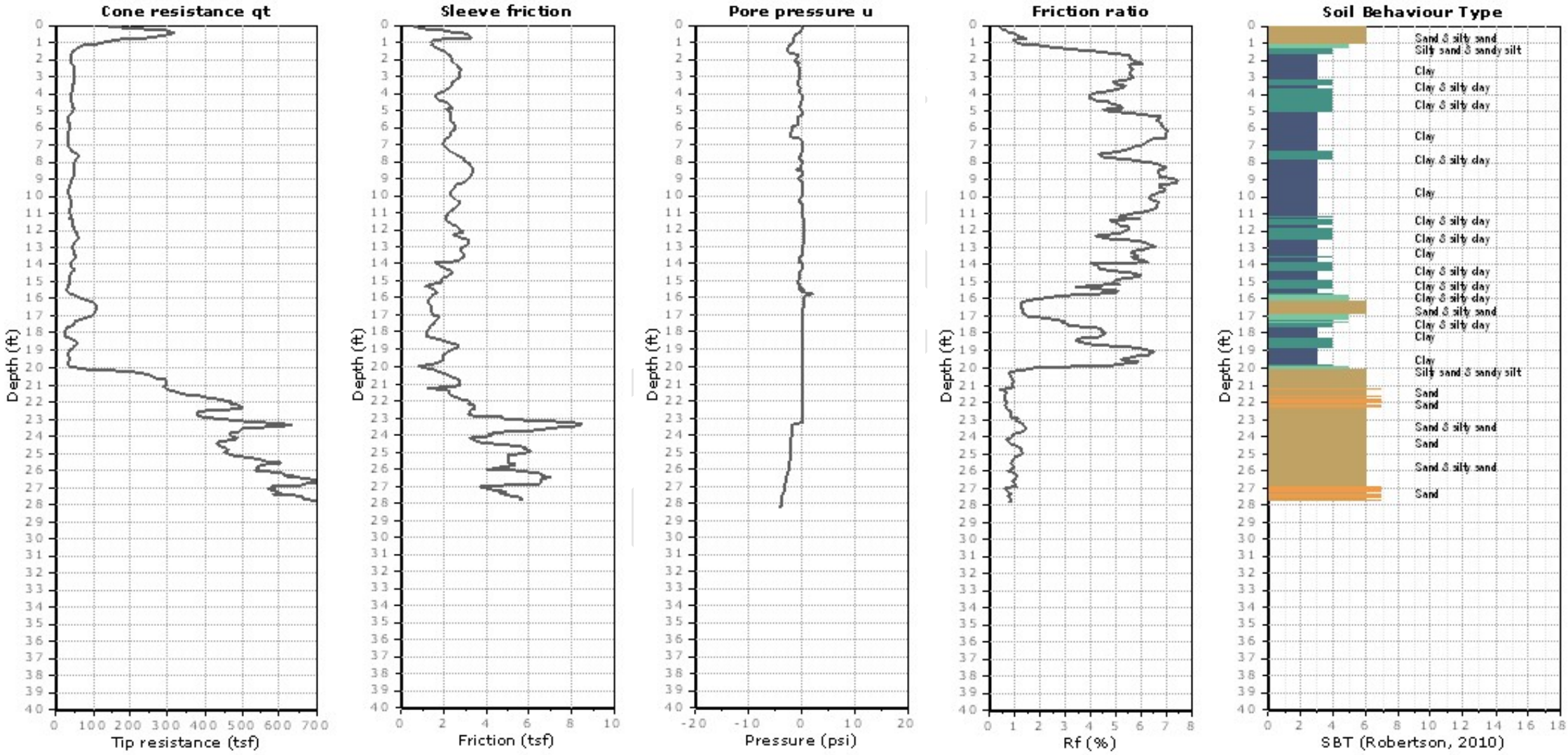
C-8G

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.22 ft, Date: 12/18/2018
Cone Type: Vertek



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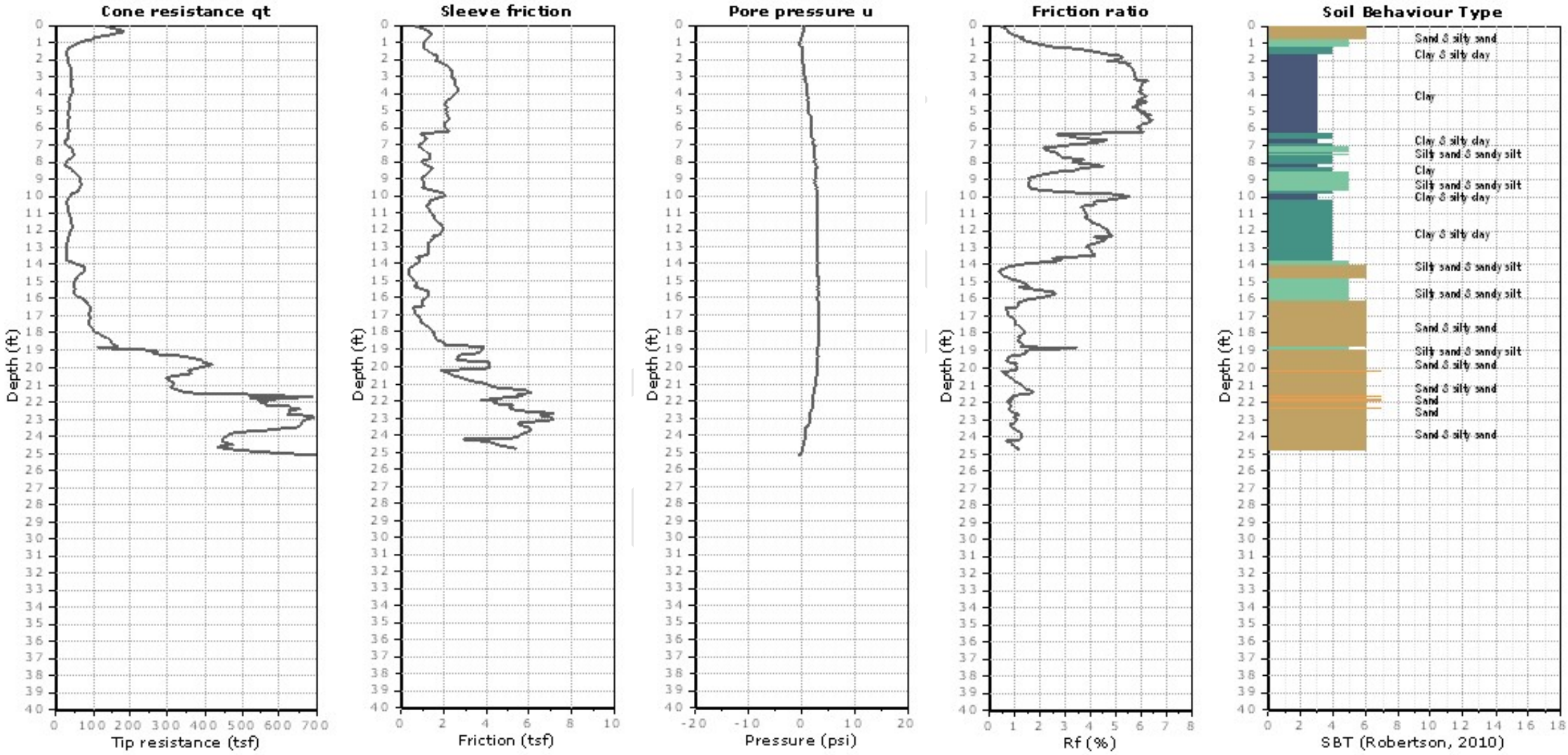
C-8H

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 25.20 ft, Date: 12/18/2018
Cone Type: Vertek



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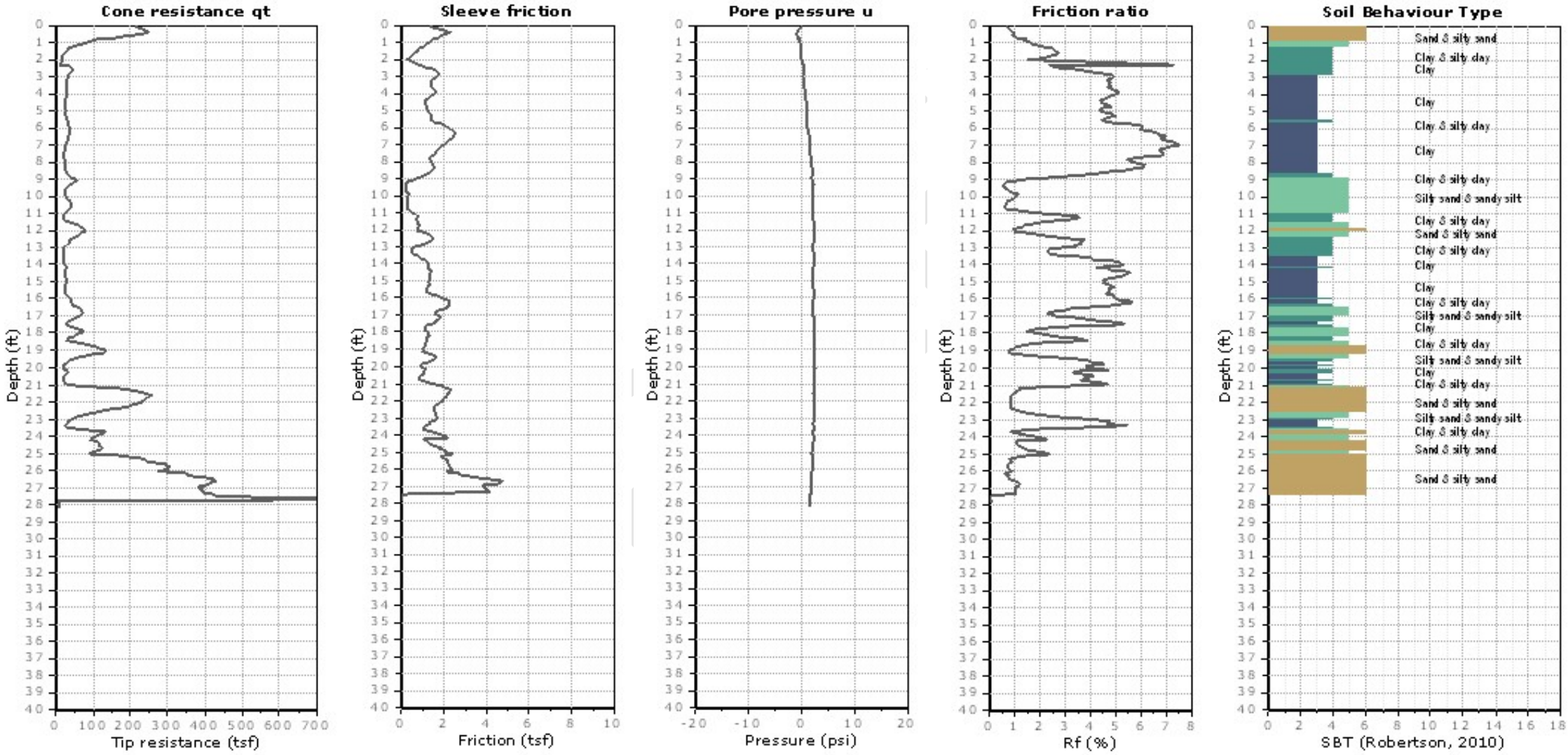
C-8I

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.17 ft, Date: 12/18/2018
Cone Type: Vertek



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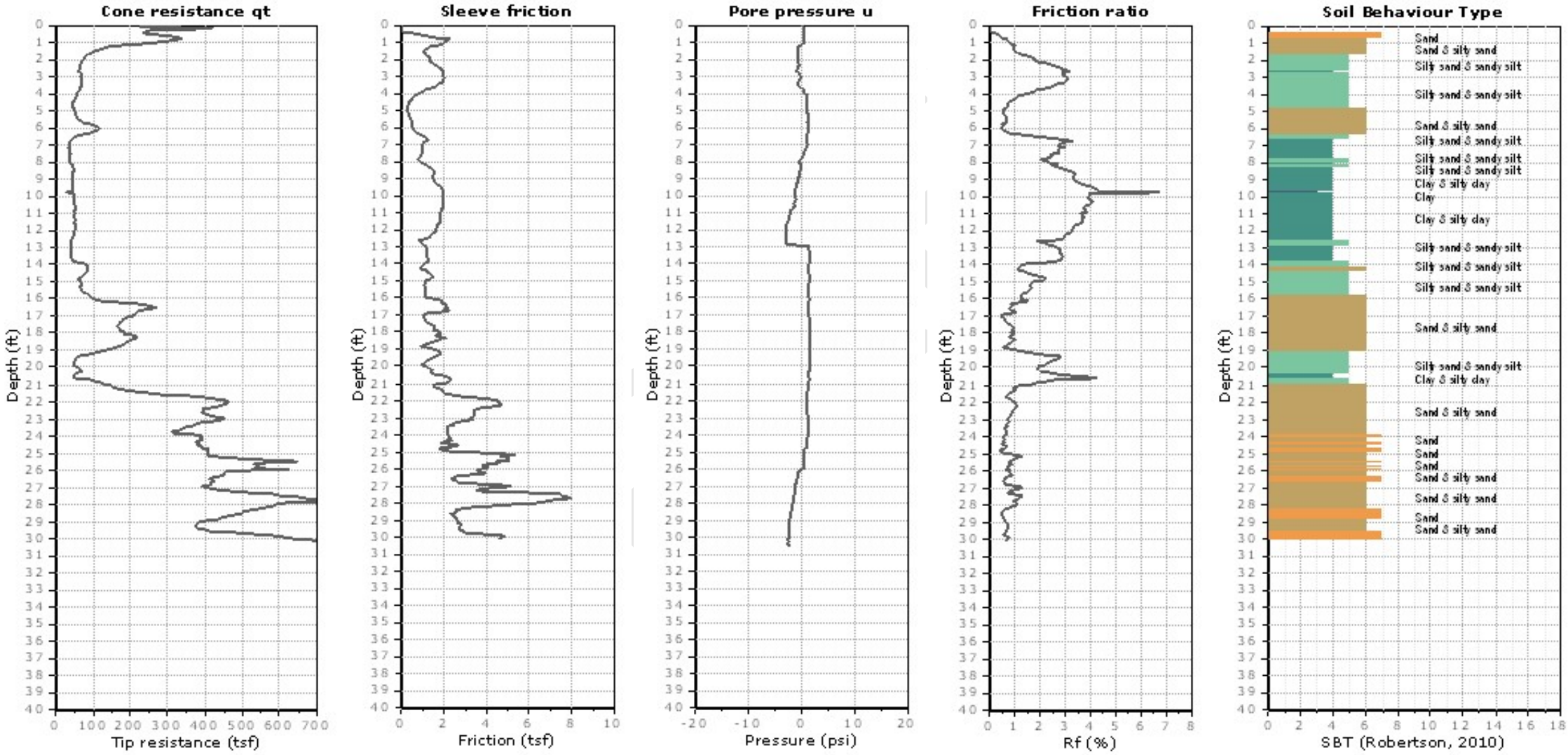
C-9A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 30.47 ft, Date: 11/21/2018
Cone Type: Vertek



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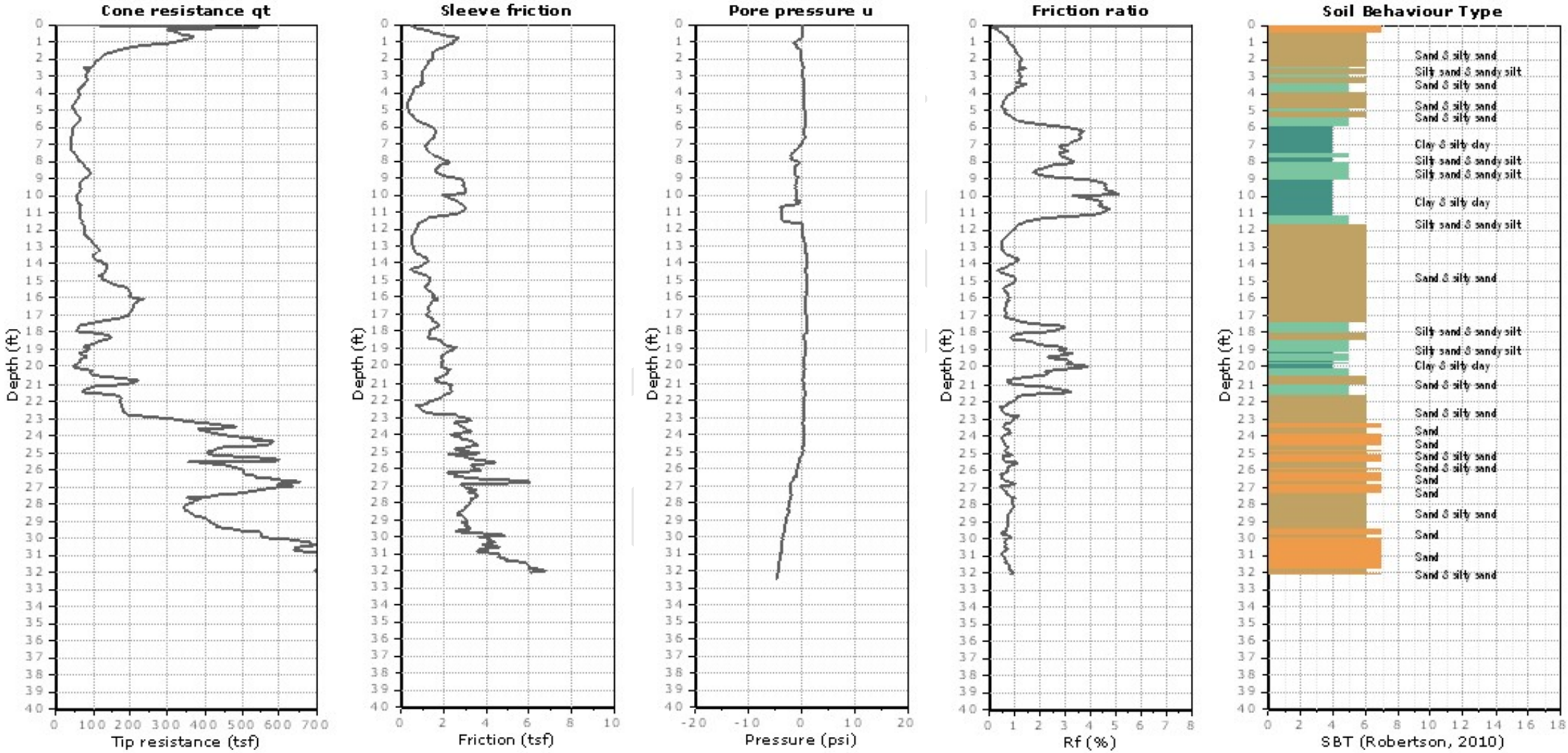
C-9AA

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 32.49 ft, Date: 11/21/2018
Cone Type: Vertek



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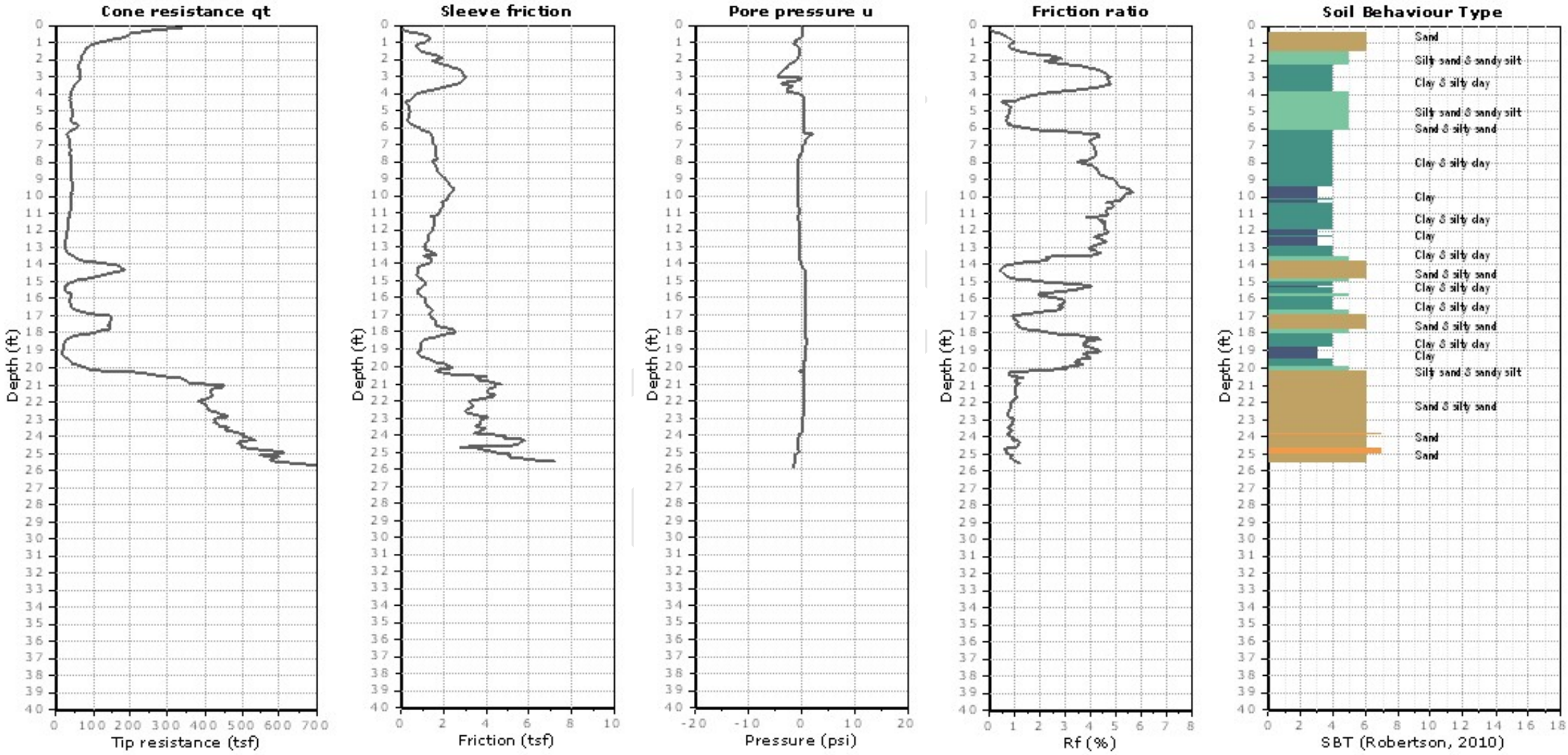
C-9B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 25.92 ft, Date: 12/21/2018
Cone Type: Vertek



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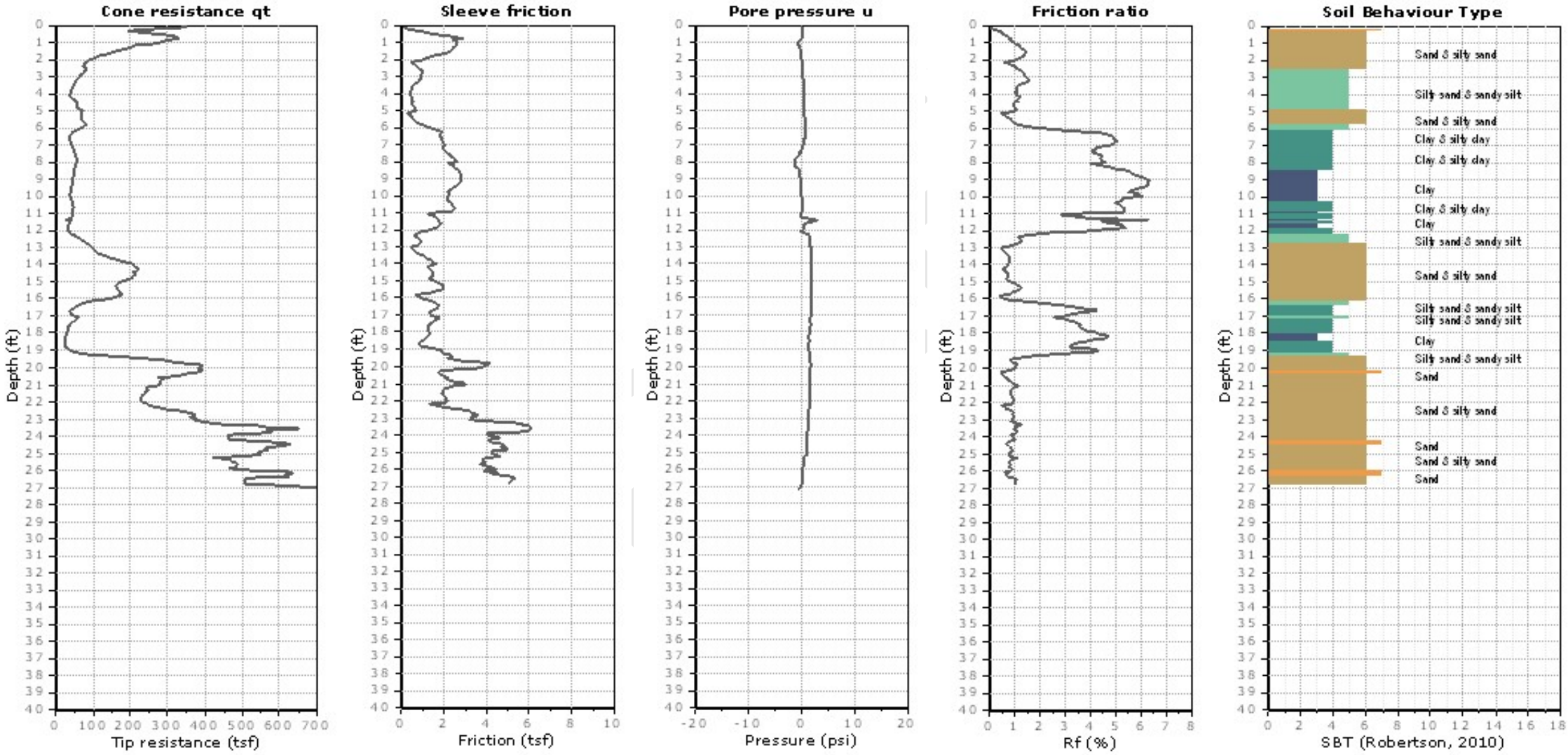
C-9C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.18 ft, Date: 12/21/2018
Cone Type: Vertek



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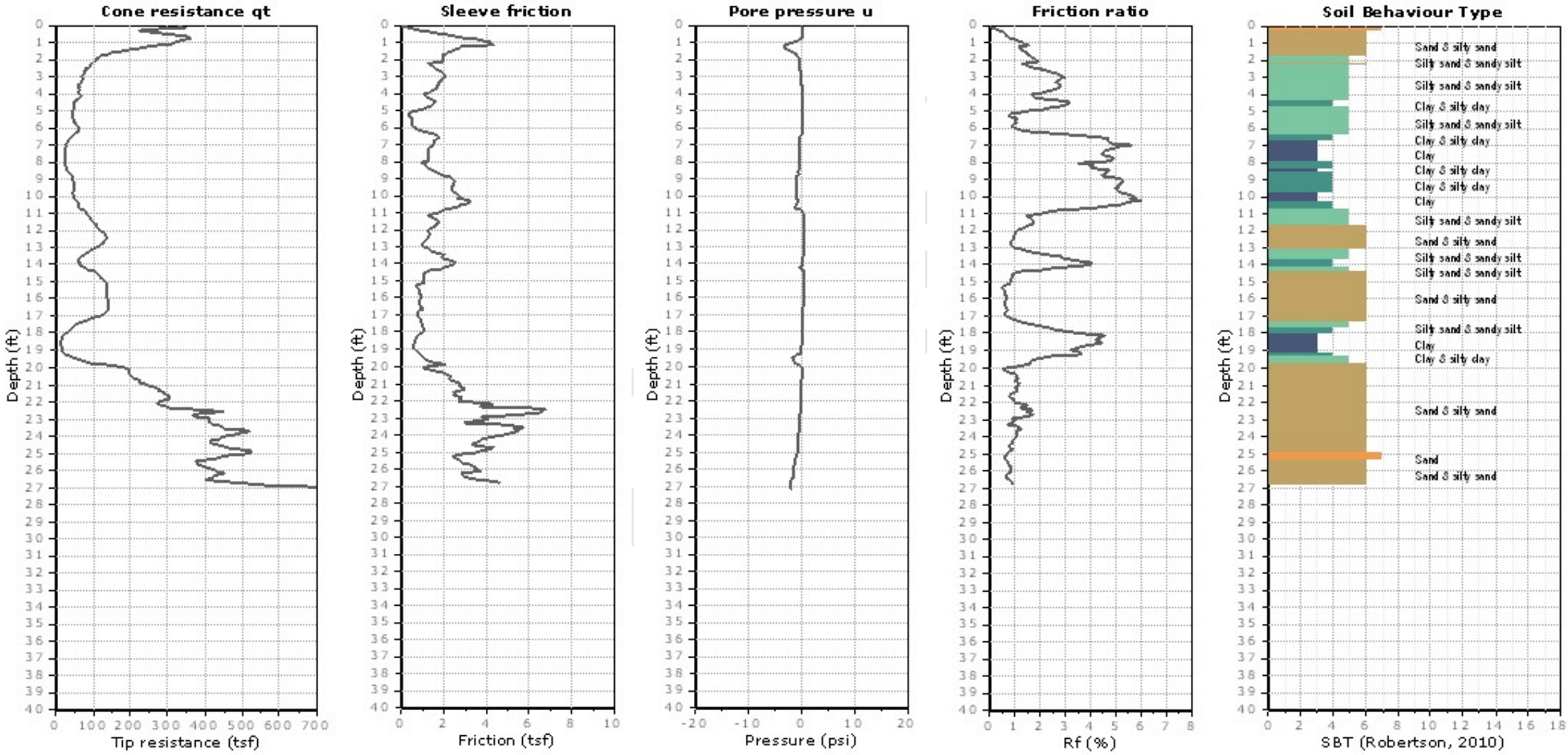
C-9D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.18 ft, Date: 12/21/2018
Cone Type: Vertek



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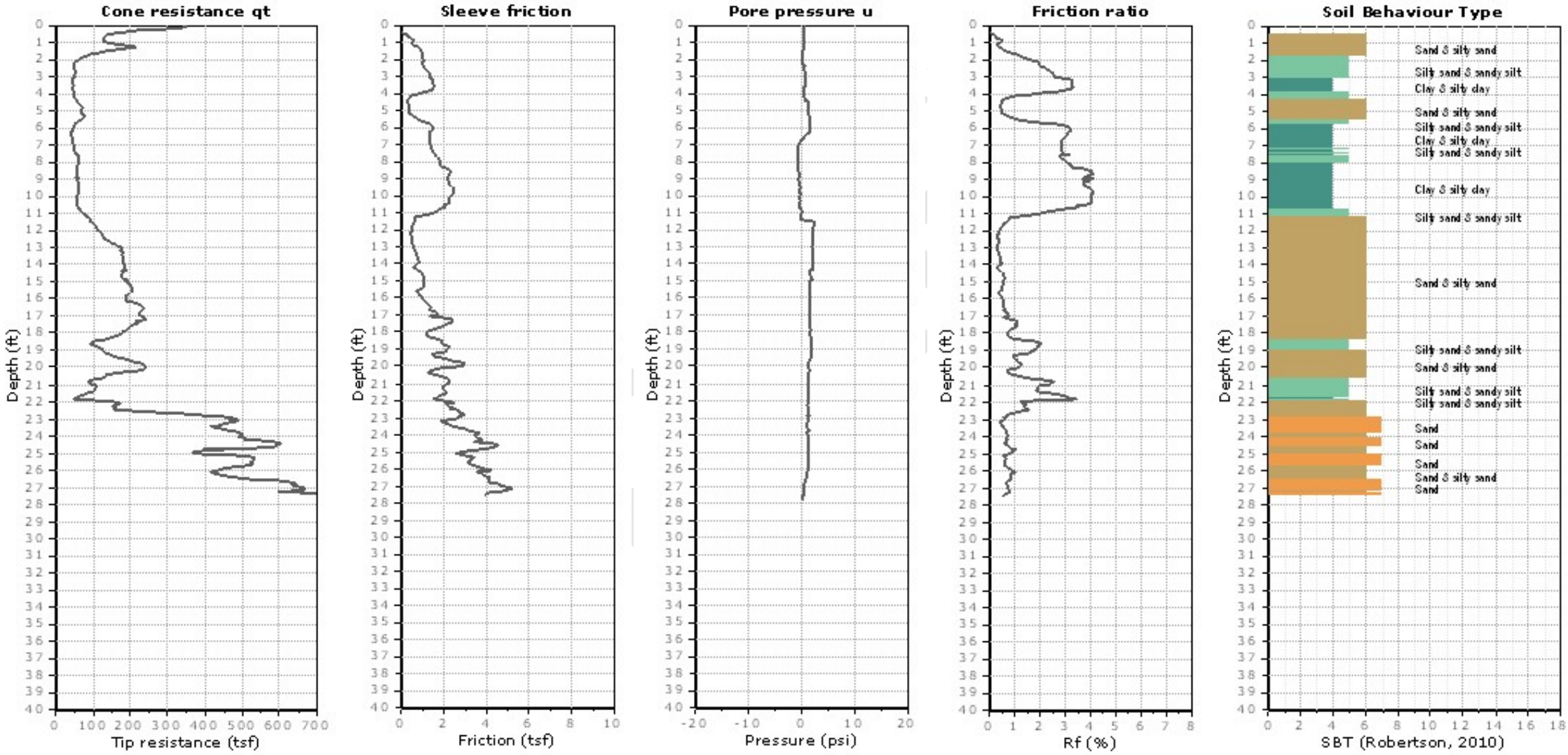
C-10A

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 27.83 ft, Date: 11/21/2018
Cone Type: Vertek



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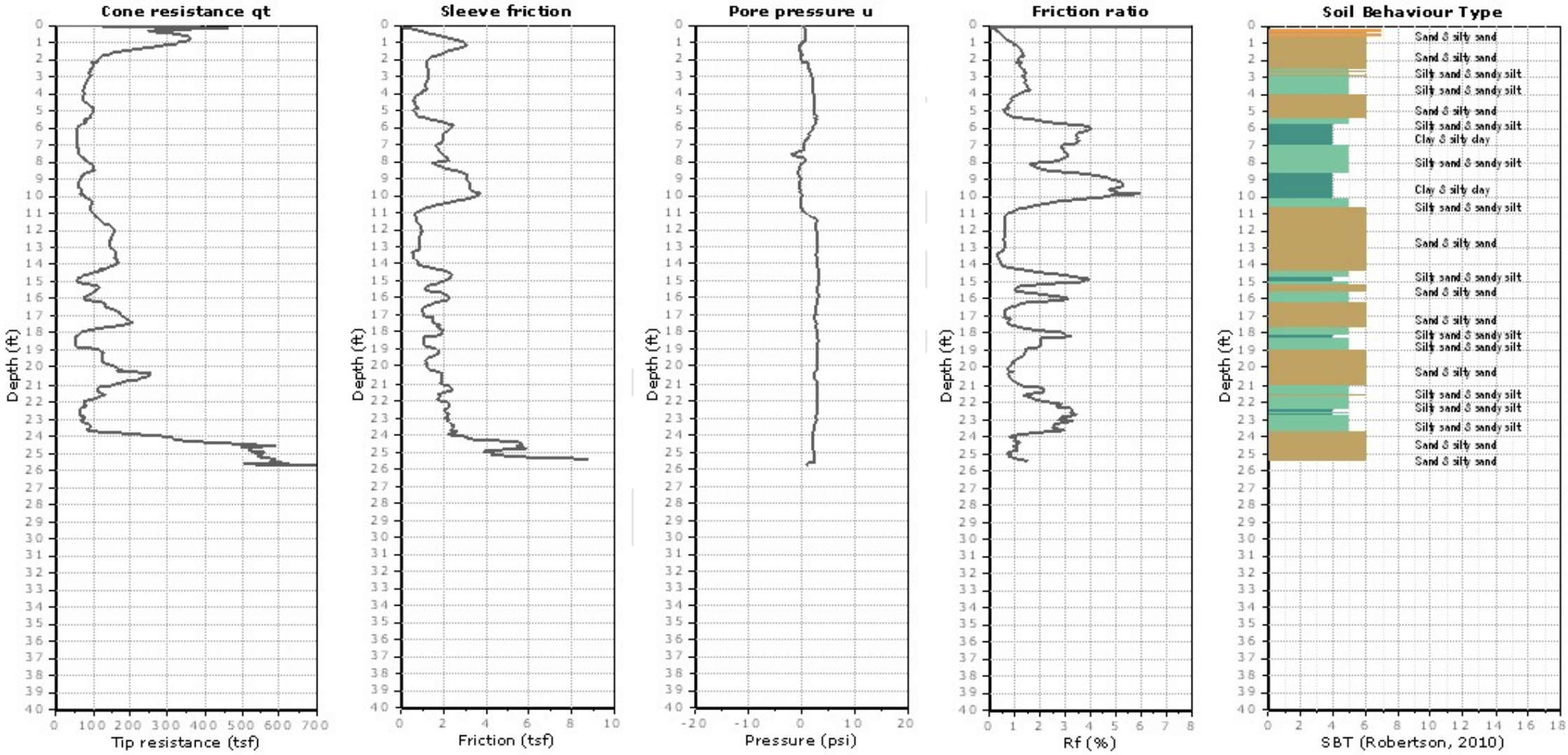
C-10AA

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 25.79 ft, Date: 11/21/2018
Cone Type: Vertek



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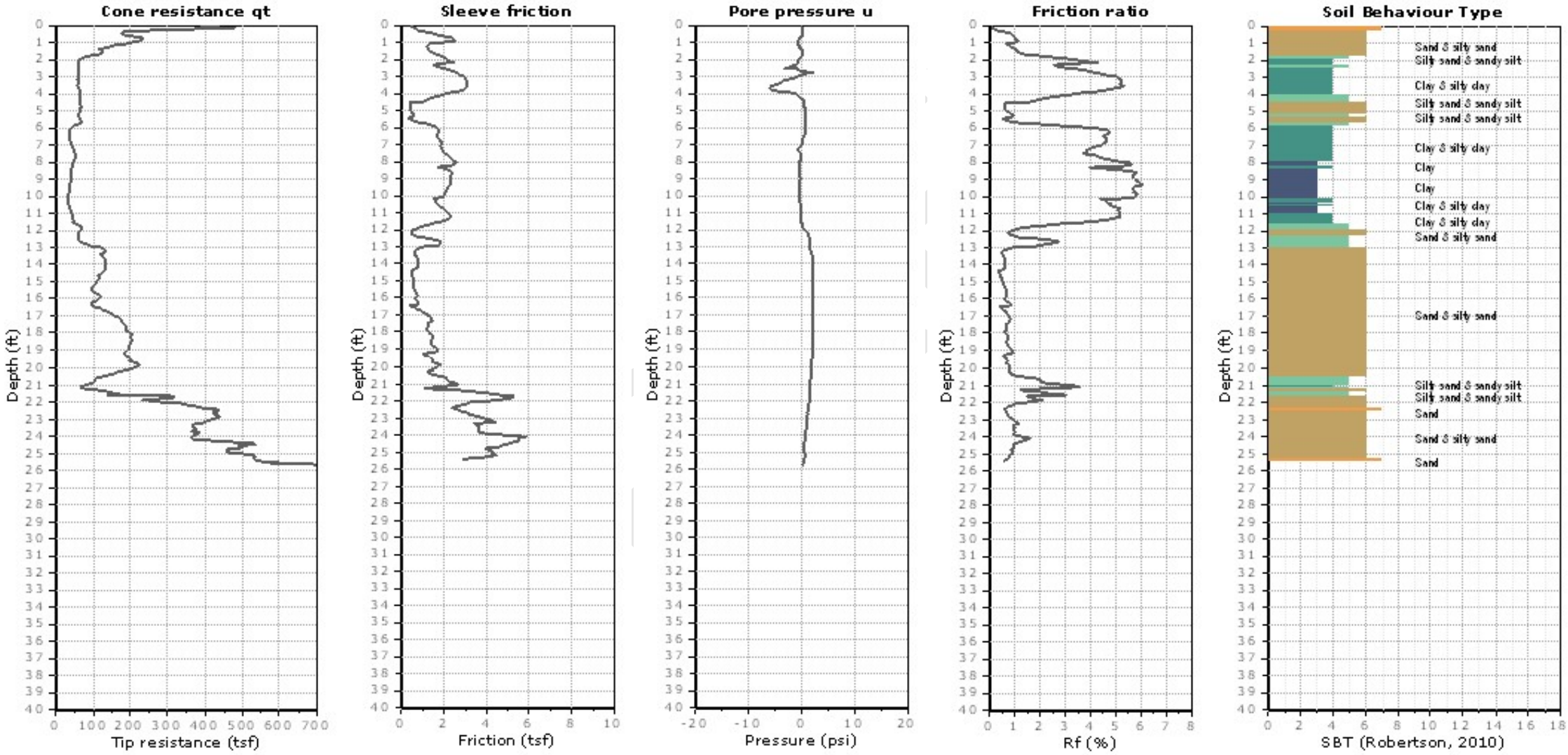
C-10B

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 25.80 ft, Date: 12/21/2018
Cone Type: Vertek



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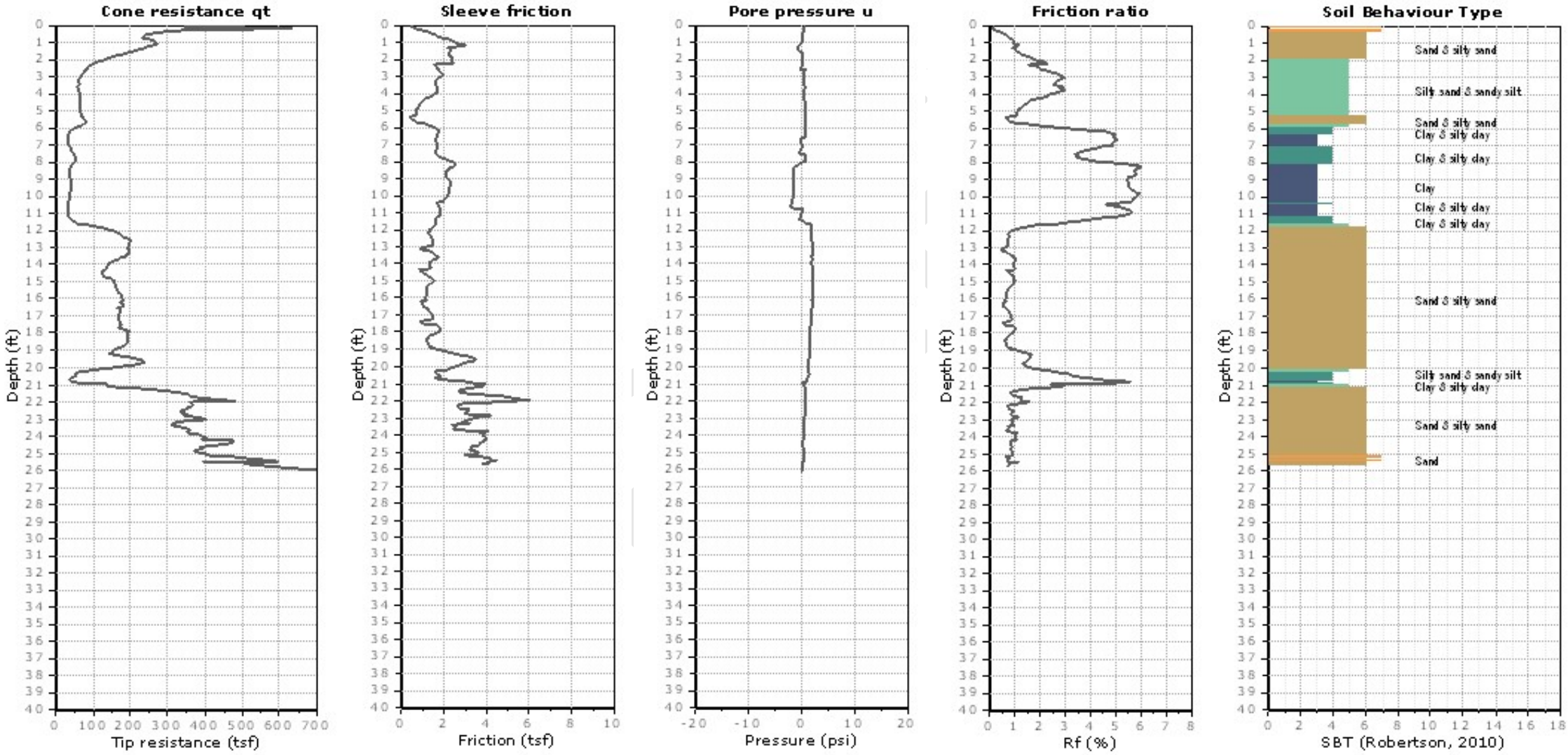
C-10C

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 26.13 ft, Date: 12/21/2018
Cone Type: Vertek



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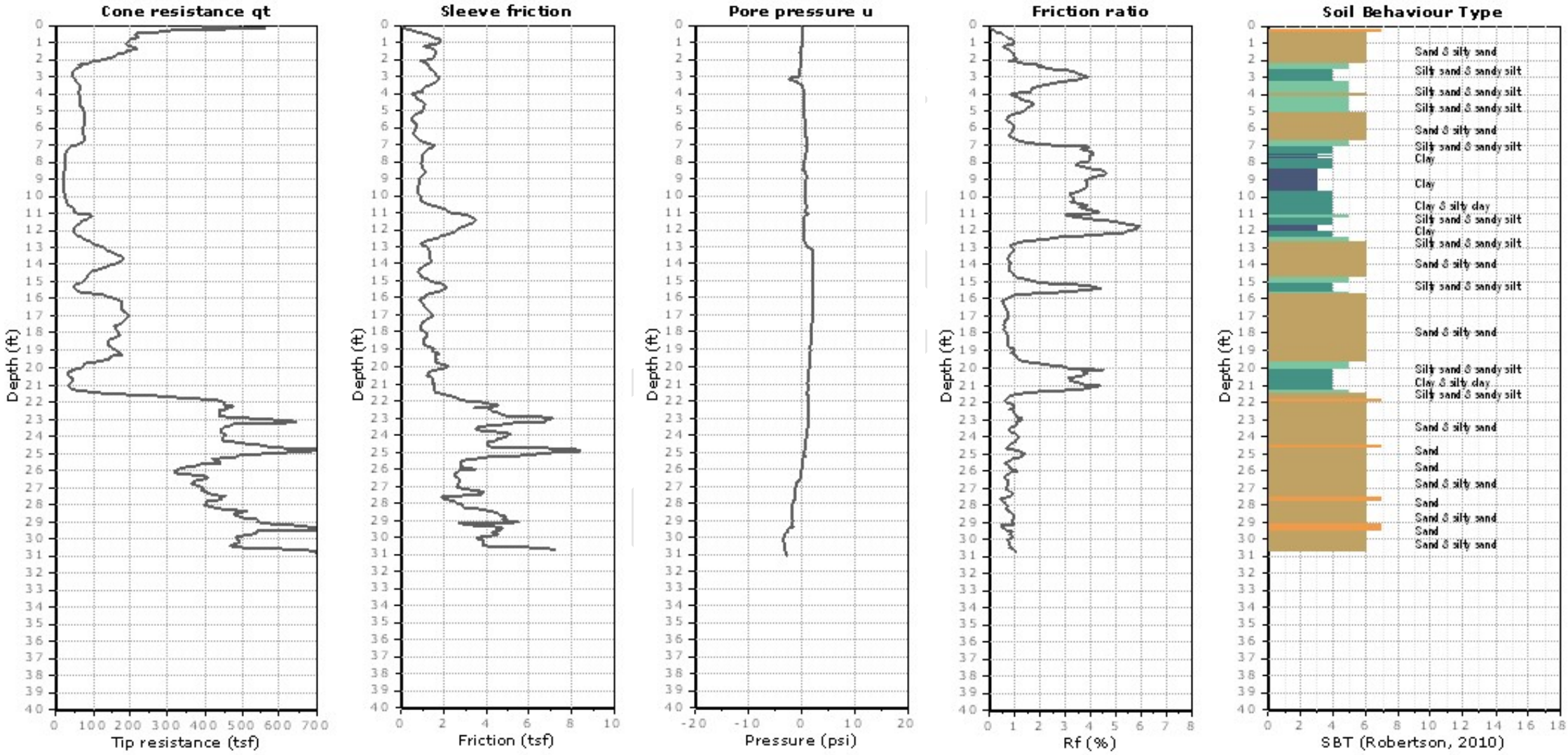
C-10D

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 31.10 ft, Date: 12/21/2018
Cone Type: Vertek



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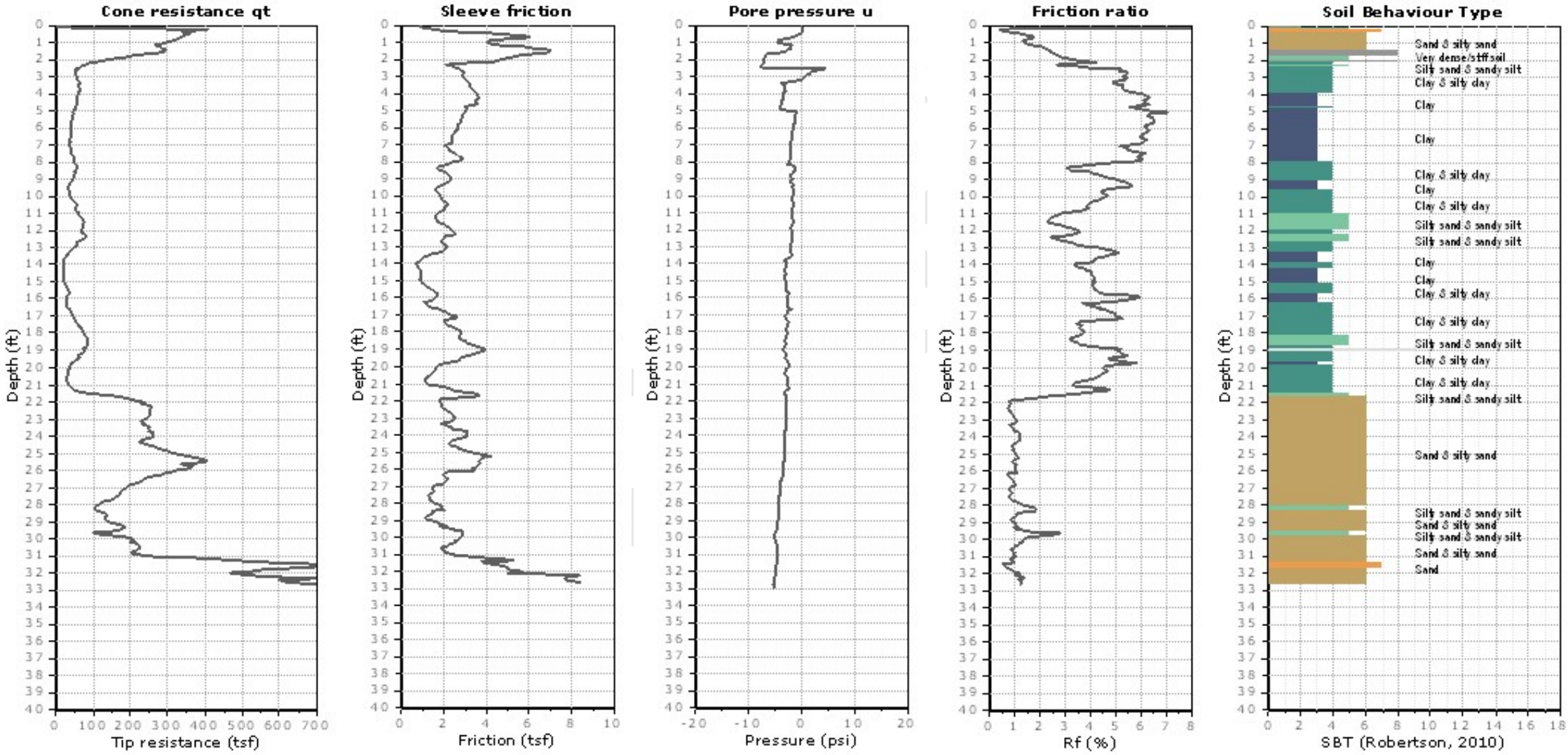
C-B1

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 33.02 ft, Date: 12/19/2018
Cone Type: Vertek



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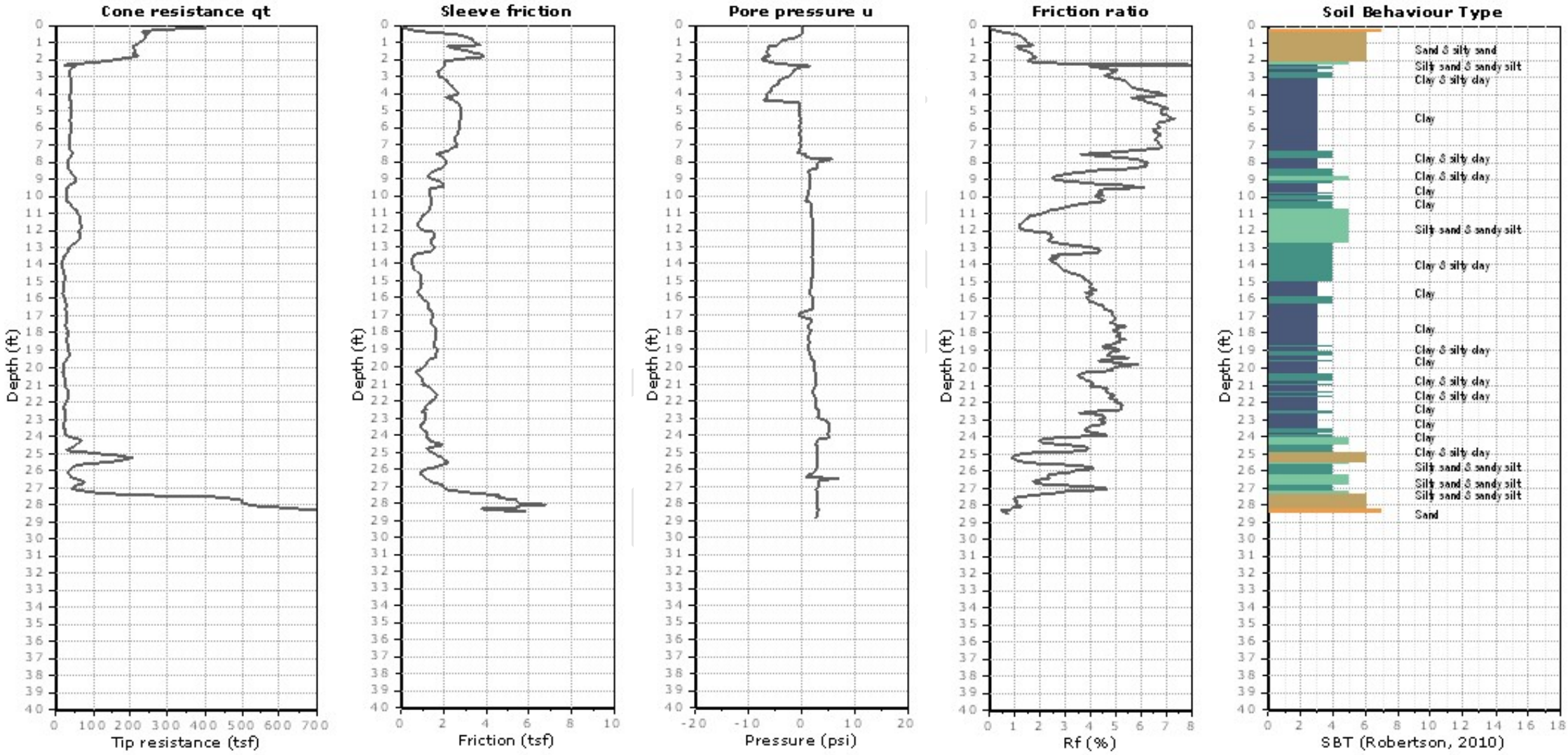
C-B2

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.87 ft, Date: 12/19/2018
Cone Type: Vertek



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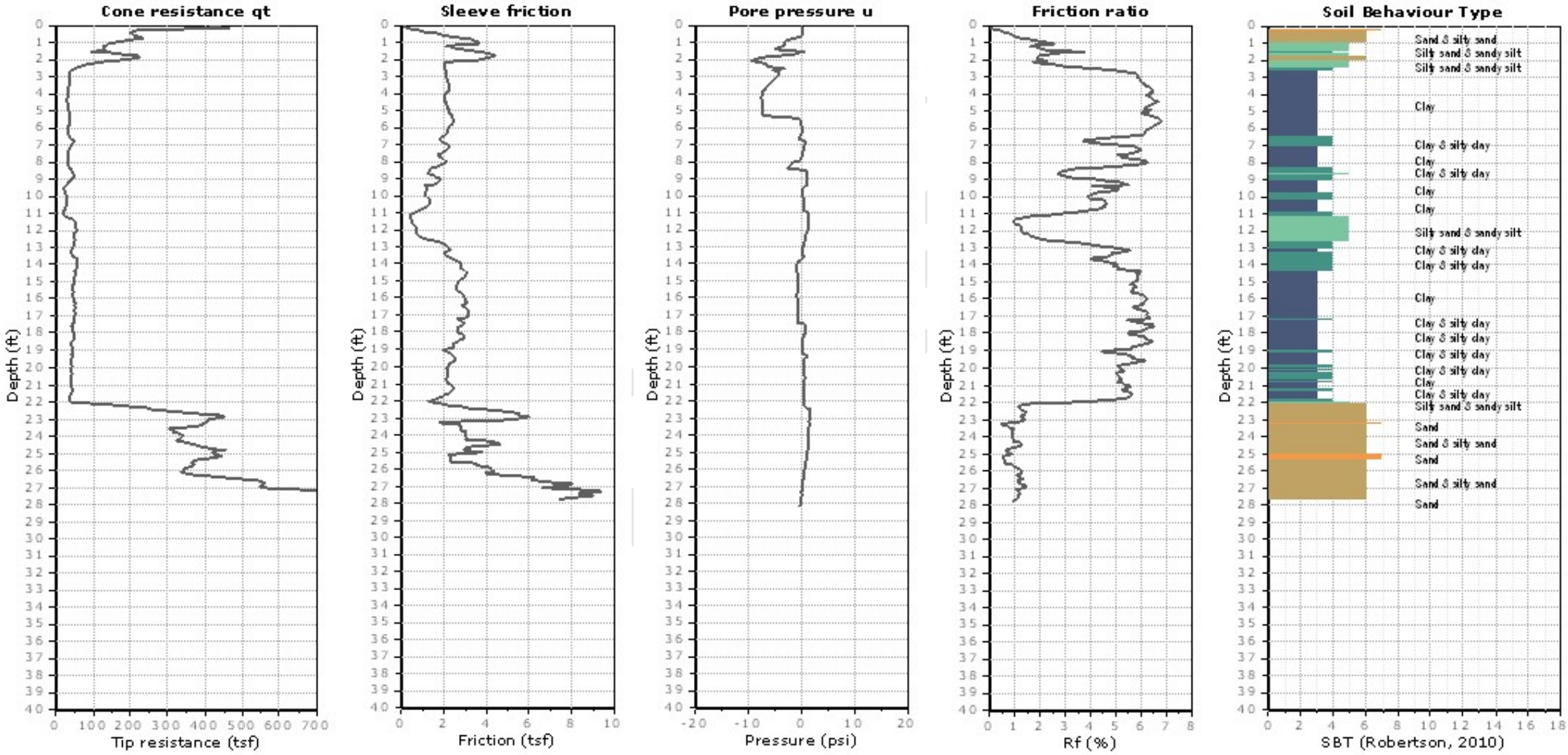
C-B3

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

Total depth: 28.15 ft, Date: 12/19/2018
Cone Type: Vertek



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C-B4

Project: **Converse Consultants / Shenandoah Street Elementary School**
Location: **Los Angeles, CA**

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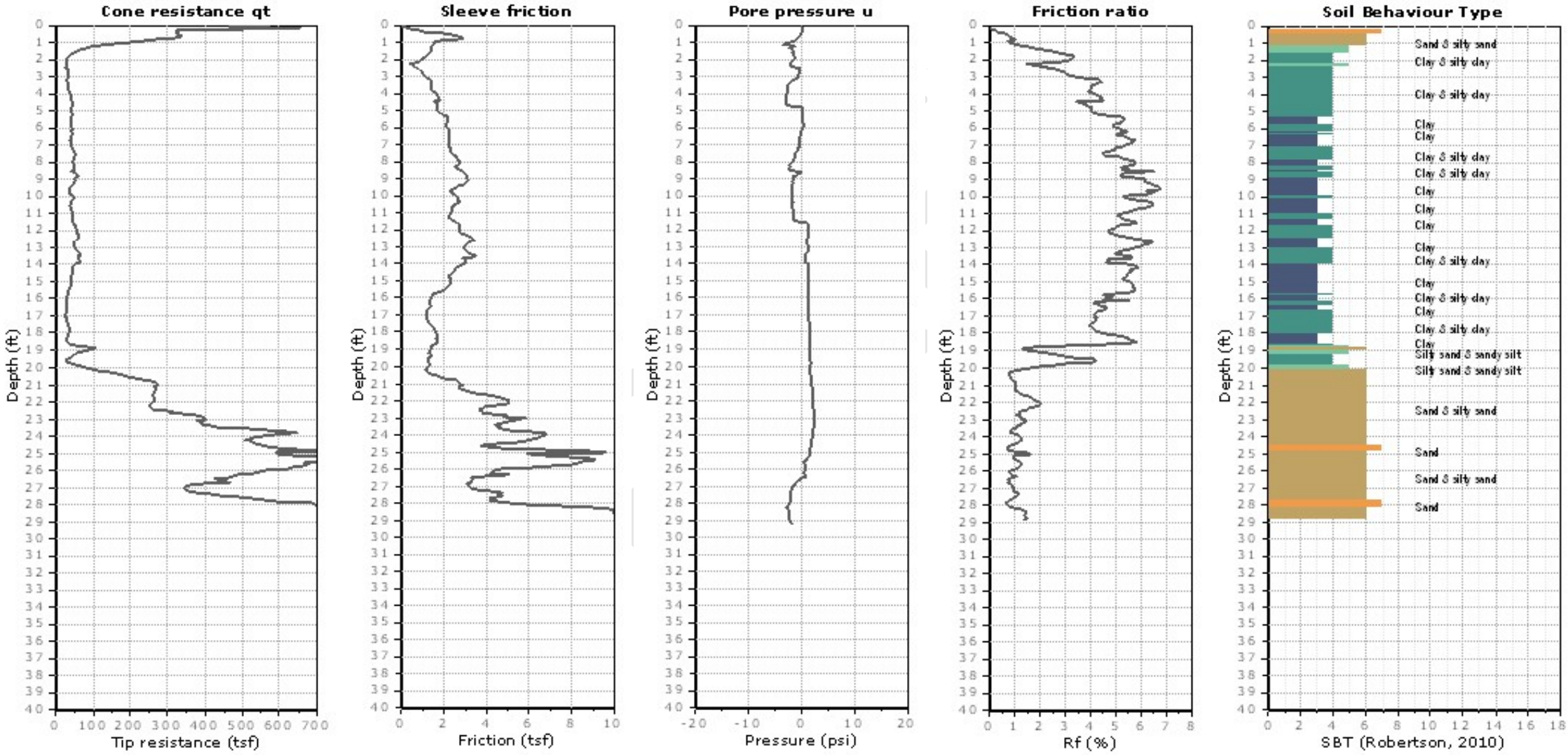

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C-C4

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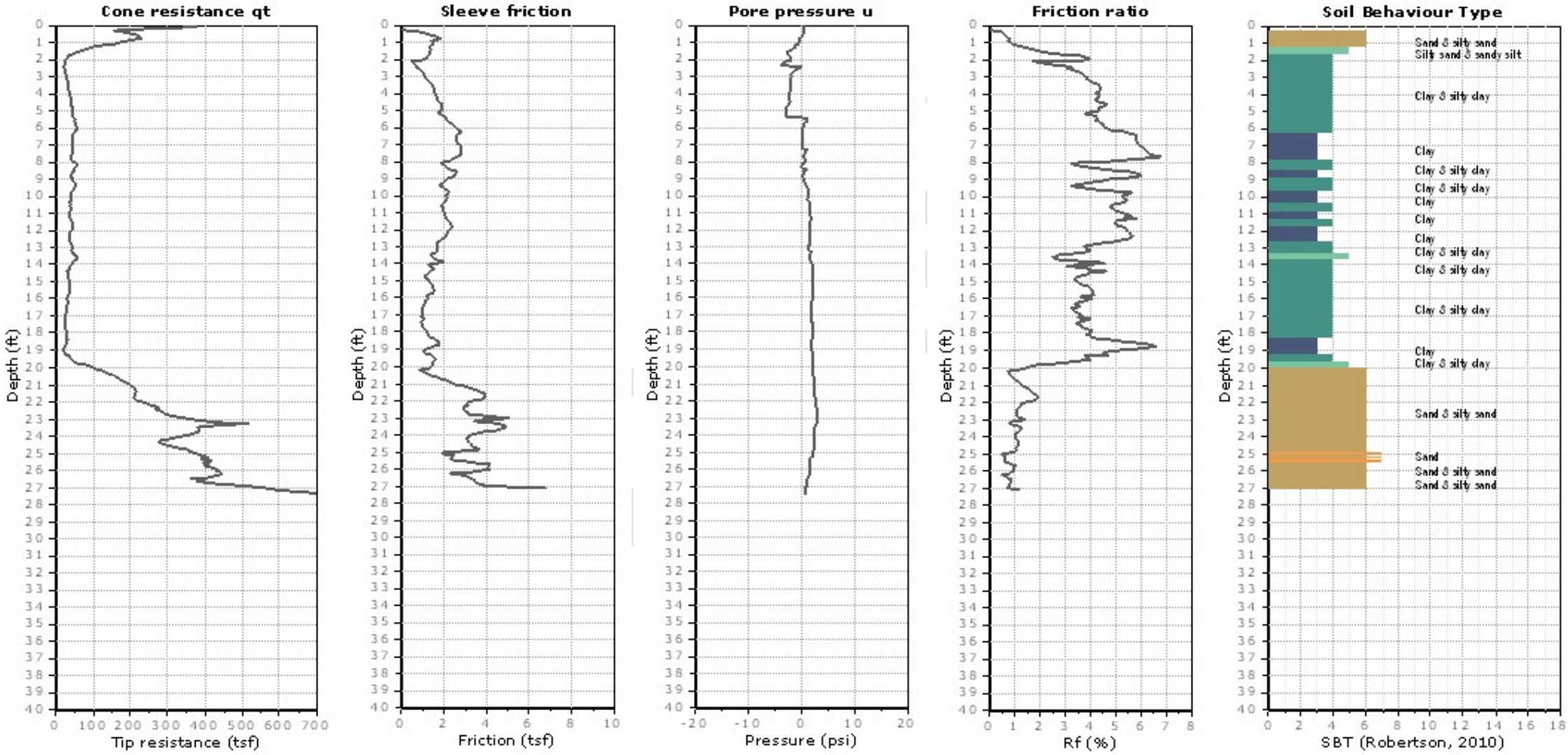

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C-D4

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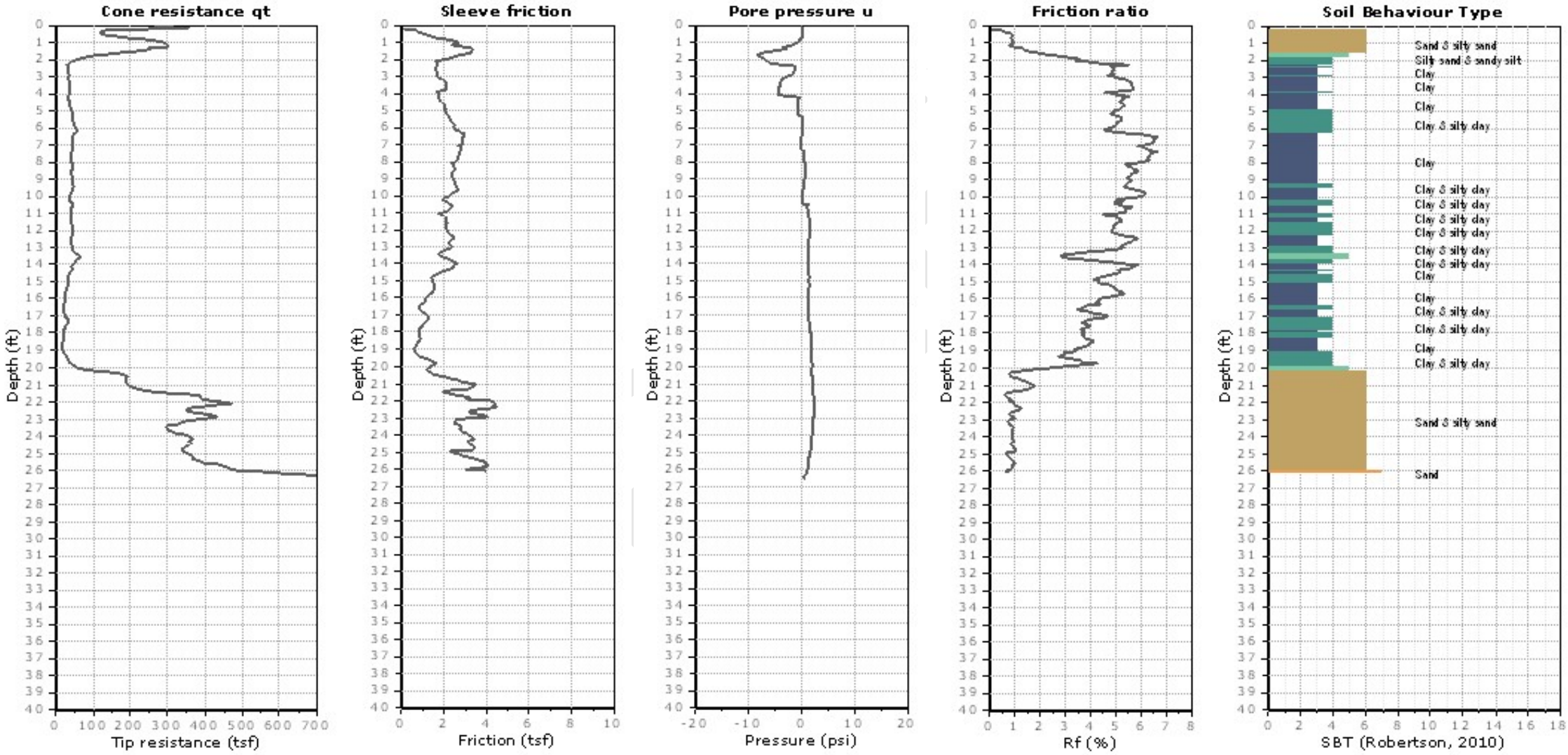

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C-E4

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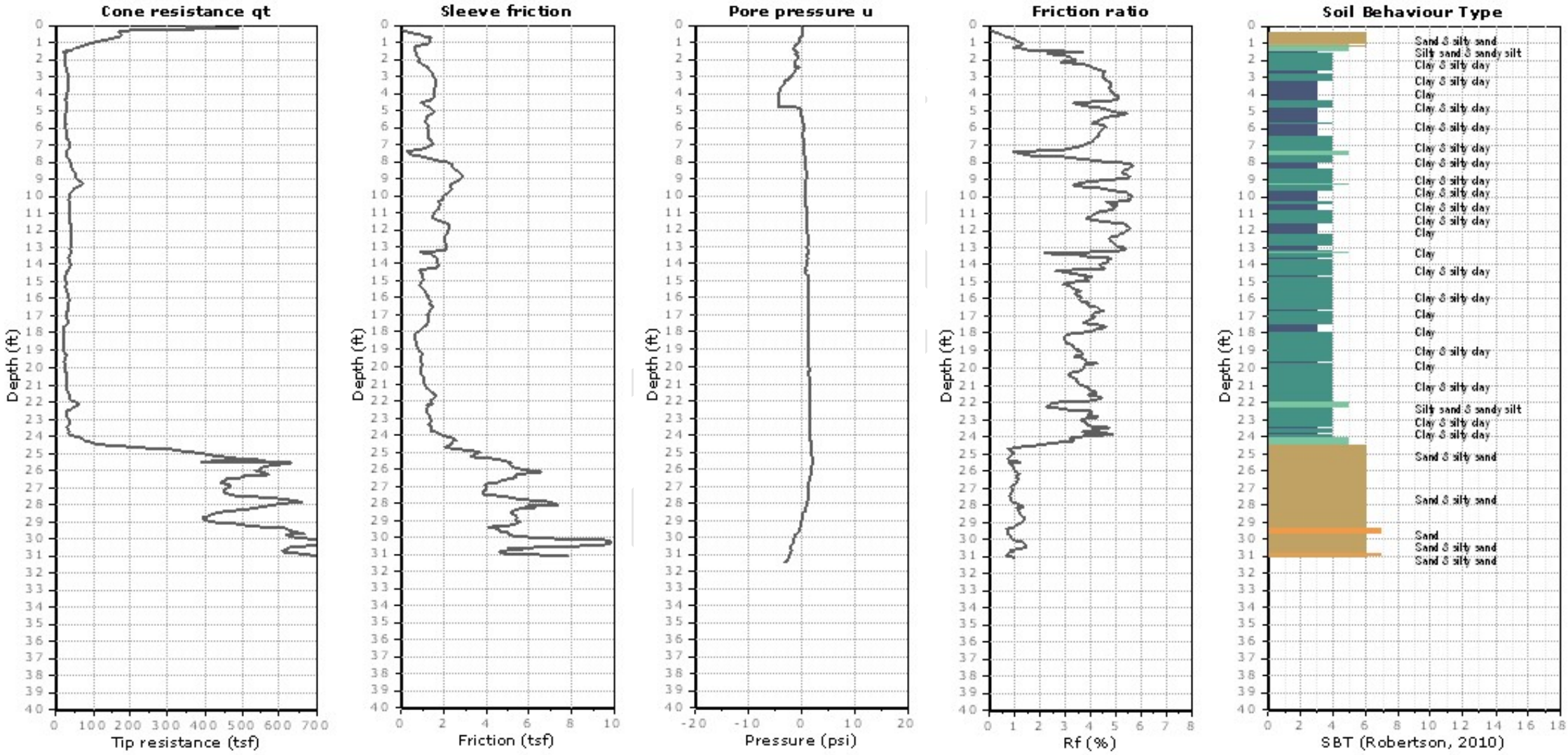

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C-F1

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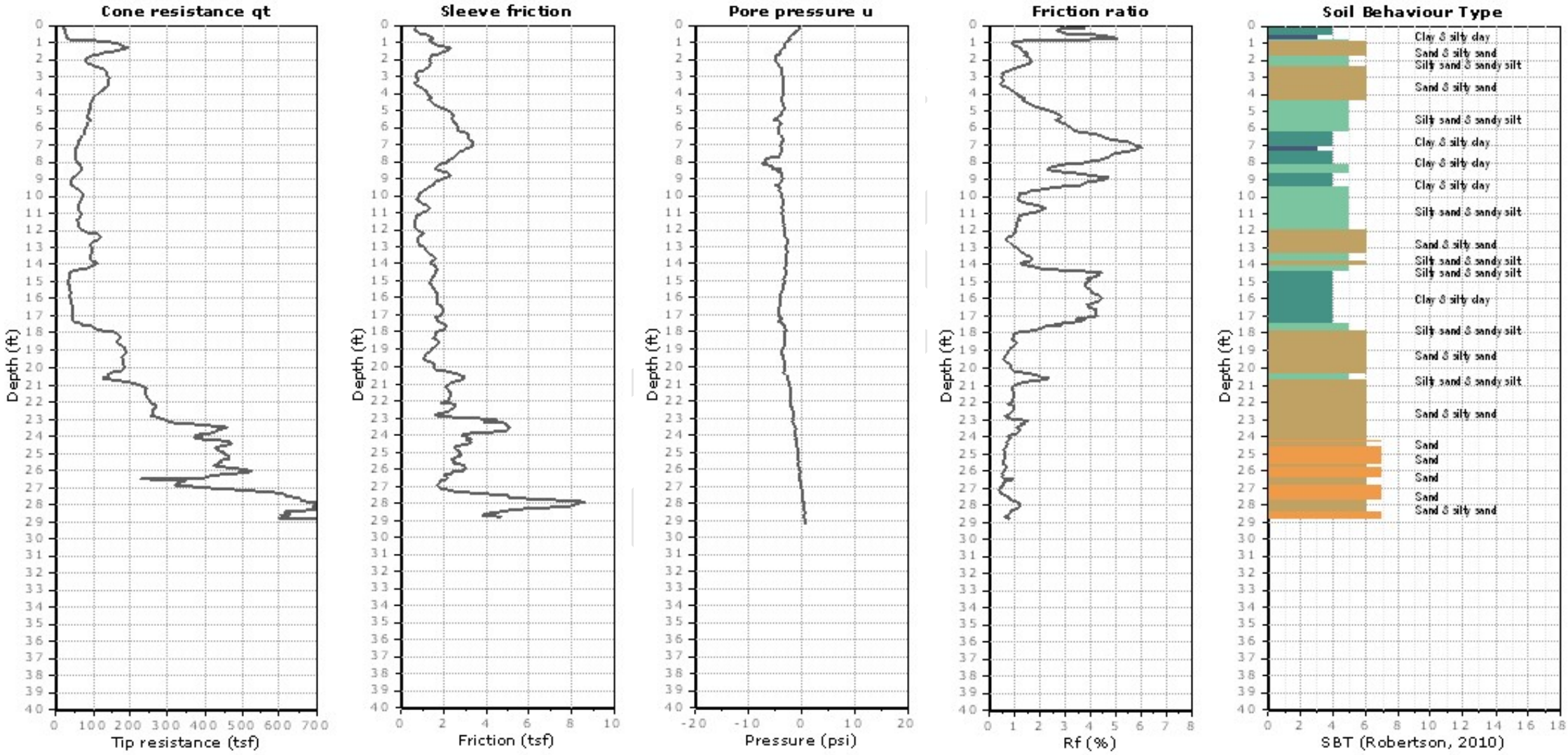

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C-F2

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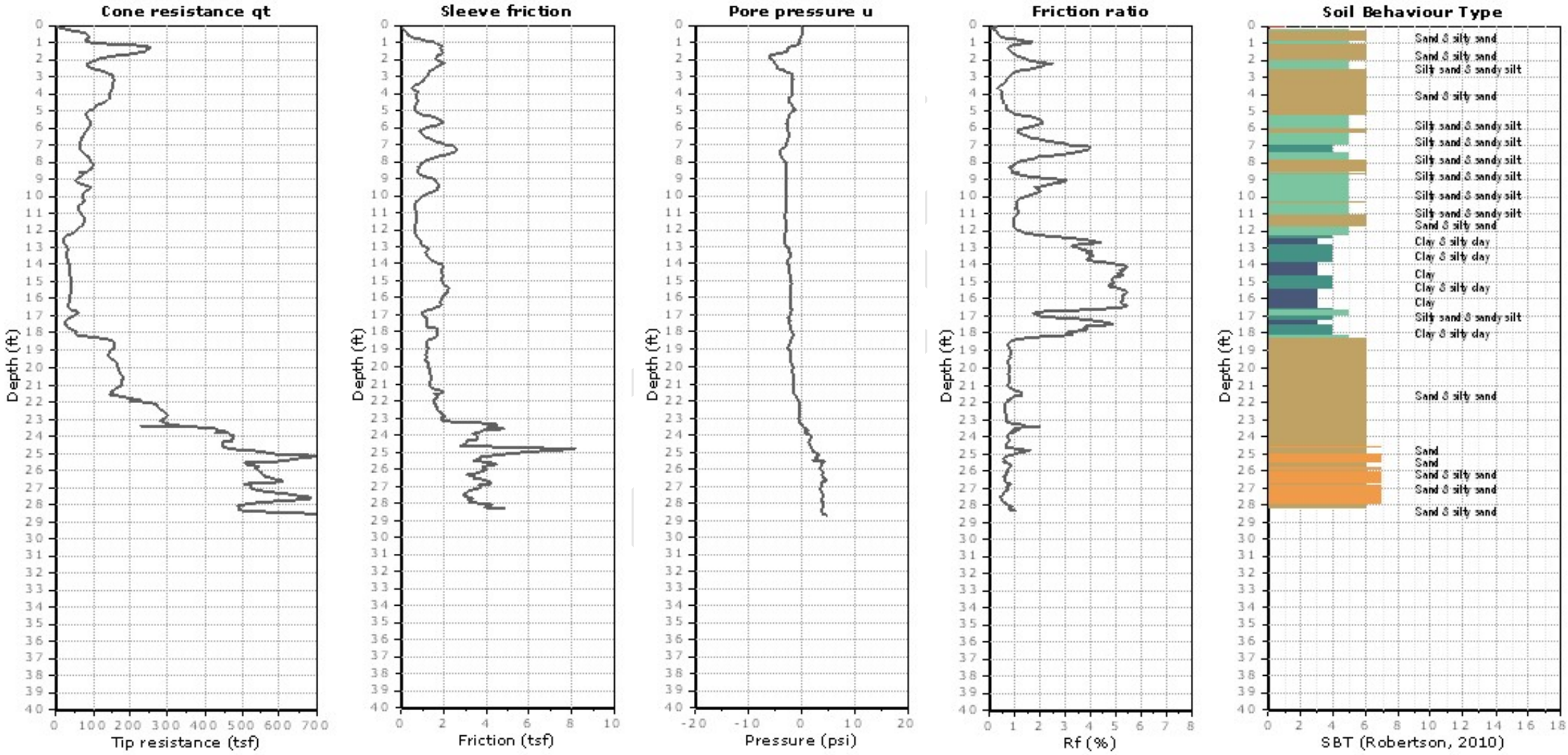

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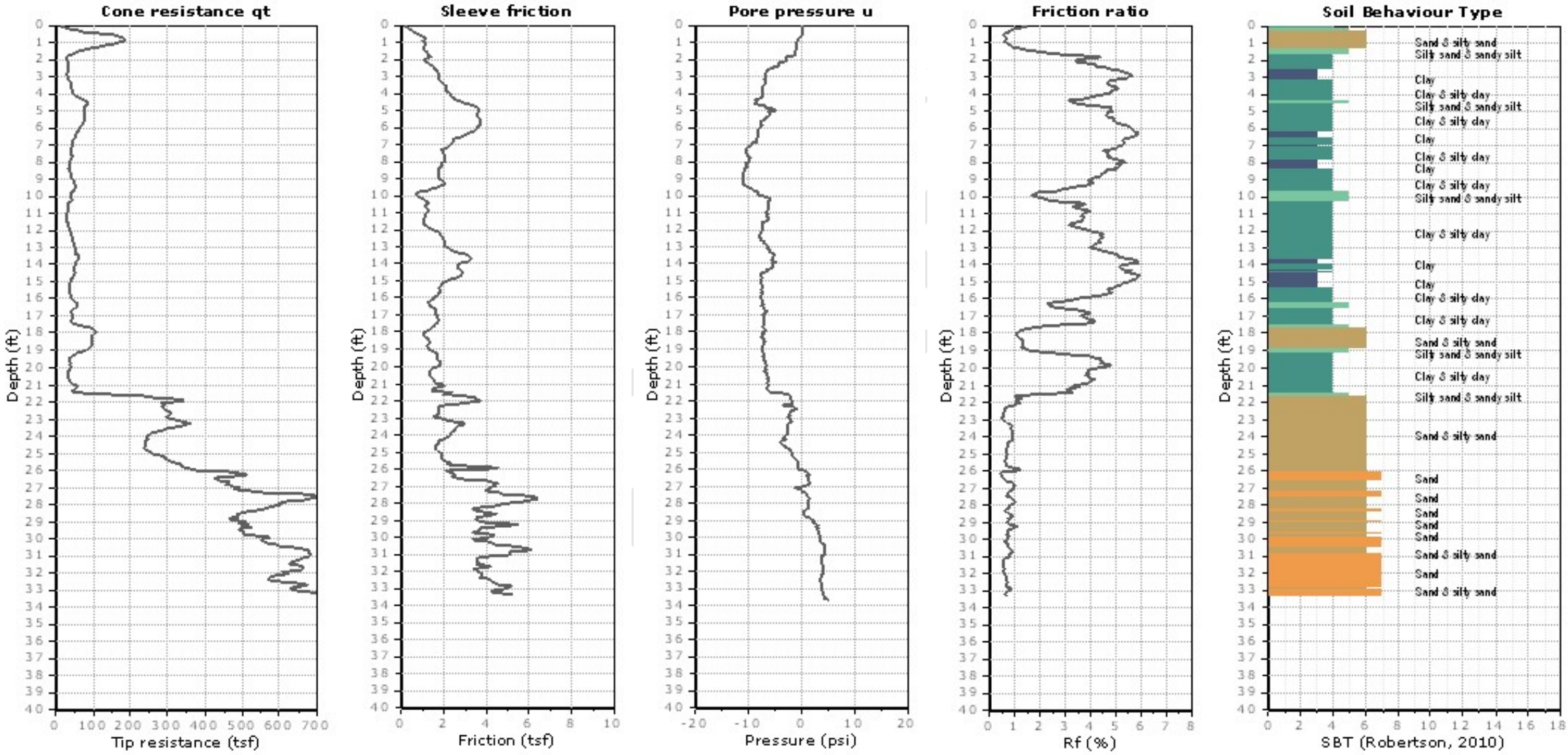

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C-G1

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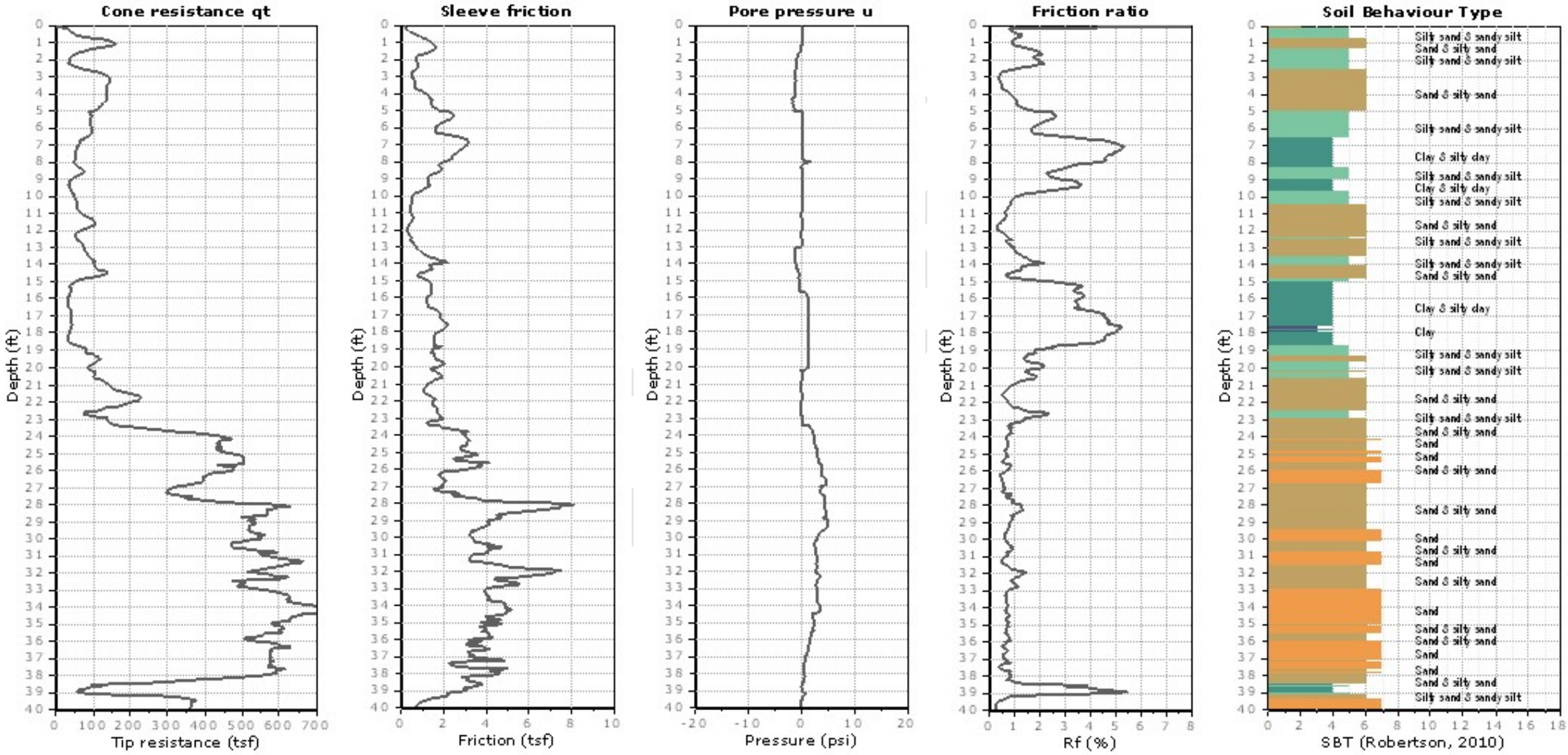

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C-G2

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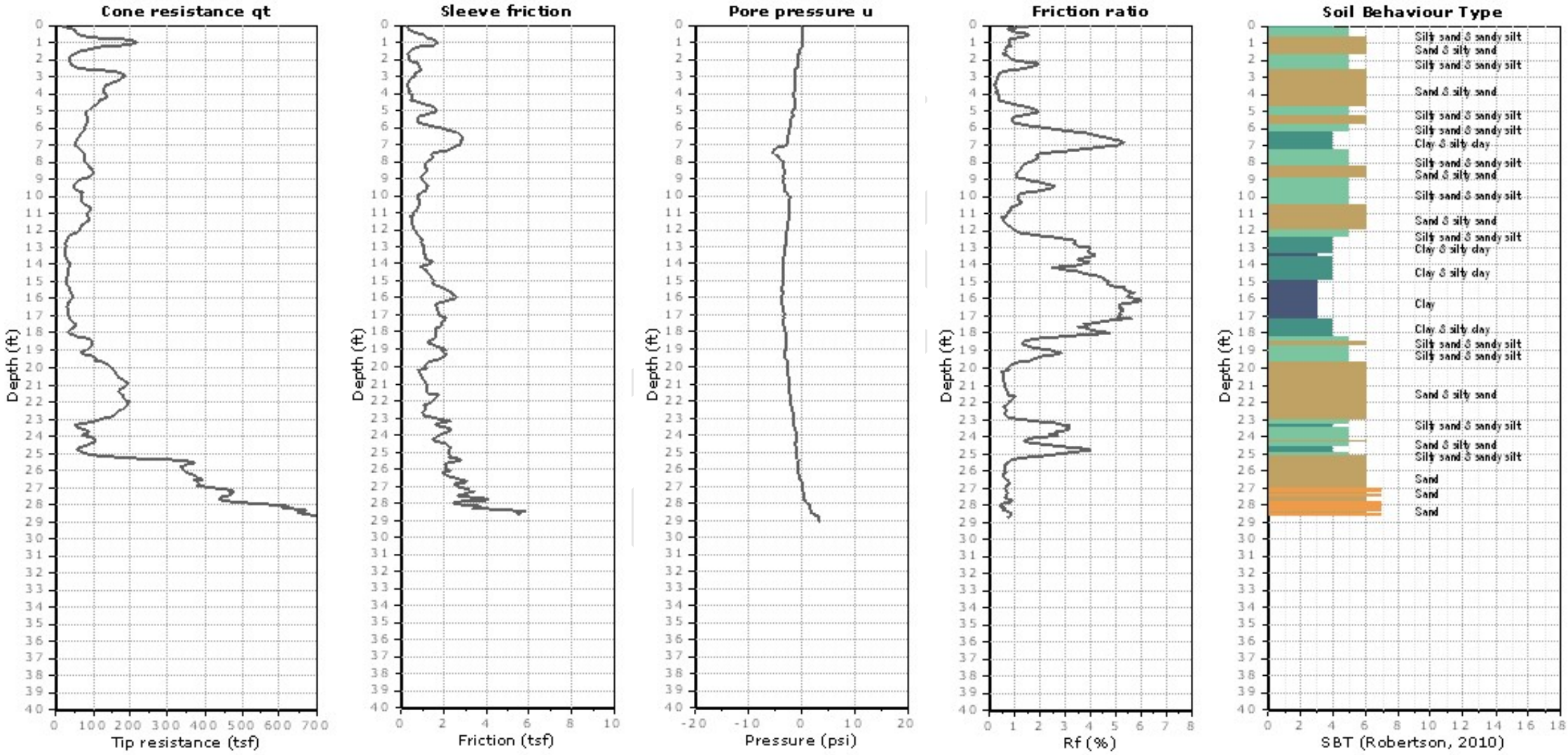

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C-G3

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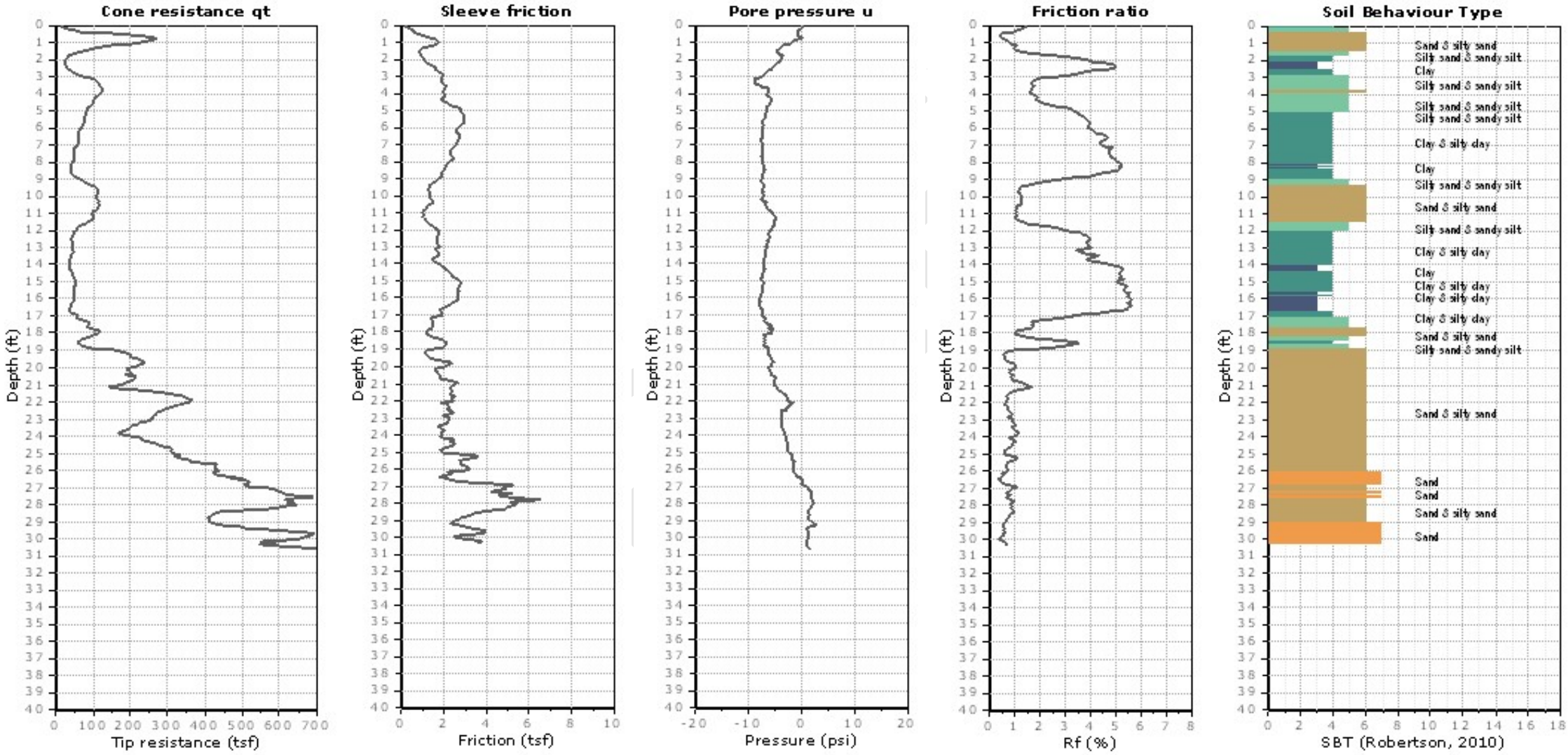

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C-H1

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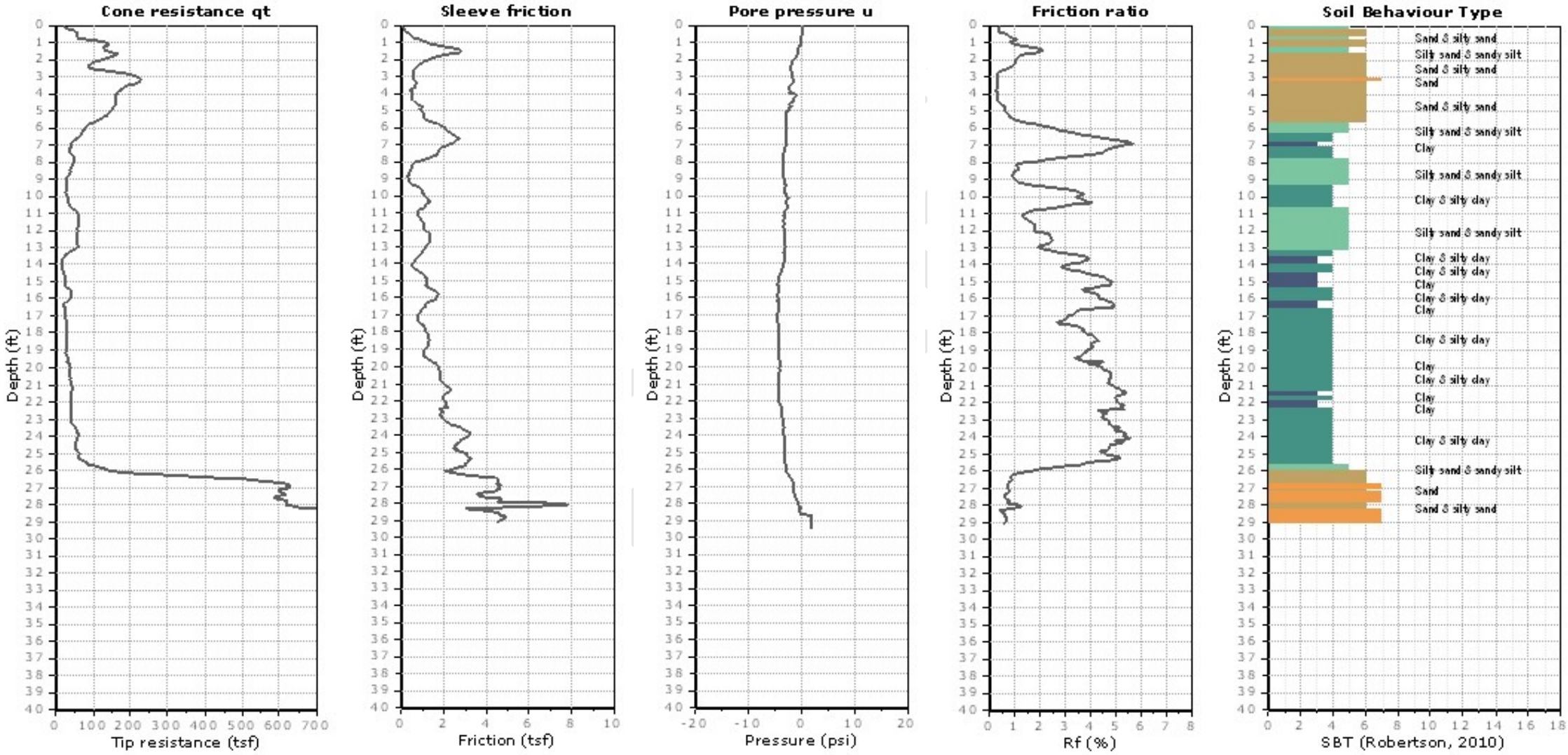

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C-H2

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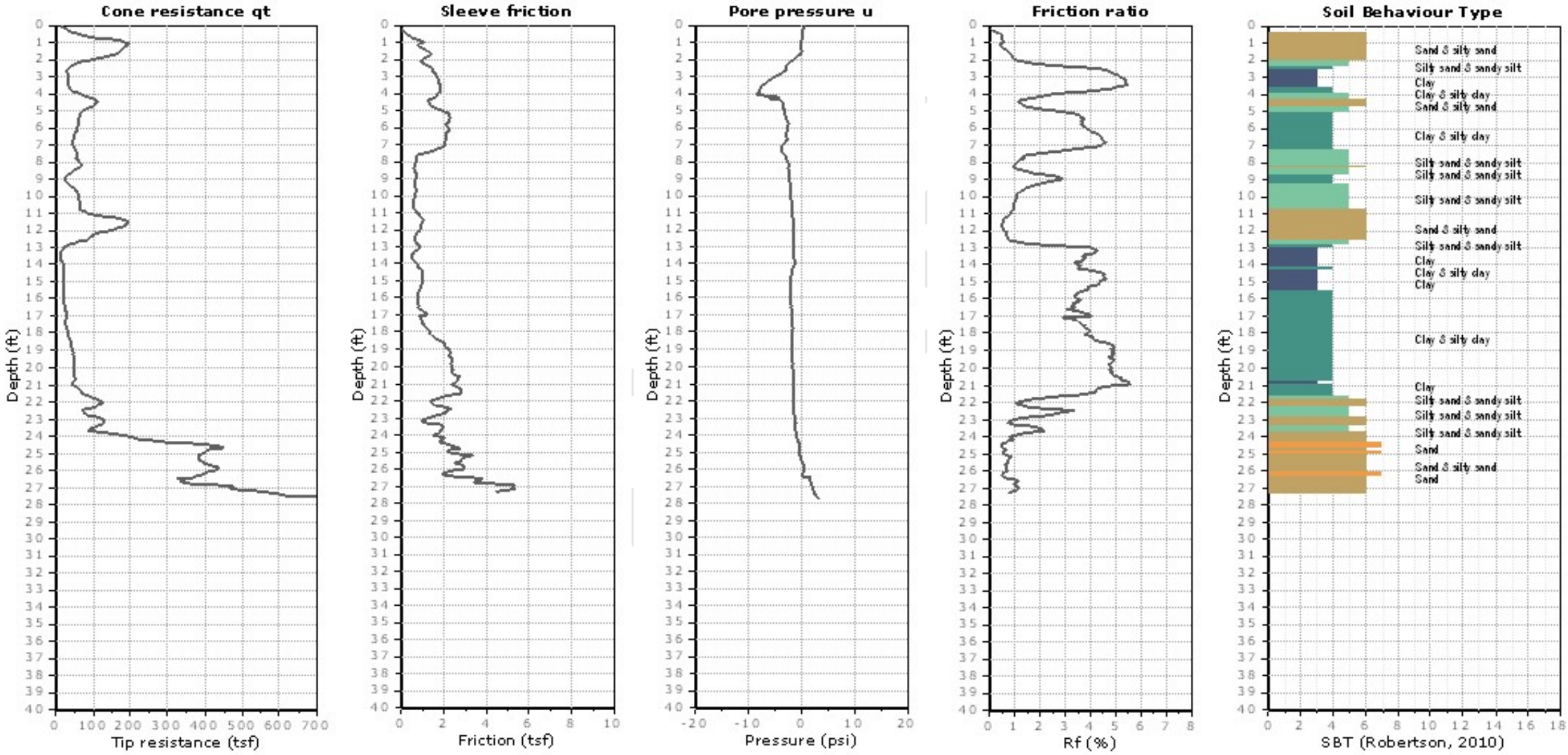

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C-H3

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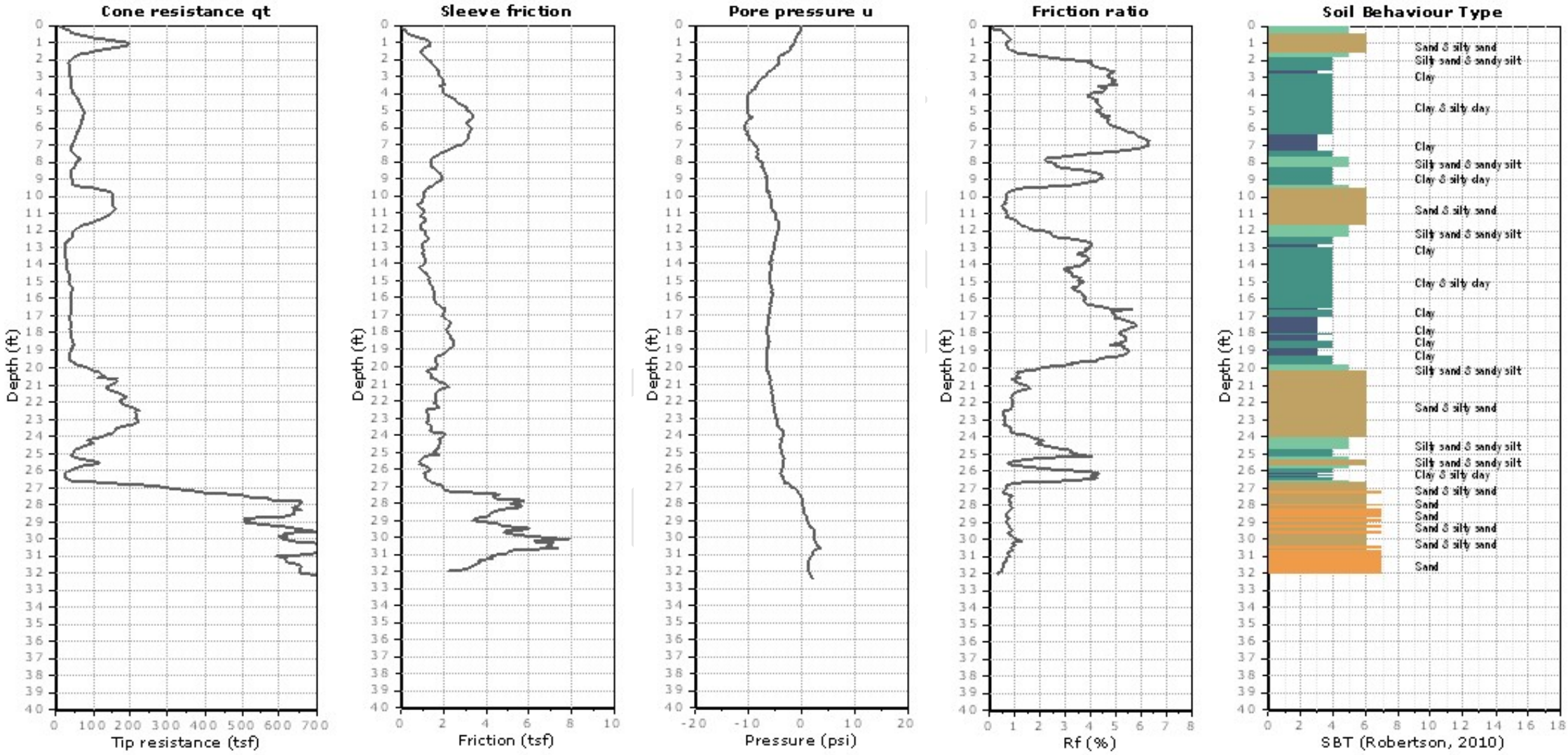

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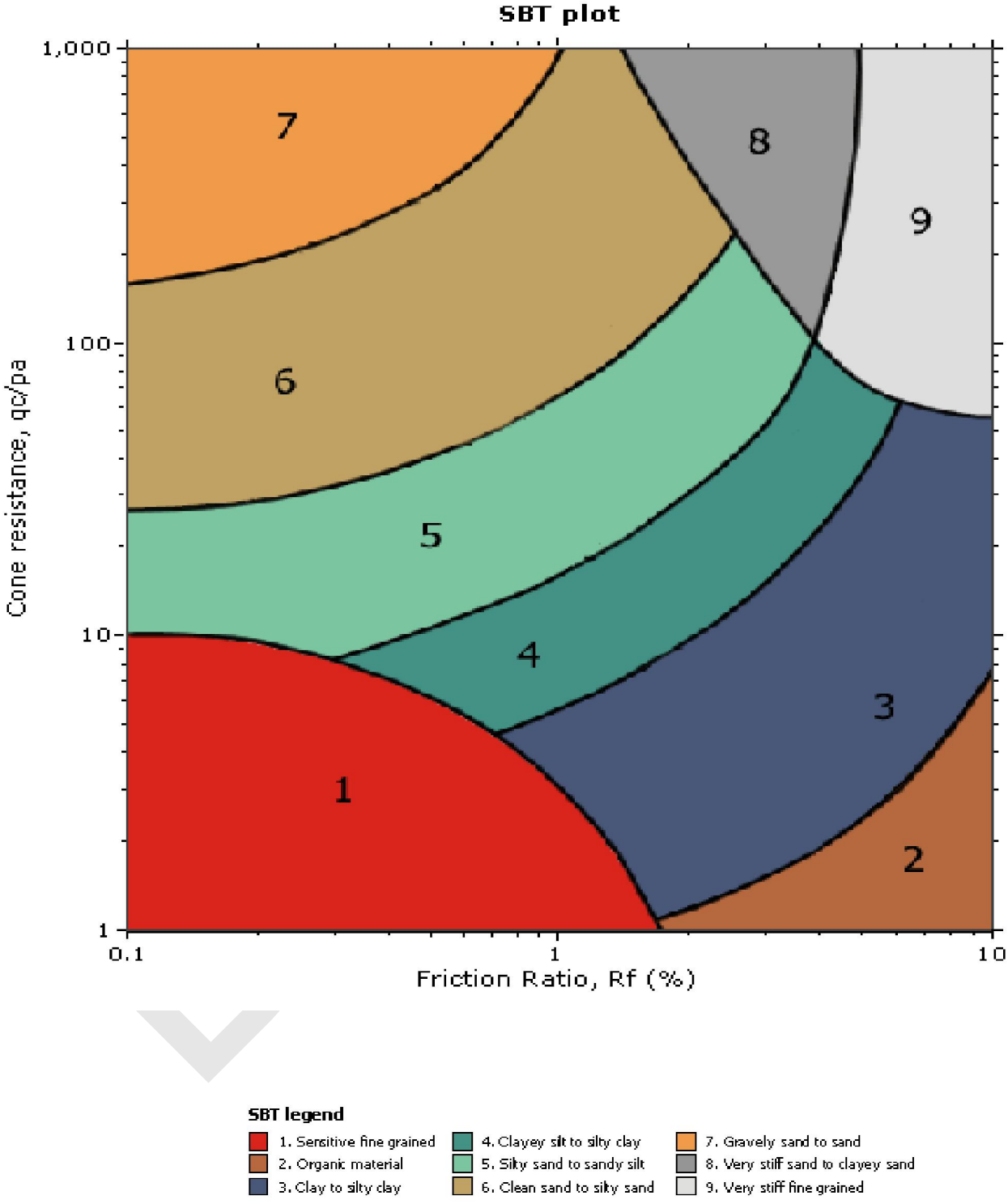

Appendix F

Preliminary Environmental Assessment - Equivalent

PRELIMINARY ENVIRONMENTAL ASSESSMENT EQUIVALENT (PEA-E) REPORT

Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, California

Prepared for

Los Angeles Unified School District
Office of Environmental Health and Safety
333 South Beaudry Avenue, 21st Floor
Los Angeles, California 90017

December 20, 2019

Project No. 029RC1-191395

Prepared by

MONTROSE ENVIRONMENTAL

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SITE DESCRIPTION 1
2.1 Site Name and Address 1
2.2 Site Topography and Proximity to Surface Water Bodies 1
3.0 GEOLOGY AND HYDROGEOLOGY 2
3.1 Geology 2
3.2 Hydrogeology 2
4.0 BACKGROUND 2
4.1 Historical Site Use 2
4.2 Current Site Use 3
4.3 Surrounding Land Uses 3
4.4 Prior Site Investigations 3
4.4.1 Phase I ESA 3
4.4.2 Geotechnical Investigation 3
5.0 APPARENT PROBLEM 3
6.0 ENVIRONMENTAL SETTING 4
7.0 CONCEPTUAL SITE MODEL 4
7.1 Factors Related to Soil Pathways 4
7.2 Factors Related to Water Pathways 4
7.3 Factors Related to Air Pathways 4
7.4 Environmental Screening Levels 5
8.0 SOIL SAMPLING ACTIVITIES 5
8.1 Summary of Activities 5
8.1.1 Pre-Field Activities 5
8.1.2 Work Notice 6
8.1.3 Site Clearance and Geophysical Survey 6
8.1.4 Shallow Soil Sampling 6
8.1.5 Soil Sample Collection 7
8.1.6 Soil Sample Analyses 7
8.1.7 Investigation Derived Waste 9
9.0 FIELD VARIANCES 9
10.0 SUMMARY OF ANALYTICAL RESULTS 9
10.1 Screening Levels 10
10.2 Lead Results 10
10.3 Arsenic Results 10
10.4 OCP Results 11
10.5 PCB Results 11
10.6 CAM Metal Results 11
11.0 QUALITY ASSURANCE/QUALITY CONTROL 11
12.0 HUMAN HEALTH AND ECOLOGICAL SCREENING EVALUATION 12
12.1 Human Health Screening Evaluation 12
12.2 Ecological Screening Evaluation 13
13.0 AREAS OF IMPACTED SOIL 13
14.0 PUBLIC PARTICIPATION 13

15.0 CONCLUSIONS AND RECOMMENDATIONS 14
15.1 Conclusions 14
15.2 Recommendations 14
16.0 REFERENCES 15

LIST OF ATTACHMENTS

FIGURES

1 Site Location Map
2 Site Plan with Boring Locations
3 Site Plan Showing Lead and Arsenic Impacted Areas
4 Site Plan with Proposed Excavation Areas

TABLES

1 Sampling Strategy Plan
2 Summary of Shallow Soil Sample Lead and Arsenic Results
3 Summary of Shallow Soil STLC and TCLP Results
4 Summary of PEA Soil Analytical Results
5 Summary of PEA Stepout Boring Soil Analytical Results
6 Summary of Soil Characterization Analytical Results
7 Summary of Additional Soil Characterization Analytical Results
8 Estimated Volumes of Impacted Soil

APPENDICES

A PEA-E Scoping Document
B Public Notification Letter
C Laboratory Analytical Data
D Waste Manifest

LIST OF ACRONYMS

amsl	above mean sea level
APN	assessors parcel number
bgs	below ground surface
Cal EPA	California Environmental Protection Agency
Cal Haz	Non-RCRA (California-regulated) hazardous waste
CAM	California Assessment Manual
CEQA	California Environmental Quality Act
COC	contaminant of concern
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
ESL	environmental screening level
EZRI	Earthquake Zone of Required Investigation
HASP	health and safety plan
HERO	Office of Human and Ecological Risk Office
LAUSD	Los Angeles Unified School District
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NIFZ	Newport-Inglewood Fault Zone
Non-haz	non-hazardous disposal
OCP	organochlorine pesticide
OEHS	Office of Environmental Health and Safety
PCB	polychlorinated biphenyls
PEA-E	preliminary environmental assessment equivalent
Phase I	Phase I Site Assessment Report
QA/QC	quality assurance/quality control
REC	recognized environmental condition
RAW	Removal Action Workplan
RSL	regional screening levels
RWQCB	Regional Water Quality Control Board
STLC	soluble threshold limit concentration
SVOC	semi-volatile organic compounds
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
TCLP	toxicity characteristic leaching procedure
USA	Underground Service Alert
USGS	United States Geological Survey
USCS	Unified Soil Classification System
VOCs	volatile organic compounds

1.0 INTRODUCTION

ES Engineering Services, LLC, doing business as Montrose Environmental (Montrose), has prepared this Preliminary Environmental Assessment Equivalent (PEA-E) Report on behalf of the Los Angeles Unified School District (LAUSD) for Shenandoah Street Elementary School located at 2450 Shenandoah Street, Los Angeles, California (site - **Figures 1 and 2**). The proposed improvement project at the Shenandoah Street Elementary School includes the removal of multiple portable buildings, demolition and landscaping of the asphalt and concrete areas near the portables and a new classroom building.

This PEA-E has been completed to investigate recognized environmental conditions (RECs) identified in a Phase I Environmental Site Assessment (Phase I ESA) completed by Montrose in August 2017 (ES, 2017) prior to school improvements and renovations. The PEA-E investigation was conducted in accordance with the work scope described in the *PEA-E Scoping Document* by Montrose, dated August 22, 2017 (**Appendix A**) and modified based on revised construction plans, and in accordance with the guidelines of the California Environmental Protection Agency (Cal EPA) and Department of Toxic Substances Control (DTSC), *PEA-E Guidance Manual* (January 1994, Interim Final – Revised October 2013).

2.0 SITE DESCRIPTION

2.1 Site Name and Address

The Shenandoah Street Elementary is an elementary school with Assessor's Parcel Numbers (APNs) 4301-018-900 and 4301-017-904, as designated by the Los Angeles County Office of the Assessor. The site is a rectangular-shaped property consisting of approximately 7.87 acres. The current campus has two permanent buildings, approximate 13 semi-permanent classroom buildings, 7 portable classroom buildings, a lunch pavilion, three separate playgrounds and a grass area. The site was previously used for agricultural purposes prior to 1928. Additional buildings and remodels were performed up until 1977 when it reached its current configuration.

2.2 Site Topography and Proximity to Surface Water Bodies

The site is located near the boundary of the Santa Monica Basin and the Central Basin between the Baldwin Hills and Beverly Hills. The topography of the area is relatively flat and gently slopes from an elevation of approximately 117 feet above mean sea level (amsl) in the northwest, to approximately 107 feet amsl in the southeast. The Ballona Creek, a concrete-lined channel, is the nearest surface water body and located approximately 0.60 miles to the southeast (USGS, 2012).

3.0 GEOLOGY AND HYDROGEOLOGY

3.1 Geology

The site is located approximately 6.25 miles northeast of the Pacific Ocean within the city of Los Angeles, along the boundary of the Central and Santa Monica Basins. The northern part of the Newport-Inglewood Fault Zone (NIFZ) creates a boundary between the Central and Santa Monica Basins. The NIFZ is inferred to be located approximately near the southwest corner of the subject property, as shown on the *Earthquake Zones of Required Investigation, Beverly Hills Quadrangle* (EZRI, 2017) map dated July 2017. The West Pico and the Inglewood Faults are also shown on the EZRI to intersect nearby the subject site.

The Cheviot Hills, located approximately 1 mile west of the subject site, are undergoing active folding due to extension of the NIFZ. A series of north-northwest trending east facing escarpments, known as the West Beverly Hills Lineament, separate the older alluvium of the Cheviot Hills to the west and the younger alluvial plain to the east. The Beverly Hills and Cheviot oil fields are located throughout the Cheviot Hills and Century City.

The Baldwin Hills are located approximately 1.5 miles south of the site and are defined by the NIFZ, which can be traced along the east side of the hills as an escarpment. The NIFZ within the Baldwin Hills has caused structural traps formed by additional faulting parallel and perpendicular to the Newport-Inglewood fault, including the Inglewood Oil Field. Surface drainage of the Baldwin Hills generally flows south and west, into six retention basins which in turn drain into the Los Angeles County storm drainage network including Ballona Creek or Centinela Creek.

3.2 Hydrogeology

The site is located in the Central Basin of the Los Angeles-San Gabriel Hydrologic Unit (RWQCB, 1994). The basin is bounded on the north by the La Brea high, and the northeast and east by less permeable Tertiary rocks. In the site vicinity, alluvium underlain by the regionally extensive Bellflower Aquiclude, and Upper Pleistocene older dune sands and terrace deposits of the Lakewood Formation (DWR, 1961) underlies the site. According to the DWR, the main productive freshwater-bearing sediments are contained within the alluvium and the Lakewood Formation. The recent site investigations indicate that the surficial soils consist primarily of silty sand to a depth of 3 feet below ground surface (bgs), the maximum depth explored.

4.0 BACKGROUND

4.1 Historical Site Use

The earliest documentation of Shenandoah Elementary School was included on a Sanborn Fire Company map from 1927. None of the original buildings developed during the 1920's remain today. The oldest existing building on site dates back to the year 1940 and the other two permanent buildings on campus were built in the 1970's. The campus has been extensively redeveloped through the construction and demolition of numerous buildings, and currently contains three permanent and 20 portable buildings and structures.

The location of Shenandoah Street Elementary School and surrounding area is presented in **Figure 1**, and the current layout of the school buildings and outdoor areas, soil boring locations, and proposed new building footprint is presented on **Figure 2**.

4.2 Current Site Use

The site serves students from Kindergarten (K) through the 5th grade. The campus served approximately 413 students for the 2017-2018 enrollment year. The site is comprised of 23 buildings, including 3 permanent and 20 portable buildings, with a total of 47 classrooms at the site. The site also includes hardscape playground areas, existing utilities, and bus drop off areas on South Shenandoah Street, which is in front of the main entrance to the school. There is an Early Education Center (EEC) located on the southwest corner of the campus that will not be part of the comprehensive modernization project.

4.3 Surrounding Land Uses

The overall area surrounding the school consists primarily of single-family residences to the east, west and south. Multi-family residences are located directly north of the subject property. The EEC, located on the southwest corner of the campus, is not part of the comprehensive modernization project and is considered a surrounding land use.

4.4 Prior Site Investigations

4.4.1 Phase I ESA

Montrose (formerly ES Engineering Services) completed a Phase I ESA dated August 8, 2017 (Montrose, 2017) that identified RECs and potential RECs as a result of historical agriculture use, former residential buildings, former school buildings, and current school buildings on the school site. A PEA was recommended to evaluate and investigate the identified RECs and determine whether soil has been impacted due to the historical use of the subject property (see **Figure 2**). The PEA Scoping Document was approved by the LAUSD on May 27, 2016 and is presented in **Appendix A**. The environmental concerns identified in the Phase I ESA are presented in **Section 4.0** (Apparent Problem).

4.4.2 Geotechnical Investigation

Converse Consultants completed a *Preliminary Soils Report* dated May 18, 2017 (Converse, 2017) for the proposed comprehensive modernization project at Shenandoah Street Elementary School. Four (4) exploratory borings and three (3) cone penetration tests (CPT) were advanced to assess the geotechnical conditions for the proposed school construction. Undocumented fills, ranging from 4 to 5 feet in thickness were encountered in the borings. The fill encountered consisted primarily of silty sand, sand, silty clay, and clay.

5.0 APPARENT PROBLEM

Based on the findings of the Phase I ESA (Montrose, 2017), the PEA field investigation is intended to evaluate the following:

- Potential lead, arsenic and OCPs in shallow soil surrounding onsite buildings as a result of the age of the buildings and the potential use of OCPs and arsenates to control termites and other pests.
- Potential arsenic, lead and OCPs below pavement areas as a result of historical weed control or the import of fill soil.
- Potential PCBs from surface leaks from the three pad mounted transformers.
- Potential contamination released into the subsurface soil from the clarifier located in the boiler room.

6.0 ENVIRONMENTAL SETTING

A description of the site's general environmental setting (topography, geology, hydrogeology) is presented in **Section 2** of this PEA-E Report. This information was used to assess the potential exposure pathways for the chemicals of potential concern identified in this PEA-E Report.

7.0 CONCEPTUAL SITE MODEL

The Shenandoah Street Elementary School is an active school site and all soil in the proposed comprehensive modernization area are paved with asphalt or concrete. All exposure pathways are currently closed for this Site. During the construction activities for the comprehensive modernization, the pavement will be removed and excavation and grading activities will occur. The exposed soil may present a potential exposure pathway. The soil, water and air exposure pathways are discussed in the following sections.

7.1 Factors Related to Soil Pathways

The site is generally flat and at grades similar to neighboring properties. The shallow subsurface soils (surface to 3 feet bgs) at the site were observed to primarily consist of combinations of silts and sands. Access to the site is restricted through perimeter chain link fencing and security gates. The current site is predominately developed with pavement, with some grass and planter areas.

7.2 Factors Related to Water Pathways

Two wells listed on the United States Geological Society website (USGS40000139910 and USGS40000139949) are located within 1 mile from the subject property approximately 4,009 feet and 4,879 feet to the east-southeast, respectively. Based on the depth to groundwater, nature of the identified COCs, distance to nearest groundwater well and limited vertical extent of the soil impacts, the potential for a release at the site to impact groundwater is minimal and therefore not considered to represent a complete exposure pathway.

7.3 Factors Related to Air Pathways

Based on the current site development (e.g., asphalt and concrete paving and school buildings and structures), potential emissions from soil are considered to be insignificant under current conditions. There is no documentation of a release of hazardous substances to the atmosphere. Future site development activities would result in the removal of asphalt and concrete paving

and certain buildings and structures that could increase the potential for fugitive dust generation. Potential sources of a hazardous substances release to the atmosphere are limited to fugitive dust from surface soils. Therefore, the potential for releases of hazardous substances from the site to the atmosphere is considered *de minimis*.

7.4 Environmental Screening Levels

The screening level currently used for arsenic at LAUSD school sites is 12 milligrams per kilogram (mg/kg), which is the DTSC's upper bound estimate (95th percentile) for background concentrations in Southern California (DTSC, 2008). The LAUSD currently uses the DTSC Recommended Screening Levels (SL) for lead concentrations in residential soil (80 mg/kg) when considering lead concentrations in soil for additional assessment. OCPs were compared to the most recent available United States Environmental Protection Agency (EPA) Region 9 Regional Screening Levels (RSLs) (EPA, 2015). These concentrations are consistent with those provided by the DTSC Office of Human and Ecological Risk (HERO) in *HERO HHRA Note Number: 3* (DTSC, 2016).

8.0 SOIL SAMPLING ACTIVITIES

Montrose conducted soil sampling and analysis to assess whether past activities within and immediately adjacent to the project area resulted in environmental impairments.

The initial PEA sampling was focused to the north portion of the site to complete the PEA equivalent investigation near the portable classroom structures. Thirty-two (32) borings (SB-1 through SB-32) were advanced for shallow soil sampling purposes throughout the site. Based on the sampling results, 15 step out borings were advanced to further assess concentrations of lead. A total of 83 discrete soil samples were collected from the 47 total soil borings advanced in the PEA assessment sampling area.

As a result of comprehensive modernization design for the school site, additional sampling was conducted (Soil Characterization Sampling). The additional sampling included fifty-two (52) primary borings (SB-33 through SB-84) in the southern portion of the school property. Based on the sampling results, 63 step out borings were advanced to further assess concentrations of lead and/or arsenic concentrations. A total of 302 soil samples were collected from the 115 total soil borings advanced in the soil characterization sampling area.

The Summary of Activities are provided in **Section 8.1**, below. The soil sample analytical results for lead and arsenic are provided in **Sections 10.2** and **10.3**, respectively. The soil sample analytical results are also summarized in **Tables 2 through 6** and the boring and sampling locations are presented on **Figure 2**.

8.1 Summary of Activities

8.1.1 Pre-Field Activities

A comprehensive health and safety plan (HASP) was prepared for the PEA-E field investigation activities conducted at the site. The intent of the HASP was to include protocols to be followed

during investigation activities and to ensure the health and safety of on-site project employees, subcontractors, visitors, and the public during all site work. The HASP identified policy, procedures, and systems to be followed by project personnel, and was required to be followed and signed by Montrose employees, subcontractors, vendors, visitors, and agency representatives at the site. A copy of the HASP was readily available during field activities and all site workers were required to review and sign the Montrose HASP before conducting work at the site.

8.1.2 Work Notice

Prior to the initiation of field investigation activities, a *PEA-E Work Notice* was prepared in English and Spanish to advise the public of the upcoming PEA-E field investigation, the schedule of environmental field work, and contact information for questions and comments. The Work Notice was distributed as follows on October 4, 2018:

1) 120 copies were provided to LAUSD for placement in the Shenandoah Elementary School main office;
2) Approximately 50 copies of the Work Notice were hand delivered to residents and businesses in the immediate vicinity of the site; and
3) Laminated copies of the Work Notice were posted on fencing along the school perimeter. A copy of the PEA-E Work Notice is included in **Appendix B**.

8.1.3 Site Clearance and Geophysical Survey

Clearance of utilities and other underground obstacles was conducted prior to initiating any subsurface investigation activities. Underground Service Alert (USA) was notified a minimum of two business days prior to commencing intrusive work at the site, and the proposed boring locations were marked in the field with chalk or chalk-based paint according to USA requirements. The USA tickets were maintained for the duration of the field investigation.

Prior to each of the soil sampling events, a geophysical survey utilizing electromagnetic and ground penetrating radar to locate the underground utility lines and subsurface features and structures was conducted prior to the initiation of intrusive investigation activities.

8.1.4 Shallow Soil Sampling

All soil borings were located in asphalt-covered areas and required coring prior to sampling. Once the locations were cleared and cored, soil samples were collected using a hand auger. The initial PEA-E investigation activities were conducted on November 19 and 20, 2018 and included collection of shallow soil samples at a total of 32 locations to assess the area of portable classroom buildings slated for removal. Thirty-one of the 32 sample locations were sampled to a depth of 1.5 feet bgs, with sample collection at 0.0 to 0.5 feet bgs and 1.0 to 1.5 feet bgs. Soil boring SB-29 was sampled at a depth of 2.5 to 3.0 feet bgs.

Based on results of the initial investigation, step-out borings were conducted on February 18, 2019 to further assess the lateral extent of soil lead impacts identified in initial borings SB-1, SB-3, SB-5, SB-7, SB-15 and SB-30.

An additional assessment was conducted on April 16 and 17, 2019 to assess the area of a proposed new classroom building, a drop off and pickup ramp, building entry, garden and play areas. Based on results of the April 2019 investigation, step-out borings were conducted on June 18 and 19, 2019 to further assess the lateral extent of lead and arsenic impacts identified in borings SB-33, SB-37, SB-39, SB-42, SB-44, SB-47, SB-48, SB-50 through SB-55 and SB-57. Additional step-out assessment activities were completed on August 30, 2019, to further assess the lateral extent of arsenic impacts near borings SB-37, SB-42, SB-50, SB-53, SB-55 and SB-57. Finally, based on the results of the August 30 assessment, assessments were conducted on September 21 and November 2, 2019 to assess impacts near soil samples SB-37C3, SB-37D2 and SB-50A2 and the southern parking lots.

8.1.5 Soil Sample Collection

The shallow soil sampling was conducted using hand auger sampling equipment. The hand auger was advanced to predetermined sample depths and then the soil samples were collected and transferred to 8-ounce glass jars. After labelling and documentation, the soil matrix samples were stored in a chilled ice chest until they were transported to the laboratory. Hand auger and sampling equipment was decontaminated in the field prior to each sample collection.

The soil borings were logged in accordance with the Unified Soil Classification System (USCS). After logging the soil, the sample collected for analysis was capped and then placed into a cooler chilled to 4 degrees Celsius for transport to the laboratory.

Waste materials generated during the investigation were placed into a labeled, Department of Transportation (DOT) approved, 55-gallon steel drum for temporary storage prior to disposal. Decontamination fluids generated during the investigation were placed in a labeled, DOT approved 55-gallon steel drum for temporary storage prior to disposal. Waste manifests are provided in **Appendix D**.

All soil samples were submitted under proper chain of custody protocols to Enthalpy Analytical LLC (Enthalpy), a California State-certified analytical laboratory, for analysis. The soil samples collected during the initial phases of assessment were analyzed for arsenic by EPA Method 6020, OCP's by EPA Method 8081A and CAM 17 Metals by EPA Method 6010B. Select samples were also analyzed for PCBs by EPA Method 8082. The laboratory was requested to analyze duplicate soil samples, at a frequency of approximately 10 percent of all soil samples collected. Based on the results of the initial soil sampling, step-out borings were collected for lead or arsenic analyses, as appropriate. See **Figure 2** for the soil sampling locations; **Table 6** presents a summary of all samples collected and corresponding analytical results. The laboratory analytical reports and chain-of-custody documentation for all of the samples submitted for analysis to date are presented in **Appendix D**. Analytical results are discussed below.

8.1.6 Soil Sample Analyses

The following samples (including field QC samples) were collected and analyzed during the field investigations:

PEA Sampling

- A total of 31 discrete soil samples and 5 duplicate soil samples were analyzed for CAM 17 Metals by EPA Method 6010B;
- A total of 30 discrete soil samples and 6 duplicate soil samples were analyzed for OCPs by EPA Method 8081A;
- A total of 5 discrete soil samples and 1 duplicate soil sample were analyzed for PCBs by EPA Method 8082;
- A total of 31 discrete soil samples and 5 duplicate soil samples were analyzed for arsenic only by EPA Method 6020B;
- A total of 36 discrete soil samples and 5 duplicate soil samples were analyzed for lead only by EPA Method 6010B;
- One soil sample with detected lead impacts was ran for STLC and/or TCLP for disposal classification.

Soil Characterization Sampling

- A total of 68 discrete soil samples and 7 duplicate soil samples were analyzed for CAM 17 Metals by EPA Method 6010B;
- A total of 68 discrete soil samples and 7 duplicate soil samples were analyzed for OCPs by EPA Method 8081A;
- A total of 10 discrete soil samples and 1 duplicate soil sample were analyzed for PCBs by EPA Method 8082;
- A total of 241 discrete soil samples and 17 duplicate soil samples were analyzed for arsenic by EPA Method 6020.
- A total of 3 discrete soil samples were analyzed for diesel and oil-range petroleum hydrocarbons (C13-22 and C23-44) by EPA Method 8015M;
- A total of 3 discrete soil samples were analyzed for gasoline-range petroleum hydrocarbons (C6-12) by EPA Method 8015B;
- A total of 3 discrete soil samples, 2 equipment blanks and 1 composite soil sample were analyzed for VOCs by EPA Method 8260B;
- A total of 3 discrete soil samples, 2 equipment blanks and 1 composite soil sample were analyzed for SVOCs by EPA Method 8270B
- One soil sample with detected lead impacts was ran for STLC and/or TCLP for disposal classification.
- A total of 27 soil sample with detected arsenic impacts was ran for STLC and/or TCLP for disposal classification.

A total of 9 field equipment blanks were collected during the shallow soil boring investigation across the site, and were analyzed for TPH carbon chain using EPA Method 8015, VOCs using EPA Method 8260B, arsenic and lead using EPA Method 6010B, OCPs using EPA Method 8081A, and PCBs using EPA Method 8082.

Results of laboratory analysis of soil samples collected during the PEA-E investigation are summarized in **Tables 2 through 6**. Chain of custody protocol was followed for all samples selected for laboratory analysis. The chain of custody form accompanied the samples from the

sampling locality to the laboratory, providing a continuous record of possession prior to analysis. Copies of the laboratory analytical reports and chain of custody records are included in **Appendix D**.

Detections noted in the tables with a "J" (J-flagged) indicate that the analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit (reported value is estimated).

Based on the soil sample analytical results, soluble threshold limit concentration (STLC) and Toxicity Characteristic Leaching Procedure (TCLP) analyses were performed on soil samples requiring the additional analyses, as discussed below.

8.1.7 Investigation Derived Waste

Two 55-gallon drums of soil cuttings and one 55-gallon drum of equipment decontamination water were generated during the field sampling activities. One representative soil sample was collected from each drum and composited for profile analysis (Soil Sample Composite). The results from the equipment blank sampling were used for disposal profile of the decontamination drum. The composited sample (Soil drum) and water sample (Decon drum) were analyzed for total lead, total arsenic and STLC Lead by EPA Method 6010B, OCPs by EPA Method 8081, PCBs by EPA Method 8082, VOCs by EPA Method 8260B, semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons as carbon chain (TPH-cc) by EPA Method 8015M and CAM 17 Metals by EPA Method 6010B. The laboratory analytical report and chain-of-custody documentation is provided in **Appendix C;** copies of the waste manifests are included in **Appendix D**.

9.0 FIELD VARIANCES

The field investigation outlined herein was conducted as initially scoped by LAUSD, with the following variances:

- The originally proposed PEA assessment activities included 47 shallow soil borings in the northern portion of the site to assess arsenic, lead, OCP and PCB concentrations. Due to the necessity to investigate work areas added to the overall plan in the southern portion of the site, an additional 115 borings were added (total of 162 borings).
- Select soil boring locations were moved slightly from their originally proposed locations to avoid subsurface utilities or to take advantage of nearby planters or grassy areas (rather than coring concrete sidewalks and walkways).
- Borings were moved slightly from their originally proposed locations near the portable classrooms to assist with assessment in this area.
- Because of utilities and barriers noted in the vicinity of the portable classrooms near the playground, several borings were moved slightly and several borings were omitted.

10.0 SUMMARY OF ANALYTICAL RESULTS

Results of laboratory analysis of soil samples collected during the PEA-E investigation are summarized below and presented in **Tables 2 through 6**.

10.1 Screening Levels

Where appropriate, the results are compared with regulatory limits for the chemicals and compounds identified in the applicable media.

- Arsenic soil samples were screened utilizing the accepted background concentration of 12 milligrams per kilogram (mg/kg);
- Lead soil samples were compared to the residential land use DTSC Screening Level published in the DTSC's Office of Human and Ecological Risk Office (HERO) Note 3;
- PCBs were screened utilizing the RSLs for Residential Land Use (value varies by PCB constituent);
- OCPs were screened utilizing the RSLs for Residential Land Use (value varies by OCP constituent).

Based on the soil sample analytical results, soil exceeding the DTSC screening level for lead (80 mg/kg), and/or the background concentration for arsenic (12 mg/kg), are displayed on **Figure 3**.

10.2 Lead Results

Lead was detected in each sample analyzed, at concentrations ranging from 1.70 mg/kg (SB-14-0.5') to 212 mg/kg in boring SB-1-0.5. Lead was detected exceeding the soil screening level of 80 mg/kg in soil samples collected from borings SB-1, SB-3, SB-5, SB-7, SB-15, SB-30 and SB-42 at a depth of 0.5 feet bgs. Based on a review of the laboratory analytical data, step-down samples were analyzed at approximately 0.5 to 1 foot intervals until a depth interval was reached where the concentrations were less than screening levels or refusal was encountered. Lateral step-out sampling was conducted for borings SB-1, SB-3, SB-5, SB-7, SB-15, SB-30 and SB-42 (designated as A, B, C and D), until the detected concentrations of lead were less than the screening level. In some cases, stepout borings were limited by the site boundary, a building foundation, limited access, or a subsurface utility obstruction. The shallow soil sampling for lead achieved the lateral and vertical delineation for the site. A summary of the shallow soil sample lead and arsenic results is presented in **Table 2**.

Soil samples SB-1-0.5, SB-1A-0.5, SB-3-0.5, SB-5-0.5 (Dup), SB-7-0.5, SB-15-0.5, SB-30-0.5 and SB-42-0.5 were additionally analyzed for STLC to determine waste disposal criteria for the lead impacted material. The STLC laboratory analytical results for soil samples SB-1-0.5, SB-1A-0.5, SB-5-0.5 (Dup) and SB-7-0.5 were above the STLC threshold of 5 mg/L, indicating that the lead-impacted soil in those boring areas is not acceptable for non-hazardous disposal; those samples were additionally analyzed for TCLP. The TCLP results indicate the soil samples are below the threshold of 5 mg/L, and that the lead-impacted soil in those boring areas is acceptable for Non-RCRA (California-regulated) hazardous waste for disposal. A summary of the shallow soil STLC and TCLP results in included in **Table 3**.

10.3 Arsenic Results

Arsenic was detected in each sample analyzed for that COC, at concentrations ranging from 0.448 mg/kg (SB-42-0.5') to 633 mg/kg in boring SB-50B-0.5. Arsenic exceeding the soil screening level of 12 mg/kg was detected in 56 soil borings. Based on a review of the laboratory

analytical data, step-down samples were analyzed at approximately 0.5 to 1 foot intervals until a depth interval was reached where the concentrations were less than screening levels or refusal was encountered.

Lateral step-out sampling for arsenic was conducted for borings SB-33, SB-37, SB-39, SB-42, SB-44, SB-47, SB-48, SB-50 through SB-55 and SB-57, until the detected concentrations of arsenic were less than the screening level. In some cases, stepout borings were limited by the site boundary, a building foundation, limited access, or a subsurface utility obstruction. The shallow soil sampling for arsenic achieved the lateral and vertical delineation for the site (**Table 2**).

Based on the initial analyses indicating exceedances for arsenic, soil samples from borings SB-37, SB-37C, SB-37C2, SB-37D2, SB-42A, SB-42D2, SB-47C, SB-50, SB-50B, SB-50B2, SB-50D, SB-51, SB-51B, SB-51C, SB-51D, SB-52, SB-53, SB-53D, SB-53D2, SB-54, SB-55, SB-55B, SB-55B2, SB-55C, SB-55C2, SB-57B, SB-57B2, SB-65, SB-66, SB-67, SB-69, SB-70, SB-71, SB-73, SB-75, SB-76 and SB-84 were additionally analyzed for STLC to determine waste disposal criteria for the arsenic impacted material. The STLC laboratory analytical results for soil samples SB-37C2-0.5, SB-47C-0.5, SB-50B-0.5, SB-50B2-0.5, SB-51-0.5, SB-51B-0.5, SB-51C-0.5, SB-52-0.5, SB-53-0.5 (Dup), SB-53D-0.5, SB-53D2-0.5, SB-54-0.5, SB-55C2-0.5, SB-57B-0.5, SB-65-1.0, SB-66-1.0, SB-67-1.0, SB-69-0.5, SB-70-0.5 and SB-84-0.5 were above the STLC threshold of 5 mg/L, indicating that the arsenic-impacted soil in those boring areas is not acceptable for non-hazardous disposal. Additional analysis for TCLP was completed for those samples and the results indicate the soil samples are below the threshold of 5 mg/L. Therefore, the lead-impacted soil in borings SB-37C2, SB-47C, SB-50B, SB-50B2, SB-51, SB-51B, SB-51C, SB-52, SB-53, SB-53D, SB-53D2, SB-54, SB-55C2, SB-57B, SB-65, SB-66, SB-67, SB-69, SB-70 and SB-84 are acceptable for Non-RCRA (California-regulated) hazardous waste for disposal (**Table 3**).

10.4 OCP Results

Based on a review of the analytical results of the composite and discreet soil samples collected during the shallow soil sampling program, OCPs were not detected above their respective screening levels. The OCP analytical results are presented in **Tables 4** and **6**.

10.5 PCB Results

No PCBs were detected above laboratory reporting limits during this investigation (**Tables 4** and **6**).

10.6 CAM Metal Results

The results of the CAM metals analysis are presented in **Tables 4** and **6**. The individual constituents were detected above laboratory detection limits, with the exception of silver and thallium. However, none of the metals detected were above their respective residential screening level, with the exception of the lead concentrations discussed above.

11.0 QUALITY ASSURANCE/QUALITY CONTROL

The following quality assurance/quality control (QA/QC) procedures were used during this investigation to ensure data integrity:

- Field quality control measures included the use of clean, disposable nitrile gloves while collecting and handling individual soil samples, decontamination of all non-disposable sampling equipment before and after each use, and adherence to strict sample collection, labeling, and preservation procedures during sample collection.
- Duplicate soil samples were collected and analyzed at a minimum frequency of 10 percent of the primary samples to evaluate statistical precision. The duplicate soil samples were analyzed for the same parameters as the primary samples and the analytical results are presented in the data tables with the primary samples results for comparison.
- Field equipment blanks were collected and analyzed at the completion of the field work to evaluate possible cross contamination during sample collection. The field equipment blanks were analyzed for the same parameters as the primary samples and the analytical results are presented at the end of each data table.
- All samples were transferred to the laboratory in accordance with chain of custody procedures, and were subject to the laboratory's standard QA/QC procedures, including the use of method blanks, surrogate recoveries, matrix spike samples, laboratory control samples, and duplicate samples.
- All samples collected during the investigation were preserved and analyzed within the specified holding times for the individual analyses.
- Appropriate laboratory detection limits were employed for each chemical constituent to allow comparison to applicable screening levels.

Upon completion of the investigation, all data were reviewed to confirm that they met the data quality objectives for precision, accuracy, representativeness, completeness, and comparability. Based on review of the data collected during this investigation, it is the opinion of Montrose that all data collected meets the data quality objectives for this investigation.

12.0 HUMAN HEALTH AND ECOLOGICAL SCREENING EVALUATION

12.1 Human Health Screening Evaluation

The PEA-E screening evaluation for human health effects involves comparing detected concentrations to established screening levels developed by DTSC and EPA, identifying chemicals of potential concern, evaluating exposure via a conceptual site model, and then estimating human health risks and non-carcinogenic hazard indices for all chemicals of potential concern. The screening levels were developed to incorporate health risks and hazard estimates associated with human exposure, so concentrations detected above these screening levels are deemed to pose an unacceptable health risk for residential exposure. The human health screening evaluation is performed assuming an unrestricted future residential land-use scenario, which is more health protective than the use of the site as a school.

The only detected concentrations above an EPA or DTSC screening levels for this PEA-E investigation were lead and arsenic. Lead was detected in 8 boring locations at concentrations exceeding the 80 mg/kg screening level (maximum concentration of 212 mg/kg). Arsenic was detected in 61 boring locations at concentrations exceeding the naturally occurring background levels at LAUSD school sites of 12 mg/kg (maximum concentration of 633 mg/kg).

12.2 Ecological Screening Evaluation

The site and its immediate surroundings have been developed by either residential or commercial activity for decades. Natural wildlife habitat does not exist within 1 mile of the site, and most of the natural organisms on the site and in the vicinity have been replaced with those typical of urban areas where small patches or edges of disturbed soil persist, typically occupied by hardy, exotic plant species. No sensitive native plant species were observed or expected to occur within the site. For these reasons, a formal ecological risk assessment was not conducted for the site.

13.0 AREAS OF IMPACTED SOIL

Based on the results of the shallow soil sampling, the site has been determined to be impacted by lead and arsenic above soil screening levels. Based on the analytical results, the vertical extent of the impact is generally limited to the upper 1 foot of soils, with the exception of areas SB-37 and SB-50, where the vertical extent of impact extends to a depth of approximately 2-feet bgs. The lateral extent of arsenic impacts have been identified (**Figure 3**).

Additional characterization determined that approximately 922 cubic yards of lead and/or arsenic impacted soils would be classified as a Non-RCRA (California-regulated) hazardous waste disposal, and approximately 2,185 cubic yards will be disposed of as non-hazardous waste. The areas of lead and/or arsenic impacted soils proposed for excavation are presented in **Figure 4** and are estimated in **Table 4**.

Assuming that all soils containing lead or arsenic at concentrations above residential screening levels are successfully excavated and removed from the site, the remaining concentrations of lead and/or arsenic will be well below their respective residential screening levels and should be acceptable for use as foundation soil for the construction of the new classroom building, the drop off and pickup ramp, building entry, garden and play areas.

14.0 PUBLIC PARTICIPATION

Prior to any PEA field activities, a single-page work notice was produced in English and Spanish (double-sided) to provide members of the community with information regarding the PEA-E investigation including the scope of work, project schedule, and who to contact regarding additional information. This work notice flyer was handed out to all elementary school staff, mailed to all parents of students, handed out to all line-of-sight properties, and posted on the fenceline along the property boundaries. A copy of the work notice is provided in **Appendix B**.

A Notice of Public Comment Period for Preliminary Environmental Assessment will be published in local newspapers in both English and Spanish prior to the public review period. In addition, this notice will be sent to teachers, staff, parents of the students, and the local community prior to the public review period (**Appendix B**).

A 30 public review of the Draft PEA Report will be conducted in the first quarter of 2020. As part of the 30 day public review, hard copies of the Draft PEA Report will be available for review at the Shenandoah Elementary School Main Office (2450 S. Shenandoah Street, Los Angeles,

CA), at the LAUSD Office of Environmental Health and Safety (OEHS), 21st Floor (333 S. Beaudry Boulevard, Los Angeles, CA), and at the Robertson Branch Library (1719 South Robertson Boulevard, Los Angeles, CA). The Draft PEA Report will also be available for review on LAUSD's OEHS Website (https://achieve.lausd.net/siteassessment).

A public meeting for the PEA will be conducted at the Shenandoah Elementary School Auditorium during the 30 day public review period. The public meeting is to present the results of the PEA and to answer any questions from the community.

15.0 CONCLUSIONS AND RECOMMENDATIONS

15.1 Conclusions

Based on the soil sampling conducted during the PEA and soil characterization activities, the following conclusions are made:

- Soil samples were collected throughout the site at various depths and analyzed for arsenic and/or lead by EPA Method 6010, OCP's by EPA Method 8081, PCBs by EPA 8082 and CAM 17 Metals by EPA Method 6010B. Select samples were also analyzed for PCBs by EPA Method 8082. While several analytes were found at levels in excess of laboratory detection limits, only lead and arsenic were identified in soil samples in excess of residential screening levels.
- OCPs were not detected above their respective screening levels.
- PCBs were not detected.
- Seventy-seven areas with shallow soil impacted by lead and/or arsenic in excess of residential screening levels were identified throughout the campus. The shallow soil sampling for lead and arsenic in soil was able to achieve lateral and vertical definition of areas of impact at the site.
- The impacted soil areas have been characterized for disposal as Non-RCRA (California-regulated) hazardous waste and as Non-Hazardous waste.
- The total estimated amount of impacted soil at the site is estimated to be approximately 3,417 cubic yards.

15.2 Recommendations

Montrose provides the following recommendations based on the results of this assessment:

- Based on the results of the additional soil sampling and health risk screening, Montrose does not recommend additional investigation for the identified COCs.
- Based on the findings that shallow soil below pavement is impacted with arsenic above 12 mg/kg and lead above 80 mg/kg, and that there is an estimated arsenic/lead impacted soil volume of 3,417 cubic yards, a Removal Action Workplan (RAW) should be completed for the removal and disposal of the impacted soil.
- The excavation and soil removal activities should be completed under LAUSD's Office of Environmental Health and Safety (OEHS) oversight.

16.0 REFERENCES

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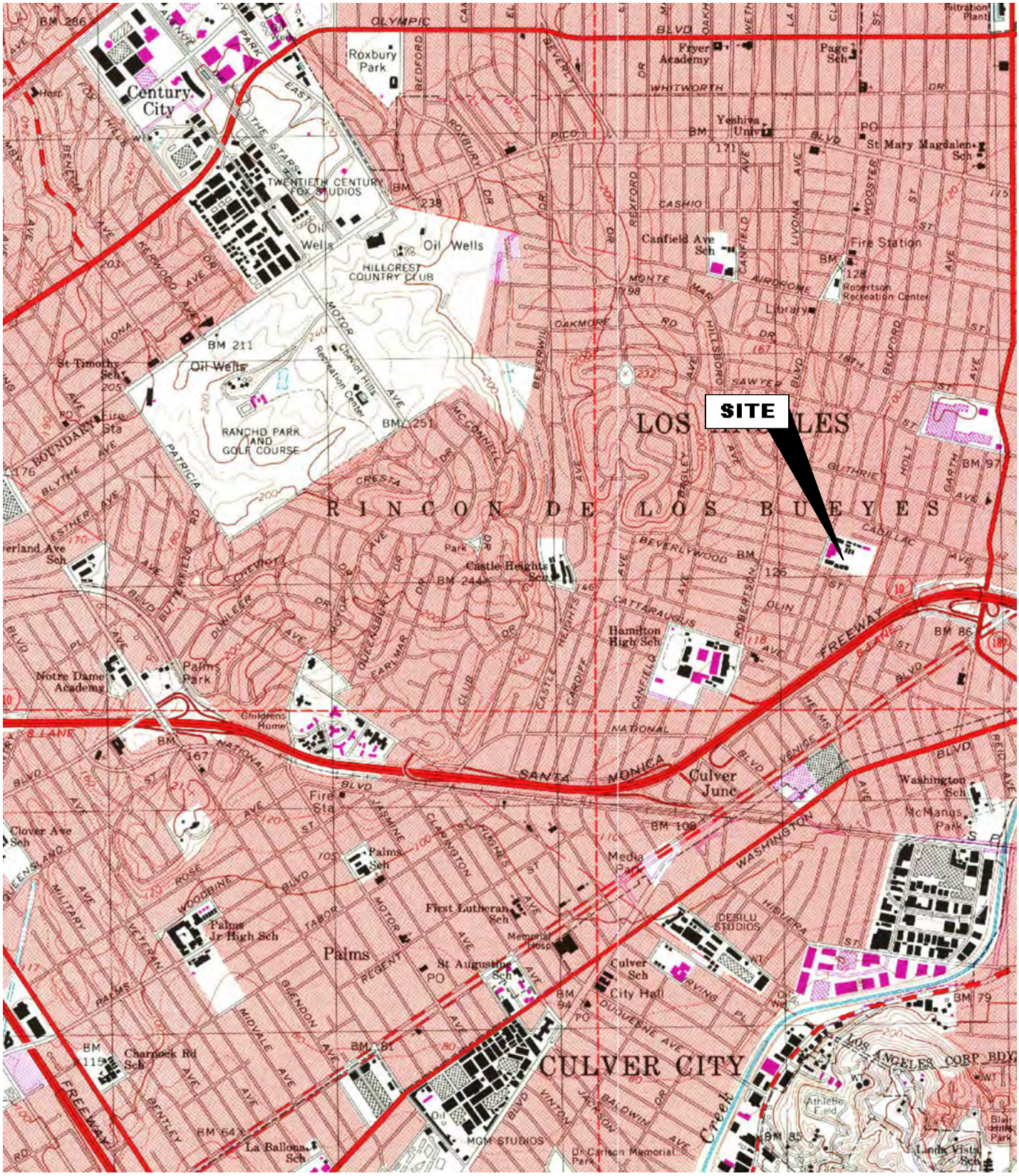
FIGURES



Map Information:
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
34°2'18.6252"N 118°23'2.85"W

MONTROSE ENVIRONMENTAL
1 Park Plaza, Suite 1000, Irvine, CA 92614 | t 714.919.6500 | f 949.988.3514

N

0 2000

APPROX. SCALE: 1" = 2000'

FIGURE 1

SITE LOCATION MAP

Shenandoah Elementary School
2450 Shenandoah Street
Los Angeles, California

DATE DRAWN
10/01/2019

PROJECT NO.
191395

FILE NO.
191395F1-SLM

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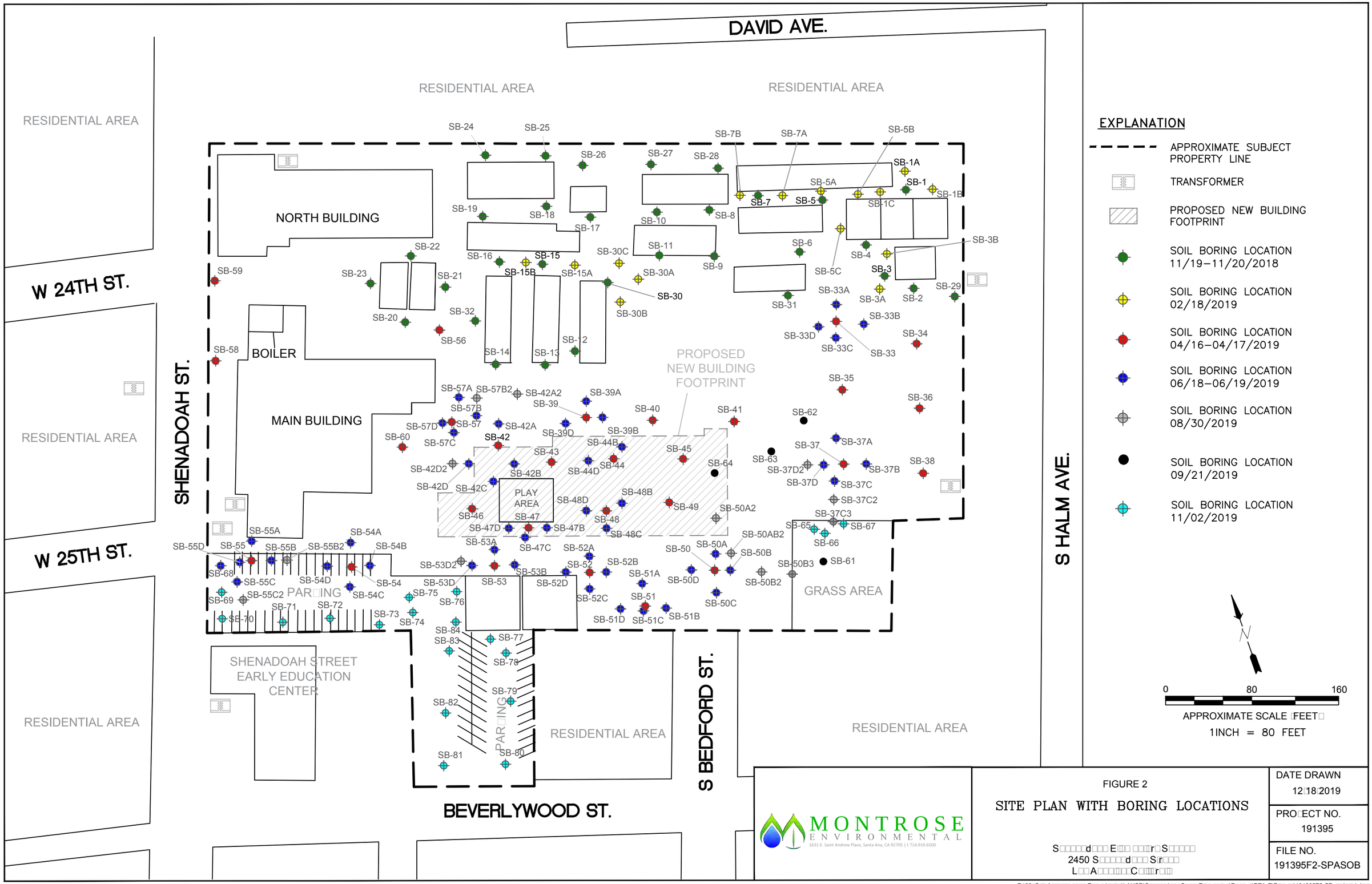

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1631 E. Saint Andrew Place, Santa Ana, CA 92705 | t 714.919.6500

FIGURE 2

SITE PLAN WITH BORING LOCATIONS

S[illegible]d[illegible] E[illegible] [illegible]r S[illegible]
2450 S[illegible]d[illegible] S[illegible]
L[illegible]A[illegible]C[illegible]r[illegible]

DATE DRAWN
12[illegible]18[illegible]2019

PRO[illegible]ECT NO.
191395

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RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

W 24TH ST.

W 25TH ST.

SHENADOAH ST.

S HALM AVE.

S BEDFORD ST.

BEVERLYWOOD ST.

NORTH BUILDING

MAIN BUILDING

BOILER

PROPOSED NEW BUILDING FOOTPRINT

PLAY AREA

PARKING

PARKING

GRASS AREA

SHENADOAH STREET EARLY EDUCATION CENTER

RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

RESIDENTIAL AREA

SB-1 SB-1A SB-1B SB-1C SB-2 SB-3 SB-3A SB-3B SB-4 SB-5 SB-5A SB-5B SB-5C SB-6 SB-7 SB-7A SB-7B SB-8 SB-9 SB-10 SB-11 SB-12 SB-13 SB-14 SB-15 SB-15A SB-15B SB-16 SB-17 SB-18 SB-19 SB-20 SB-21 SB-22 SB-23 SB-24 SB-25 SB-26 SB-27 SB-28 SB-29 SB-30 SB-30A SB-30B SB-30C SB-31 SB-32 SB-33 SB-33A SB-33B SB-33C SB-33D SB-34 SB-35 SB-36 SB-37 SB-37A SB-37B SB-37C SB-37C2 SB-37C3 SB-37D SB-37D2 SB-38 SB-39 SB-39A SB-39B SB-39D SB-40 SB-41 SB-42 SB-42A SB-42A2 SB-42B SB-42C SB-42D SB-42D2 SB-43 SB-44 SB-44B SB-44D SB-45 SB-46 SB-47 SB-47B SB-47C SB-47D SB-48 SB-48B SB-48C SB-48D SB-49 SB-50 SB-50A SB-50A2 SB-50AB2 SB-50B SB-50B2 SB-50B3 SB-50C SB-50D SB-51 SB-51A SB-51B SB-51C SB-51D SB-52 SB-52A SB-52B SB-52C SB-52D SB-53 SB-53A SB-53B SB-53D SB-53D2 SB-54 SB-54A SB-54B SB-54C SB-54D SB-55 SB-55A SB-55B SB-55B2 SB-55C SB-55C2 SB-55D SB-56 SB-57 SB-57A SB-57B SB-57B2 SB-57C SB-57D SB-58 SB-59 SB-60 SB-61 SB-62 SB-63 SB-64 SB-65 SB-66 SB-67 SB-68 SB-69 SB-70 SB-71 SB-72 SB-73 SB-74 SB-75 SB-76 SB-77 SB-78 SB-79 SB-80 SB-81 SB-82 SB-83 SB-84

EXPLANATION

- APPROXIMATE SUBJECT PROPERTY LINE
- TRANSFORMER
- PROPOSED NEW BUILDING FOOTPRINT
- SOIL BORING LOCATION 11/19–11/20/2018
- SOIL BORING LOCATION 02/18/2019
- SOIL BORING LOCATION 04/16–04/17/2019
- SOIL BORING LOCATION 06/18–06/19/2019
- SOIL BORING LOCATION 08/30/2019
- SOIL BORING LOCATION 09/21/2019
- SOIL BORING LOCATION 11/02/2019
- CONTAINED LEAD >80 mg/kg
- CONTAINED ARSENIC >12 mg/kg

N

0 80 160

APPROXIMATE SCALE (FEET)

1INCH = 80 FEET

MONTROSE ENVIRONMENTAL

1631 E. Saint Andrew Place, Santa Ana, CA 92705 | t 714.919.6500

FIGURE 3

SITE PLAN SHOWING LEAD AND ARSENIC IMPACTED AREAS

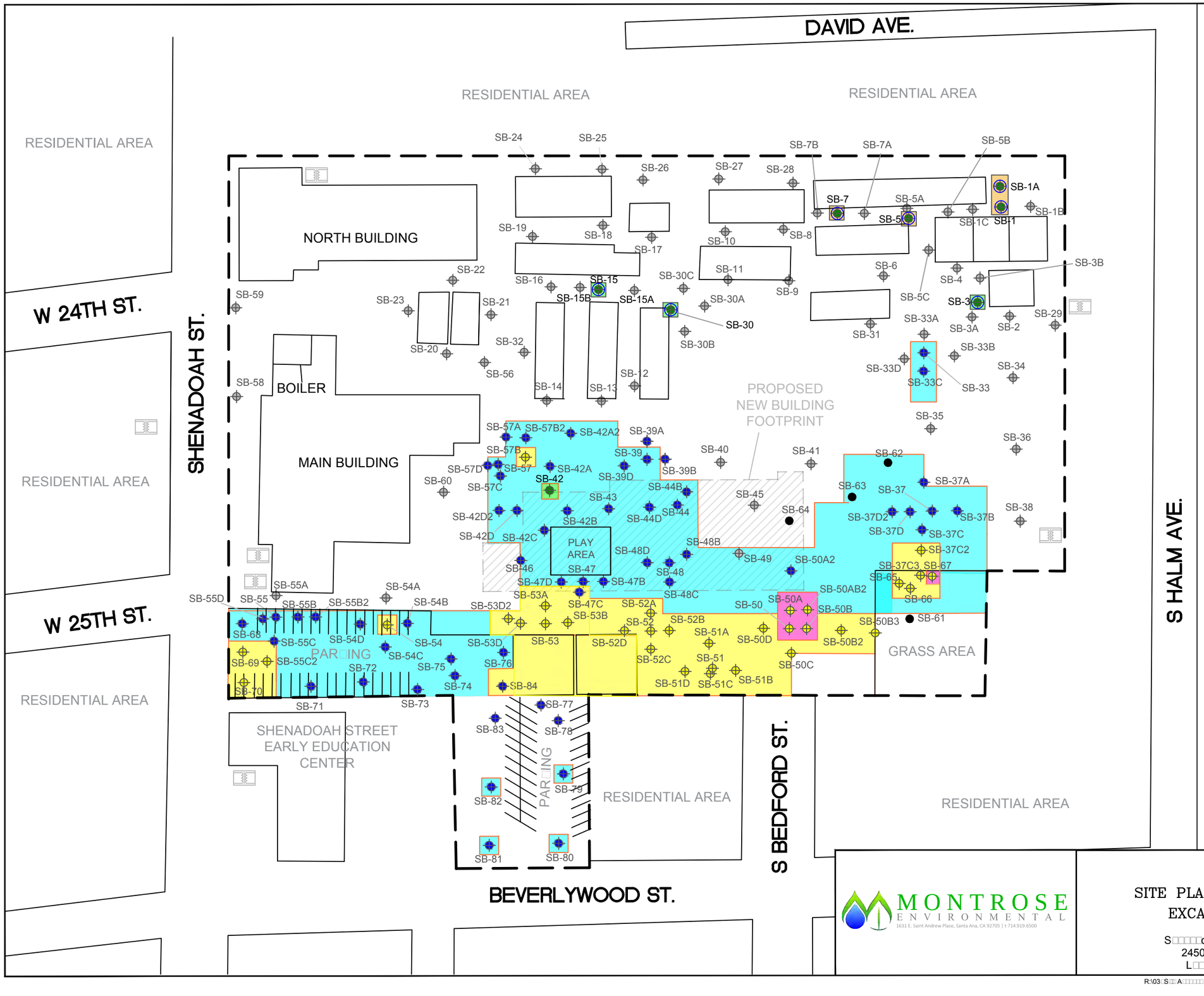
S[illegible]d[illegible] E[illegible] [illegible]r S[illegible]
2450 S[illegible]d[illegible] Sr[illegible]
L[illegible]A[illegible]C[illegible]r[illegible]

DATE DRAWN
12/18/2019

PROJECT NO.
191395

FILE NO.
191395F3-SPSLAAIA

R:\03 S[illegible]A[illegible]R[illegible]d[illegible]\LAUSD\S[illegible]d[illegible]Sr[illegible]E[illegible]r\R[illegible]r[illegible]\PEA-E\F[illegible]r[illegible]\191395F3-SPSLAAIA.d[illegible]



MONTROSE ENVIRONMENTAL
1631 E. Saint Andrew Place, Santa Ana, CA 92705 | t 714.919.6500

FIGURE 4

SITE PLAN WITH PROPOSED EXCAVATION AREAS

S□□□□□d□□□ E□□□ □□□□r□ S□□□□□
2450 S□□□□□d□□□ S□r□□□
L□□A□□□□□□C□□□□r□□

DATE DRAWN
12□18□2019

PRO□ECT NO.
191395

FILE NO.
191395F4-SPEX

R:\03□S□□ A□□□□□□ □□□□ R□□ □d□□□□\LAUSD\S□□□□□d□□□ S□r□□□E□□ □□□□r\R□□□r□\PEA-E\F□□r□□\191395F4-SPEX.d□□

TABLES

Table 1
Sampling Strategy Plan
Shenandoah Street Elementary School
Los Angeles, CA

Assessment Area	Sample Location	Sample Dates	Sample Depth (ft bgs)	Proposed Analyses	Sample Location Rationale
North Portion of School Site	**SB-1 through SB-32**	**November 19 and 20, 2018**	**0-0.5, 1-1.5, 2-2.5**	Arsenic, Metals, OCPs, PCBs (10% of samples)	Evaluate potential impacts in shallow soil from lead based paint, arsenic, OCPs and PCBs near the portable buildings.
	Horizontal Stepouts	**February 18, 2019**	**0-0.5, 1-1.5**	Lead	
South Portion of School Site	**SB-33 through SB-60**	**April 16 and 17, 2019**	**0-0.5, 1-1.5, 2-2.5**	Arsenic, Metals, OCPs, PCBs (10% of samples), TPH, VOCs	Evaluate fill soils and potential shallow soil contamination from herbicide and pesticide below pavement.
	Horizontal Stepouts	**June 18 and 19, 2019**	**0-0.5, 1-1.5, 2-2.5**	Arsenic and Lead	
	Horizontal Stepouts	**August 30, 2019**	**0-0.5, 1-1.5, 2-2.5**	Arsenic and Lead	
	SB-61 through SB-64	**September 21, 2019**	**0-0.5, 1-1.5, 2-2.5**	Arsenic	
	SB-65 through SB-84	**November 2, 2019**	**0-0.5, 0.5-1, 1-1.5**	Arsenic	

NOTES:
Metals: Title 22 Metals by EPA Method 6010B / 7471A
OCPs: Organochlorine Pesticides by EPA Method 8081A
PCBs: Polychlorinated Biphenyls by EPA Method 8082
VOCs: Volatile Organic Compounds by EPA Method 8260B / 5035
TPH: Total Petroleum Hydrocarbons by EPA Method 8015M
ft bgs: Feet below ground surface

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
Site Screening Levels			80*	12**
SB-1-0.5	0.5	11/20/2018	**212**	3.72 [2]
SB-1-1.5	1.5	11/20/2018	8.62	--
SB-1A-0.5	0.5	2/18/2019	**157**	--
SB-1A-1.5	1.5	2/18/2019	49.6	--
SB-1B-0.5	0.5	2/18/2019	6.23	--
SB-1B-1.5	1.5	2/18/2019	5.02	--
SB-1C-0.5	0.5	2/18/2019	9.84	--
SB-1C-1.5	1.5	2/18/2019	3.62	--
SB-2-0.5	0.5	11/20/2018	8.86	4.05 [2]
SB-2-1.5	1.5	11/20/2018	--	--
SB-3-0.5	0.5	11/20/2018	**88.7**	1.624J [2]
SB-3-1.5	1.5	11/20/2018	4.54	--
SB-3A-0.5	0.5	11/20/2018	5.08	--
SB-3A-1.5	1.5	11/20/2018	5.79	--
SB-3B-0.5	0.5	11/20/2018	3.82	--
SB-3B-1.5	1.5	11/20/2018	4.28	--
SB-4-0.5	0.5	11/20/2018	17.3	4.65 [2]
SB-4-1.5	1.5	11/20/2018	--	--
SB-5-0.5	0.5	11/20/2018	47.9	3.00 [2]
SB-5-0.5 (Dup)	0.5	11/20/2018	**131**	1.932J [2]
SB-5-1.5	1.5	11/20/2018	6.62	--
SB-5A-0.5	0.5	2/18/2019	34	--
SB-5A-1.5	1.5	2/18/2019	6.21	--
SB-5B-0.5	0.5	2/18/2019	12.1	--
SB-5B-1.5	1.5	2/18/2019	5.64	--
SB-5C-0.5	0.5	2/18/2019	6.19	--
SB-5C-1.5	1.5	2/18/2019	5.78	--
SB-6-0.5	0.5	11/20/2018	15.0	5.09 [2]
SB-6-1.5	1.5	11/20/2018	--	--
SB-7-0.5	0.5	11/20/2018	**175**	3.14 [2]
SB-7-1.5	1.5	11/20/2018	5.53	--
SB-7A-0.5	0.5	2/18/2019	15.6	--
SB-7A-1.5	1.5	2/18/2019	4.36	--
SB-7B-0.5	0.5	2/18/2019	14.2	--
SB-7B-1.5	1.5	2/18/2019	11.2	--
SB-8-0.5	0.5	11/19/2018	6.57	3.57 [2]
SB-8-1.5	1.5	11/19/2018	--	--
SB-9-0.5	0.5	11/20/2018	8.34	5.31 [2]
SB-9-1.5	1.5	11/20/2018	--	--
SB-10-0.5	0.5	11/19/2018	8.08	7.87 [2]
SB-10-1.5	1.5	11/19/2018	--	--
SB-11-0.5	0.5	11/20/2018	5.31	5.01 [2]
SB-11-0.5 (Dup)	0.5	11/20/2018	5.64	4.01 [2]
SB-11-1.5	1.5	11/20/2018	--	--
SB-12-0.5	0.5	11/19/2018	4.92	4.95 [2]

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-12-1.5	1.5	11/19/2018	--	--
SB-13-0.5	0.5	11/19/2018	3.06	5.64 [2]
SB-13-1.5	1.5	11/19/2018	--	--
SB-14-0.5	0.5	11/19/2018	1.70	2.15J [2]
SB-14-1.5	1.5	11/19/2018	--	--
SB-15-0.5	0.5	11/20/2018	**112**	5.58J [2]
SB-15-1.5	1.5	11/20/2018	5.73	--
SB-15A-0.5	0.5	2/18/2019	5.24	--
SB-15A-1.5	1.5	2/18/2019	3.09	--
SB-15B-0.5	0.5	2/18/2019	6.58	--
SB-15B-1.5	1.5	2/18/2019	3.90	--
SB-16-0.5	0.5	11/20/2018	12.0	5.09 [2]
SB-16-0.5 (Dup)	0.5	11/20/2018	9.88	5.18 [2]
SB-16-1.5	1.5	11/20/2018	--	--
SB-17-0.5	0.5	11/19/2018	10.3	4.49 [2]
SB-17-1.5	1.5	11/19/2018	--	--
SB-18-0.5	0.5	11/19/2018	28.6	6.62 [2]
SB-18-1.5	1.5	11/19/2018	--	--
SB-19-0.5	0.5	11/19/2018	6.31	4.54 [2]
SB-19-1.5	1.5	11/19/2018	--	--
SB-20-0.5	0.5	11/19/2018	7.16	5.96 [2]
SB-20-1.5	1.5	11/19/2018	--	--
SB-21-0.5	0.5	11/19/2018	20.4	5.97 [2]
SB-21-1.5	1.5	11/19/2018	--	--
SB-22-0.5	0.5	11/19/2018	8.57	1.940J [2]
SB-22-1.5	1.5	11/19/2018	--	--
SB-23-0.5	0.5	11/19/2018	19.1	10.4 [2]
SB-23-1.5	1.5	11/19/2018	--	--
SB-24-0.5	0.5	11/20/2018	18.8	6.27 [2]
SB-24-1.5	1.5	11/20/2018	--	--
SB-25-0.5	0.5	11/20/2018	29.5	4.61 [2]
SB-25-0.5 (Dup)	0.5	11/20/2018	56.9	4.73 [2]
SB-25-1.5	1.5	11/20/2018	--	--
SB-26-0.5	0.5	11/19/2018	25.8	5.53 [2]
SB-26-1.5	1.5	11/19/2018	--	--
SB-27-0.5	0.5	11/19/2018	7.18	4.26 [2]
SB-27-1.5	1.5	11/19/2018	--	--
SB-28-0.5	0.5	11/19/2018	10.1	3.45 [2]
SB-28-0.5 (Dup)	0.5	11/19/2018	21.0	3.92 [2]
SB-28-1.5	1.5	11/19/2018	--	--
SB-29-3.0	3.0	11/20/2018	--	--
SB-30-0.5	0.5	11/20/2018	**94.1**	5.23 [2]
SB-30-1.5	1.5	11/20/2018	5.17	--
SB-30A-0.5	0.5	2/18/2019	5.04	--
SB-30A-1.5	1.5	2/18/2019	4.62	--
SB-30B-0.5	0.5	2/18/2019	5.04	--
SB-30B-1.5	1.5	2/18/2019	3.65	--

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-30C-0.5	0.5	2/18/2019	6.64	--
SB-30C-1.5	1.5	2/18/2019	5.13	--
SB-31-0.5	0.5	11/20/2018	6.26	5.02 [2]
SB-31-1.5	1.5	11/20/2018	--	--
SB-32-0.5	0.5	11/20/2018	5.55	6.14 [2]
SB-32-1.5	1.5	11/20/2018	--	--
SB-33-0.5	0.5	4/16/2019	11.7	**14.4** [2]
SB-33-1.5	1.5	4/16/2019	5.32	5.89 [2]
SB-33A-0.5	0.5	6/19/2019	--	5.02 [2]
SB-33A-1.5	1.5	6/19/2019	--	--
SB-33B-0.5	0.5	6/19/2019	--	6.18 [2]
SB-33B-1.5	1.5	6/19/2019	--	--
SB-33C-0.5	0.5	6/19/2019	--	**29.2** [2]
SB-33C-0.5 (Dup)	0.5	6/19/2019	--	**23.5** [2]
SB-33C-1.5	1.5	6/19/2019	--	--
SB-33D-0.5	0.5	6/19/2019	--	5.45 [2]
SB-33D-1.5	1.5	6/19/2019	--	8.75 [2]
SB-34-0.5	0.5	4/16/2019	72.2	4.03 [2]
SB-34-1.5	1.5	4/16/2019	4.86	5.30 [2]
SB-35-0.5	0.5	4/16/2019	9.61	3.93 [2]
SB-35-1.5	1.5	4/16/2019	4.12	5.91 [2]
SB-36-0.5	0.5	4/16/2019	6.16	5.44 [2]
SB-36-1.5	1.5	4/16/2019	7.70	7.54 [2]
SB-37-0.5	0.5	4/16/2019	5.68	5.85 [2]
SB-37-1.5	1.5	4/16/2019	12.1	**14.8** [2]
SB-37A-0.5	0.5	6/19/2019	--	5.44 [2]
SB-37A-1.5	1.5	6/19/2019	--	--
SB-37B-0.5	0.5	6/19/2019	--	**27.5** [2]
SB-37B-0.5 (Dup)	0.5	6/19/2019	--	**32.7** [2]
SB-37B-1.5	1.5	6/19/2019	--	--
SB-37C-0.5	0.5	6/19/2019	--	**89.9** [2]
SB-37C-1.5	1.5	6/19/2019	--	7.61 [2]
SB-37C2-0.5	0.5	8/30/2019	--	**189** [2]
SB-37C2-1.5	1.5	8/30/2019	--	**38.2** [2]
SB-37C3-0.5	0.5	8/30/2019	--	**136** [2]
SB-37C3-1.5	1.5	8/30/2019	--	**45.3** [2]
SB-37D-0.5	0.5	6/19/2019	--	**31.8** [2]
SB-37D-1.5	1.5	6/19/2019	--	7.90 [2]
SB-37D2-0.5	0.5	8/30/2019	--	**57.4** [2]
SB-37D2-0.5 (Dup)	0.5	8/30/2019	--	**48.6** [2]
SB-37D2-1.5	1.5	8/30/2019	--	**35.5** [2]
SB-38-0.5	0.5	4/16/2019	47.0	6.60 [2]
SB-38-1.5	1.5	4/16/2019	5.25	6.79 [2]
SB-39-0.5	0.5	4/17/2019	24.7	**21.1** [2]
SB-39-0.5 (Dup)	0.5	4/17/2019	12.1	7.98 [2]
SB-39-1.5	1.5	4/17/2019	4.60	6.30 [2]
SB-39-2.5	2.5	4/17/2019	2.97	9.61 [2]

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-39A-0.5	0.5	6/18/2019	--	6.16 [2]
SB-39A-1.5	1.5	6/18/2019	--	--
SB-39A-2.5	2.5	6/18/2019	--	--
SB-39B-0.5	0.5	6/18/2019	--	5.70 [2]
SB-39B-1.5	1.5	6/18/2019	--	--
SB-39B-2.5	2.5	6/18/2019	--	--
SB-39D-0.5'	0.5	6/18/2019	--	8.26 [2]
SB-39D-1.5'	1.5	6/18/2019	--	--
SB-39D-2.5'	2.5	6/18/2019	--	--
SB-40-0.5	0.5	4/17/2019	7.31	5.66 [2]
SB-40-1.5	1.5	4/17/2019	3.98	5.17 [2]
SB-40-2.5	2.5	4/17/2019	3.62	7.95 [2]
SB-41-0.5	0.5	4/16/2019	3.45	5.94 [2]
SB-41-1.5	1.5	4/16/2019	4.59	6.76 [2]
SB-41-2.5	2.5	4/16/2019	4.02	8.96 [2]
SB-42-0.5	0.5	4/17/2019	**110**	0.448 [2]
SB-42-1.5	1.5	4/17/2019	3.86	6.77 [2]
SB-42-2.5	2.5	4/17/2019	3.56	9.57 [2]
SB-42A-0.5	0.5	6/18/2019	29.0	**99.7 [2]**
SB-42A-1.5	1.5	6/18/2019	--	5.39 [2]
SB-42A-2.5	2.5	6/18/2019	--	6.81 [2]
SB-42A2-0.5	0.5	8/30/2019	--	**43.2 [2]**
SB-42A2-1.5	1.5	8/30/2019	--	5.37 [2]
SB-42B-0.5	0.5	6/18/2019	13.2	**19.1 [2]**
SB-42B-1.5	1.5	6/19/2019	--	--
SB-42B-2.5	2.5	6/19/2019	--	--
SB-42C-0.5	0.5	6/19/2019	12.3	**35.6 [2]**
SB-42C-1.5	1.5	6/19/2019	--	6.96 [2]
SB-42C-1.5 (Dup)	1.5	6/19/2019	--	--
SB-42C-2.5	2.5	6/19/2019	--	7.35 [2]
SB-42D-0.5	0.5	6/19/2019	39.5	**33.8 [2]**
SB-42D-1.5	1.5	6/19/2019	--	6.72 [2]
SB-42D-2.5	2.5	6/19/2019	--	6.66 [2]
SB-42D2-0.5	0.5	8/30/2019	--	**61.9 [2]**
SB-42D2-1.5	1.5	8/30/2019	--	7.52 [2]
SB-43-0.5	0.5	4/17/2019	5.42	6.15 [2]
SB-43-0.5 (Dup)	0.5	4/17/2019	4.82	6.76 [2]
SB-43-1.5	1.5	4/17/2019	3.58	6.22 [2]
SB-43-2.5	2.5	4/17/2019	3.62	7.31 [2]
SB-44-0.5	0.5	4/17/2019	16.5	**48.5 [2]**
SB-44-1.5	1.5	4/17/2019	3.47	6.72 [2]
SB-44-2.5	2.5	4/17/2019	4.00	6.75 [2]
SB-44B-0.5	0.5	6/18/2019	--	4.67 [2]
SB-44B-1.5	1.5	6/18/2019	--	--
SB-44B-1.5 (Dup)	1.5	6/18/2019	--	--
SB-44B-2.5	2.5	6/18/2019	--	--
SB-44D-0.5	0.5	6/18/2019	--	**15.9 [2]**

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-44D-1.5	2.5	6/18/2019	--	6.66 [2]
SB-44D-2.5	2.5	6/18/2019	--	7.19 [2]
SB-45-0.5	0.5	4/16/2019	15.0	6.02 [2]
SB-45-1.5	1.5	4/16/2019	4.60	5.00 [2]
SB-45-2.5	2.5	4/16/2019	7.64	9.83 [2]
SB-46-0.5	0.5	4/17/2019	35.6	2.48 [2]
SB-46-1.5	1.5	4/17/2019	4.78	5.17 [2]
SB-46-2.5	2.5	4/17/2019	5.95	8.21 [2]
SB-47-0.5	0.5	4/17/2019	15.0	**25.9** [2]
SB-47-1.5	1.5	4/17/2019	3.38	6.96 [2]
SB-47-1.5 (Dup)	1.5	4/17/2019	4.69	6.38 [2]
SB-47-2.5	2.5	4/17/2019	6.18	8.97 [2]
SB-47B-0.5	0.5	6/18/2019	--	**13.2** [2]
SB-47B-0.5 (Dup)	0.5	6/18/2019	--	**27.0** [2]
SB-47B-1.5	1.5	6/18/2019	--	--
SB-47B-2.5	2.5	6/18/2019	--	--
SB-47C-0.5	0.5	6/18/2019	--	**131** [2]
SB-47C-0.5	0.5	7/23/2019		1.45 [2]
SB-47C-1.5	1.5	6/18/2019	--	6.28 [2]
SB-47C-2.5	2.5	6/18/2019	--	8.30 [2]
SB-47D-0.5	0.5	6/18/2019	--	6.18 [2]
SB-47D-1.5	1.5	6/18/2019	--	--
SB-47D-2.5	2.5	6/18/2019	--	--
SB-48-0.5	0.5	4/17/2019	11.5	**30.6** [2]
SB-48-1.5	1.5	4/17/2019	5.2	5.69 [2]
SB-48-2.5	2.5	4/17/2019	5.95	7.14 [2]
SB-48B-0.5	0.5	6/18/2019	--	**15.5** [2]
SB-48B-1.5	1.5	8/13/2019	--	7.35 [2]
SB-48B-2.5	2.5	6/18/2019	--	6.59 [2]
SB-48C-0.5	0.5	6/18/2019	--	5.90 [2]
SB-48C-1.5	1.5	6/18/2019	--	--
SB-48C-2.5	2.5	6/18/2019	--	--
SB-48D-0.5	0.5	6/18/2019	--	**15.3** [2]
SB-48D-1.5	1.5	6/18/2019	--	6.22 [2]
SB-48D-2.5	2.5	6/18/2019	--	7.84 [2]
SB-49-0.5	0.5	4/17/2019	5.64	6.46 [2]
SB-49-1.5	1.5	4/17/2019	4.94	6.30 [2]
SB-49-1.5 (Dup)	0.5	4/17/2019	4.15	5.32 [2]
SB-49-2.5	2.5	4/17/2019	5.59	8.66 [2]
SB-50-0.5	0.5	4/16/2019	21.9	**69.0** [2]
SB-50-1.5	1.5	4/16/2019	56.4	6.98 [2]
SB-50A-0.5	0.5	6/19/2019	--	**22.8** [2]
SB-50A-1.5	1.5	6/19/2019	--	6.24 [2]
SB-50A2-0.5	0.5	8/30/2019	--	9.94 [2]
SB-50A2-0.5 (Dup)	0.5	8/30/2019	--	**14.1** [2]
SB-50A2-1.5	1.5	8/30/2019	--	--
SB-50A2-2.5	1.5	8/30/2019	--	--

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-50AB2-0.5	0.5	8/30/2019	--	6.34 [2]
SB-50AB2-1.5	1.5	8/30/2019	--	6.02 [2]
SB-50B-0.5	0.5	6/19/2019	--	**633** [2]
SB-50B-1.5	1.5	6/19/2019	--	**56.6** [2]
SB-50B2-0.5	0.5	8/30/2019	--	**140** [2]
SB-50B2-1.5	1.5	8/30/2019	--	5.62 [2]
SB-50B3-0.5	0.5	8/30/2019	--	9.12 [2]
SB-50B3-1.5	1.5	8/30/2019	--	8.33 [2]
SB-50C-0.5	0.5	6/19/2019	--	7.71 [2]
SB-50C-1.5	1.5	6/19/2019	--	--
SB-50D-0.5	0.5	6/19/2019	--	**69.0** [2]
SB-50D-0.5 (Dup)	0.5	6/19/2019	--	**32.1** [2]
SB-50D-1.5	1.5	6/19/2019	--	6.39 [2]
SB-51-0.5	0.5	4/16/2019	11.4	**218** [2]
SB-51-1.5	1.5	4/16/2019	5.18	10.7 [2]
SB-51A-0.5	0.5	6/19/2019	--	**26.8** [2]
SB-51A-1.5	1.5	6/19/2019	--	--
SB-51B-0.5	0.5	6/19/2019	--	**395** [2]
SB-51B-1.5	1.5	6/19/2019	--	11.0 [2]
SB-51C-0.5	0.5	6/19/2019	--	**136** [2]
SB-51C-1.5	1.5	6/19/2019	--	8.42 [2]
SB-51D-0.5	0.5	6/19/2019	--	**92.9** [2]
SB-51D-1.5	1.5	6/19/2019	--	8.86 [2]
SB-52-0.5	0.5	4/16/2019	40.4	**233** [2]
SB-52-1.5	1.5	4/16/2019	5.27	6.30 [2]
SB-52A-0.5	0.5	6/18/2019	--	**15.0** [2]
SB-52A-1.5	1.5	6/18/2019	--	--
SB-52B-0.5	0.5	6/18/2019	--	5.52 [2]
SB-52B-1.5	1.5	6/18/2019	--	--
SB-52C-0.5	0.5	6/18/2019	--	**27.7** [2]
SB-52C-1.5	1.5	6/18/2019	--	--
SB-52D-0.5	0.5	6/18/2019	--	**23.5** [2]
SB-52D-1.5	1.5	6/18/2019	--	--
SB-53-0.5	0.5	4/16/2019	3.08	**129** [2]
SB-53-0.5 (Dup)	0.5	4/16/2019	44.1	**252** [2]
SB-53-1.5	1.5	4/16/2019	3.54	6.61 [2]
SB-53A-0.5	0.5	6/18/2019	--	**54.9** [2]
SB-53A-1.5	1.5	6/18/2019	--	--
SB-53B-0.5	0.5	6/18/2019	--	**65.3** [2]
SB-53B-1.5	1.5	6/18/2019	--	--
SB-53B-1.5 (Dup)	1.5	6/18/2019	--	--
SB-53D-0.5	0.5	6/18/2019	--	**136** [2]
SB-53D-1.5	1.5	6/18/2019	--	--
SB-53D2-0.5	0.5	8/30/2019	--	**118** [2]
SB-53D2-1.5	1.5	8/30/2019	--	7.12 [2]
SB-54-0.5	0.5	4/16/2019	23.4	**124** [2]
SB-54-1.5	1.5	4/16/2019	4.93	5.59 [2]

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-54A-0.5	0.5	6/19/2019	--	5.35 [2]
SB-54A-1.5	1.5	6/19/2019	--	--
SB-54B-0.5	0.5	6/19/2019	--	8.83 [2]
SB-54B-1.5	1.5	6/19/2019	--	--
SB-54C-0.5	0.5	6/19/2019	--	5.65 [2]
SB-54C-1.5	1.5	6/19/2019	--	--
SB-54D-0.5	0.5	6/19/2019	--	9.40 [2]
SB-54D-1.5	1.5	6/19/2019	--	--
SB-55-0.5	0.5	4/16/2019	5.85	**59.7** [2]
SB-55-1.5	1.5	4/16/2019	4.48	6.90 [2]
SB-55-0.5 (Dup)	0.5	4/16/2019	2.40	6.16 [2]
SB-55A-0.5	0.5	6/19/2019	--	6.41 [2]
SB-55A-1.5	1.5	6/19/2019	--	--
SB-55B-0.5	0.5	6/19/2019	--	**87.3** [2]
SB-55B-1.5	1.5	6/19/2019	--	8.35 [2]
SB-55B2-0.5	0.5	8/30/2019	--	**86.4** [2]
SB-55B2-1.5	1.5	8/30/2019	--	7.83 [2]
SB-55C-0.5	0.5	6/19/2019	--	**55.4** [2]
SB-55C-1.5	1.5	6/19/2019	--	7.75 [2]
SB-55C-1.5 (Dup)	1.5	6/19/2019	--	--
SB-55C2-0.5	0.5	8/30/2019	--	**128** [2]
SB-55C2-1.5	1.5	8/30/2019	--	**17.5** [2]
SB-55D-0.5	0.5	6/19/2019	--	**21.1** [2]
SB-55D-1.5	1.5	6/19/2019	--	6.96 [2]
SB-56-0.5	0.5	4/17/2019	6.05	6.45 [2]
SB-56-1.5	1.5	4/17/2019	3.59	5.90 [2]
SB-56-2.5	2.5	4/17/2019	6.20	7.86 [2]
SB-57-0.5	0.5	4/17/2019	7.52	**12.5** [2]
SB-57-1.5	1.5	4/17/2019	4.49	5.38 [2]
SB-57-2.5	2.5	4/17/2019	4.07	8.23 [2]
SB-57A-0.5	0.5	6/18/2019	--	6.03 [2]
SB-57A-1.5	1.5	6/18/2019	--	--
SB-57A-2.5	2.5	6/18/2019	--	--
SB-57B-0.5	0.5	6/18/2019	--	**151** [2]
SB-57B-1.5	1.5	6/18/2019	--	5.42 [2]
SB-57B-2.5	2.5	6/18/2019	--	--
SB-57B2-0.5	0.5	8/30/2019	--	**99.3** [2]
SB-57B2-1.5	1.5	8/30/2019	--	5.01 [2]
SB-57C-0.5	0.5	6/18/2019	--	6.95 [2]
SB-57C-1.5	1.5	6/18/2019	--	--
SB-57C-1.5 (Dup)	1.5	6/18/2019	--	--
SB-57C-2.5	2.5	6/18/2019	--	--
SB-57D-0.5	0.5	6/18/2019	--	6.86 [2]
SB-57D-1.5	1.5	6/18/2019	--	--
SB-57D-2.5	2.5	6/18/2019	--	--
SB-58-0.5	0.5	4/16/2019	16.4	7.17 [2]
SB-58-1.5	1.5	4/16/2019	16.4	9.06 [2]

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-58-2.5	2.5	4/16/2019	4.51	6.36 [2]
SB-59-0.5	0.5	4/16/2019	44.1	6.22 [2]
SB-59-1.5	1.5	4/16/2019	6.12	6.37 [2]
SB-59-2.5	2.5	4/16/2019	4.75	6.83 [2]
SB-60-0.5	0.5	4/16/2019	41.1	8.51 [2]
SB-60-0.5 (Dup)	0.5	4/16/2019	8.64	8.06 [2]
SB-60-1.5	1.5	4/16/2019	--	--
SB-61-0.5	0.5	9/21/2019	--	9.85 [3]
SB-61-1.5	1.5	9/21/2019	--	6.64 [3]
SB-62-0.5	0.5	9/21/2019	--	**14.7 [3]**
SB-62-1.5	1.5	9/21/2019	--	8.73 [3]
SB-63-0.5	0.5	9/21/2019	--	**25.8 [3]**
SB-63-1.5	1.5	9/21/2019	--	8.22 [3]
SB-64-0.5	0.5	9/21/2019	--	7.18 [3]
SB-64-1.5	1.5	9/21/2019	--	8.81 [3]
SB-64-2.5	2.5	9/21/2019	--	9.64 [3]
SB-65-0.5	0.5	11/2/2019	--	7.94 [3]
SB-65-1.0	1.0	11/2/2019	--	**190 [3]**
SB-65-1.5	1.5	11/2/2019	--	11.8 [3]
SB-66-0.5	0.5	11/2/2019	--	**33.4 [3]**
SB-66-1.0	1.0	11/2/2019	--	**144 [3]**
SB-66-1.5	1.5	11/2/2019	--	**12.6 [3]**
SB-67-0.5	0.5	11/2/2019	--	**68.8 [3]**
SB-67-1.0	1.0	11/2/2019	--	**271 [3]**
SB-67-1.5	1.5	11/2/2019	--	**74.4 [3]**
SB-68-0.5	0.5	11/2/2019	--	8.18 [3]
SB-68-1.0	1.0	11/2/2019	--	9.45 [3]
SB-68-1.5	1.5	11/2/2019	--	8.24 [3]
SB-69-0.5	0.5	11/2/2019	--	**260 [3]**
SB-69-1.0	1.0	11/2/2019	--	8.34 [3]
SB-69-1.5	1.5	11/2/2019	--	9.13 [3]
SB-70-0.5	0.5	11/2/2019	--	**115 [3]**
SB-70-1.0	1.0	11/2/2019	--	6.98 [3]
SB-70-1.5	1.5	11/2/2019	--	9.27 [3]
SB-71-0.5	0.5	11/2/2019	--	**63.0 [3]**
SB-71-1.0	1.0	11/2/2019	--	8.77 [3]
SB-71-1.5	1.5	11/2/2019	--	**27.0 [3]**
SB-72-0.5	0.5	11/2/2019	--	**32.1 [3]**
SB-72-1.0	1.0	11/2/2019	--	**13.0 [3]**
SB-72-1.5	1.5	11/2/2019	--	**16.7 [3]**
SB-73-0.5	0.5	11/2/2019	--	**84.2 [3]**
SB-73-1.0	1.0	11/2/2019	--	9.70 [3]
SB-73-1.5	1.5	11/2/2019	--	6.59 [3]
SB-74-0.5	0.5	11/2/2019	--	**47.1 [3]**
SB-74-1.0	1.0	11/2/2019	--	8.41 [3]
SB-74-1.5	1.5	11/2/2019	--	**20.9 [3]**
SB-75-0.5	0.5	11/2/2019	--	**111 [3]**

Table 2
Summary of Shallow Soil Sample Lead and Arsenic Results
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	Depth (ft bgs)	Sample Date	Lead [1]	Arsenic [2] [3]
			mg/kg	
SB-75-1.0	1.0	11/2/2019	--	9.16 [3]
SB-75-1.5	1.5	11/2/2019	--	4.71 [3]
SB-76-0.5	0.5	11/2/2019	--	**53.9** [3]
SB-76-1.0	1.0	11/2/2019	--	5.09 [3]
SB-76-1.5	1.5	11/2/2019	--	8.73 [3]
SB-77-0.5	0.5	11/2/2019	--	5.74 [3]
SB-77-1.0	1.0	11/2/2019	--	8.23 [3]
SB-77-1.5	1.5	11/2/2019	--	5.30 [3]
SB-78-0.5	0.5	11/2/2019	--	5.56 [3]
SB-78-1.0	1.0	11/2/2019	--	6.50 [3]
SB-78-1.5	1.5	11/2/2019	--	7.22 [3]
SB-79-0.5	0.5	11/2/2019	--	9.60 [3]
SB-79-1.0	1.0	11/2/2019	--	10.7 [3]
SB-79-1.5	1.5	11/2/2019	--	7.53 [3]
SB-80-0.5	0.5	11/2/2019	--	**13.4** [3]
SB-80-1.0	1.0	11/2/2019	--	5.84 [3]
SB-80-1.5	1.5	11/2/2019	--	7.95 [3]
SB-81-0.5	0.5	11/2/2019	--	**18.7** [3]
SB-81-1.0	1.0	11/2/2019	--	**19.8** [3]
SB-81-1.5	1.5	11/2/2019	--	5.68 [3]
SB-82-0.5	0.5	11/2/2019	--	**12.1** [3]
SB-82-1.0	1.0	11/2/2019	--	6.78 [3]
SB-82-1.5	1.5	11/2/2019	--	4.94 [3]
SB-83-0.5	0.5	11/2/2019	--	7.61 [3]
SB-83-1.0	1.0	11/2/2019	--	6.99 [3]
SB-83-1.5	1.5	11/2/2019	--	7.49 [3]
SB-84-0.5	0.5	11/2/2019	--	**153** [3]
SB-84-1.0	1.0	11/2/2019	--	**71.6** [3]
SB-84-1.5	1.5	11/2/2019	--	10.9 [3]

NOTES:
-- = Not Analyzed Highlighted Value = Exceeds Site Screening Levels
mg/kg = milligrams per kilogram
DUP = Duplicate
Highlighted results exceed the respective Site Screening Levels
ND = Indicated constituent not detected at or above the MDL
J = Result is an estimated value between the Reporting Detection Limit (RDL) and the Method Detection Limit (MDL)
80* = Department of Toxic Substances (DTSC) HERO Note 3 Modified Screening Levels for Residential Soil
12** = Southern California Regional Background Concentration for Residential Soil (DTSC)
[1] = Lead by EPA Method 6010B
[2] = Arsenic by EPA Method 6020
[3] = Arsenic by EPA Method 6010B

Table 3
Summary of Shallow Soil STLC and TCLP Results
Shenandoah Street Elementary School
Los Angeles, CA

Sample ID	Lead TTLC (mg/kg)	Lead STLC (mg/L)	Lead TCLP (mg/L)	Arsenic TTLC (mg/kg)	Arsenic STLC (mg/L)	Arsenic TCLP (mg/L)	Waste Characterization
Hazardous Waste Limits	**1000**	**5**	**5**	**500**	**5**	**5**	
SB-1-0.5	**212**	**13.8**	**0.232**	--	--	--	California Hazardous
SB-1A-0.5	**157**	**24.0**	**0.674**	--	--	--	California Hazardous
SB-3-0.5	**88.7**	**3.5**	--	--	--	--	Non-Hazardous
SB-5-0.5 (Dup)	**131**	**5.95**	**0.035J**	--	--	--	California Hazardous
SB-7-0.5	**175**	**6.72**	**0.028J**	--	--	--	California Hazardous
SB-15-0.5	**112**	**4.25**	--	--	--	--	Non-Hazardous
SB-30-0.5	**94.1**	**0.668**	--	--	--	--	Non-Hazardous
SB-33-0.5	**--**	**--**	--	**14.4**	--	--	Non-Hazardous
SB-33C-0.5	**--**	**--**	--	**29.2**	--	--	Non-Hazardous
SB-33C-0.5 (Dup)	**--**	**--**	--	**23.5**	--	--	Non-Hazardous
SB-37A-1.5	**--**	**--**	--	**14.8**	--	--	Non-Hazardous
SB-37B-0.5	--	--	--	**27.5**	--	--	Non-Hazardous
SB-37B-0.5 (Dup)	--	--	--	**32.7**	--	--	Non-Hazardous
SB-37C-0.5	--	--	--	**89.9**	**4.08**	--	Non-Hazardous
SB-37C2-0.5	--	--	--	**189**	**14.2**	**1.766**	California Hazardous
SB-37C3-0.5	--	--	--	**136**	**10.6**	**2.30**	California Hazardous
SB-37D-0.5	--	--	--	**31.8**	--	--	Non-Hazardous
SB-37D2-0.5	--	--	--	**57.4**	**2.68**	--	Non-Hazardous
SB-39-0.5	--	--	--	**21.1**	--	--	Non-Hazardous
SB-42-0.5	**110**	**0.448**	--	--	--	--	Non-Hazardous
SB-42A-0.5	29	--	--	**99.7**	**4.08**		Non-Hazardous
SB-42B-0.5	--	--	--	**19.1**	--	--	Non-Hazardous
SB-42C-0.5	--	--	--	**35.6**	--	--	Non-Hazardous
SB-42D-0.5	**39.5**	--	--	**33.8**	--	--	Non-Hazardous
SB-42D2-0.5	--	--	--	**61.9**	**2.99**	--	Non-Hazardous
SB-44-0.5	--	--	--	**48.5**	--	--	Non-Hazardous
SB-44D-0.5	--	--	--	**15.9**	--	--	Non-Hazardous
SB-47-0.5	--	--	--	**25.9**	--	--	Non-Hazardous
SB-47B-0.5	--	--	--	**13.2**	--	--	Non-Hazardous
SB-47B-0.5 (Dup)	--	--	--	**27**	--	--	Non-Hazardous
SB-47C-0.5	--	--	--	**131**	**6.98**	**1.45**	California Hazardous
SB-48D-0.5	--	--	--	**15.3**	--	--	Non-Hazardous
SB-50-0.5	**21.9**	--	--	**69.0**	**2.11**	--	Non-Hazardous
SB-50A-0.5	--	--	--	**22.8**	--	--	Non-Hazardous
SB-50B-0.5	--	--	--	**633**	**9.31**	**2.11**	California Hazardous
SB-50B2-0.5	--	--	--	**140**	**7.78**	**1.465**	California Hazardous
SB-50D-0.5	--	--	--	**69.0**	**2.59**	--	Non-Hazardous
SB-50D-0.5 (Dup)	--	--	--	**32.1**	--	--	Non-Hazardous
SB-51-0.5	**11.4**	--	--	**218**	**9.96**	**2.45**	California Hazardous
SB-51A-0.5	--	--	--	**26.8**	--	--	Non-Hazardous
SB-51B-0.5	--	--	--	**395**	**38.10**	**3.85**	California Hazardous

Table 3
Summary of Shallow Soil STLC and TCLP Results
Shenandoah Street Elementary School
Los Angeles, CA

Sample ID	Lead TTLC (mg/kg)	Lead STLC (mg/L)	Lead TCLP (mg/L)	Arsenic TTLC (mg/kg)	Arsenic STLC (mg/L)	Arsenic TCLP (mg/L)	Waste Characterization
Hazardous Waste Limits	**1000**	**5**	**5**	**500**	**5**	**5**	
SB-51C-0.5	--	--	--	**136**	**6.00**	**1.00**	California Hazardous
SB-51D-0.5	--	--	--	**92.9**	**4.24**	--	Non-Hazardous
SB-52-0.5	**40.4**	--	--	**233**	**10.40**	**2.89**	California Hazardous
SB-52A-0.5	--	--	--	**15.0**	--	--	Non-Hazardous
SB-52C-0.5	--	--	--	**27.7**	--	--	Non-Hazardous
SB-52D-0.5	--	--	--	**23.5**	--	--	Non-Hazardous
SB-53-0.5	**3.08**	--	--	**129**	--	--	Non-Hazardous
SB-53-0.5 (Dup)	**44.1**	--	--	**252**	**12.9**	**3.02**	California Hazardous
SB-53A-0.5	--	--	--	**54.9**	--	--	Non-Hazardous
SB-53B-0.5	--	--	--	**65.3**	--	--	Non-Hazardous
SB-53D-0.5	--	--	--	**136**	**8.99**	**1.91**	California Hazardous
SB-53D2-0.5				**118**	**5.30**	**0.907**	California Hazardous
SB-54-0.5	**23.4**	--	--	**124**	**5.09**	**1.04**	California Hazardous
SB-55-0.5	**5.85**	--	--	**59.7**	**2.61**	**0.06**	Non-Hazardous
SB-55B-0.5	--	--	--	**87.3**	**3.76**	--	Non-Hazardous
SB-55B2-0.5	--	--	--	**86.4**	**4.08**	--	Non-Hazardous
SB-55C-0.5	--	--	--	**55.4**	**2.28**	--	Non-Hazardous
SB-55C2-0.5	--	--	--	**128**	**6.67**	1.556	Non-Hazardous
SB-55D-0.5	--	--	--	**21.1**	--	--	Non-Hazardous
SB-57-0.5	--	--	--	**12.5**	--	--	Non-Hazardous
SB-57B-0.5	--	--	--	**151**	**5.60**	**0.79**	California Hazardous
SB-57B2-0.5	--	--	--	**99.3**	**4.93**	--	Non-Hazardous
SB-65-1.0	--	--	--	**190**	**9.43**	**1.689**	California Hazardous
SB-66-0.5	--	--	--	**33.4**	--	--	Non-Hazardous
SB-66-1.0	--	--	--	**144**	**9.39**	**1.815**	California Hazardous
SB-66-1.5	--	--	--	**12.6**	--	--	Non-Hazardous
SB-67-0.5	--	--	--	**68.8**	**2.38**	--	Non-Hazardous
SB-67-1.0	--	--	--	**271**	**16.10**	**3.89**	California Hazardous
SB-67-1.5	--	--	--	**74.4**	**2.70**	--	Non-Hazardous
SB-69-0.5	--	--	--	**260**	**6.67**	**1.157**	California Hazardous
SB-70-0.5	--	--	--	**115**	**6.22**	**1.405**	California Hazardous
SB-71-0.5	--	--	--	**63**	**2.51**	--	Non-Hazardous
SB-71-1.5	--	--	--	**27**	--	--	Non-Hazardous
SB-72-0.5	--	--	--	**32.1**	--	--	Non-Hazardous
SB-72-1.0	--	--	--	**13**	--	--	Non-Hazardous
SB-72-1.5	--	--	--	**16.7**	--	--	Non-Hazardous
SB-73-0.5	--	--	--	**84.2**	**3.58**	--	Non-Hazardous
SB-74-0.5	--	--	--	**47.1**	--	--	Non-Hazardous
SB-74-1.5	--	--	--	**20.9**	--	--	Non-Hazardous
SB-75-0.5	--	--	--	**111**	**4.60**	**0.850**	Non-Hazardous
SB-76-0.5	--	--	--	**53.9**	**2.42**	--	Non-Hazardous

Table 3
Summary of Shallow Soil STLC and TCLP Results
Shenandoah Street Elementary School
Los Angeles, CA

Sample ID	Lead TTLC (mg/kg)	Lead STLC (mg/L)	Lead TCLP (mg/L)	Arsenic TTLC (mg/kg)	Arsenic STLC (mg/L)	Arsenic TCLP (mg/L)	Waste Characterization
Hazardous Waste Limits	**1000**	**5**	**5**	**500**	**5**	**5**	
SB-80-0.5	--	--	--	**13.4**	--	--	Non-Hazardous
SB-81-0.5	--	--	--	**18.7**	--	--	Non-Hazardous
SB-81-1.0	--	--	--	**19.8**	--	--	Non-Hazardous
SB-82-0.5	--	--	--	**12.1**	--	--	Non-Hazardous
SB-84-0.5	--	--	--	**153**	**8.52**	**1.497**	California Hazardous
SB-84-1.0	--	--	--	**71.6**	**3.88**	--	Non-Hazardous

NOTES:

-- = Not Analyzed

Highlighted Value = Exceeds Hazardous Waste Limits

STLC = Soluble Threshold Limit Concentration

TTLC = Total Treshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

J=concentration is an estimated value between the MDL and the RDL

mg/L = milligrams per liter

mg/kg = milligrams per kilogram

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-1		SB-2			SB-3		SB-4		SB-5			Residential Screening Levels		
				SB-1-0.5'	SB-1-1.5'	SB-2-0.5'	SB-2-0.5' (DUP)	SB-2-1.5'	SB-3-0.5'	SB-3-1.5'	SB-4-0.5'	SB-4-1.5'	SB-5-0.5'	SB-5-0.5' (Dup.)	SB-5-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.25 J**	--	**2.18 J**	--	--	**1.05 J**	--	<0.37	--	**0.67 J**	**0.95 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**4.91**	--	**4.38**	--	--	**1.45**	--	**6.03**	--	**3.33**	**3.56**	--	12*	12*	12*
	Barium	6010B	mg/kg	**123**	--	**60.3**	--	--	**118**	--	**123**	--	**104**	**90.8**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	--	<0.17	--	--	<0.17	--	<0.17	--	<0.17	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.34**	--	**0.58**	--	--	**1.12**	--	**1.64**	--	**1.58**	**2.00**	--	2,100	71	--
	Chromium	6010B	mg/kg	**28.5**	--	**7.32**	--	--	**31.3**	--	**28.1**	--	**31.1**	**34.6**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**11.3**	--	**4.79**	--	--	**12.1**	--	**10.4**	--	**11.4**	**12.4**	--	NE	23	--
	Copper	6010B	mg/kg	**17.9**	--	**8.28**	--	--	**14.0**	--	**17.8**	--	**16.0**	**23.5**	--	NE	3,100	--
	Lead	6010B	mg/kg	**212**	**8.62**	**8.86**	--	--	**88.7**	**4.54**	**17.3**	--	**47.9**	**131**	**6.62**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	**13.8**	--	--	--	--	**3.50**	--	--	--	**5.95**	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	**0.232**	--	--	--	--	--	--	--	--	**0.035 J**	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**2.19**	--	**1.01**	--	--	**0.73 J**	--	**0.93 J**	--	**0.49 J**	<0.13	--	NE	390	--
	Nickel	6010B	mg/kg	**17.6**	--	**8.40**	--	--	**17.9**	--	**19.6**	--	**19.0**	**17.8**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	--	**2.50 J**	--	--	<0.72	--	<0.72	--	<0.72	<0.72	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	--	<0.13	--	--	<0.13	--	<0.13	--	<0.13	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	**2.24 J**	--	**2.26 J**	--	--	**1.06 J**	--	<0.42	--	<0.42	**0.80 J**	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**48.7**	--	**24.4**	--	--	**53.8**	--	**50.2**	--	**53.0**	**53.3**	--	390	390	--
	Zinc	6010B	mg/kg	**108**	--	**22.6**	--	--	**58.0**	--	**58.0**	--	**62.2**	**88.0**	--	NE	23,000	--
Arsenic		6020	mg/kg	**3.72**	--	**4.05**	--	--	**1.624 J**	--	**4.65**	--	**3.00**	**1.932 J**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	--	<0.039	--	--	<0.039	--	<0.039	--	<0.039	**0.04 J**	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.00015	<0.000078	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.000097	<0.000078	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.00018	--	<0.000089	--	--	<0.000091	--	<0.000091	--	<0.00033	<0.000088	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.00021	--	<0.000099	--	--	<0.0001	--	<0.0001	--	<0.000087	<0.000088	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	<0.00037	--	**0.00021 J**	--	--	<0.00018	--	<0.00018	--	<0.00014	<0.00018	--			
	Aldrin	8081A	mg/kg	<0.00012	--	**0.00011 J**	--	--	<0.000062	--	<0.000062	--	**0.00016 J**	<0.00006	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.00013	--	<0.000064	--	--	<0.000065	--	<0.000065	--	<0.00011	<0.000063	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.0082	--	<0.0039	--	--	<0.004	--	<0.004	--	<0.0039	<0.0039	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.00015	<0.000078	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.000086	<0.000078	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.00011	<0.000078	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.00012	<0.000078	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.00015	--	<0.000073	--	--	<0.000075	--	<0.000075	--	<0.00017	<0.000073	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.00014	--	**0.00046 J**	--	--	<0.000067	--	<0.000067	--	<0.0002	**0.0002 J**	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0012	--	<0.00058	--	--	<0.0006	--	<0.0006	--	<0.00067	<0.00058	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	<0.00023	--	**0.00019 J**	--	--	<0.00011	--	<0.00011	--	<0.00013	<0.00011	--			
	Heptachlor	8081A	mg/kg	<0.00016	--	<0.000079	--	--	<0.000081	--	<0.000081	--	<0.00012	<0.000078	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.00016	--	<0.000076	--	--	<0.000078	--	<0.000078	--	<0.000083	**0.000083 J**	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.00017	--	<0.00008	--	--	<0.000081	--	<0.000082	--	<0.00012	<0.000079	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0031	--	<0.0015	--	--	<0.0015	--	<0.0015	--	<0.0026	<0.0015	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.027	--	<0.013	--	--	<0.013	--	<0.013	--	<0.011	<0.013	--	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	<0.0045	<0.0044	--	--	--	--	--	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	<0.0078	<0.0076	--	--	--	--	--	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	<0.0038	<0.0037	--	--	--	--	--	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	<0.004	<0.0039	--	--	--	--	--	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	<0.0017	<0.0016	--	--	--	--	--	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	<0.0034	<0.0033	--	--	--	--	--	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	<0.0033	<0.0032	--	--	--	--	--	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	<0.0021	<0.0021	--	--	--	--	--	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	<0.0041	<0.004	--	--	--	--	--	--	--	--	NE	NE	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-6		SB-7		SB-8		SB-9		SB-10		Residential Screening Levels		
				SB-6-0.5'	SB-6-1.5'	SB-7-0.5'	SB-7-1.5'	SB-8-0.5'	SB-8-1.5'	SB-9-0.5'	SB-9-1.5'	SB-10-0.5'	SB-10-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.94 J**	--	**2.74 J**	--	**2.60 J**	--	**2.13 J**	--	<0.37	--	NE	31	--
	Arsenic	6010B	mg/kg	**5.30**	--	**4.82**	--	**4.86**	--	**5.80**	--	**5.00**	--	12*	12*	12*
	Barium	6010B	mg/kg	**120**	--	**141**	--	**111**	--	**101**	--	**107**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	--	<0.17	--	<0.17	--	<0.17	--	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.88**	--	**1.41**	--	**1.63**	--	**1.73**	--	**1.58**	--	2,100	71	--
	Chromium	6010B	mg/kg	**24.4**	--	**25.7**	--	**23.6**	--	**25.7**	--	**24.8**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**9.91**	--	**10.1**	--	**9.35**	--	**8.89**	--	**9.63**	--	NE	23	--
	Copper	6010B	mg/kg	**20.2**	--	**18.8**	--	**18.2**	--	**16.5**	--	**17.1**	--	NE	3,100	--
	Lead	6010B	mg/kg	**15.0**	--	**175**	**5.53**	**6.57**	--	**8.34**	--	**8.08**	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	**6.72**	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	**0.028 J**	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**1.32**	--	**1.02**	--	**1.00**	--	**0.97 J**	--	**1.02**	--	NE	390	--
	Nickel	6010B	mg/kg	**31.2**	--	**18.2**	--	**17.5**	--	**18.7**	--	**18.2**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	--	**1.72 J**	--	**1.40 J**	--	<0.72	--	<0.72	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	--	<0.13	--	<0.13	--	<0.13	--	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	<0.42	--	<0.42	--	<0.42	--	<0.42	--	<0.42	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**43.9**	--	**44.9**	--	**41.6**	--	**41.9**	--	**41.2**	--	390	390	--
	Zinc	6010B	mg/kg	**66.5**	--	**146**	--	**48.9**	--	**48.2**	--	**47.9**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.09**	--	**3.14 J**	--	**3.57**	--	**5.31**	--	**7.87**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	--	**0.13 J**	--	<0.039	--	<0.039	--	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	**0.00013 J**	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.000081	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.000091	--	**0.00057 J**	--	<0.000092	--	<0.00009	--	<0.00009	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.000091	--	<0.0001	--	<0.0001	--	<0.0001	--	<0.0001	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	<0.00018	--	<0.00018	--	<0.00018	--	<0.00018	--	<0.00018	--			
	Aldrin	8081A	mg/kg	<0.000062	--	<0.00006	--	<0.000063	--	<0.000061	--	<0.000061	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.000065	--	<0.000064	--	<0.000066	--	<0.000064	--	**0.00012 J**	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.004	--	<0.0039	--	<0.0041	--	<0.004	--	<0.004	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.000081	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.000081	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.000081	--	**0.00021 J**	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.000081	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.000075	--	<0.000073	--	**0.00027 J**	--	<0.000074	--	<0.000074	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.000067	--	<0.000066	--	<0.000068	--	<0.000066	--	<0.000066	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0006	--	<0.00058	--	<0.0006	--	<0.00059	--	<0.00059	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	<0.00011	--	<0.00011	--	**0.00014 J**	--	**0.00017 J**	--	<0.00011	--			
	Heptachlor	8081A	mg/kg	<0.000081	--	<0.000079	--	<0.000082	--	<0.00008	--	<0.000079	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.000078	--	<0.000076	--	<0.000079	--	<0.000077	--	<0.000077	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.000082	--	<0.00008	--	<0.000083	--	<0.000081	--	<0.00008	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0015	--	<0.0015	--	<0.0016	--	<0.0015	--	<0.0015	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.013	--	<0.013	--	<0.014	--	<0.013	--	<0.013	--	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	<0.0043	--	--	--	--	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	<0.0076	--	--	--	--	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	<0.0037	--	--	--	--	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	<0.0038	--	--	--	--	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	<0.0016	--	--	--	--	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	<0.0033	--	--	--	--	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	<0.0032	--	--	--	--	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	<0.0021	--	--	--	--	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	<0.0039	--	--	--	--	--	--	--	NE	NE	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-11			SB-12		SB-13		SB-14		SB-15		Residential Screening Levels		
				SB-11-0.5'	SB-11-0.5 (Dup.)	SB-11-1.5'	SB-12-0.5'	SB-12-1.5'	SB-13-0.5'	SB-13-1.5'	SB-14-0.5'	SB-14-1.5'	SB-15-0.5'	SB-15-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.57 J**	<0.37	--	**1.05 J**	--	**1.44 J**	--	**2.03 J**	--	**0.81 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**6.63**	**4.53**	--	--	--	--	--	--	--	**6.46**	--	12*	12*	12*
	Barium	6010B	mg/kg	**114**	**127**	--	**98.8**	--	**127**	--	**222**	--	**123**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	--	<0.17	--	<0.17	--	<0.17	--	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.78**	**1.71**	--	**1.49**	--	**1.70**	--	**0.44 J**	--	**1.65**	--	2,100	71	--
	Chromium	6010B	mg/kg	**24.6**	**26.3**	--	**23.2**	--	**21.4**	--	**7.91**	--	**26.6**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**9.00**	**10.4**	--	**9.14**	--	**10.4**	--	**10.7**	--	**9.56**	--	NE	23	--
	Copper	6010B	mg/kg	**18.2**	**18.2**	--	**16.6**	--	**15.9**	--	**14.8**	--	**20.7**	--	NE	3,100	--
	Lead	6010B	mg/kg	**5.31**	**5.64**	--	**4.92**	--	**3.06**	--	**1.70**	--	**112**	**5.73**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	**--**	--	--	--	--	--	--	--	--	**4.25**	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	**--**	--	--	--	--	--	--	--	--	**--**	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.98 J**	**0.77 J**	--	<0.13	--	<0.13	--	<0.13	--	**1.02**	--	NE	390	--
	Nickel	6010B	mg/kg	**18.6**	**18.3**	--	**19.0**	--	**18.4**	--	**8.01**	--	**20.9**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	**1.14 J**	<0.72	--	<0.72	--	<0.72	--	<0.72	--	<0.72	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	--	<0.13	--	<0.13	--	<0.13	--	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	<0.42	<0.42	--	<0.42	--	<0.42	--	<0.42	--	<0.42	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.7**	**46.2**	--	**39.1**	--	**40.6**	--	**20.9**	--	**45.2**	--	390	390	--
	Zinc	6010B	mg/kg	**50.1**	**51.1**	--	**49.3**	--	**59.2**	--	**42.4**	--	**83.6**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.01**	**4.01**	--	**4.95**	--	**5.64**	--	**2.15 J**	--	**5.58 J**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	<0.039	--	**0.10 J**	--	<0.039	--	<0.039	--	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.00008	<0.00015	--	<0.0021	--	<0.0021	--	<0.0021	--	**0.00039 J**	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.00008	<0.000098	--	<0.002	--	<0.002	--	<0.002	--	<0.00039	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.00009	<0.00033	--	<0.002	--	<0.002	--	<0.002	--	<0.00044	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0001	<0.000088	--	<0.0016	--	<0.0016	--	<0.0016	--	<0.00044	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	<0.00018	<0.00014	--	--	--	--	--	--	--	<0.00088	--			
	Aldrin	8081A	mg/kg	<0.000061	<0.000092	--	<0.0015	--	<0.0015	--	<0.0015	--	<0.0003	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.000065	<0.00011	--	<0.0015	--	<0.0015	--	<0.0015	--	<0.00032	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.004	<0.0039	--	<0.035	--	<0.035	--	<0.035	--	<0.02	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.00008	<0.00015	--	<0.0012	--	<0.0012	--	<0.0012	--	<0.00039	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.00008	<0.000087	--	<0.0021	--	<0.0021	--	<0.0021	--	<0.00039	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.00008	<0.00011	--	<0.0012	--	<0.0012	--	<0.0012	--	<0.00039	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.00008	<0.00012	--	<0.0028	--	<0.0028	--	<0.0028	--	<0.00039	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.000074	<0.00018	--	<0.0034	--	<0.0034	--	<0.0034	--	<0.00036	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.000066	<0.0002	--	<0.0027	--	<0.0027	--	<0.0027	--	<0.00032	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.00059	<0.00068	--	<0.0021	--	<0.0021	--	<0.0021	--	<0.0029	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	<0.0041	--	<0.0041	--	<0.0041	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	<0.00011	<0.00014	--	--	--	--	--	--	--	<0.00054	--			
	Heptachlor	8081A	mg/kg	<0.00008	<0.00012	--	<0.0013	--	<0.0013	--	<0.0013	--	<0.00039	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.000077	<0.000084	--	<0.0023	--	<0.0023	--	<0.0023	--	<0.00038	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.000081	<0.00012	--	<0.002	--	<0.002	--	<0.002	--	<0.0004	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0015	<0.0026	--	<0.0092	--	<0.0092	--	<0.0092	--	<0.0075	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.013	<0.011	--	<0.054	--	<0.054	--	<0.054	--	<0.065	--	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	--	--	--	<0.003	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	--	--	--	<0.014	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	--	--	--	<0.0095	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	--	--	--	<0.014	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	--	--	--	<0.019	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	--	--	--	<0.020	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	--	--	--	<0.0069	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	--	--	--	<0.017	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	--	--	--	<0.0086	--	--	--	NE	NE	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-16			SB-17		SB-18		SB-19		SB-20		Residential Screening Levels		
				SB-16-0.5'	SB-16-0.5' (Dup.)	SB-16-1.5'	SB-17-0.5'	SB-17-1.5'	SB-18-0.5'	SB-18-1.5'	SB-19-0.5'	SB-19-1.5'	SB-20-0.5'	SB-20-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.34 J**	**1.00 J**	--	**1.09 J**	--	**1.38 J**	--	**0.55 J**	--	**0.66 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**6.94**	**5.66**	--	**4.98**	--	**8.25**	--	**5.91**	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**116**	**104**	--	**120**	--	**102**	--	**109**	--	**110**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	--	<0.17	--	<0.17	--	<0.17	--	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.84**	**1.55**	--	**1.68**	--	**1.56**	--	**1.74**	--	**1.52**	--	2,100	71	--
	Chromium	6010B	mg/kg	**23.0**	**22.3**	--	**24.1**	--	**22.0**	--	**22.4**	--	**25.2**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**9.21**	**9.09**	--	**10.2**	--	**8.72**	--	**9.57**	--	**9.30**	--	NE	23	--
	Copper	6010B	mg/kg	**18.6**	**17.4**	--	**19.3**	--	**17.9**	--	**17.2**	--	**17.5**	--	NE	3,100	--
	Lead	6010B	mg/kg	**12.0**	**9.88**	--	**10.3**	--	**28.6**	--	**6.31**	--	**7.16**	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.97 J**	**0.80 J**	--	**1.23**	--	**0.99 J**	--	**0.92 J**	--	<0.17	--	NE	390	--
	Nickel	6010B	mg/kg	**22.1**	**18.4**	--	**18.9**	--	**17.4**	--	**18.8**	--	**21.2**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	--	<0.72	--	<0.72	--	<0.72	--	**1.28 J**	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	--	<0.13	--	<0.13	--	<0.13	--	<0.17	--	390	390	--
	Thallium	6010B	mg/kg	<0.42	<0.42	--	<0.42	--	<0.42	--	<0.42	--	<0.42	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**41.9**	**40.4**	--	**42.5**	--	**35.8**	--	**39.0**	--	**43.8**	--	390	390	--
	Zinc	6010B	mg/kg	**56.0**	**53.6**	--	**56.2**	--	**79.7**	--	**49.7**	--	**58.5**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.09**	**5.18**	--	**4.49**	--	**6.62**	--	**4.54**	--	**5.96**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	<0.039	--	<0.039	--	<0.039	--	<0.039	--	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.000078	<0.00008	--	<0.00015	--	<0.000079	--	<0.000079	--	<0.0105	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.000078	<0.00008	--	<0.0001	--	<0.000079	--	<0.000079	--	<0.01	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.000088	<0.00009	--	<0.00034	--	<0.000089	--	<0.000089	--	<0.01	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.000098	<0.000089	--	<0.000091	--	<0.000099	--	<0.000088	--	<0.008	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	<0.00017	<0.00018	--	<0.00015	--	<0.00018	--	<0.00018	--	--	--			
	Aldrin	8081A	mg/kg	<0.000059	<0.000061	--	<0.000095	--	<0.00006	--	<0.00006	--	<0.0075	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.000063	<0.000065	--	<0.00012	--	<0.000064	--	<0.000064	--	<0.0075	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.0039	<0.004	--	<0.004	--	<0.0039	--	<0.0039	--	<0.175	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.000078	<0.00008	--	<0.00016	--	<0.000079	--	<0.000079	--	<0.006	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.000078	<0.00008	--	<0.000089	--	<0.000079	--	<0.000079	--	<0.0105	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.000078	<0.00008	--	<0.00011	--	<0.000079	--	<0.000079	--	<0.006	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.000078	<0.00008	--	<0.00012	--	<0.000079	--	<0.000079	--	<0.014	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.000072	<0.000074	--	<0.00018	--	**0.00035 J**	--	<0.000073	--	<0.017	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.000065	**0.00016 J**	--	<0.00021	--	<0.000065	--	<0.000066	--	<0.0135	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.00057	<0.00059	--	<0.0007	--	<0.00058	--	<0.00058	--	<0.0105	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	--	--	--	--	--	<0.0205	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	**0.00023 J**	<0.00011	--	<0.00014	--	<0.00011	--	**0.00021 J**	--	--	--			
	Heptachlor	8081A	mg/kg	<0.000078	<0.00008	--	<0.00012	--	<0.000079	--	<0.000079	--	<0.0065	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.000075	<0.000077	--	<0.000086	--	<0.000076	--	<0.000076	--	<0.0115	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.000079	<0.000081	--	<0.00013	--	<0.00008	--	<0.00008	--	<0.01	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0015	<0.0015	--	<0.0027	--	<0.0015	--	<0.0015	--	<0.046	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.013	<0.013	--	<0.012	--	<0.013	--	<0.013	--	<0.27	--	NE	0.49	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-21		SB-22		SB-23		SB-24		SB-25			Residential Screening Levels		
				SB-21-0.5'	SB-21-1.5'	SB-22-0.5'	SB-22-1.5'	SB-23-0.5'	SB-23-1.5'	SB-24-0.5'	SB-24-1.5'	SB-25-0.5'	SB-25-0.5' (Dup.)	SB-25-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.92 J**	--	**2.08 J**	--	**1.75 J**	--	**1.26 J**	--	**1.62 J**	**0.40 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**6.11**	--	**1.71**	--	--	--	**8.06**	--	**5.90**	**3.20**	--	12*	12*	12*
	Barium	6010B	mg/kg	**95.8**	--	**75.3**	--	**102**	--	**128**	--	**528**	**145**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	--	<0.17	--	<0.17	--	<0.17	--	<0.17	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.24**	--	**0.77**	--	**1.42**	--	**1.64**	--	**1.63**	**1.32**	--	2,100	71	--
	Chromium	6010B	mg/kg	**21.6**	--	**19.3**	--	**23.6**	--	**31.2**	--	**33.2**	**29.4**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**8.07**	--	**9.33**	--	**9.28**	--	**11.3**	--	**10.9**	**9.71**	--	NE	23	--
	Copper	6010B	mg/kg	**16.3**	--	**13.6**	--	**16.8**	--	**19.5**	--	**22.7**	**21.0**	--	NE	3,100	--
	Lead	6010B	mg/kg	**20.4**	--	**8.57**	--	**19.1**	--	**18.8**	--	**29.5**	**56.9**	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**1.10**	--	**0.47 J**	--	<0.13	--	**1.27**	--	**0.74 J**	**0.42 J**	--	NE	390	--
	Nickel	6010B	mg/kg	**16.4**	--	**16.7**	--	**18.2**	--	**22.1**	--	**22.0**	**16.9**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	--	**0.90 J**	--	**1.48 J**	--	<0.72	--	**0.77 J**	<0.72	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	--	<0.13	--	<0.13	--	<0.13	--	<0.13	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	<0.42	--	<0.42	--	<0.42	--	<0.42	--	<0.42	<0.42	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.0**	--	**34.2**	--	**41.0**	--	**53.7**	--	**50.6**	**43.8**	--	390	390	--
	Zinc	6010B	mg/kg	**112**	--	**41.1**	--	**90.4**	--	**70.9**	--	**63.0**	**98.1**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.97**	--	**1.940 J**	--	**10.4**	--	**6.27**	--	**4.61**	**4.73**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	--	**0.08 J**	--	<0.039	--	<0.039	--	<0.039	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	**0.0036 J**	--	<0.000079	--	<0.0021	--	<0.00008	--	<0.000078	<0.000079	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	**0.0021 J**	--	<0.000079	--	<0.002	--	<0.00008	--	<0.000078	<0.000079	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	**0.0049 J**	--	<0.000089	--	<0.002	--	<0.00009	--	<0.000088	<0.000089	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0005	--	<0.000099	--	<0.0016	--	<0.0001	--	<0.000087	<0.0001	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	**0.007 J**	--	**0.007 J**	--	--	--	<0.00018	--	<0.00018	<0.00018	--			
	Aldrin	8081A	mg/kg	<0.0003	--	<0.00006	--	<0.0015	--	<0.000061	--	<0.00006	<0.000061	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.00032	--	<0.000064	--	<0.0015	--	<0.000064	--	<0.000063	<0.000064	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	**0.071 J**	--	<0.0039	--	**0.130**	--	<0.004	--	<0.0039	<0.004	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0004	--	<0.000079	--	<0.0012	--	<0.00008	--	<0.000078	<0.000079	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0004	--	<0.000079	--	<0.0021	--	<0.00008	--	<0.000078	<0.000079	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0004	--	<0.000079	--	<0.0012	--	<0.00008	--	<0.000078	<0.000079	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0004	--	<0.000079	--	<0.0028	--	<0.00008	--	<0.000078	<0.000079	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.00037	--	<0.000073	--	<0.0034	--	<0.000074	--	**0.000074 J**	<0.000074	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.00033	--	**0.00072 J**	--	<0.0027	--	<0.000066	--	<0.000065	<0.000066	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0029	--	<0.00058	--	<0.0021	--	<0.00059	--	<0.00058	<0.00059	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	<0.0041	--	--	--	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	**0.0084 J**	--	**0.0066 J**	--	--	--	<0.00011	--	<0.00011	<0.00011	--			
	Heptachlor	8081A	mg/kg	<0.0004	--	<0.000079	--	<0.0013	--	<0.00008	--	<0.000078	<0.000079	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.00038	--	<0.000076	--	<0.0023	--	<0.000077	--	<0.000075	<0.000077	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.0004	--	<0.00008	--	<0.002	--	<0.00008	--	<0.000079	<0.00008	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0076	--	<0.0015	--	<0.0092	--	<0.0015	--	<0.0015	<0.0015	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.066	--	<0.013	--	<0.054	--	<0.013	--	<0.013	<0.013	--	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	<0.003	--	--	--	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	<0.014	--	--	--	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	<0.0095	--	--	--	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	<0.014	--	--	--	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	<0.019	--	--	--	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	<0.020	--	--	--	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	<0.0069	--	--	--	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	<0.017	--	--	--	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	<0.0086	--	--	--	--	--	--	NE	NE	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-26		SB-27		SB-28			SB-29	SB-30		Residential Screening Levels		
				SB-26-0.5'	SB-26-1.5'	SB-27-0.5'	SB-27-1.5'	SB-28-0.5'	SB-28-0.5' (Dup.)	SB-28-1.5'	SB-29-3'	SB-30-0.5'	SB-30-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.65 J**	--	**0.95 J**	--	**1.56 J**	**1.78 J**	--	--	**0.86 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**7.28**	--	**3.30**	--	**4.82**	**4.89**	--	--	**8.46**	--	12*	12*	12*
	Barium	6010B	mg/kg	**108**	--	**97.4**	--	**97.7**	**108**	--	--	**110**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	--	<0.17	--	<0.17	<0.17	--	--	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.78**	--	**1.43**	--	**1.53**	**1.37**	--	--	**1.82**	--	2,100	71	--
	Chromium	6010B	mg/kg	**22.8**	--	**19.0**	--	**29.9**	**30.8**	--	--	**25.8**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**9.31**	--	**9.18**	--	**10.8**	**11.7**	--	--	**9.27**	--	NE	23	--
	Copper	6010B	mg/kg	**27.0**	--	**16.6**	--	**22.5**	**21.1**	--	--	**22.6**	--	NE	3,100	--
	Lead	6010B	mg/kg	**25.8**	--	**7.18**	--	**10.1**	**21.0**	--	--	**94.1**	**5.17**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	**0.668**	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**2.23**	--	**1.82**	--	**1.19**	**0.99 J**	--	--	**1.21**	--	NE	390	--
	Nickel	6010B	mg/kg	**17.6**	--	**14.8**	--	**18.7**	**18.3**	--	--	**20.6**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	**1.19 J**	--	<0.72	--	<0.72	**1.84 J**	--	--	**1.22 J**	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	--	<0.13	--	<0.13	<0.13	--	--	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	**1.76 J**	--	**2.62 J**	--	<0.42	**0.67 J**	--	--	**1.09 J**	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**41.3**	--	**35.8**	--	**47.0**	**52.0**	--	--	**43.4**	--	390	390	--
	Zinc	6010B	mg/kg	**104**	--	**41.8**	--	**79.9**	**88.3**	--	--	**116**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.53**	--	**4.26**	--	**3.45**	**3.92**	--		**5.23**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	--	<0.039	--	<0.039	<0.039	--	--	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.000079	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	**0.00047 J**	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	**0.0015 J**	--	<0.00009	--	<0.000089	**0.0025 J**	--	--	<0.000089	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0001	--	<0.0001	--	<0.0001	<0.00051	--	--	<0.000089	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	**0.00024 J**	--	**0.00028 J**	--	**0.00019 J**	**0.0026 J**	--		<0.00018	--			
	Aldrin	8081A	mg/kg	<0.000061	--	<0.000061	--	<0.000061	<0.00031	--	--	**0.00023 J**	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.000064	--	<0.000064	--	<0.000064	<0.00032	--	--	<0.000064	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.004	--	<0.004	--	<0.004	<0.02	--	--	<0.004	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.000079	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.000079	--	**0.00012 J**	--	<0.000079	**0.0018 J**	--	--	<0.000079	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.000079	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.000079	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.000073	--	<0.000074	--	<0.000074	<0.00037	--	--	**0.00013 J**	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.000066	--	<0.000066	--	<0.000066	<0.00033	--	--	<0.000066	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.00058	--	<0.00059	--	<0.00058	<0.003	--	--	<0.00058	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	**0.00015 J**	--	**0.0003 J**	--	**0.00018 J**	**0.0033 J**	--		**0.00031 J**	--			
	Heptachlor	8081A	mg/kg	<0.000079	--	<0.00008	--	<0.000079	<0.0004	--	--	<0.000079	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.000076	--	<0.000077	--	<0.000077	<0.00039	--	--	<0.000076	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.00008	--	<0.000081	--	<0.00008	<0.00041	--	--	<0.00008	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0015	--	<0.0015	--	<0.0015	<0.0076	--	--	<0.0015	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.013	--	<0.013	--	<0.013	<0.067	--	--	<0.013	--	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	--	--	--	<0.0044	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	--	--	--	<0.0076	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	--	--	--	<0.0037	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	--	--	--	<0.0039	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	--	--	--	<0.0016	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	--	--	--	<0.0033	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	--	--	--	<0.0032	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	--	--	--	<0.0021	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	--	--	--	<0.004	--	--	NE	NE	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-31		SB-32		Residential Screening Levels		
				SB-31-0.5'	SB-31-1.5'	SB-32-0.5'	SB-32-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.96 J**	--	**0.56 J**	--	NE	31	--
	Arsenic	6010B	mg/kg	**4.66**	--	**5.60**	--	12*	12*	12*
	Barium	6010B	mg/kg	**128**	--	**102**	--	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	--	<0.17	--	1,600	160	--
	Cadmium	6010B	mg/kg	**1.69**	--	**1.59**	--	2,100	71	--
	Chromium	6010B	mg/kg	**19.7**	--	**22.0**	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**9.46**	--	**8.79**	--	NE	23	--
	Copper	6010B	mg/kg	**16.1**	--	**17.4**	--	NE	3,100	--
	Lead	6010B	mg/kg	**6.26**	--	**5.55**	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**1.18**	--	**1.15**	--	NE	390	--
	Nickel	6010B	mg/kg	**16.5**	--	**17.4**	--	15,000	1,500	--
	Selenium	6010B	mg/kg	**1.31 J**	--	**3.11**	--	NE	390	--
	Silver	6010B	mg/kg	<0.13	--	<0.13	--	390	390	--
	Thallium	6010B	mg/kg	<0.42	--	<0.42	--	NE	0.78	--
	Vanadium	6010B	mg/kg	**37.7**	--	**37.1**	--	390	390	--
	Zinc	6010B	mg/kg	**47.5**	--	**46.0**	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.02**	--	**6.14**	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	<0.039	--	<0.039	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	NE	0.30	0.30
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.00009	--	<0.000088	--	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0001	--	<0.000099	--	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	<0.00018	--	<0.00018	--			
	Aldrin	8081A	mg/kg	<0.000061	--	<0.00006	--	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.000064	--	<0.000063	--	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.004	--	<0.0039	--	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.000074	--	<0.000073	--	NE	NE	RL
	Endrin	8081A	mg/kg	<0.000066	--	<0.000065	--	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.00059	--	<0.00058	--	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	--	--	--	--	NE	NE	RL
	g-Chlordane	8081A	mg/kg	<0.00011	--	**0.00013 J**	--			
	Heptachlor	8081A	mg/kg	<0.000079	--	<0.000078	--	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.000077	--	<0.000076	--	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.00008	--	<0.000079	--	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0015	--	<0.0015	--	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.013	--	<0.013	--	NE	0.49	RL

Table 4
Summary of PEA Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Notes:
Select samples analyzed for California Code of Regulations Title 22 (CAM 17) Metals by EPA Method 6010B/7470A by Enthalpy Associated Laboratories (Enthalpy) in Orange, California
Select samples analyzed for PCBs by EPA Method 8082 by Enthalpy
Select samples analyzed for Organochlorine Pesticides (OCPs) by EPA Method 8081A by Enthalpy
Select samples analyzed for Arsenic by EPA Method 6020 by Enthalpy
RED indicates the value exceeds the DTSC SLs
J: estimated value between the method detection limit (MDL) and laboratory reporting limit
MDL: method detection limit
mg/kg: milligrams per kilogram
ND: not detected
PQL: practical quantification limit
RWQCB: Regional Water Quality Control Board
RDL: reporting detection limit
SL: Screening Level
(1): California Department of Toxic Substance Control (DTSC) Office of Human and Ecological Risk (HERO, 2018) RSLs Human Health Risk Assessment (HHRA) Note 3
(2): United States Environmental Protection Agency (EPA) Regional Screening Levels for Residential Soil (RSL-mg/kg) November 2017
(3): Los Angeles Unified School District Environmental Import/Export Materials Testing Section 01 4524 dated August 29, 2018
*: Arsenic screening level based on California background level
**: LAUSD limit requiring further analysis for leaching potential
***: LAUSD limit before testing for Hexavalent Chromium
****: Run TTLC. If TTLC soil concentration is greater than TTLC limit, it is a California Regulated Hazardous Waste. If the TTCL soil concentration is less than TTLC limit, compare to 10x the STLC limit. If soil concentration is greater than 10x the STLC limit, conduct WET test. If soil concentration does not pass WET test it is considered a California Regulated Hazardous Waste. If the soil concentration is less than 10x the STLC limit or passes the WET test, compare the concentration to 20x the TCLP limit. If the soil concentration is less than 20x the TCLP limit, the soil is considered non-hazardous and may be used at school sites. However, if the soil concentration is greater than 20x the TCLP limit, a TCLP leaching test is required. If the soil concentration results from the TCLP leaching test are lower than the TCLP limit, then the waste cannot leach enough chemical into soil and groundwater to be considered a toxic hazardous waste and therefore is not a Federal-Regulated Hazardous Waste and may be used at school sites. However, if the soil concentration result from the leaching test is greater than the TCLP Limit, it is considered a Federal-Regulated (RCRA) Hazardous Waste.

Table 5
Summary of PEA Stepout Boring Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-1A		SB-1B		SB-1C		SB-5A		SB-5B		SB-5C		Residential Screening Levels		
				SB-1A-0.5'	SB-1A-1.5'	SB-1B-0.5'	SB-1B-1.5'	SB-1C-0.5'	SB-1C-1.5'	SB-5A-0.5'	SB-5A-1.5'	SB-5B-0.5'	SB-5B-1.5'	SB-5C-0.5'	SB-5C-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	**157.0**	**49.6**	**6.23**	**5.02**	**9.84**	**3.62**	**34.0**	**6.21**	**12.1**	**5.64**	**6.19**	**5.78**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	**24.0**	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	**0.674**	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--

Table 5
Summary of PEA Stepout Boring Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-3A		SB-3B		SB-7A		SB-7B		SB-15A		SB-15B		Residential Screening Levels		
				SB-3A-0.5'	SB-3A-1.5'	SB-3B-0.5'	SB-3B-1.5'	SB-7A-0.5'	SB-7A-1.5'	SB-7B-0.5'	SB-7B-1.5'	SB-15A-0.5'	SB-15A-1.5'	SB-15-0.5'	SB-15-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	**5.08**	**5.79**	**3.82**	**4.28**	**15.6**	**4.36**	**14.2**	**11.2**	**5.24**	**3.09**	**6.58**	**3.9**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--

Table 5
Summary of PEA Stepout Boring Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-30A		SB-30B		SB-30C		Residential Screening Levels		
				SB-30A-0.5'	SB-30A-1.5'	SB-30B-0.5'	SB-30B-1.5'	SB-30C-0.5'	SB-30C-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	**6.09**	**4.62**	**5.04**	**3.65**	**6.64**	**5.13**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	NE	23,000	--

Table 5
Summary of PEA Stepout Boring Soil Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Notes:
Select samples analyzed for Lead by EPA Method 6010B by Enthalpy Associated Laboratories (Enthalpy) in Orange, California
RED indicates the value exceeds the DTSC SLs
J: estimated value between the method detection limit (MDL) and laboratory reporting limit
MDL: method detection limit
mg/kg: milligrams per kilogram
ND: not detected
PQL: practical quantification limit
RWQCB: Regional Water Quality Control Board
RDL: reporting detection limit
SL: Screening Level
(1): California Department of Toxic Substance Control (DTSC) Office of Human and Ecological Risk (HERO, 2018) RSLs Human Health Risk Assessment (HHRA) Note 3
(2): United States Environmental Protection Agency (EPA) Regional Screening Levels for Residential Soil (RSL-mg/kg) November 2017
(3): Los Angeles Unified School District Environmental Import/Export Materials Testing Section 01 4524 dated August 29, 2018
*: Arsenic screening level based on California background level
**: LAUSD limit requiring further analysis for leaching potential
***: LAUSD limit before testing for Hexavalent Chromium
****: Run TTLC. If TTLC soil concentration is greater than TTLC limit, it is a California Regulated Hazardous Waste. If the TTCL soil concentration is less than TTLC limit, compare to 10x the STLC limit. If soil concentration is greater than 10x the STLC limit, conduct WET test. If soil concentration does not pass WET test it is considered a California Regulated Hazardous Waste. If the soil concentration is less than 10x the STLC limit or passes the WET test, compare the concentration to 20x the TCLP limit. If the soil concentration is less than 20x the TCLP limit, the soil is considered non-hazardous and may be used at school sites. However, if the soil concentration is greater than 20x the TCLP limit, a TCLP leaching test is required. If the soil concentration results from the TCLP leaching test are lower than the TCLP limit, then the waste cannot leach enough chemical into soil and groundwater to be considered a toxic hazardous waste and therefore is not a Federal-Regulated Hazardous Waste and may be used at school sites. However, if the soil concentration result from the leaching test is greater than the TCLP Limit, it is considered a Federal-Regulated (RCRA) Hazardous Waste.

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-33		SB-34		SB-35		Residential Screening Levels		
				SB-33-0.5'	SB-33-1.5'	SB-34-0.5'	SB-34-1.5'	SB-35-0.5'	SB-35-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.54 J**	**1.11 J**	**4.68**	**2.60 J**	**1.43 J**	**1.16 J**	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**122**	**107**	**131**	**96.8**	**138**	**108**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.59**	**1.80**	**1.37**	**1.60**	**1.47**	**1.84**	2,100	71	--
	Chromium	6010B	mg/kg	**26.9**	**26.2**	**32.2**	**23.5**	**30.9**	**23.9**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**10.6**	**10.6**	**11.8**	**9.88**	**11.4**	**10.3**	NE	23	--
	Copper	6010B	mg/kg	**19.4**	**17.2**	**14.7**	**17.0**	**14.7**	**17.1**	NE	3,100	--
	Lead	6010B	mg/kg	**11.7**	**5.32**	**72.2**	**4.86**	**9.61**	**4.12**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.82 J**	**0.60 J**	**1.48**	**1.12**	**0.58 J**	**0.60 J**	NE	390	--
	Nickel	6010B	mg/kg	**19.3**	**19.7**	**17.3**	**18.1**	**19.0**	**19.9**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**0.58 J**	**1.21 J**	**1.82 J**	<0.42	**1.89 J**	**1.42 J**	NE	0.78	--
	Vanadium	6010B	mg/kg	**42.6**	**39.9**	**47.9**	**36.8**	**48.0**	**38.6**	390	390	--
	Zinc	6010B	mg/kg	**60.6**	**51.2**	**64.4**	**47.2**	**55.5**	**49.5**	NE	23,000	--
Arsenic		6020	mg/kg	**14.4**	**5.89**	**4.03**	**5.30**	**3.93**	**5.91**	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-33		SB-34		SB-35		Residential Screening Levels		
				SB-33-0.5'	SB-33-1.5'	SB-34-0.5'	SB-34-1.5'	SB-35-0.5'	SB-35-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0042	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.004	<0.002	<0.002	<0.002	<0.004	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.004	<0.002	<0.002	<0.002	<0.004	<0.002	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0032	<0.0016	<0.0016	<0.0016	<0.0032	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.003	<0.0015	<0.0015	<0.0015	<0.003	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.003	<0.0015	<0.0015	<0.0015	<0.003	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.070	<0.035	<0.035	<0.035	<0.070	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0024	<0.0012	<0.0012	<0.0012	<0.0024	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0042	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0024	<0.0012	<0.0012	<0.0012	<0.0024	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0056	<0.0028	<0.0028	<0.0028	<0.0056	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0068	<0.0034	<0.0034	<0.0034	<0.0068	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0054	<0.0027	<0.0027	<0.0027	<0.0054	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0042	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0082	<0.0041	<0.0041	<0.0041	<0.0082	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0026	<0.0013	<0.0013	<0.0013	<0.0026	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0046	<0.0023	<0.0023	<0.0023	<0.0046	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.004	<0.002	<0.002	<0.002	<0.004	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0184	<0.0092	<0.0092	<0.0092	<0.0184	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.108	<0.054	<0.0054	<0.0054	<0.108	<0.054	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	<0.003	<0.003	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	<0.014	<0.014	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	<0.0095	<0.0095	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	<0.014	<0.014	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	<0.019	<0.019	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	<0.02	<0.02	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	<0.0069	<0.0069	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	<0.017	<0.017	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	<0.086	<0.086	--	--	NE	NE	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-36		SB-37		SB-38		SB-39				Residential Screening Levels		
				SB-36-0.5'	SB-36-1.5'	SB-37-0.5'	SB-37-1.5'	SB-38-0.5'	SB-38-1.5'	SB-39-0.5'	SB-39-0.5' (DUP)	SB-39-1.5'	SB-39-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	<0.37	**0.48 J**	**0.87 J**	<0.37	**0.95 J**	<0.37	<0.37	<0.37	**1.50 J**	<0.37	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**107**	**139**	**134**	**107**	**105**	**104**	**114**	**76**	**105.0**	**88.6**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.94**	**2.05**	**1.79**	**1.65**	**1.16**	**2.06**	**1.43**	**1.27**	**1.65**	**1.39**	2,100	71	--
	Chromium	6010B	mg/kg	**26.9**	**38.4**	**25.1**	**29.1**	**27.9**	**25.6**	**20.9**	**19.4**	**24.8**	**27.1**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**10.7**	**13.7**	**12.1**	**10.5**	**9.55**	**9.57**	**8.65**	**7.61**	**9.37**	**8.54**	NE	23	--
	Copper	6010B	mg/kg	**18.0**	**22.7**	**20**	**18.0**	**13.8**	**17.1**	**18.2**	**14.6**	**17.9**	**19.5**	NE	3,100	--
	Lead	6010B	mg/kg	**6.16**	**7.70**	**5.68**	**12.1**	**47.0**	**5.25**	**24.7**	**12.1**	**4.60**	**2.97**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.92 J**	**1.19**	**0.91 J**	**0.88 J**	**0.96 J**	**1.93**	**0.80 J**	**0.33 J**	**0.79 J**	**0.87 J**	NE	390	--
	Nickel	6010B	mg/kg	**20.7**	**30.7**	**22.1**	**22.1**	**22.3**	**17.5**	**16.8**	**13.3**	**18.4**	**18.5**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	**1.94 J**	<0.72	**0.77 J**	**1.04 J**	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**0.96 J**	**1.08 J**	**0.47 J**	**1.17 J**	**2.06 J**	**3.94**	<0.42	**1.53 J**	**1.00 J**	<0.42	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.9**	**67.4**	**38.5**	**41.0**	**46.0**	**38.8**	**38.6**	**32.9**	**38.4**	**46.1**	390	390	--
	Zinc	6010B	mg/kg	**54.7**	**79.1**	**51.6**	**60.6**	**58.6**	**44.6**	**98.4**	**53.1**	**43.6**	**40.7**	NE	23,000	--
Arsenic		6020	mg/kg	**5.44**	**7.54**	**5.85**	**14.8**	**6.60**	**6.79**	**21.1**	**7.98**	**6.30**	**9.61**	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--		--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--		--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-36		SB-37		SB-38		SB-39				Residential Screening Levels		
				SB-36-0.5'	SB-36-1.5'	SB-37-0.5'	SB-37-1.5'	SB-38-0.5'	SB-38-1.5'	SB-39-0.5'	SB-39-0.5' (DUP)	SB-39-1.5'	SB-39-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0042	<0.0105	<0.0021	<0.0105	<0.0105	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.002	<0.002	<0.002	<0.004	<0.010	<0.002	<0.010	<0.010	<0.002	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.002	<0.002	<0.002	<0.004	<0.010	<0.002	<0.010	<0.010	<0.002	<0.002	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0032	<0.008	<0.0016	<0.008	<0.008	<0.0016	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.003	<0.0075	<0.0015	<0.0075	<0.0075	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.003	<0.0075	<0.0015	<0.0075	<0.0075	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.070	<0.175	<0.035	<0.175	<0.175	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0024	<0.006	<0.0012	<0.006	<0.006	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0042	<0.0105	<0.0021	<0.0105	<0.0105	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0024	<0.006	<0.0012	<0.006	<0.006	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0056	<0.014	<0.0028	<0.014	<0.014	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0068	<0.017	<0.0034	<0.017	<0.017	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0054	<0.0135	<0.0027	<0.0135	<0.0135	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0042	<0.105	<0.0021	<0.105	<0.105	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0082	<0.205	<0.0041	<0.205	<0.205	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0026	<0.0065	<0.0013	<0.0065	<0.0065	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0046	<0.0115	<0.0023	<0.0115	<0.0115	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.004	<0.010	<0.002	<0.010	<0.010	<0.002	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0184	<0.0460	<0.0092	<0.0460	<0.0460	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.108	<0.270	<0.054	<0.270	<0.270	<0.054	<0.054	NE	0.49	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-40			SB-41			SB-42			Residential Screening Levels		
				SB-40-0.5'	SB-40-1.5'	SB-40-2.5'	SB-41-0.5'	SB-41-1.5'	SB-41-2.5'	SB-42-0.5'	SB-42-1.5'	SB-42-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.80 J**	<0.37	**3.05**	**0.51 J**	**0.74 J**	**1.12**	**0.98 J**	**2.29 J**	<0.37	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**154**	**103**	**99.9**	**106**	**99.4**	**101**	**159**	**84.8**	**83.4**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.71**	**1.58**	**1.57**	**1.56**	**1.5**	**1.58**	**1.45**	**1.24**	**1.23**	2,100	71	--
	Chromium	6010B	mg/kg	**27.2**	**25.5**	**27.9**	**22.8**	**28.2**	**35.9**	**26.1**	**25.6**	**23.1**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**10.9**	**9.81**	**9.88**	**9.57**	**11.3**	**11.3**	**11.1**	**8.41**	**7.78**	NE	23	--
	Copper	6010B	mg/kg	**20.3**	**17.6**	**18.0**	**17.3**	**18.5**	**22.5**	**19.0**	**16.7**	**18.3**	NE	3,100	--
	Lead	6010B	mg/kg	**7.31**	**3.98**	**3.62**	**3.45**	**4.59**	**4.02**	**110**	**3.86**	**3.56**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	**0.448**	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	**0.020 J**	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.93 J**	**0.75 J**	**1.23**	**0.53 J**	**1.10**	**1.10 J**	**0.51 J**	**0.64 J**	**0.89 J**	NE	390	--
	Nickel	6010B	mg/kg	**19.1**	**15.4**	**20.2**	**16.9**	**20.0**	**24.2**	**18.8**	**15.9**	**15.1**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	**1.82 J**	<0.72	<0.72	<0.72	**1.25 J**	<0.72	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**0.44 J**	<0.42	<0.42	<0.42	<0.42	<0.42	**0.47 J**	<0.42	<0.42	NE	0.78	--
	Vanadium	6010B	mg/kg	**44**	**39.6**	**44.8**	**36.5**	**49.0**	**61.8**	**45.0**	**37.4**	**37.4**	390	390	--
	Zinc	6010B	mg/kg	**51.1**	**38.3**	**46.0**	**42.4**	**45.8**	**49.2**	**69.4**	**41.7**	**41.3**	NE	23,000	--
Arsenic		6020	mg/kg	**5.66**	**5.17**	**7.95**	**5.94**	**6.76**	**8.96**	**44.9**	**6.77**	**9.57**	12*	12*	12*
Thallium		6020	mg/kg	--	--		--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--		--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-40			SB-41			SB-42			Residential Screening Levels		
				SB-40-0.5'	SB-40-1.5'	SB-40-2.5'	SB-41-0.5'	SB-41-1.5'	SB-41-2.5'	SB-42-0.5'	SB-42-1.5'	SB-42-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.0051 J**	<0.002	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.011**	<0.002	<0.002	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0032	<0.0016	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.003	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.003	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.070	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0024	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0024	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0056	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0068	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0054	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0042	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0082	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0026	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0046	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.002	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0184	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.108	<0.054	<0.054	NE	0.49	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-43				SB-44			SB-45			Residential Screening Levels		
				SB-43-0.5'	SB-43-0.5' (DUP)	SB-43-1.5'	SB-43-2.5'	SB-44-0.5'	SB-44-1.5'	SB-44-2.5'	SB-45-0.5'	SB-45-1.5'	SB-45-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.22 J**	**1.08 J**	**0.83 J**	**1.24 J**	**3.43**	<0.37	**1.27 J**	**1.46 J**	**1.72 J**	**3.01**	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**107**	**105**	**94.6**	**90.8**	**201**	**90.6**	**90.7**	**90.7**	**102**	**104**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.68**	**1.54**	**1.58**	**1.52**	**1.28**	**1.37**	**1.46**	**1.48**	**1.81**	**1.70**	2,100	71	--
	Chromium	6010B	mg/kg	**24.9**	**22.8**	**24.0**	**28.6**	**23.6**	**20.8**	**26.8**	**25.3**	**23.6**	**32.5**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**8.19**	**10.5**	**8.24**	**9.99**	**11.3**	**8.58**	**9.15**	**7.9**	**9.46**	**13.2**	NE	23	--
	Copper	6010B	mg/kg	**18.7**	**15.6**	**15.9**	**19.6**	**21.5**	**15.8**	**17.3**	**15.4**	**16.8**	**20.6**	NE	3,100	--
	Lead	6010B	mg/kg	**5.42**	**4.82**	**3.58**	**3.62**	**16.5**	**3.47**	**4.00**	**15.0**	**4.60**	**7.64**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--		--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--		--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.43 J**	**0.31 J**	**0.49 J**	**0.80 J**	**0.44 J**	**0.72 J**	**0.70 J**	**1.24**	**1.56**	**2.24**	NE	390	--
	Nickel	6010B	mg/kg	**15.9**	**17.2**	**21.8**	**20.9**	**17.1**	**16.2**	**19.0**	**17.5**	**19.0**	**29.0**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	**0.76 J**	<0.72	<0.72	<0.72	<0.72	**1.34 J**	**1.65 J**	**2.52 J**	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	<0.42	**0.45 J**	<0.42	<0.42	**0.73 J**	<0.42	**0.97 J**	**1.23 J**	**3.50**	**1.15 J**	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.0**	**34.7**	**35.2**	**45.6**	**43.7**	**33.8**	**41.5**	**39.3**	**37.2**	**58.6**	390	390	--
	Zinc	6010B	mg/kg	**45.7**	**43.8**	**42.6**	**45.5**	**61.6**	**37.2**	**44.0**	**27.4**	**47.6**	**59.8**	NE	23,000	--
Arsenic		6020	mg/kg	**6.15**	**6.76**	**6.22**	**7.31**	**48.5**	**6.72**	**6.75**	**6.02**	**5.00**	**9.83**	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-43				SB-44			SB-45			Residential Screening Levels		
				SB-43-0.5'	SB-43-0.5' (DUP)	SB-43-1.5'	SB-43-2.5'	SB-44-0.5'	SB-44-1.5'	SB-44-2.5'	SB-45-0.5'	SB-45-1.5'	SB-45-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0105	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.002	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	**0.0022 J**	<0.002	<0.002	<0.010	<0.002	<0.002	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0075	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0075	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.175	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.006	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0105	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.006	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.014	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.017	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0135	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.105	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.205	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0065	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0115	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.010	<0.002	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0460	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.270	<0.054	<0.054	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	<0.003	<0.003	<0.003	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	<0.014	<0.014	<0.014	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	<0.0095	<0.0095	<0.0095	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	<0.014	<0.014	<0.014	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	<0.019	<0.019	<0.019	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	<0.020	<0.020	<0.020	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	<0.0069	<0.0069	<0.0069	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	<0.017	<0.017	<0.017	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	<0.0086	<0.0086	<0.0086	--	--	--	NE	NE	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-46			SB-47				SB-48			Residential Screening Levels		
				SB-46-0.5'	SB-46-1.5'	SB-46-2.5'	SB-47-0.5'	SB-47-1.5'	SB-47-1.5' (DUP)	SB-47-2.5'	SB-48-0.5'	SB-48-1.5'	SB-48-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**2.53 J**	**0.89 J**	**0.64 J**	**1.43 J**	**2.51 J**	<0.37	<0.37	<0.37	**0.64 J**	<0.37	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**160**	**107**	**109**	**152**	**86.0**	**96.6**	**104**	**121**	**113**	**108**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.14**	**1.85**	**1.69**	**1.00**	**1.47**	**1.55**	**1.61**	**1.96**	**1.82**	**1.88**	2,100	71	--
	Chromium	6010B	mg/kg	**21.5**	**24.7**	**31.2**	**22.2**	**21.4**	**26.6**	**29.5**	**30.3**	**25.7**	**32.2**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**12.8**	**10.3**	**11.9**	**12.7**	**8.89**	**11.5**	**11.3**	**11.1**	**10.9**	**11.8**	NE	23	--
	Copper	6010B	mg/kg	**29.7**	**18.2**	**19.5**	**18.8**	**15.5**	**17.7**	**18.6**	**18.9**	**18.5**	**20.7**	NE	3,100	--
	Lead	6010B	mg/kg	**35.6**	**4.78**	**5.95**	**15.0**	**3.38**	**4.69**	**6.18**	**11.5**	**5.20**	**5.95**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.22 J**	**0.84 J**	**1.02**	**0.21 J**	**0.50 J**	**0.64 J**	**0.83 J**	**0.83 J**	**0.87 J**	**1.54**	NE	390	--
	Nickel	6010B	mg/kg	**15.7**	**19**	**24.3**	**15.4**	**17**	**21.7**	**24.5**	**20**	**20.5**	**25.2**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**1.81 J**	**<0.42**	**<0.42**	**0.93 J**	**0.50 J**	**<0.42**	<0.42	**<0.42**	**0.59 J**	1.04 J	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.4**	**38.7**	**53.0**	**44.1**	**34.5**	**45.1**	**48.7**	**44.8**	**40.4**	**51.9**	390	390	--
	Zinc	6010B	mg/kg	**87.5**	**63.5**	**60.1**	**63.3**	**44.9**	**54.5**	**62.4**	**68.8**	**55.6**	**61.8**	NE	23,000	--
Arsenic		6020	mg/kg	**2.48**	**5.17**	**8.21**	**25.9**	**6.96**	**6.38**	**8.97**	**30.6**	**5.69**	**7.14**	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-46			SB-47				SB-48			Residential Screening Levels		
				SB-46-0.5'	SB-46-1.5'	SB-46-2.5'	SB-47-0.5'	SB-47-1.5'	SB-47-1.5' (DUP)	SB-47-2.5'	SB-48-0.5'	SB-48-1.5'	SB-48-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	0.0066	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	0.0043 J	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NE	0.49	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-49				SB-50		SB-51		SB-52		Residential Screening Levels		
				SB-49-0.5'	SB-49-0.5' (DUP)	SB-49-1.5'	SB-49-2.5'	SB-50-0.5'	SB-50-1.5'	SB-51-0.5'	SB-51-1.5'	SB-52-0.5'	SB-52-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**2.32 J**	**0.85 J**	**2.45 J**	<0.37	**0.64 J**	<0.37	**0.96 J**	<0.37	<0.37	<0.37	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**123**	**121**	**116**	**128**	**183**	**179**	**108**	**131**	**199**	**136**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**2.12**	**1.87**	**1.72**	**1.70**	**1.52**	**2.24**	**1.96**	**1.78**	**1.62**	**1.90**	2,100	71	--
	Chromium	6010B	mg/kg	**31.4**	**28.3**	**29.3**	**35.8**	**24.6**	**31.2**	**23.6**	**37.7**	**27.4**	**29.4**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**10.8**	**10.9**	**12.2**	**11.4**	**12.6**	**13.7**	**9.24**	**13.7**	**14.5**	**12.1**	NE	23	--
	Copper	6010B	mg/kg	**21.6**	**19.2**	**20.0**	**19.7**	**21.00**	**683**	**20.2**	**24.1**	**29.4**	**19.6**	NE	3,100	--
	Lead	6010B	mg/kg	**5.64**	**4.15**	**4.94**	**5.59**	**21.9**	**56.4**	**11.4**	**5.18**	**40.4**	**5.27**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**0.91 J**	**0.84 J**	**1.17**	**0.87 J**	**0.43 J**	**0.65 J**	**0.63 J**	**0.71 J**	<0.13	**1.71**	NE	390	--
	Nickel	6010B	mg/kg	**23.2**	**21.5**	**25.1**	**26.9**	**19.6**	**21.4**	**18.9**	**27.8**	**19.0**	**21.0**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	<0.42	<0.42	<0.42	<0.42	**1.83 J**	**1.11 J**	<0.42	<0.42	<0.42	**3.06**	NE	0.78	--
	Vanadium	6010B	mg/kg	**46.2**	**43.9**	**50.6**	**55.2**	**46.1**	**43.8**	**35.0**	**62.6**	**43.5**	**49.8**	390	390	--
	Zinc	6010B	mg/kg	**70.1**	**55.4**	**63.2**	**63.0**	**80.0**	**121**	**66.2**	**72.9**	**123**	**53.7**	NE	23,000	--
Arsenic		6020	mg/kg	**6.46**	**5.32**	**6.30**	**8.66**	**69.0**	**6.98**	**218**	**10.7**	**233**	**6.30**	12*	12*	12*
Arsenic STLC (in milligrams/Liter)		6020	mg/L	--	--	--	--	**2.110**	--	**9.960**	--	**10.400**	--			
Arsenic TCLP (in milligrams/Liter)		6020	mg/L	--	--	--	--	--	--	**2.450**	--	**2.890**	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-49				SB-50		SB-51		SB-52		Residential Screening Levels		
				SB-49-0.5'	SB-49-0.5' (DUP)	SB-49-1.5'	SB-49-2.5'	SB-50-0.5'	SB-50-1.5'	SB-51-0.5'	SB-51-1.5'	SB-52-0.5'	SB-52-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NE	0.49	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-53			SB-54		SB-55			SB-56 (1)		Residential Screening Levels		
				SB-53-0.5'	SB-53-0.5' (DUP)	SB-53-1.5'	SB-54-0.5'	SB-54-1.5'	SB-55-0.5'	SB-55-1.5'	SB-55-1.5' (DUP)	SB-56-0.5'	SB-56-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**1.76 J**	**2.47 J**	<0.37	**1.31 J**	<0.37	<0.37	**0.72 J**	**0.49 J**	<0.37	<0.37	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**127**	**166**	**110**	**146**	**115**	**102**	**101**	**88.4**	**129**	**98.2**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.46**	**1.67**	**1.78**	**2.28**	**1.66**	**1.73**	**1.53**	**1.22**	**1.83**	**1.49**	2,100	71	--
	Chromium	6010B	mg/kg	**27.9**	**32.9**	**25.9**	**31.7**	**26.3**	**23.8**	**25.5**	**26.4**	**32.4**	**24.9**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**11.5**	**11.7**	**9.88**	**10.9**	**9.10**	**8.61**	**10.3**	**9.15**	**10.5**	**9.12**	NE	23	--
	Copper	6010B	mg/kg	**28.2**	**35.7**	**17.6**	**32.0**	**18.9**	**20.0**	**17.3**	**17.3**	**19.6**	**14.8**	NE	3,100	--
	Lead	6010B	mg/kg	**3.08**	**44.1**	**3.54**	**23.4**	**4.93**	**5.85**	**4.48**	**2.40**	**6.05**	**3.59**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**1.05**	**1.17**	**1.02**	**0.87 J**	**0.56 J**	**0.33 J**	**0.83 J**	**0.69 J**	**0.57 J**	**0.15 J**	NE	390	--
	Nickel	6010B	mg/kg	**1.59**	**19.4**	**17.5**	**18.9**	**19.5**	**18.2**	**19.1**	**16.4**	**18.1**	**17.0**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	**1.00 J**	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**0.82**	**1.64 J**	<0.42	**0.71 J**	**0.63 J**	**0.47 J**	**0.75 J**	**0.45 J**	**0.80**	<0.42	NE	0.78	--
	Vanadium	6010B	mg/kg	**40.8**	**47.4**	**39.1**	**48.4**	**40.7**	**36.9**	**41.4**	**40.7**	**48.9**	**37.0**	390	390	--
	Zinc	6010B	mg/kg	**6.79**	**146**	**57.9**	**88.6**	**50.1**	**59.2**	**47.4**	**49.0**	**46.6**	**40.1**	NE	23,000	--
Arsenic		6020	mg/kg	**129**	**252**	**6.61**	**124**	**5.59**	**59.7**	**6.90**	**6.16**	**6.45**	**5.90**	12*	12*	12*
Arsenic STLC (in milligrams/Liter)		6020	mg/L	--	--	--	**5.090**	--	**2.610**	--	--	--	--			
Arsenic TCLP (in milligrams/Liter)		6020	mg/L	--	--	--	**1.040**	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	**0.05 J**	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-53			SB-54		SB-55			SB-56 (1)		Residential Screening Levels		
				SB-53-0.5'	SB-53-0.5' (DUP)	SB-53-1.5'	SB-54-0.5'	SB-54-1.5'	SB-55-0.5'	SB-55-1.5'	SB-55-1.5' (DUP)	SB-56-0.5'	SB-56-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0016	<0.0016	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0015	<0.0015	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0020	<0.0020	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	--	<0.0030	<0.0030	<0.0030	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	--	<0.0140	<0.0140	<0.0140	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	--	<0.0095	<0.0095	<0.0095	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	--	<0.0140	<0.0140	<0.0140	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	--	<0.0190	<0.0190	<0.0190	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	--	<0.0200	<0.0200	<0.0200	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	--	<0.0069	<0.0069	<0.0069	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	--	<0.0170	<0.0170	<0.0170	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	--	<0.0086	<0.0086	<0.0086	--	--	NE	NE	RL

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

Analyte		EPA Method	Unit	SB-56 (2)	SB-57			SB-58			SB-60			Residential Screening Levels		
				SB-56-2.5'	SB-57-0.5'	SB-57-1.5'	SB-57-2.5'	SB-58-0.5'	SB-58-1.5'	SB-58-2.5'	SB-60-0.5'	SB-60-0.5' (DUP)	SB-60-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	**0.67 J**	<0.37	<0.37	**2.19 J**	<0.37	**1.97 J**	**1.00 J**	**1.05 J**	**2.49 J**	**1.84 J**	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	**115**	**581**	<0.23	**90.5**	**103**	**135**	**122**	**160**	**123**	**129**	NE	15,000	--
	Beryllium	6010B	mg/kg	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	1,600	160	--
	Cadmium	6010B	mg/kg	**1.84**	**1.16**	<0.21	**1.36**	**1.42**	**2.10**	**1.93**	**1.68**	**1.08**	**1.88**	2,100	71	--
	Chromium	6010B	mg/kg	**34.4**	**8.25**	<0.13	**27.0**	**26.2**	**35.4**	**29.4**	**33.3**	**35.8**	**28.3**	36,000	120,000	100***
	Cobalt	6010B	mg/kg	**11.2**	**17.2**	<0.19	**9.33**	**8.94**	**11.8**	**11.6**	**12.4**	**10.9**	**10.4**	NE	23	--
	Copper	6010B	mg/kg	**24.9**	**19.9**	**17.1**	**16.6**	**21.1**	**24.3**	**21.8**	**21.2**	**20.8**	**20.1**	NE	3,100	--
	Lead	6010B	mg/kg	**6.20**	**7.52**	**4.49**	**4.07**	**16.4**	**16.4**	**4.51**	**41.1**	**8.64**	**3.25**	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	**1.21**	**<0.13**	<0.13	**0.91 J**	**0.95 J**	**1.57**	**0.75 J**	**1.10**	**0.21 J**	**0.77 J**	NE	390	--
	Nickel	6010B	mg/kg	**24.8**	**7.08**	**48.0**	**19.8**	**17.4**	**23.6**	**20.5**	**19.2**	**20.6**	**16.4**	15,000	1,500	--
	Selenium	6010B	mg/kg	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	NE	390	--
	Silver	6010B	mg/kg	<0.13	<0.13	**0.17 J**	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	390	390	--
	Thallium	6010B	mg/kg	**0.56 J**	**0.81 J**	<0.42	**<0.42**	**1.29 J**	<0.42	<0.42	**0.89 J**	<0.42	<0.42	NE	0.78	--
	Vanadium	6010B	mg/kg	**55.5**	**32.0**	<0.37	**44.5**	**44.3**	**59.6**	**47.9**	**53.2**	**40.1**	**42.6**	390	390	--
	Zinc	6010B	mg/kg	**58.3**	**54.4**	**43.2**	**44.6**	**72.0**	**73.1**	**54.4**	**71.0**	**58.2**	**51.8**	NE	23,000	--
Arsenic		6020	mg/kg	**7.86**	**12.5**	**5.38**	**8.23**	**7.17**	**9.06**	**6.36**	**8.51**	**8.06**	**5.98**	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471A	mg/kg	<0.039	<0.039	<0.039	<0.039	**0.05 J**	<0.039	<0.039	<0.039	<0.039	<0.039	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 6
Summary of Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-56 (2)	SB-57			SB-58			SB-60			Residential Screening Levels		
				SB-56-2.5'	SB-57-0.5'	SB-57-1.5'	SB-57-2.5'	SB-58-0.5'	SB-58-1.5'	SB-58-2.5'	SB-60-0.5'	SB-60-0.5' (DUP)	SB-60-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Organochlorine Pesticides (OCPs)	4,4'-DDD	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	1.9	RL
	4,4'-DDE	8081A	mg/kg	<0.002	<0.002	<0.002	<0.002	**0.0039 J**	**0.0016**	<0.002	<0.002	<0.002	<0.002	NE	2.0	RL
	4,4'-DDT	8081A	mg/kg	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	NE	1.9	RL
	a-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.086	RL
	a-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Aldrin	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.039	RL
	b-BHC	8081A	mg/kg	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	NE	0.30	RL
	Chlordane (technical)	8081A	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	**0.160**	<0.035	<0.035	0.44	1.7	RL
	d-BHC	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Dieldrin	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	0.034	RL
	Endosulfan I	8081A	mg/kg	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012	NE	NE	RL
	Endosulfan II	8081A	mg/kg	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	NE	NE	RL
	Endosulfan sulfate	8081A	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	NE	NE	RL
	Endrin	8081A	mg/kg	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	<0.0027	NE	19	RL
	Endrin aldehyde	8081A	mg/kg	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	NE	NE	RL
	Endrin Ketone	8081A	mg/kg	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	<0.0041	NE	NE	RL
	g-Chlordane	8081A	mg/kg	--	--	--	--	--	--	--	--	--	--			
	Heptachlor	8081A	mg/kg	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	NE	0.13	RL
	Heptachlor epoxide	8081A	mg/kg	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	NE	0.070	RL
	Lindane (Gamma-BHC)	8081A	mg/kg	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	NE	0.57	RL
	Methoxychlor	8081A	mg/kg	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	NE	320	RL
	Toxaphene	8081A	mg/kg	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NE	0.49	RL
Polychlorinated Biphenyls (PCBs)	PCB-1016	8082	mg/kg	--	--	--	--	<0.003	<0.003	<0.003	--	--	--	NE	4.1	RL
	PCB-1221	8082	mg/kg	--	--	--	--	<0.014	<0.014	<0.014	--	--	--	NE	0.20	RL
	PCB-1232	8082	mg/kg	--	--	--	--	<0.0095	<0.0095	<0.0095	--	--	--	NE	0.17	RL
	PCB-1242	8082	mg/kg	--	--	--	--	<0.014	<0.014	<0.014	--	--	--	NE	0.23	RL
	PCB-1248	8082	mg/kg	--	--	--	--	<0.019	<0.019	<0.019	--	--	--	NE	0.23	RL
	PCB-1254	8082	mg/kg	--	--	--	--	<0.020	<0.020	<0.020	--	--	--	NE	0.24	RL
	PCB-1260	8082	mg/kg	--	--	--	--	<0.0069	<0.0069	<0.0069	--	--	--	NE	0.24	RL
	PCB-1262	8082	mg/kg	--	--	--	--	<0.017	<0.017	<0.017	--	--	--	NE	NE	RL
	PCB-1268	8082	mg/kg	--	--	--	--	<0.0086	<0.0086	<0.0086	--	--	--	NE	NE	RL

Table 6
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Notes:
Select samples analyzed for California Code of Regulations Title 22 (CAM 17) Metals by EPA Method 6010B/7470A by Enthalpy Associated Laboratories (Enthalpy) in Orange, California
Select samples analyzed for Arsenic by EPA Method 6020 by Enthalpy
Select samples analyzed for Mercury by EPA Method 7471A by Enthalpy
Select samples analyzed for Organochlorine Pesticides (OCPs) by EPA Method 8081A by Enthalpy
Select samples analyzed for Polychlorinated Biphenyls (PCBs) by EPA Method 8082 by Enthalpy
RED indicates the value exceeds the DTSC SLs
J: estimated value between the method detection limit (MDL) and laboratory reporting limit
MDL: method detection limit
mg/kg: milligrams per kilogram
ND: not detected
PQL: practical quantification limit
RWQCB: Regional Water Quality Control Board
RDL: reporting detection limit
SL: Screening Levels
(1): California Department of Toxic Substance Control (DTSC) Office of Human and Ecological Risk (HERO, 2018) RSLs Human Health Risk Assessment (HHRA) Note 3
(2): United States Environmental Protection Agency (EPA) Regional Screening Levels for Residential Soil (RSL-mg/kg) November 2017
(3): Los Angeles Unified School District Environmental Import/Export Materials Testing Section 01 4524 dated August 29, 2018
*: Arsenic screening level based on California background level
**: LAUSD limit requiring further analysis for leaching potential
***: LAUSD limit before testing for Hexavalent Chromium
****: Run TTLC. If TTLC soil concentration is greater than TTLC limit, it is a California Regulated Hazardous Waste. If the TTCL soil concentration is less than TTLC limit, compare to 10x the STLC limit. If soil concentration is greater than 10x the STLC limit, conduct WET test. If soil concentration does not pass WET test it is considered a California Regulated Hazardous Waste. If the soil concentration is less than 10x the STLC limit or passes the WET test, compare the concentration to 20x the TCLP limit. If the soil concentration is less than 20x the TCLP limit, the soil is considered non-hazardous and may be used at school sites. However, if the soil concentration is greater than 20x the TCLP limit, a TCLP leaching test is required. If the soil concentration results from the TCLP leaching test are lower than the TCLP limit, then the waste cannot leach enough chemical into soil and groundwater to be considered a toxic hazardous waste and therefore is not a Federal-Regulated Hazardous Waste and may be used at school sites. However, if the soil concentration result from the leaching test is greater than the TCLP Limit, it is considered a Federal-Regulated (RCRA) Hazardous Waste.

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-61		SB-62		SB-63		SB-64			Residential Screening Levels		
				SB-61-0.5'	SB-61-1.5'	SB-62-0.5'	SB-62-1.5'	SB-63-0.5'	SB-63-1.5'	SB-64-0.5'	SB-64-1.5'	SB-64-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**9.85**	**6.64**	**14.7**	**8.73**	**25.8**	**8.22**	**7.18**	**8.81**	**9.64**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	12*	12*	12*
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	NE	0.78	--
Mercury		7471	mg/kg	--	--	--	--	--	--	--	--	--	1	11	--
Hexavalent Chromium		7199	mg/kg	--	--	--	--	--	--	--	--	--	NE	0.30	0.30

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-65			SB-66			SB-67			SB-68			Residential Screening Levels		
				SB-65-0.5'	SB-65-1.0'	SB-65-1.5'	SB-66-0.5'	SB-66-1.0'	SB-66-1.5'	SB-67-0.5'	SB-67-1.0'	SB-67-1.5'	SB-68-0.5'	SB-68-1.0'	SB-68-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**7.94**	**190**	**11.8**	**33.4**	**144**	**12.6**	**68.8**	**271**	**74.4**	**8.18**	**9.45**	**8.24**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
Arsenic TCLP (EPA 1311/3010A)		6010B	mg/L	--	**1.689**	--	--	**1.815**	--	--	**3.89**	--	--	--	--			
Arsenic STLC		6010B	mg/L	--	**9.43**	--	--	**9.39**	--	**2.38**	**16.1**	**2.70**	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-69			SB-70			SB-71			SB-72			Residential Screening Levels		
				SB-69-0.5'	SB-69-1.0'	SB-69-1.5'	SB-70-0.5'	SB-70-1.0'	SB-70-1.5'	SB-71-0.5'	SB-71-1.0'	SB-71-1.5'	SB-72-0.5'	SB-72-1.0'	SB-72-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**260**	**8.34**	**9.13**	**115**	**6.98**	**9.27**	**63.0**	**8.77**	**27.0**	**32.1**	**13.0**	**16.7**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
Arsenic TCLP (EPA 1311/3010A)		6010B	mg/L	**1.157**	--	--	**1.405**	--	--	--	--	--	--	--	--			
Arsenic STLC		6010B	mg/L	**6.67**	--	--	**6.22**	--	--	**2.51**	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-73			SB-74			SB-75			SB-76			Residential Screening Levels		
				SB-73-0.5'	SB-73-1.0'	SB-73-1.5'	SB-74-0.5'	SB-74-1.0'	SB-74-1.5'	SB-75-0.5'	SB-75-1.0'	SB-75-1.5'	SB-76-0.5'	SB-76-1.0'	SB-76-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**84.2**	**9.70**	**6.59**	**47.1**	**8.41**	**20.9**	**111**	**9.16**	**4.71**	**53.9**	**5.09**	**8.73**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
Arsenic TCLP (EPA 1311/3010A)		6010B	mg/L	--	--	--	--	--	--	**0.850**	--	--	--	--	--			
Arsenic STLC		6010B	mg/L	**3.58**	--	--	--	--	--	**4.60**	--	--	**2.42**	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-77			SB-78			SB-79			SB-80			Residential Screening Levels		
				SB-77-0.5'	SB-77-1.0'	SB-77-1.5'	SB-78-0.5'	SB-78-1.0'	SB-78-1.5'	SB-79-0.5'	SB-79-1.0'	SB-79-1.5'	SB-80-0.5'	SB-80-1.0'	SB-80-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**5.74**	**8.23**	**5.30**	**5.56**	**6.5**	**7.22**	**9.60**	**10.7**	**7.53**	**13.4**	**5.84**	**7.95**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
Arsenic TCLP (EPA 1311/3010A)		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--			
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-81			SB-82			SB-83			SB-84			Residential Screening Levels		
				SB-81-0.5'	SB-81-1.0'	SB-81-1.5'	SB-82-0.5'	SB-82-1.0'	SB-82-1.5'	SB-83-0.5'	SB-83-1.0'	SB-83-1.5'	SB-84-0.5'	SB-84-1.0'	SB-84-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	**18.7**	**19.8**	**5.68**	**12.1**	**6.78**	**4.94**	**7.61**	**6.99**	**7.49**	**153**	**71.6**	**10.9**	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
Arsenic TCLP (EPA 1311/3010A)		6010B	mg/L	--	--	--	--	--	--	--	--	--	**1.497**	--	--			
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	--	--	**8.52**	**3.88**	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-33A		SB-33B		SB-33C			Residential Screening Levels		
				SB-33A-0.5'	SB-33A-1.5'	SB-33B-0.5'	SB-33B-1.5'	SB-33C-0.5'	SB-33C-0.5' (Dup)	SB-33C-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.02**	--	**6.18**	--	**29.2**	**23.5**	**11.1**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-33D		SB-37A		SB-37B			SB-37C		SB-37D		Residential Screening Levels		
				SB-33D-0.5'	SB-33D-1.5'	SB-37A-0.5'	SB-37A-1.5'	SB-37B-0.5'	SB-37B-0.5' (Dup)	SB-37B-1.5'	SB-37C-0.5'	SB-37C-1.5'	SB-37D-0.5'	SB-37D-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**5.45**	--	**5.44**	--	**27.5**	**32.7**	--	**89.9**	**7.61**	**31.8**	**7.90**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	**4.080**	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-39A			SB-39B			SB-39D			SB-42A			Residential Screening Levels		
				SB-39A-0.5'	SB-39A-1.5'	SB-39A-2.5'	SB-39B-0.5'	SB-39B-1.5'	SB-39B-2.5'	SB-39D-0.5'	SB-39D-1.5'	SB-39D-2.5'	SB-42A-0.5'	SB-42A-1.5'	SB-42A-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	**29.0**	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**6.16**	--	--	**5.70**	--	--	**8.26**	--	--	**99.7**	**5.39**	**6.81**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	--	--	**4.080**	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-42B			SB-42C				SB-42D			SB-44B				Residential Screening Levels		
				SB-42B-0.5'	SB-42B-1.5'	SB-42B-2.5'	SB-42C-0.5'	SB-42C-1.5'	SB-42C-1.5' (DUP)	SB-42C-2.5'	SB-42D-0.5'	SB-42D-1.5'	SB-42D-2.5'	SB-44B-0.5'	SB-44B-1.5'	SB-44B-1.5' (Dup)	SB-44B-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	**13.2**	--	--	**12.3**	--	--	--	**39.5**	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**19.1**	--	--	**35.6**	**6.96**	--	**7.35**	**33.8**	**6.72**	**6.66**	**4.67**	--	--	--	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-44D			SB-47B				SB-47C			SB-47D			Residential Screening Levels		
				SB-44D-0.5'	SB-44D-1.5'	SB-44D-2.5'	SB-47B-0.5'	SB-47B-0.5' (Dup)	SB-47B-1.5'	SB-47B-2.5'	SB-47C-0.5'	SB-47C-1.5'	SB-47C-2.5'	SB-47D-0.5'	SB-47D-1.5'	SB-47D-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**15.9**	**6.66**	**7.19**	**13.2**	**27.0**	--	--	**131**	**6.28**	**8.30**	**6.18**	--	--	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	**6.980**	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	**1.450**	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-48B			SB-48C			SB-48D			SB-50A		Residential Screening Levels		
				SB-48B-0.5'	SB-48B-1.5'	SB-48B-2.5'	SB-48C-0.5'	SB-48C-1.5'	SB-48C-2.5'	SB-48D-0.5'	SB-48D-1.5'	SB-48D-2.5'	SB-50A-0.5'	SB-50A-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**15.5**	**7.35**	**6.59**	**5.90**	--	--	**15.3**	**6.22**	**7.84**	**22.8**	**6.24**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-50B		SB-50C		SB-50D			SB-51A		SB-51B		Residential Screening Levels		
				SB-50B-0.5'	SB-50B-1.5'	SB-50C-0.5'	SB-50C-1.5'	SB-50D-0.5'	SB-50D-0.5' (Dup)	SB-50D-1.5'	SB-51A-0.5'	SB-51A-1.5'	SB-51B-0.5'	SB-51B-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**633**	**56.6**	**7.71**	--	**69.0**	**32.1**	**6.39**	**26.8**	--	**395**	**11.0**	12*	12*	12*
Arsenic STLC		6010B	mg/L	**9.310**	--	--	--	**2.590**	--	--	--	--	**38.100**	--			
Arsenic TCLP		6010B	mg/L	**2.110**	--	--	--	--	--	--	--	--	**3.850**	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-51C		SB-51D		SB-52A		SB-52B		SB-52C		SB-52D		Residential Screening Levels		
				SB-51C-0.5'	SB-51C-1.5'	SB-51D-0.5'	SB-51D-1.5'	SB-52A-0.5'	SB-52A-1.5'	SB-52B-0.5'	SB-52B-1.5'	SB-52C-0.5'	SB-52C-1.5'	SB-52D-0.5'	SB-52D-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**136**	**8.42**	**92.9**	**8.86**	**15.0**	--	**5.52**	--	**27.7**	--	**23.5**	--	12*	12*	12*
Arsenic STLC		6010B	mg/L	**6.000**	--	**4.240**	--	--	--	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	**1.000**	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-53A		SB-53B			SB-53D		SB-54A		SB-54B		SB-54C		Residential Screening Levels		
				SB-53A-0.5'	SB-53A-1.5'	SB-53B-0.5'	SB-53B-1.5'	SB-53B-1.5' (Dup)	SB-53D-0.5'	SB-53D-1.5'	SB-54A-0.5'	SB-54A-1.5'	SB-54B-0.5'	SB-54B-1.5'	SB-54C-0.5'	SB-54C-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**54.9**	--	**65.3**	--	--	**136**	**67.6**	**5.35**	--	**8.83**	--	**5.65**	--	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	--	**8.990**	**4.890**	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	**1.910**	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-54D		SB-55A		SB-55B		SB-55C			SB-55D		Residential Screening Levels		
				SB-54D-0.5'	SB-54D-1.5'	SB-55A-0.5'	SB-55A-1.5'	SB-55B-0.5'	SB-55B-1.5'	SB-55C-0.5'	SB-55C-1.5'	SB-55C-1.5' (Dup)	SB-55D-0.5'	SB-55D-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**9.40**	--	**6.41**	--	**87.3**	**8.35**	**55.4**	**7.75**	--	**21.1**	**6.96**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	--	**3.760**	--	**2.280**	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-57A			SB-57B			SB-57C				SB-57D			Residential Screening Levels		
				SB-57A-0.5'	SB-57A-1.5'	SB-57A-2.5'	SB-57B-0.5'	SB-57B-1.5'	SB-57B-2.5'	SB-57C-0.5'	SB-57C-1.5'	SB-57C-1.5' (Dup)	SB-57C-2.5'	SB-57D-0.5'	SB-57D-1.5'	SB-57D-2.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**6.03**	--	--	**151**	**5.42**	--	**6.95**	--	--	--	**6.86**	--	--	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	**5.600**	--	--	--	--	--	--	--	--	--			
Arsenic TCLP		6010B	mg/L	--	--	--	**0.791**	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-37C2		SB-37D2			SB-37C3		SB-42A2		SB-42D2		Residential Screening Levels		
				SB-37C2-0.5'	SB-37C2-1.5	SB-37D2-0.5'	SB-37D2-0.5' (DUP)	SB-37D2-1.5'	SB-37C3-0.5'	SB-37C3-1.5'	SB-42A2-0.5'	SB-42A2-1.5'	SB-42D2-0.5'	SB-42D2-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**189**	**38.2**	**57.4**	**48.6**	**35.5**	**136**	**45.3**	**43.2**	**5.37**	**61.9**	**7.52**	12*	12*	12*
Arsenic STLC		6010B	mg/L	**14.2**	--	**2.68**	--	--	--	--	--	--	**2.99**	--			
Arsenic TCLP		6010B	mg/L	**1.766**	--	--	--	--	--	--	--	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

	Analyte	EPA Method	Unit	SB-50A2			SB-50B2		SB-50B3		SB-50AB2			SB-53D2		Residential Screening Levels		
				SB-50A2-0.5'	SB-50A2-1.5'	SB-50A2-2.5'	SB-50B2-0.5'	SB-50B2-1.5'	SB-50B3-0.5'	SB-50B3-1.5'	SB-50AB2-0.5'	SB-50AB2-0.5' (DUP)	SB-50AB2-1.5'	SB-53D2-0.5'	SB-53D2-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**9.94**	--	--	**140**	**5.62**	**9.12**	**8.33**	**6.34**	**14.10**	**6.02**	**118**	**7.12**	12*	12*	12*
Arsenic STLC		6010B	mg/L	--	--	--	**7.78**	--	--	--	--	--	--	**5.30**	--			
Arsenic TCLP		6010B	mg/L	--	--	--	**1.465**	--	--	--	--	--	--	**0.907**	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Analyte		EPA Method	Unit	SB-55B2		SB-55C2		SB-57B2		Residential Screening Levels		
				SB-55B2-0.5'	SB-55B2-1.5'	SB-55C2-0.5'	SB-55C2-1.5'	SB-57B2-0.5'	SB-57B2-1.5'	DTSC[1]	EPA[2]	LAUSD[3]
Title 22 (CAM 17) Metals	Antimony	6010B	mg/kg	--	--	--	--	--	--	NE	31	--
	Arsenic	6010B	mg/kg	--	--	--	--	--	--	12*	12*	12*
	Barium	6010B	mg/kg	--	--	--	--	--	--	NE	15,000	--
	Beryllium	6010B	mg/kg	--	--	--	--	--	--	1,600	160	--
	Cadmium	6010B	mg/kg	--	--	--	--	--	--	2,100	71	--
	Chromium	6010B	mg/kg	--	--	--	--	--	--	36,000	120,000	100***
	Cobalt	6010B	mg/kg	--	--	--	--	--	--	NE	23	--
	Copper	6010B	mg/kg	--	--	--	--	--	--	NE	3,100	--
	Lead	6010B	mg/kg	--	--	--	--	--	--	80	400	80/50**
	Lead STLC (in milligrams/Liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Lead TCLP (in milligrams/liter)	6010B	mg/L	--	--	--	--	--	--	80	400	80/50**
	Molybdenum	6010B	mg/kg	--	--	--	--	--	--	NE	390	--
	Nickel	6010B	mg/kg	--	--	--	--	--	--	15,000	1,500	--
	Selenium	6010B	mg/kg	--	--	--	--	--	--	NE	390	--
	Silver	6010B	mg/kg	--	--	--	--	--	--	390	390	--
	Thallium	6010B	mg/kg	--	--	--	--	--	--	NE	0.78	--
	Vanadium	6010B	mg/kg	--	--	--	--	--	--	390	390	--
	Zinc	6010B	mg/kg	--	--	--	--	--	--	NE	23,000	--
Arsenic		6020	mg/kg	**86.4**	**7.83**	**128**	**17.50**	**99.3**	**5.01**	12*	12*	12*
Arsenic STLC		6010B	mg/L	**4.08**	--	**6.67**	--	**4.93**	--			
Arsenic TCLP		6010B	mg/L	--	--	**1.556**	--	--	--			
Thallium		6020	mg/kg	--	--	--	--	--	--	NE	0.78	--

Table 7
Summary of Additional Soil Characterization Analytical Results
Los Angeles Unified School District
Shenandoah Street Elementary School
2450 Shenandoah Street
Los Angeles, CA

Notes:
Select samples analyzed for Lead by EPA Method 6010B by Enthalpy Associated Laboratories (Enthalpy) in Orange, California
Select samples analyzed for Arsenic by EPA Method 6020 by Enthalpy
Select samples analyzed for Arsenic by EPA Method 6010B by Enthalpy
RED indicates the value exceeds the DTSC SLs
J: estimated value between the method detection limit (MDL) and laboratory reporting limit
MDL: method detection limit
mg/kg: milligrams per kilogram
ND: not detected
PQL: practical quantification limit
RWQCB: Regional Water Quality Control Board
RDL: reporting detection limit
SL: Screening Levels
(1): California Department of Toxic Substance Control (DTSC) Office of Human and Ecological Risk (HERO, 2018) RSLs Human Health Risk Assessment (HHRA) Note 3
(2): United States Environmental Protection Agency (EPA) Regional Screening Levels for Residential Soil (RSL-mg/kg) November 2017
(3): Los Angeles Unified School District Environmental Import/Export Materials Testing Section 01 4524 dated August 29, 2018
*: Arsenic screening level based on California background level
**: LAUSD limit requiring further analysis for leaching potential
***: LAUSD limit before testing for Hexavalent Chromium
****: Run TTLC. If TTLC soil concentration is greater than TTLC limit, it is a California Regulated Hazardous Waste. If the TTCL soil concentration is less than TTLC limit, compare to 10x the STLC limit. If soil concentration is greater than 10x the STLC limit, conduct WET test. If soil concentration does not pass WET test it is considered a California Regulated Hazardous Waste. If the soil concentration is less than 10x the STLC limit or passes the WET test, compare the concentration to 20x the TCLP limit. If the soil concentration is less than 20x the TCLP limit, the soil is considered non-hazardous and may be used at school sites. However, if the soil concentration is greater than 20x the TCLP limit, a TCLP leaching test is required. If the soil concentration results from the TCLP leaching test are lower than the TCLP limit, then the waste cannot leach enough chemical into soil and groundwater to be considered a toxic hazardous waste and therefore is not a Federal-Regulated Hazardous Waste and may be used at school sites. However, if the soil concentration result from the leaching test is greater than the TCLP Limit, it is considered a Federal-Regulated (RCRA) Hazardous Waste.

Table 8
Estimated Volumes of Impacted Soil
Shenandoah Street Elementary School
Los Angeles, CA

Assessment Area of Property	Contaminant of Concern	Boring Area	Corresponding Color on Site Plan	Minimum Excavation Depth (ft.)	Approximate Surface Area (ft^2)	Approximate Volume (ft^3)	Approximate Volume (yds^3)	Designated Disposal Scenario
North	Lead	SB-1, SB-5, SB-7	Orange	1.0	1,050	1,050	39	Cal Haz
	Lead	SB-3, SB-15, SB-30, SB-42	Green	1.0	675	675	25	Non Haz
South	Arsenic	SB-37, SB-51/SB-52/SB-53, SB-53, SB-54, SB-57B, SB-69/SB-70	Yellow	1.0	18,835	18,835	698	Cal Haz
	Arsenic	SB-50, SB-67	Pink	2.0	2,500	5,000	185	Cal Haz
	Arsenic	SB-33, SB-37/SB-39/SB-47/SB-48, SB-43/SB-44/SB-33, SB-55/SB-72/SB-74/SB-75, SB-57, SB-63	Blue	1.0	58,340	58,340	2,160	Non Haz
							Total Estimated Removal Volume from PEA and Additional Assessments (yds^3)	3,107
							Estimated Bulking During Excavation*	10%
							Estimated Post Excavation Soil Volume to be Removed and Disposed (yds^3)	3,417

NOTES:

Lead (Pb) Site Screening Level: 80 mg/kg
Arsenic (As) Site Screening Level: 12 mg/kg
ft. = feet
ft^3 = cubic feet
ft^2 = square feet
yds^3 = cubic yards
Non Haz = Non Hazardous Disposal Designation
Cal Haz = California Hazardous (Non-RCRA) Disposal Designation
* = based on a potential bulk factor of 10% for sandy soil

APPENDIX A

PEA Scoping Document

ES Engineering Services, LLC
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Irvine, CA 92614
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August 22, 2017

Ms. Jennifer Hilario
Site Assessment Project Manager
Los Angeles Unified School District
Office of Environmental Health & Safety
Contract Professional
333 South Beaudry, 21st Floor (21-223-07)
Los Angeles, CA 90017

Proj. No. 191395

Preliminary Endangerment Assessment Equivalent (PEA-E) Scoping Document
Shenandoah Street Elementary School
Los Angeles, California

INTRODUCTION

In July 2017 the ES Engineering Services, LLC (ES) conducted a Phase I Environmental Site Assessment (Phase I ESA) for the Los Angeles Unified School District (District), for proposed construction at the Shenandoah Street Elementary School (Site) in Los Angeles, California (**Figure 1**). The District is preparing to demolish the existing classroom buildings that will make way for the construction of new classroom buildings on the property. ES prepared this *Preliminary Endangerment Assessment Equivalent (PEA-E) Scoping Document* (Work Scope) to evaluate potential environmental conditions and provide recommendations for assessing environmental conditions, if any, at the Site.

BACKGROUND

Based upon the findings in the Phase I ESA, prior to site construction of the Main Building in 1928, the land was utilized for agricultural purposes. Several smaller structures were located in the northeast portion of the site (current location of classroom buildings 24, 39 and 37). The North Building was constructed in 1940. Smaller classroom buildings (Classrooms 20 through 43) were constructed at separate times, from 1947 until 1991. An addition and remodeling was performed on the Main Building in 1977.

In 1978, the United States Consumer Product Safety Commission (U.S. CPSC) banned the application of paint containing more than 0.06 percent lead by weight due to leads toxicity and damaging effects caused on the nervous system. According to the U.S. CPSC, school structures constructed prior to January 1, 1993 with paint surface coatings are assumed to have lead-based paint. Classroom buildings 9 through 12 and 46 and 47 were constructed after 1993.

Although during the site visit, the interior of each of the structure appeared to have been re-modeled, asbestos-containing materials and lead-based paint may be present in parts of each of the classroom buildings due to the known age of the structures. Rain storms, wind and

other types of weathering such as sunlight can cause leaching, paint chipping, abrasion and scraping resulting in a potential accumulation of lead in soil, generally within 7 to 10 feet from exterior walls.

The potential for organochlorine pesticide (OCP) contaminated soils resulting from the former agricultural use of the subject property and the use of termiticides applied at wood building foundations for termite control. Because of the age of some of the buildings, there is potential for the presence of pesticides and termiticides in the onsite soil and in the vicinity of the on-site buildings.

During site visits for the Phase 1 ESA, a clarifier was noted in the boiler room. Also, two pad-mounted transformers were observed at the site; a main transformer housed in a locked concrete vault located near the Main Building and a “dry-type” transformer located at the southeast corner of the playground. A third transformer was indicated on the Facilities Design Plan provided by the LAUSD and located north of the North Building. Two pole-mounted transformers were also observed on adjacent properties. Please refer to the attached **Figure 2** for the locations of the observed features.

Arsenic is naturally occurring in soils, particularly in the western United States. However, arsenic has been used in alloys of lead (for example, in car batteries and ammunition), in the production of pesticides, treated wood products, herbicides, and insecticides as an herbicide. The background soil screening level for arsenic in Southern California is 12.0 milligrams per kilogram (mg/kg - DTSC, 2008). Laboratory analysis of soil samples collected during this assessment will also be analyzed for arsenic.

The clarifier located in the boiler room will also be sampled.

WORKPLAN

This workplan was prepared and will be conducted in accordance with the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) PEA Guidance Manual (January 1994, revised October 2015). The PEA is required by the DTSC prior to issuing unrestricted land use certification to ensure that existing site conditions do not present significant risks to future students and faculty.

The site was used for agricultural purposes prior to 1928. Therefore, soil samples will be analyzed for organochlorine pesticides (OCPs). The first structures were constructed after 1928 and most were constructed prior to 1991. Lead from paint on structures developed prior to 1993 have potentially impacted nearby asphalt and soil and shallow borings are necessary to identify potential impacts. Arsenic will also be analyzed for soil samples collected from select borings. Soil samples to evaluate a potential release of polychlorinated biphenyls (PCBs) from the former or current transformers in use at the site will be collected and analyzed. Finally, because of the potential to collect and concentrate contaminants of concern (COCs) related to the use of the boiler and mentioned above, the clarifier located in the boiler room will be sampled for carbon chain total petroleum hydrocarbons (TPHcc), full scan volatile organic

compounds (VOCs), semi-volatile organic compounds (SVOCs), California Assessment Manual (CAM) 17 metals and PCBs.

As previously mentioned, semi-permanent classroom buildings No. 9 through 12, 46 and 47 were constructed after 1993. Consequently, it is unlikely that lead-based paint is present on exterior surfaces near these structures.

DATA COLLECTION AND EVALUATION

Methodology

A sampling and analysis program will be conducted to evaluate the potential presence of select chemical constituents in surface and shallow soils. Because the depth to groundwater beneath the Site is approximately 70 feet below ground surface (bgs), it is unlikely that groundwater has been affected by historical site activities. Consequently, groundwater assessment will not be conducted at this time. If necessary, the PEA-E Report will provide a leaching/groundwater assessment to estimate the potential for residual contamination, if present, to leach and impact groundwater at concentrations above drinking water standards. The site is not located within a methane zone, so soil vapor sampling for methane is not part of this scope.

For the PEA soil assessment, potential impacts by lead, arsenic, organochlorine pesticides (OCPs), and polychlorinated biphenyls *(*PCBs) will be based on a soil sampling strategy conducted in accordance with DTSC's *Interim Guidance Evaluation of School Sites with Potential Soil Contamination as a Result of Lead from Lead-based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers*, dated June 9, 2006.

To determine the effects of paint fall to the ground after peeling and weathering from walls, windows, and doors, the drip zone (or area near buildings) will be sampled. The drip zone analysis measures the spatial extent of unsafe soil lead levels as you move away from exterior walls painted with lead paint. Because the site has been covered with asphalt since sometime after 1952, there is also potential for the asphalt to also contain lead.

Soil Borings

Thirty-three (33) soil borings will be advanced at the Site to assess areas of potential environmental concern (defined below). Each boring will be continuously cored to a depth of 2.5 feet bgs and soil samples collected from the surface zone (approximately 0.0 to 0.5 feet bgs) and from shallow soils (approximately 1 to 1.5 and 2 to 2.5 feet bgs). Where necessary, deeper samples will be collected from approximately 3.0 to 3.5 feet bgs and 5.0 to 5.5 feet bgs are proposed. Each proposed boring location and the corresponding soil sample analyses to be performed is described below:

- Twenty-nine soil borings (SB1 through SB29) are proposed to collect soil samples from the surface zone (approximately 0.0 to 0.5 feet bgs) and shallow zones (approximately 1 to 1.5 and 2 to 2.5 feet bgs) to evaluate the potential for lead-based paint on exterior surfaces (i.e. buildings constructed prior to 1993) and to screen for arsenic. The soil samples collected from the surface zone will be will be submitted to the laboratory and analyzed for lead and arsenic; the shallow zone soil samples will be archived at the laboratory for future analysis, if necessary.

  The surface soil samples collected from borings SB1 through SB29 will also be analyzed for OCPs, due to the potential historic use of pesticides throughout the site. Soil samples collected and submitted for OCP analysis will be composited by the laboratory at a rate of approximately 3 samples to 1; the shallow zone soil samples will be archived at the laboratory for future analysis, if necessary.

- Soil borings SB-30 through SB-32 are proposed to collect deeper soil samples to assess impacts from transformers potentially in use in those areas prior to 1978. Soil samples will be collected from approximately 3.0 feet bgs and approximately 5.0 feet bgs. The samples collected will be submitted to the laboratory for analysis for PCBs.

- Soil boring SB-33 is proposed to collect deeper soil samples to assess potential soil impacts from the clarifier in use in the boiler room. Soil samples will be collected from approximately 3 to 3.5 feet bgs and approximately 5.0 to 5.5 feet bgs. The samples collected will be submitted to the laboratory for analysis for TPHcc, VOCs, SVOCs, CAM 17 metals and PCBs.

The resulting laboratory data will be subjected to data validation to assure that data quality objectives (DQOs) are met and that the data are suitable for use in the human health and ecological screening evaluation. Quality assurance/quality control measures will include duplicate sample laboratory analyses for lead, arsenic and PCBs at a rate of approximately 5% of the total number of samples (4 soil samples). Based on a review of the analytical results, step-out and/or deepened soil borings may be necessary to complete assessment of the COCs listed above. The proposed soil sampling locations are shown on the attached **Figure 2**. The soil sampling plan is also included in the attached **Table**.

REFERENCES

Determination of a Southern California Regional Background Arsenic Concentration in Soil, prepared by California Department of Toxic Substances Control (DTSC) and dated 2008.

*Preliminary Endangerment Assessment Guidance Manua*l, prepared by California Department of Toxic Substances Control (DTSC) and dated January 1994 (revised October 2013).

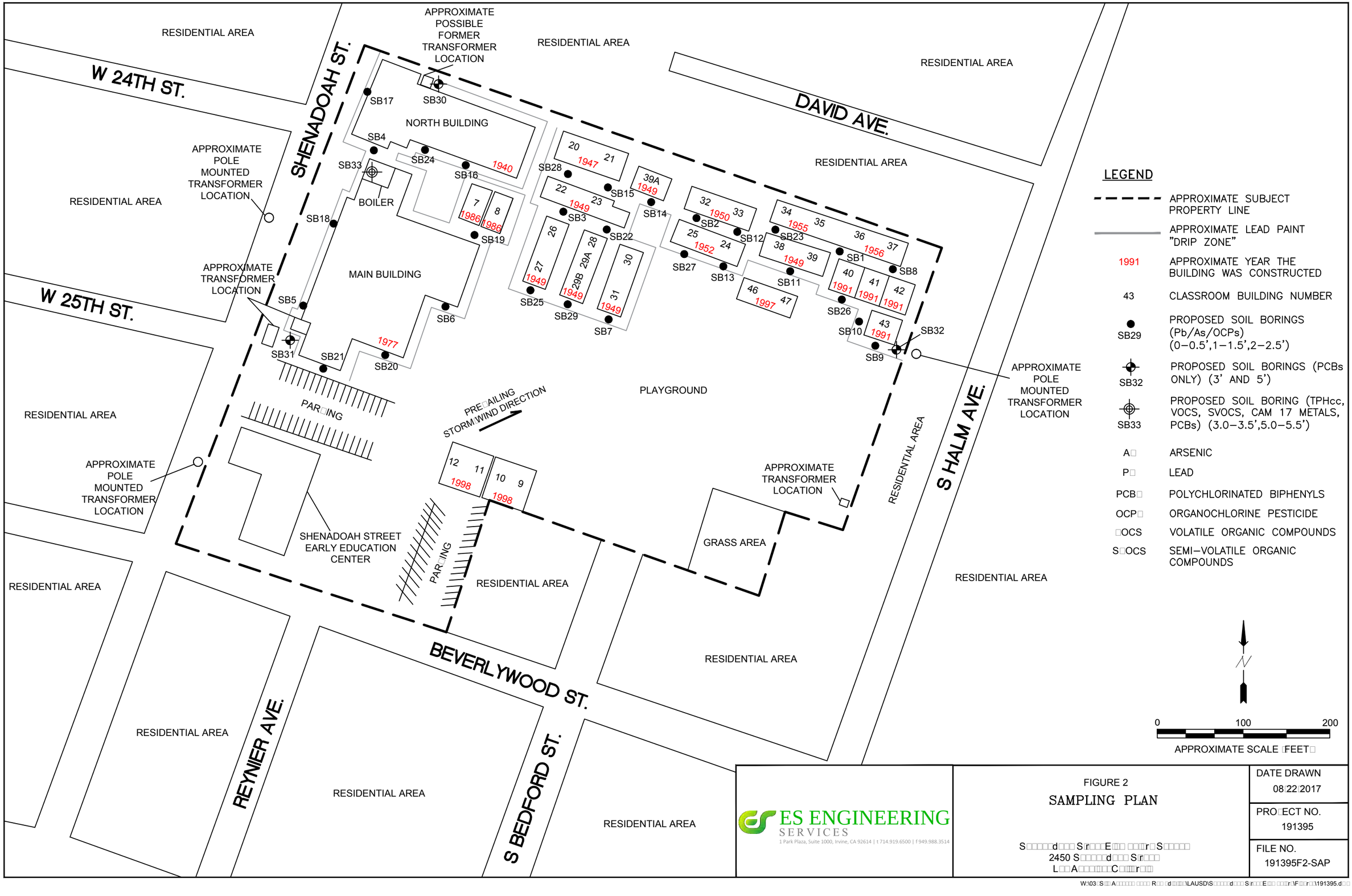
Interim Guidance for Evaluation of School Sites with Potential Soil Contamination as a Result from Lead-based Paint, Organochlorine Pesticides from Termiticides and Polychlorinated Biphenyls from Electrical Transformers, prepared by DTSC and last revised on September 12, 2006.

Low-Threat Underground Storage Tank Case Closure Policy, State Water Board Resolution No. 2012-0016.

Table - Soil Sampling Plan
Shenandoah Street Elementary School
Los Angeles, CA

Boring ID	TD (ft bgs)	Pb 6010B	As 6020	OCPs 8081A	PCBs 8082	TPHcc 8015	VOCs 8260	SVOCs 8270	CAM Metals 6010B	Dup?	Sample Interval
SB-1	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-2	2.5	X	X	X						As, Pb	0-0.5', 1-1.5', 2-2.5'
SB-3	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-4	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-5	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-6	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-7	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-8	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-9	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-10	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-11	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-12	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-13	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-14	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-15	2.5	X	X	X						Pb	0-0.5', 1-1.5', 2-2.5'
SB-16	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-17	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-18	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-19	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-20	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-21	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-22	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-23	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-24	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-25	2.5	X	X	X						Pb	0-0.5', 1-1.5', 2-2.5'
SB-26	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-27	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-28	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-29	2.5	X	X	X							0-0.5', 1-1.5', 2-2.5'
SB-30	5	X			X						3', 5'
SB-31	5	X			X						3', 5'
SB-32	5	X			X						3', 5'
SB-33	5.5	X			X	X	X	X	X	PCB	3.0-3.5', 5.0-5.5'
Totals:		**33**	**29**	**10**	**4**	**1**	**1**	**1**	**1**		

Surface zone (0-0.5') soil samples collected for AS/Pb/OCP will be submitted to the laboratory for analysis;
shallow zone (1-1.5’ and 2-2.5’) soil samples will be archived at the laboratory for future analysis, if necessary.
Dups from the 0-0.5' or 1.5-2' soil horizons
All locations require Asphalt/Concrete coring



ES ENGINEERING SERVICES
1 Park Plaza, Suite 1000, Irvine, CA 92614 | t 714.919.6500 | f 949.988.3514

FIGURE 2
SAMPLING PLAN

S d S r E r S
2450 S d S r
L A C r

DATE DRAWN
08/22/2017

PROJECT NO.
191395

FILE NO.
191395F2-SAP

W:\03 S A R d \LAUSD\S d S r E r\F r\191395.d

APPENDIX B

Public Notification Letter

Los Angeles Unified School District

Office of Environmental Health and Safety

AUSTIN BEUTNER
Superintendent of Schools

VIVIAN EKCHIAN
Chief Executive Officer, Office of Educational Services

CARLOS A. TORRES
Director, Environmental Health and Safety

November 14, 2018

TO: Neighbors and Community Members of
Shenandoah Street Elementary School

FROM: Los Angeles Unified School District
Office of Environmental Health and Safety

REGARDING: Preliminary Environmental Assessment
Shenandoah Street Elementary School, Los Angeles, California

The Los Angeles Unified School District (LAUSD) - Office of Environmental Health and Safety (OEHS) would like to provide you with advance notice for a Preliminary Environmental Assessment (PEA) that will be conducted within the boundaries of Shenandoah Street Elementary School, located at 2450 Shenandoah Street, Los Angeles, CA 90034. The PEA will be conducted across most of the campus scheduled to undergo a comprehensive modernization.

A licensed contractor, working on behalf of LAUSD, will perform the environmental investigation under the oversight of the LAUSD-OEHS, which is independent from the LAUSD Facilities Services Division (LAUSD-FSD). (The LAUSD-FSD is the responsible Branch for the development and construction of the comprehensive modernization project.) The entire environmental investigation will consist of sampling at locations on campus where existing facilities will be demolished (as needed) and new buildings/paving/landscaping will be constructed in its place. Soil samples will be analyzed for potential residual arsenic, lead-based paint, polychlorinated biphenyls (PCBs), and organochlorine pesticides (OCPs). If necessary, a soil cleanup will be performed prior to construction activities to protect students, faculty, and staff.

The field work phase focusing on the areas where portable classrooms are currently located is anticipated to be completed in November 2018 and scheduled to begin on the week of November 19, 2018 during LAUSD's Thanksgiving break. Field work is scheduled to be conducted between 7:00 am and 5:00 pm. Soil sampling in additional areas will be completed at a later date as soon as design is finalized for the rest of the comprehensive modernization project.

The results of the investigation will be submitted to LAUSD-OEHS in a report for review. The report will include an assessment of whether any of the above listed compounds are present in soil at concentrations that would require further assessment, or if a response action will be necessary before the Site is cleared for construction activities. When the OEHS's review is complete, OEHS will issue a determination with regard to the assessment.

If you have any questions concerning the upcoming environmental investigation or other related activities for the proposed project, please contact Jennifer Hilario, LAUSD Office of Environmental Health and Safety, Site Assessment Project Manager at (213) 241-4261 (email at jennifer.hilario@lausd.net).

Los Angeles Unified School District

Office of Environmental Health and Safety

AUSTIN BEUTNER
Superintendent of Schools

VIVIAN EKCHIAN
Chief Executive Officer, Office of Educational Services

CARLOS A. TORRES
Director, Environmental Health and Safety

14 de noviembre del 2018

A: Vecinos y Miembros Comunitarios de la Escuela Primaria Shenandoah Street

DE: Distrito Escolar Unificado de Los Ángeles
Oficina de Salud y Seguridad Ambiental

ASUNTO: Evaluación Inicial Ambiental
Escuela Primaria Shenandoah Street, Los Ángeles, California

La Oficina de Salud y Seguridad Ambiental (OEHS, por sus siglas en inglés) del Distrito Escolar Unificado de Los Ángeles (LAUSD) desea avisarle que se llevará a cabo una evaluación inicial ambiental (PEA) dentro de la Escuela Primaria Shenandoah Street. La escuela se encuentra en 2450 Shenandoah Street, Los Ángeles, CA 90034. La PEA se llevará a cabo en la mayoría parte del campo programado para someterse a una modernización integral.

Un contratista licenciado, trabajando por parte de LAUSD, realizará la investigación inicial ambiental bajo la supervisión de la Oficina de Salud y Seguridad Ambiental, que es independente de la división de servicios de instalaciones de LAUSD. (La división de servicios de instalaciones es la rama responsable para el desarrollo y construcción del proyecto). La todo investigación ambiental consistirá en la toma de muestras ambientales en áreas de la escuela donde se demolerán las estructuras existentes (según sea necesario) para la construcción de nuevas aulas de clases/pavimento/jardín. El suelo será analizado para identificar la presencia de arsénico, pintura a base de plomo, bifenilos policlorados y pesticidas organoclorados. También se analizarán muestras de vapor de suelo para la presencia de compuestos orgánicos volátiles. Si es necesario, y para la protección de la salud de los estudiantes, maestros y del personal escolar, se realizará la limpieza ambiental del suelo antes de que inicien las actividades de construcción.

Se anticipa que la fase de trabajo de campo que se enfoca en las áreas donde se ubican actualmente las aulas portátiles se completará en noviembre de 2018 durante las vacaciones de acción de gracias empezando en la semana del 19 de noviembre del 2018. Las horas de trabajo serán entre 7:00 am y 5:00 pm. El muestreo del suelo en áreas adicionales se completará en una fecha posterior tan pronto como el diseño finalice para el resto del proyecto de modernización integral.

Los resultados de la investigación serán presentados al LAUSD-OEHS en un informe para su revisión. El informe incluirá una evaluación de la presencia de los compuestos mencionados anteriormente. La evaluación también identificará si los compuestos se encuentran en el suelo a niveles que requieran una evaluación adicional, mitigación o una “acción de respuesta” antes de que el área de estudio sea despejada para la construcción. Cuando finalice la revisión por parte de la Oficina de Salud y Seguridad Ambiental, el OEHS emitirá una conclusión con respecto a la evaluación ambiental.

Si tiene alguna pregunta acerca de la investigación ambiental u otras actividades relacionadas, por favor póngase en contacto con la gerente del proyecto Jennifer Hilario de la Oficina de Salud y Seguridad Ambiental del Distrito llamando al (213) 241-4261 (correo electrónico jennifer.hilario@lausd.net).

APPENDIX C

Laboratory Analytical Data

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard

Lab Request: 408720
Report Date: 01/10/2019
Date Received: 11/21/2018
Client ID: 12860

Comments: Shenandoah Elementary School
#026RC1-191395
PO1026791
2450 Shenandoah Street, Los Angeles, CA

Revised Report 2 - See attached report for EPA 8081A and EPA 8082 results. Additional STLC, TCLP & TTLC results requested on 12/06/18 and 01/03/19 are also included.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID	Sample #	Client Sample ID
408720-001	SB-1-0.5'	408720-025	SB-16-0.5'	408720-049	SB-30-1.5'
408720-002	SB-1-1.5'	408720-026	SB-16-1.5'	408720-050	SB-31-0.5'
408720-003	SB-2-0.5'	408720-027	SB-17-0.5'	408720-051	SB-31-1.5'
408720-004	SB-2-1.5'	408720-028	SB-17-1.5'	408720-052	SB-32-0.5'
408720-005	SB-3-0.5'	408720-029	SB-18-0.5'	408720-053	SB-32-1.5'
408720-006	SB-3-1.5'	408720-030	SB-18-1.5'	408720-054	SB-5-0.5' (DUP)
408720-007	SB-4-0.5'	408720-031	SB-19-0.5'	408720-055	SB-11-0.5' (DUP)
408720-008	SB-4-1.5'	408720-032	SB-19-1.5'	408720-056	SB-16-0.5' (DUP)
408720-009	SB-5-0.5'	408720-033	SB-21-0.5'	408720-057	SB-25-0.5' (DUP)
408720-010	SB-5-1.5'	408720-034	SB-21-1.5'	408720-058	SB-28-0.5' (DUP)
408720-011	SB-6-0.5'	408720-035	SB-22-0.5'	408720-059	SB-2-0.5' (DUP)
408720-012	SB-6-1.5'	408720-036	SB-22-1.5'	408720-060	Equipment Blank- Day 1
408720-013	SB-7-0.5'	408720-037	SB-24-0.5'	408720-061	Equipment Blank- Day 2
408720-014	SB-7-1.5'	408720-038	SB-24-1.5'	408720-062	Soil Sample Composite
408720-015	SB-8-0.5'	408720-039	SB-25-0.5'		
408720-016	SB-8-1.5'	408720-040	SB-25-1.5'		
408720-017	SB-9-0.5'	408720-041	SB-26-0.5'		
408720-018	SB-9-1.5'	408720-042	SB-26-1.5'		
408720-019	SB-10-0.5'	408720-043	SB-27-0.5'		
408720-020	SB-10-1.5'	408720-044	SB-27-1.5'		
408720-021	SB-11-0.5'	408720-045	SB-28-0.5'		
408720-022	SB-11-1.5'	408720-046	SB-28-1.5'		
408720-023	SB-15-0.5'	408720-047	SB-29-3'		
408720-024	SB-15-1.5'	408720-048	SB-30-0.5'		

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Ranjit K. K. Clarke

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 10:09	**Site:**			
Sample #:	**408720-001**	**Client Sample #:**	SB-1-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1199884		
Lead	**0.232**	1	0.005	0.05	mg/L	01/10/19	01/10/19	KLN	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.25 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**4.91**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**123**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.34**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**28.5**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.9**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**212**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**2.19**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**17.6**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**2.24 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**48.7**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**108**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1198825		
Lead	**13.8**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**3.72**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 10:16	**Site:**			
Sample #:	**408720-002**	**Client Sample #:**	SB-1-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1198609		
Lead	**8.62**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 12:34 **Site:**
Sample #: 408720-003 **Client Sample #:** SB-2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**2.18 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**4.38**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**60.3**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**0.58**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**7.32**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**4.79**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**8.28**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**8.86**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.01**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**8.40**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**2.50 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**2.26 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**24.4**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**22.6**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**4.05**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							
Method: EPA 8082 NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 12:45 **Site:**
Sample #: 408720-004 **Client Sample #:** SB-2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 10:49 **Site:**
Sample #: 408720-005 **Client Sample #:** SB-3-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.05 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**1.45**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**118**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.12**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**31.3**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**12.1**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**14.0**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**88.7**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.73 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**17.9**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**1.06 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**53.8**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**58.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1198825		
Lead	**3.50**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**1.624 J**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	J
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 10:55 **Site:**
Sample #: 408720-006 **Client Sample #:** SB-3-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1198609		
Lead	**4.54**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 10:36 **Site:**
Sample #: **408720-007** **Client Sample #:** SB-4-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	ND	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	
Arsenic	**6.03**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**123**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.64**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**28.1**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.4**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.8**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**17.3**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.93 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**19.6**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**50.2**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**58.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**4.65**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 10:42 **Site:**
Sample #: **408720-008** **Client Sample #:** SB-4-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:54	**Site:**			
Sample #:	**408720-009**	**Client Sample #:**	SB-5-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1199885		
Lead	**0.035 J**	1	0.005	0.05	mg/L	01/10/19	01/10/19	KLN	B1,J
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**0.67 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**3.33**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**104**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.58**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**31.1**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**11.4**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**16.0**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**47.9**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.49 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**19.0**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**53.0**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**62.2**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1198825		
Lead	**5.95**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**3.00**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:59	**Site:**			
Sample #:	**408720-010**	**Client Sample #:**	SB-5-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1198609		
Lead	**6.62**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 10:26	**Site:**			
Sample #:	**408720-011**	**Client Sample #:**	SB-6-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**0.94 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**5.30**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**120**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.88**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**24.4**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.91**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**20.2**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**15.0**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.32**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**31.2**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**43.9**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**66.5**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.09**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 10:30	**Site:**			
Sample #:	**408720-012**	**Client Sample #:**	SB-6-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:35	**Site:**			
Sample #:	**408720-013**	**Client Sample #:**	SB-7-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1199885		
Lead	**0.028 J**	1	0.005	0.05	mg/L	01/10/19	01/10/19	KLN	B1,J
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**2.74 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**4.82**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**141**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.41**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**25.7**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.1**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**18.8**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**175**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.02**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**18.2**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**1.72 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**44.9**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**146**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1198825		
Lead	**6.72**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**3.14**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	**0.13 J**	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	J
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							
Method: EPA 8082 *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:40	**Site:**			
Sample #:	**408720-014**	**Client Sample #:**	SB-7-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1198609		
Lead	**5.53**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 14:58	**Site:**			
Sample #:	**408720-015**	**Client Sample #:**	SB-8-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**2.60 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**4.86**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**111**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.63**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**23.6**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.35**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**18.2**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**6.57**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.00**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**17.5**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**1.40 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**41.6**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**48.9**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1198412		
Arsenic	**3.57**	10	0.2	3	mg/Kg	12/04/18	12/05/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 15:01	**Site:**			
Sample #:	**408720-016**	**Client Sample #:**	SB-8-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:18 **Site:**
Sample #: **408720-017** **Client Sample #:** SB-9-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**2.13 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**5.80**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**101**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.73**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**25.7**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**8.89**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**16.5**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**8.34**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.97 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.7**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**41.9**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**48.2**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.31**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:23 **Site:**
Sample #: **408720-018** **Client Sample #:** SB-9-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 14:31	**Site:**			
Sample #:	**408720-019**	**Client Sample #:**	SB-10-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	ND	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	
Arsenic	**5.00**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**107**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.58**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**24.8**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.63**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.1**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**8.08**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.02**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**18.2**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**41.2**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**47.9**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**7.87**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 14:38	**Site:**			
Sample #:	**408720-020**	**Client Sample #:**	SB-10-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:00	**Site:**			
Sample #:	**408720-021**	**Client Sample #:**	SB-11-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**0.57 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**6.63**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**114**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.78**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**24.6**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.00**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**18.2**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**5.31**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.98 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.6**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**1.14 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**40.7**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**50.1**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.01**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 09:05	**Site:**			
Sample #:	**408720-022**	**Client Sample #:**	SB-11-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:45 **Site:**
Sample #: 408720-023 **Client Sample #:** SB-15-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**0.81 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**6.46**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**123**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.65**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**26.6**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.56**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**20.7**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**112**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.02**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**20.9**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**45.2**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**83.6**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1198825		
Lead	**4.25**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.58 J**	20	0.4	6	mg/Kg	12/25/18	11/26/18	JP	J
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:50 **Site:**
Sample #: 408720-024 **Client Sample #:** SB-15-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1198609		
Lead	**5.73**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:27 **Site:**
Sample #: **408720-025** **Client Sample #:** SB-16-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.34 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**6.94**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**116**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.84**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**23.0**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.21**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**18.6**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**12.0**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.97 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**22.1**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**41.9**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**56.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.09**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:33 **Site:**
Sample #: **408720-026** **Client Sample #:** SB-16-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 14:14	**Site:**			
Sample #:	**408720-027**	**Client Sample #:**	SB-17-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.09 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**4.98**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**120**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.68**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**24.1**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.2**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**19.3**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**10.3**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.23**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**18.9**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**42.5**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**56.2**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**4.49**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 14:20	**Site:**			
Sample #:	**408720-028**	**Client Sample #:**	SB-17-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 13:58 **Site:**
Sample #: **408720-029** **Client Sample #:** SB-18-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.38 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**8.25**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**102**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.56**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**22.0**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**8.72**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.9**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**28.6**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.99 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**17.4**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**35.8**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**79.7**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**6.62**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 14:05 **Site:**
Sample #: **408720-030** **Client Sample #:** SB-18-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 13:40	**Site:**			
Sample #:	**408720-031**	**Client Sample #:**	SB-19-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**0.55 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**5.91**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**109**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.74**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**22.4**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.57**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.2**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**6.31**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.92 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.8**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**39.0**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**49.7**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**4.54**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 13:47	**Site:**			
Sample #:	**408720-032**	**Client Sample #:**	SB-19-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:32	**Site:**			
Sample #:	**408720-033**	**Client Sample #:**	SB-21-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.92 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**6.11**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**95.8**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.24**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**21.6**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**8.07**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**16.3**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**20.4**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.10**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**16.4**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**40.0**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**112**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**5.97**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:40	**Site:**			
Sample #:	**408720-034**	**Client Sample #:**	SB-21-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:22	**Site:**			
Sample #:	**408720-035**	**Client Sample #:**	SB-22-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**2.08 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**1.71**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**75.3**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**0.77**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**19.3**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.33**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**13.6**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**8.57**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.47 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**16.7**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**0.90 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**34.2**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**41.1**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**1.940 J**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	J
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	**0.08 J**	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	J
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:24	**Site:**			
Sample #:	**408720-036**	**Client Sample #:**	SB-22-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:07 **Site:**
Sample #: **408720-037** **Client Sample #:** SB-24-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.26 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**8.06**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**128**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.64**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**31.2**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**19.5**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**18.8**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.27**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**22.1**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**53.7**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**70.9**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**6.27**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:12 **Site:**
Sample #: **408720-038** **Client Sample #:** SB-24-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 07:50	**Site:**			
Sample #:	**408720-039**	**Client Sample #:**	SB-25-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197966		
Antimony	**1.62 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Arsenic	**5.90**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**528**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.63**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**33.2**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**22.7**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	
Lead	**29.5**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**0.74 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**22.0**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**0.77 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**50.6**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**63.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197968		
Arsenic	**4.61**	10	0.2	3	mg/Kg	12/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197977		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 08:00	**Site:**			
Sample #:	**408720-040**	**Client Sample #:**	SB-25-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 15:12 **Site:**
Sample #: **408720-041** **Client Sample #:** SB-26-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.65 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**7.28**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**108**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.78**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**22.8**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.31**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**27.0**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**25.8**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**2.23**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**17.6**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	**1.19 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**1.76 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**41.3**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**104**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**5.53**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 15:18 **Site:**
Sample #: **408720-042** **Client Sample #:** SB-26-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 15:23	**Site:**			
Sample #:	**408720-043**	**Client Sample #:**	SB-27-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.95 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**3.30**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**97.4**	1	0.23	1	mg/Kg	11/25/18	11/27/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.43**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**19.0**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.18**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**16.6**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**7.18**	1	0.32	1	mg/Kg	11/25/18	11/27/18	KLN	
Molybdenum	**1.82**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**14.8**	1	0.2	1.5	mg/Kg	11/25/18	11/27/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**2.62 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**35.8**	1	0.37	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Zinc	**41.8**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**4.26**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 15:30	**Site:**			
Sample #:	**408720-044**	**Client Sample #:**	SB-27-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 16:00 **Site:**
Sample #: **408720-045** **Client Sample #:** SB-28-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**1.56 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**4.82**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**97.7**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.53**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**29.9**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.8**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**22.5**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**10.1**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**1.19**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**18.7**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**47.0**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**79.9**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**3.45**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 16:05 **Site:**
Sample #: **408720-046** **Client Sample #:** SB-28-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 11:29 **Site:**
Sample #: **408720-047** **Client Sample #:** SB-29-3' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8082 NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:12 **Site:**
Sample #: **408720-048** **Client Sample #:** SB-30-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197967		
Antimony	**0.86 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**8.46**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**110**	1	0.23	1	mg/Kg	11/25/18	12/03/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.82**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**25.8**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.27**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**22.6**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**94.1**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**1.21**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**20.6**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	**1.22 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**1.09 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**43.4**	1	0.37	0.5	mg/Kg	11/25/18	12/03/18	KLN	
Zinc	**116**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1198825		
Lead	**0.668**	10	0.05	0.15	mg/L		12/13/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197969		
Arsenic	**5.23**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: See Attached							QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:18 **Site:**
Sample #: **408720-049** **Client Sample #:** SB-30-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1198609		
Lead	**5.17**	1	0.32	1	mg/Kg	12/10/18	12/11/18	KLN	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 11:06	**Site:**			
Sample #:	**408720-050**	**Client Sample #:**	SB-31-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.96 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**4.66**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**128**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.69**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**19.7**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.46**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**16.1**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**6.26**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**1.18**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**16.5**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	**1.31 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**37.7**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**47.5**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**5.02**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 11:10	**Site:**			
Sample #:	**408720-051**	**Client Sample #:**	SB-31-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:06	**Site:**			
Sample #:	**408720-052**	**Client Sample #:**	SB-32-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.56 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**5.60**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**102**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.59**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**22.0**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**8.79**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.4**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**5.55**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**1.15**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**17.4**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	**3.11**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**37.1**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**46.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**6.14**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A *NELAC*	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 12:12	**Site:**			
Sample #:	**408720-053**	**Client Sample #:**	SB-32-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:59 **Site:**
Sample #: **408720-054** **Client Sample #:** SB-5-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.95 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**3.56**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**90.8**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**2.00**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**34.6**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**12.4**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**23.5**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**131**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Nickel	**17.8**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**0.80 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**53.3**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**88.0**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**1.932 J**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	J
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	**0.04 J**	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	J
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 09:00 **Site:**
Sample #: **408720-055** **Client Sample #:** SB-11-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	ND	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	
Arsenic	**4.53**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**127**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.71**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**26.3**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**10.4**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**18.2**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**5.64**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**0.77 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.3**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**46.2**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**51.1**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**4.01**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 08:27 **Site:**
Sample #: **408720-056** **Client Sample #:** SB-16-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**1.00 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**5.66**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**104**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.55**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**22.3**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.09**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**17.4**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**9.88**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**0.80 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.4**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**40.4**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**53.6**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**5.18**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 07:50 **Site:**
Sample #: **408720-057** **Client Sample #:** SB-25-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**0.40 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**3.20**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**145**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.32**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**29.4**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**9.71**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**21.0**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**56.9**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**0.42 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**16.9**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**43.8**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**98.1**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**4.73**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 16:00 **Site:**
Sample #: **408720-058** **Client Sample #:** SB-28-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197967		
Antimony	**1.78 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**4.89**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**108**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.37**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**30.8**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**11.7**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**21.1**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**21.0**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**0.99 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**18.3**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	**1.84 J**	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	**0.67 J**	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	J
Vanadium	**52.0**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**88.3**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1197969		
Arsenic	**3.92**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8081A NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 12:34 **Site:**
Sample #: **408720-059** **Client Sample #:** SB-2-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8082 NELAC	Prep Method: See Attached						QCBatchID:		
See Attached		1							

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 16:30 **Site:**
Sample #: 408720-060 **Client Sample #:** Equipment Blank- Day 1 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC Prep Method: EPA 3010A							QCBatchID: QC1198051		
Antimony	ND	1	0.014	0.04	mg/L	11/27/18	11/27/18	KLN	
Arsenic	ND	1	0.008	0.01	mg/L	11/27/18	11/27/18	KLN	
Barium	ND	1	0.002	0.01	mg/L	11/27/18	11/27/18	KLN	
Beryllium	ND	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	
Cadmium	ND	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	
Chromium	ND	1	0.002	0.01	mg/L	11/27/18	11/27/18	KLN	
Cobalt	ND	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	
Copper	ND	1	0.004	0.01	mg/L	11/27/18	11/30/18	KLN	
Lead	ND	1	0.005	0.01	mg/L	11/27/18	11/27/18	KLN	
Molybdenum	**0.0088 J**	1	0.005	0.01	mg/L	11/27/18	11/27/18	KLN	J
Nickel	ND	1	0.003	0.02	mg/L	11/27/18	11/27/18	KLN	
Selenium	ND	1	0.016	0.03	mg/L	11/27/18	11/27/18	KLN	
Silver	ND	1	0.003	0.005	mg/L	11/27/18	11/27/18	KLN	
Thallium	ND	1	0.009	0.05	mg/L	11/27/18	11/27/18	KLN	
Vanadium	ND	1	0.002	0.005	mg/L	11/27/18	11/27/18	KLN	
Zinc	**0.015 J**	1	0.007	0.05	mg/L	11/27/18	11/27/18	KLN	B1,J
Method: EPA 6020 NELAC Prep Method: EPA 3010A							QCBatchID: QC1198143		
Arsenic	ND	1	0.31	2	ug/L	11/29/18	11/29/18	JP	
Method: EPA 7470A NELAC Prep Method: Method							QCBatchID: QC1198091		
Mercury	ND	1	0.094	0.4	ug/L	11/28/18	11/28/18	SBW	
Method: EPA 8081A NELAC Prep Method: EPA 3510C							QCBatchID: QC1197961		
4,4'-DDD	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
4,4'-DDE	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
4,4'-DDT	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
a-BHC	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Aldrin	ND	1	0.007	0.1	ug/L	11/25/18	11/26/18	TD	
b-BHC	ND	1	0.003	0.1	ug/L	11/25/18	11/26/18	TD	
Chlordane (technical)	ND	1	0.27	1	ug/L	11/25/18	11/26/18	TD	
d-BHC	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
Dieldrin	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan I	ND	1	0.004	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan II	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan sulfate	ND	1	0.012	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin	ND	1	0.008	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin aldehyde	ND	1	0.009	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin Ketone	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
Heptachlor	ND	1	0.003	0.1	ug/L	11/25/18	11/26/18	TD	
Heptachlor epoxide	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Lindane (Gamma-BHC)	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Methoxychlor	ND	1	0.055	0.1	ug/L	11/25/18	11/26/18	TD	
Toxaphene	ND	1	0.48	2	ug/L	11/25/18	11/26/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*64*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*60*	*50-150*	

Method: EPA 8082 NELAC Prep Method: EPA 3510C							QCBatchID: QC1197962		
PCB-1016	ND	1	0.058	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1221	ND	1	0.253	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1232	ND	1	0.196	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1242	ND	1	0.169	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1248	ND	1	0.1	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1254	ND	1	0.054	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1260	ND	1	0.08	0.5	ug/L	11/25/18	11/26/18	TD	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 16:30	**Site:**			
Sample #:	**408720-060**	**Client Sample #:**	Equipment Blank- Day 1	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1262	ND	1	0.045	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1268	ND	1	0.062	0.5	ug/L	11/25/18	11/26/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 11/20/2018 13:11 **Site:**
Sample #: 408720-061 **Client Sample #:** Equipment Blank- Day 2 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC Prep Method: EPA 3010A							QCBatchID: QC1198051		
Antimony	ND	1	0.014	0.04	mg/L	11/27/18	11/27/18	KLN	
Arsenic	ND	1	0.008	0.01	mg/L	11/27/18	11/27/18	KLN	
Barium	ND	1	0.002	0.01	mg/L	11/27/18	11/27/18	KLN	
Beryllium	ND	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	
Cadmium	**0.002 J**	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	B1,J
Chromium	ND	1	0.002	0.01	mg/L	11/27/18	11/27/18	KLN	
Cobalt	ND	1	0.001	0.005	mg/L	11/27/18	11/27/18	KLN	
Copper	ND	1	0.004	0.01	mg/L	11/27/18	11/30/18	KLN	
Lead	ND	1	0.005	0.01	mg/L	11/27/18	11/30/18	KLN	
Molybdenum	ND	1	0.005	0.01	mg/L	11/27/18	11/30/18	KLN	
Nickel	**0.004 J**	1	0.003	0.02	mg/L	11/27/18	11/27/18	KLN	B1,J
Selenium	ND	1	0.016	0.03	mg/L	11/27/18	11/27/18	KLN	
Silver	ND	1	0.003	0.005	mg/L	11/27/18	11/27/18	KLN	
Thallium	**0.035 J**	1	0.009	0.05	mg/L	11/27/18	11/27/18	KLN	J
Vanadium	ND	1	0.002	0.005	mg/L	11/27/18	11/27/18	KLN	
Zinc	**0.024 J**	1	0.007	0.05	mg/L	11/27/18	11/27/18	KLN	B1,J
Method: EPA 6020 NELAC Prep Method: EPA 3010A							QCBatchID: QC1198143		
Arsenic	ND	1	0.31	2	ug/L	11/29/18	11/29/18	JP	
Method: EPA 7470A NELAC Prep Method: Method							QCBatchID: QC1198091		
Mercury	ND	1	0.094	0.4	ug/L	11/28/18	11/28/18	SBW	
Method: EPA 8081A NELAC Prep Method: EPA 3510C							QCBatchID: QC1197961		
4,4'-DDD	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
4,4'-DDE	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
4,4'-DDT	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
a-BHC	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Aldrin	ND	1	0.007	0.1	ug/L	11/25/18	11/26/18	TD	
b-BHC	ND	1	0.003	0.1	ug/L	11/25/18	11/26/18	TD	
Chlordane (technical)	ND	1	0.27	1	ug/L	11/25/18	11/26/18	TD	
d-BHC	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
Dieldrin	ND	1	0.006	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan I	ND	1	0.004	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan II	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
Endosulfan sulfate	ND	1	0.012	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin	ND	1	0.008	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin aldehyde	ND	1	0.009	0.1	ug/L	11/25/18	11/26/18	TD	
Endrin Ketone	ND	1	0.011	0.1	ug/L	11/25/18	11/26/18	TD	
Heptachlor	ND	1	0.003	0.1	ug/L	11/25/18	11/26/18	TD	
Heptachlor epoxide	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Lindane (Gamma-BHC)	ND	1	0.002	0.1	ug/L	11/25/18	11/26/18	TD	
Methoxychlor	ND	1	0.055	0.1	ug/L	11/25/18	11/26/18	TD	
Toxaphene	ND	1	0.48	2	ug/L	11/25/18	11/26/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*60*	*50-150*	

Method: EPA 8082 NELAC Prep Method: EPA 3510C							QCBatchID: QC1197962		
PCB-1016	ND	1	0.058	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1221	ND	1	0.253	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1232	ND	1	0.196	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1242	ND	1	0.169	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1248	ND	1	0.1	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1254	ND	1	0.054	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1260	ND	1	0.08	0.5	ug/L	11/25/18	11/26/18	TD	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 13:11	**Site:**			
Sample #:	**408720-061**	**Client Sample #:**	Equipment Blank- Day 2	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1262	ND	1	0.045	0.5	ug/L	11/25/18	11/26/18	TD	
PCB-1268	ND	1	0.062	0.5	ug/L	11/25/18	11/26/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*74*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 13:20	**Site:**			
Sample #:	**408720-062**	**Client Sample #:**	Soil Sample Composite	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197967		
Antimony	**1.29 J**	1	0.37	3	mg/Kg	11/25/18	11/27/18	KLN	J
Arsenic	**7.66**	1	0.36	1	mg/Kg	11/25/18	11/27/18	KLN	
Barium	**130**	1	0.23	1	mg/Kg	11/25/18	11/30/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Cadmium	**1.65**	1	0.21	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Chromium	**28.4**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	
Cobalt	**11.2**	1	0.19	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Copper	**20.7**	1	0.31	1	mg/Kg	11/25/18	11/27/18	KLN	B
Lead	**18.2**	1	0.32	1	mg/Kg	11/25/18	12/03/18	KLN	
Molybdenum	**0.94 J**	1	0.13	1	mg/Kg	11/25/18	11/27/18	KLN	B1,J
Nickel	**20.5**	1	0.2	1.5	mg/Kg	11/25/18	12/03/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/25/18	11/27/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/25/18	11/27/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/25/18	11/27/18	KLN	
Vanadium	**52.0**	1	0.37	0.5	mg/Kg	11/25/18	11/30/18	KLN	
Zinc	**69.3**	1	0.28	5	mg/Kg	11/25/18	11/27/18	KLN	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1198120		
Lead	**0.105**	1	0.005	0.015	mg/L	11/28/18	11/28/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197969		
Arsenic	**5.96**	10	0.2	3	mg/Kg	11/25/18	11/26/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197976		
Mercury	ND	1	0.039	0.14	mg/Kg	11/26/18	11/26/18	SBW	
Method: EPA 8015M Prep Method: EPA 3580A							QCBatchID: QC1198012		
TPH (C13 to C22)	ND	1	10	10	mg/Kg	11/26/18	11/27/18	MTS	
TPH (C23 to C44)	**18**	1	10	10	mg/Kg	11/26/18	11/27/18	MTS	
TPH (C6 to C12)	ND	1	10	10	mg/Kg	11/26/18	11/27/18	MTS	
Surrogate	*% Recovery*		*Limits*	*Notes*					
Triacontane (SUR)	*110*		*50-150*						
Method: EPA 8081A *NELAC* Prep Method: See Attached							QCBatchID:		
See Attached		1							
Method: EPA 8082 *NELAC* Prep Method: See Attached							QCBatchID:		
See Attached		1							
Method: EPA 8260B *NELAC* Prep Method: EPA 5030							QCBatchID: QC1197948		
1,1,1,2-Tetrachloroethane	ND	1	0.24	5	ug/Kg		11/24/18	ZZ	
1,1,1-Trichloroethane	ND	1	0.15	5	ug/Kg		11/24/18	ZZ	
1,1,2,2-Tetrachloroethane	ND	1	0.29	5	ug/Kg		11/24/18	ZZ	
1,1,2-Trichloroethane	ND	1	0.22	5	ug/Kg		11/24/18	ZZ	
1,1,2-Trichlorotrifluoroethane	ND	1	0.74	5	ug/Kg		11/24/18	ZZ	
1,1-Dichloroethane	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
1,1-Dichloroethene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
1,1-Dichloropropene	ND	1	0.21	5	ug/Kg		11/24/18	ZZ	
1,2,3-Trichlorobenzene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
1,2,3-Trichloropropane	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
1,2,4-Trichlorobenzene	ND	1	0.33	5	ug/Kg		11/24/18	ZZ	
1,2,4-Trimethylbenzene	ND	1	0.28	5	ug/Kg		11/24/18	ZZ	
1,2-Dibromo-3-chloropropane	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
1,2-Dibromoethane	ND	1	0.12	5	ug/Kg		11/24/18	ZZ	
1,2-Dichlorobenzene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
1,2-Dichloroethane	ND	1	0.14	5	ug/Kg		11/24/18	ZZ	
1,2-Dichloropropane	ND	1	0.34	5	ug/Kg		11/24/18	ZZ	
1,3,5-Trimethylbenzene	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
1,3-Dichlorobenzene	ND	1	0.21	5	ug/Kg		11/24/18	ZZ	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 13:20	**Site:**			
Sample #:	**408720-062**	**Client Sample #:**	Soil Sample Composite	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
1,3-Dichloropropane	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
1,4-Dichlorobenzene	ND	1	0.24	5	ug/Kg		11/24/18	ZZ	
2,2-Dichloropropane	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
2-Butanone (MEK)	**1.8 J**	1	0.72	100	ug/Kg		11/24/18	ZZ	B1,J
2-Chlorotoluene	ND	1	0.25	5	ug/Kg		11/24/18	ZZ	
4-Chlorotoluene	ND	1	0.22	5	ug/Kg		11/24/18	ZZ	
4-Isopropyltoluene	ND	1	0.27	5	ug/Kg		11/24/18	ZZ	
4-Methyl-2-pentanone (MIBK)	ND	1	0.17	5	ug/Kg		11/24/18	ZZ	
Acetone	ND	1	50	100	ug/Kg		11/24/18	ZZ	
Allyl Chloride	ND	1	0.14	5	ug/Kg		11/24/18	ZZ	
Benzene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
Bromobenzene	ND	1	0.3	5	ug/Kg		11/24/18	ZZ	
Bromochloromethane	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
Bromodichloromethane	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
Bromoform	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
Bromomethane	ND	1	0.22	5	ug/Kg		11/24/18	ZZ	
Carbon Tetrachloride	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
Chlorobenzene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
Chlorodibromomethane	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
Chloroethane	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
Chloroform	**0.56 J**	1	0.17	5	ug/Kg		11/24/18	ZZ	J
Chloromethane	ND	1	0.21	5	ug/Kg		11/24/18	ZZ	
cis-1,2-Dichloroethene	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
cis-1,3-dichloropropene	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
cis-1,4-dichloro-2-butene	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
Dibromomethane	ND	1	0.21	5	ug/Kg		11/24/18	ZZ	
Dichlorodifluoromethane	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
Ethylbenzene	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
Hexachlorobutadiene	ND	1	0.42	5	ug/Kg		11/24/18	ZZ	
Isopropylbenzene	ND	1	0.25	5	ug/Kg		11/24/18	ZZ	
m and p-Xylene	ND	1	0.38	5	ug/Kg		11/24/18	ZZ	
Methylene chloride	**8.7**	1	0.21	5	ug/Kg		11/24/18	ZZ	
Methyl-t-butyl Ether (MTBE)	ND	1	0.17	5	ug/Kg		11/24/18	ZZ	
Naphthalene	ND	1	0.16	5	ug/Kg		11/24/18	ZZ	
N-butylbenzene	ND	1	0.25	5	ug/Kg		11/24/18	ZZ	
N-propylbenzene	ND	1	0.22	5	ug/Kg		11/24/18	ZZ	
o-Xylene	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
Sec-butylbenzene	ND	1	0.28	5	ug/Kg		11/24/18	ZZ	
Styrene	ND	1	0.13	5	ug/Kg		11/24/18	ZZ	
Tert-butylbenzene	ND	1	0.34	5	ug/Kg		11/24/18	ZZ	
Tetrachloroethene	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
Toluene	ND	1	0.17	5	ug/Kg		11/24/18	ZZ	
trans-1,2-dichloroethene	ND	1	0.19	5	ug/Kg		11/24/18	ZZ	
trans-1,3-dichloropropene	ND	1	0.18	5	ug/Kg		11/24/18	ZZ	
trans-1,4-dichloro-2-butene	ND	1	0.2	5	ug/Kg		11/24/18	ZZ	
Trichloroethene	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
Trichlorofluoromethane	ND	1	0.23	5	ug/Kg		11/24/18	ZZ	
Vinyl Chloride	ND	1	0.14	5	ug/Kg		11/24/18	ZZ	
Xylenes (Total)	ND	1	0.38	5	ug/Kg		11/24/18	ZZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*128*	*70-145*	
4-Bromofluorobenzene (SUR)	*102*	*70-145*	
Dibromofluoromethane (SUR)	*124*	*70-145*	
Toluene-d8 (SUR)	*102*	*70-145*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 13:20	**Site:**			
Sample #:	**408720-062**	**Client Sample #:**	Soil Sample Composite	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8270C *NELAC* Prep Method: EPA 3545							QCBatchID: QC1198135		
1,2,4-Trichlorobenzene	ND	1	22	250	ug/Kg	01/29/18	11/29/18	MTS	
1,2-Dichlorobenzene	ND	1	37	250	ug/Kg	01/29/18	11/29/18	MTS	
1,3-Dichlorobenzene	ND	1	50	250	ug/Kg	01/29/18	11/29/18	MTS	
1,4-Dichlorobenzene	ND	1	31	250	ug/Kg	01/29/18	11/29/18	MTS	
1-Methylnaphthalene	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
2,4,5-Trichlorophenol	ND	1	43	250	ug/Kg	01/29/18	11/29/18	MTS	
2,4,6-Trichlorophenol	ND	1	35	250	ug/Kg	01/29/18	11/29/18	MTS	
2,4-Dichlorophenol	ND	1	23	250	ug/Kg	01/29/18	11/29/18	MTS	
2,4-Dimethylphenol	ND	1	100	250	ug/Kg	01/29/18	11/29/18	MTS	
2,4-Dinitrophenol	ND	1	23	1200	ug/Kg	01/29/18	11/29/18	MTS	
2,4-Dinitrotoluene	ND	1	14	250	ug/Kg	01/29/18	11/29/18	MTS	
2,6-Dinitrotoluene	ND	1	33	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Chloronaphthalene	ND	1	15	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Chlorophenol	ND	1	15	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Methyl-4,6-dinitrophenol	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Methylnaphthalene	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Methylphenol (o-Cresol)	ND	1	31	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Nitroaniline	ND	1	31	250	ug/Kg	01/29/18	11/29/18	MTS	
2-Nitrophenol	ND	1	16	250	ug/Kg	01/29/18	11/29/18	MTS	
3 and 4-Methylphenol (m and p-Cresol)	ND	1	19	400	ug/Kg	01/29/18	11/29/18	MTS	
3,3'-Dichlorobenzidine	ND	1	54	1200	ug/Kg	01/29/18	11/29/18	MTS	
3-Nitroaniline	ND	1	37	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Bromophenyl phenyl ether	ND	1	24	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Chloro-3-methylphenol	ND	1	18	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Chloroaniline	ND	1	73	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Chlorophenyl phenyl ether	ND	1	19	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Nitroaniline	ND	1	148	250	ug/Kg	01/29/18	11/29/18	MTS	
4-Nitrophenol	ND	1	117	250	ug/Kg	01/29/18	11/29/18	MTS	
Acenaphthene	ND	1	25	250	ug/Kg	01/29/18	11/29/18	MTS	
Acenaphthylene	ND	1	20	250	ug/Kg	01/29/18	11/29/18	MTS	
Aniline	ND	1	101	250	ug/Kg	01/29/18	11/29/18	MTS	
Anthracene	ND	1	23	250	ug/Kg	01/29/18	11/29/18	MTS	
Azobenzene	ND	1	67	250	ug/Kg	01/29/18	11/29/18	MTS	
Benz(a)anthracene	ND	1	22	250	ug/Kg	01/29/18	11/29/18	MTS	
Benzidine	ND	1	23	1200	ug/Kg	01/29/18	11/29/18	MTS	
Benzo(a)pyrene	ND	1	25	250	ug/Kg	01/29/18	11/29/18	MTS	
Benzo(b)fluoranthene	ND	1	27	250	ug/Kg	01/29/18	11/29/18	MTS	
Benzo(g,h,i)perylene	ND	1	29	250	ug/Kg	01/29/18	11/29/18	MTS	
Benzo(k)fluoranthene	ND	1	32	250	ug/Kg	01/29/18	11/29/18	MTS	
Benzoic acid	ND	1	36	1200	ug/Kg	01/29/18	11/29/18	MTS	
Benzyl alcohol	ND	1	36	250	ug/Kg	01/29/18	11/29/18	MTS	
Bis(2-chloroethoxy)methane	ND	1	15	250	ug/Kg	01/29/18	11/29/18	MTS	
Bis(2-chloroethyl) Ether	ND	1	25	1200	ug/Kg	01/29/18	11/29/18	MTS	
Bis(2-chloroisopropyl) Ether	ND	1	17	250	ug/Kg	01/29/18	11/29/18	MTS	
Bis(2-ethylhexyl) phthalate	ND	1	52	250	ug/Kg	01/29/18	11/29/18	MTS	
Butylbenzyl Phthalate	ND	1	44	250	ug/Kg	01/29/18	11/29/18	MTS	
Carbazole	ND	1	23	250	ug/Kg	01/29/18	11/29/18	MTS	
Chrysene	ND	1	20	250	ug/Kg	01/29/18	11/29/18	MTS	
Dibenz(a,h)anthracene	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
Dibenzofuran	ND	1	14	250	ug/Kg	01/29/18	11/29/18	MTS	
Diethyl phthalate	ND	1	24	250	ug/Kg	01/29/18	11/29/18	MTS	
Dimethyl phthalate	ND	1	22	250	ug/Kg	01/29/18	11/29/18	MTS	
Di-n-butyl phthalate	ND	1	67	250	ug/Kg	01/29/18	11/29/18	MTS	
Di-n-octyl phthalate	ND	1	23	250	ug/Kg	01/29/18	11/29/18	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/20/2018 13:20	**Site:**			
Sample #:	**408720-062**	**Client Sample #:**	Soil Sample Composite	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Fluoranthene	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
Fluorene	ND	1	27	250	ug/Kg	01/29/18	11/29/18	MTS	
Hexachlorobenzene	ND	1	15	250	ug/Kg	01/29/18	11/29/18	MTS	
Hexachlorobutadiene	ND	1	39	250	ug/Kg	01/29/18	11/29/18	MTS	
Hexachlorocyclopentadiene	ND	1	14	1200	ug/Kg	01/29/18	11/29/18	MTS	
Hexachloroethane	ND	1	43	250	ug/Kg	01/29/18	11/29/18	MTS	
Indeno(1,2,3-cd)pyrene	ND	1	90	250	ug/Kg	01/29/18	11/29/18	MTS	
Isophorone	ND	1	25	250	ug/Kg	01/29/18	11/29/18	MTS	
Naphthalene	ND	1	25	250	ug/Kg	01/29/18	11/29/18	MTS	
Nitrobenzene	ND	1	21	1200	ug/Kg	01/29/18	11/29/18	MTS	
N-Nitrosodimethylamine (NDMA)	ND	1	34	250	ug/Kg	01/29/18	11/29/18	MTS	
N-Nitrosodi-n-propylamine (NDPA)	ND	1	26	250	ug/Kg	01/29/18	11/29/18	MTS	
N-Nitrosodiphenylamine	ND	1	24	250	ug/Kg	01/29/18	11/29/18	MTS	
Pentachlorophenol	ND	1	55	1200	ug/Kg	01/29/18	11/29/18	MTS	
Phenanthrene	ND	1	22	250	ug/Kg	01/29/18	11/29/18	MTS	
Phenol	ND	1	26	250	ug/Kg	01/29/18	11/29/18	MTS	
Pyrene	ND	1	23	250	ug/Kg	01/29/18	11/29/18	MTS	
Pyridine	ND	1	21	250	ug/Kg	01/29/18	11/29/18	MTS	
Total Cresol	ND	1	400	400	ug/Kg	01/29/18	11/29/18	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
2,4,6-Tribromophenol (SUR)	*85*	*34-143*	
2-Fluorobiphenyl (SUR)	*62*	*41-125*	
2-Fluorophenol (SUR)	*54*	*13-153*	
Nitrobenzene-d5 (SUR)	*61*	*27-125*	
p-Terphenyl (SUR)	*71*	*33-155*	
Phenol-d5 (SUR)	*63*	*10-110*	

QCBatchID: QC1197948	**Analyst:** lucy		**Method:** EPA 8260B		
Matrix: Solid	**Analyzed:** 11/24/2018		**Instrument:** VOA-MS (group)		

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197948MB1					
1,1,1,2-Tetrachloroethane	ND	ug/Kg	0.24	5	
1,1,1-Trichloroethane	ND	ug/Kg	0.15	5	
1,1,2,2-Tetrachloroethane	ND	ug/Kg	0.29	5	
1,1,2-Trichloroethane	ND	ug/Kg	0.22	5	
1,1,2-Trichlorotrifluoroethane	ND	ug/Kg	0.74	5	
1,1-Dichloroethane	ND	ug/Kg	0.23	5	
1,1-Dichloroethene	ND	ug/Kg	0.18	5	
1,1-Dichloropropene	ND	ug/Kg	0.21	5	
1,2,3-Trichlorobenzene	ND	ug/Kg	0.18	5	
1,2,3-Trichloropropane	ND	ug/Kg	0.2	5	
1,2,4-Trichlorobenzene	ND	ug/Kg	0.33	5	
1,2,4-Trimethylbenzene	ND	ug/Kg	0.28	5	
1,2-Dibromo-3-chloropropane	ND	ug/Kg	0.2	5	
1,2-Dibromoethane	ND	ug/Kg	0.12	5	
1,2-Dichlorobenzene	ND	ug/Kg	0.18	5	
1,2-Dichloroethane	ND	ug/Kg	0.14	5	
1,2-Dichloropropane	ND	ug/Kg	0.34	5	
1,3,5-Trimethylbenzene	ND	ug/Kg	0.23	5	
1,3-Dichlorobenzene	ND	ug/Kg	0.21	5	
1,3-Dichloropropane	ND	ug/Kg	0.19	5	
1,4-Dichlorobenzene	ND	ug/Kg	0.24	5	
2,2-Dichloropropane	ND	ug/Kg	0.19	5	
2-Butanone (MEK)	**1.6 J**	ug/Kg	0.72	100	
2-Chlorotoluene	ND	ug/Kg	0.25	5	
4-Chlorotoluene	ND	ug/Kg	0.22	5	
4-Isopropyltoluene	ND	ug/Kg	0.27	5	
4-Methyl-2-pentanone (MIBK)	ND	ug/Kg	0.17	5	
Acetone	ND	ug/Kg	50	100	
Allyl Chloride	ND	ug/Kg	0.14	5	
Benzene	ND	ug/Kg	0.18	5	
Bromobenzene	ND	ug/Kg	0.3	5	
Bromochloromethane	ND	ug/Kg	0.18	5	
Bromodichloromethane	ND	ug/Kg	0.2	5	
Bromoform	ND	ug/Kg	0.19	5	
Bromomethane	ND	ug/Kg	0.22	5	
Carbon Tetrachloride	ND	ug/Kg	0.18	5	
Chlorobenzene	ND	ug/Kg	0.18	5	
Chlorodibromomethane	ND	ug/Kg	0.19	5	
Chloroethane	ND	ug/Kg	0.2	5	
Chloroform	ND	ug/Kg	0.17	5	
Chloromethane	ND	ug/Kg	0.21	5	
cis-1,2-Dichloroethene	ND	ug/Kg	0.2	5	
cis-1,3-dichloropropene	ND	ug/Kg	0.2	5	
cis-1,4-dichloro-2-butene	ND	ug/Kg	0.2	5	
Dibromomethane	ND	ug/Kg	0.23	5	
Dichlorodifluoromethane	ND	ug/Kg	0.23	5	
Di-isopropyl ether (DIPE)	ND	ug/Kg	0.21	5	
Ethanol	ND	ug/Kg	100	500	
Ethylbenzene	ND	ug/Kg	0.25	5	
Ethyl-tertbutylether (ETBE)	ND	ug/Kg	0.42	5	
Hexachlorobutadiene	ND	ug/Kg	0.38	5	
Isopropylbenzene	ND	ug/Kg	0.17	5	

QCBatchID: QC1197948 **Analyst:** lucy **Method:** EPA 8260B

Matrix: Solid **Analyzed:** 11/24/2018 **Instrument:** VOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197948MB1					
m and p-Xylene	ND	ug/Kg	0.21	5	
Methylene chloride	**2.4 J**	ug/Kg	0.22	5	
Methyl-t-butyl Ether (MTBE)	ND	ug/Kg	0.25	5	
Naphthalene	ND	ug/Kg	0.28	5	
N-butylbenzene	ND	ug/Kg	0.16	5	
N-propylbenzene	ND	ug/Kg	0.19	5	
o-Xylene	ND	ug/Kg	0.13	5	
Sec-butylbenzene	ND	ug/Kg	0.34	5	
Styrene	ND	ug/Kg	0.23	5	
t-Butyl alcohol (TBA)	ND	ug/Kg	8.8	10	
Tert-amylmethylether (TAME)	ND	ug/Kg	0.19	5	
Tert-butylbenzene	ND	ug/Kg	0.18	5	
Tetrachloroethene	ND	ug/Kg	0.2	5	
Toluene	ND	ug/Kg	0.23	5	
trans-1,2-dichloroethene	ND	ug/Kg	0.23	5	
trans-1,3-dichloropropene	ND	ug/Kg	0.14	5	
trans-1,4-dichloro-2-butene	ND	ug/Kg	0.38	5	
Trichloroethene	ND	ug/Kg	0.39	5	
Trichlorofluoromethane	ND	ug/Kg	0.25	5	
Vinyl Chloride	ND	ug/Kg	0.18	5	
Xylenes (Total)	ND	ug/Kg	0.45	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197948LCS1											
1,1-Dichloroethene	50		54		ug/Kg	108			59-172		
Benzene	50		48		ug/Kg	96			62-137		
Chlorobenzene	50		46		ug/Kg	92			60-133		
Methyl-t-butyl Ether (MTBE)	50		46		ug/Kg	92			62-137		
Toluene	50		46		ug/Kg	92			59-139		
Trichloroethene	50		47		ug/Kg	94			66-142		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197948MS1, QC1197948MSD1												**Source: 408726-003**
1,1-Dichloroethene	ND	50	50	54	53	ug/Kg	108	106	1.9	59-172	22	
Benzene	ND	50	50	47	50	ug/Kg	94	100	6.2	62-137	24	
Chlorobenzene	ND	50	50	44	42	ug/Kg	88	84	4.7	60-133	24	
Methyl-t-butyl Ether (MTBE)	ND	50	50	48	49	ug/Kg	96	98	2.1	62-137	21	
Toluene	1.8	50	50	45	45	ug/Kg	86	86	0.0	59-139	21	
Trichloroethene	ND	50	50	48	46	ug/Kg	96	92	4.3	66-142	21	

QCBatchID: QC1197961 **Analyst:** Jarriaga **Method:** EPA 8081A

Matrix: Water **Analyzed:** 11/25/2018 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197961MB1					
4,4'-DDD	ND	ug/L	0.011	0.1	
4,4'-DDE	ND	ug/L	0.006	0.1	
4,4'-DDT	ND	ug/L	0.011	0.1	
a-BHC	ND	ug/L	0.002	0.1	
Aldrin	ND	ug/L	0.007	0.1	
b-BHC	ND	ug/L	0.003	0.1	
Chlordane (technical)	ND	ug/L	0.27	1	
d-BHC	ND	ug/L	0.006	0.1	
Dieldrin	ND	ug/L	0.006	0.1	
Endosulfan I	ND	ug/L	0.004	0.1	
Endosulfan II	ND	ug/L	0.011	0.1	
Endosulfan sulfate	ND	ug/L	0.012	0.1	
Endrin	ND	ug/L	0.008	0.1	
Endrin aldehyde	ND	ug/L	0.009	0.1	
Endrin Ketone	ND	ug/L	0.011	0.1	
Heptachlor	ND	ug/L	0.003	0.1	
Heptachlor epoxide	ND	ug/L	0.002	0.1	
Lindane (Gamma-BHC)	ND	ug/L	0.002	0.1	
Methoxychlor	ND	ug/L	0.055	0.1	
Toxaphene	ND	ug/L	0.48	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197961LCS1, QC1197961LCSD1											
4,4'-DDD	0.5	0.5	0.36	0.35	ug/L	72	70	3	42-142	20	
4,4'-DDE	0.5	0.5	0.35	0.35	ug/L	70	70	0	48-133	20	
4,4'-DDT	0.5	0.5	0.41	0.40	ug/L	82	80	2	40-143	20	
a-BHC	0.5	0.5	0.31	0.31	ug/L	62	62	0	55-122	20	
Aldrin	0.5	0.5	0.35	0.34	ug/L	70	68	3	46-117	20	
b-BHC	0.5	0.5	0.38	0.36	ug/L	76	72	5	46-136	20	
d-BHC	0.5	0.5	0.34	0.34	ug/L	68	68	0	53-124	20	
Dieldrin	0.5	0.5	0.36	0.38	ug/L	72	76	5	49-129	20	
Endosulfan I	0.5	0.5	0.34	0.34	ug/L	68	68	0	54-122	20	
Endosulfan II	0.5	0.5	0.35	0.34	ug/L	70	68	3	46-132	20	
Endosulfan sulfate	0.5	0.5	0.39	0.38	ug/L	78	76	3	52-129	20	
Endrin	0.5	0.5	0.41	0.41	ug/L	82	82	0	57-145	20	
Endrin aldehyde	0.5	0.5	0.35	0.34	ug/L	70	68	3	48-116	20	
Endrin Ketone	0.5	0.5	0.36	0.36	ug/L	72	72	0	44-137	20	
Heptachlor	0.5	0.5	0.35	0.37	ug/L	70	74	6	51-128	20	
Heptachlor epoxide	0.5	0.5	0.32	0.32	ug/L	64	64	0	51-122	20	
Lindane (Gamma-BHC)	0.5	0.5	0.33	0.33	ug/L	66	66	0	54-128	20	
Methoxychlor	0.5	0.5	0.61	0.59	ug/L	122	118	3	52-158	20	

QCBatchID: QC1197962 **Analyst:** Jarriaga **Method:** EPA 8082

Matrix: Water **Analyzed:** 11/25/2018 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197962MB1					
PCB-1016	ND	ug/L	0.058	0.5	
PCB-1221	ND	ug/L	0.253	0.5	
PCB-1232	ND	ug/L	0.196	0.5	
PCB-1242	ND	ug/L	0.169	0.5	
PCB-1248	ND	ug/L	0.1	0.5	
PCB-1254	ND	ug/L	0.054	0.5	
PCB-1260	ND	ug/L	0.08	0.5	
PCB-1262	ND	ug/L	0.045	0.5	
PCB-1268	ND	ug/L	0.062	0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1197962LCS1, QC1197962LCSD1											
PCB-1016	5	5	4.4	4.7	ug/L	88	94	7	70-130	20	
PCB-1260	5	5	4.3	4.5	ug/L	86	90	5	70-130	20	

QCBatchID: QC1197966 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/26/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197966MB1					
Antimony	**0.96 J**	mg/Kg	0.37	3	
Arsenic	**0.45 J**	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	**0.43 J**	mg/Kg	0.32	1	
Molybdenum	**0.51 J**	mg/Kg	0.13	1	
Nickel	**0.63 J**	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	**0.94 J**	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197966LCS1											
Antimony	100		108		mg/Kg	108			80-120		
Arsenic	100		100		mg/Kg	100			80-120		
Barium	100		106		mg/Kg	106			80-120		
Beryllium	100		100		mg/Kg	100			80-120		
Cadmium	100		95.5		mg/Kg	96			80-120		
Chromium	100		94.9		mg/Kg	95			80-120		
Cobalt	100		103		mg/Kg	103			80-120		
Copper	100		97.6		mg/Kg	98			80-120		
Lead	100		108		mg/Kg	108			80-120		
Molybdenum	100		103		mg/Kg	103			80-120		
Nickel	100		108		mg/Kg	108			80-120		
Selenium	100		88.9		mg/Kg	89			80-120		
Silver	100		103		mg/Kg	103			80-120		
Thallium	100		99.3		mg/Kg	99			80-120		
Vanadium	100		105		mg/Kg	105			80-120		
Zinc	100		103		mg/Kg	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197966MS1, QC1197966MSD1												**Source: 408720-001**
Antimony	1.25	100	100	50.5	45.5	mg/Kg	49	44	10.4	75-125	20	M
Arsenic	4.91	100	100	107	96.0	mg/Kg	102	91	10.8	75-125	20	
Barium	123	100	100	241	221	mg/Kg	118	98	8.7	75-125	20	
Beryllium	ND	100	100	96.8	95.1	mg/Kg	97	95	1.8	75-125	20	
Cadmium	1.34	100	100	95.7	88.9	mg/Kg	94	88	7.4	75-125	20	
Chromium	28.5	100	100	126	117	mg/Kg	98	89	7.4	75-125	20	
Cobalt	11.3	100	100	111	101	mg/Kg	100	90	9.4	75-125	20	
Copper	17.9	100	100	119	109	mg/Kg	101	91	8.8	75-125	20	
Lead	212	100	100	352	280	mg/Kg	140	68	22.8	75-125	20	M
Molybdenum	2.19	100	100	98.5	90.5	mg/Kg	96	88	8.5	75-125	20	

QCBatchID: QC1197966	**Analyst:** dswafford	**Method:** EPA 6010B			
Matrix: Solid	**Analyzed:** 11/26/2018	**Instrument:** AAICP (group)			

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197966MS1, QC1197966MSD1												**Source: 408720-001**
Nickel	17.6	100	100	121	112	mg/Kg	103	94	7.7	75-125	20	
Selenium	ND	100	100	89.8	85.1	mg/Kg	90	85	5.4	75-125	20	
Silver	ND	100	100	102	94.0	mg/Kg	102	94	8.2	75-125	20	
Thallium	2.24	100	100	89.9	86.5	mg/Kg	88	84	3.9	75-125	20	
Vanadium	48.7	100	100	163	151	mg/Kg	114	102	7.6	75-125	20	
Zinc	108	100	100	214	197	mg/Kg	106	89	8.3	75-125	20	

QCBatchID: QC1197967 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/26/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1197967MB1						
Antimony	ND		mg/Kg	0.37	3	
Arsenic	ND		mg/Kg	0.36	1	
Barium	ND		mg/Kg	0.23	1	
Beryllium	ND		mg/Kg	0.17	0.5	
Cadmium	ND		mg/Kg	0.21	0.5	
Chromium	ND		mg/Kg	0.13	1	
Cobalt	ND		mg/Kg	0.19	0.5	
Copper	**1.32**		mg/Kg	0.31	1	B
Lead	**0.34**	**J**	mg/Kg	0.32	1	
Molybdenum	**0.26**	**J**	mg/Kg	0.13	1	
Nickel	**0.50**	**J**	mg/Kg	0.2	1.5	
Selenium	ND		mg/Kg	0.72	3	
Silver	ND		mg/Kg	0.13	0.5	
Thallium	ND		mg/Kg	0.42	3	
Vanadium	ND		mg/Kg	0.37	0.5	
Zinc	**0.95**	**J**	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197967LCS1											
Antimony	100		117		mg/Kg	117			80-120		
Arsenic	100		108		mg/Kg	108			80-120		
Barium	100		114		mg/Kg	114			80-120		
Beryllium	100		102		mg/Kg	102			80-120		
Cadmium	100		102		mg/Kg	102			80-120		
Chromium	100		102		mg/Kg	102			80-120		
Cobalt	100		110		mg/Kg	110			80-120		
Copper	100		105		mg/Kg	105			80-120		
Lead	100		117		mg/Kg	117			80-120		
Molybdenum	100		112		mg/Kg	112			80-120		
Nickel	100		118		mg/Kg	118			80-120		
Selenium	100		99.8		mg/Kg	100			80-120		
Silver	100		111		mg/Kg	111			80-120		
Thallium	100		108		mg/Kg	108			80-120		
Vanadium	100		114		mg/Kg	114			80-120		
Zinc	100		112		mg/Kg	112			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197967MS1, QC1197967MSD1												**Source: 408720-041**
Antimony	0.65	100	100	57.1	51.8	mg/Kg	56	51	9.7	75-125	20	M
Arsenic	7.28	100	100	97.4	95.9	mg/Kg	90	89	1.6	75-125	20	
Barium	108	100	100	205	210	mg/Kg	97	102	2.4	75-125	20	
Beryllium	ND	100	100	95.7	96.0	mg/Kg	96	96	0.3	75-125	20	
Cadmium	1.78	100	100	87.4	87.9	mg/Kg	86	86	0.6	75-125	20	
Chromium	22.8	100	100	107	111	mg/Kg	84	88	3.7	75-125	20	
Cobalt	9.31	100	100	97.8	98.6	mg/Kg	88	89	0.8	75-125	20	
Copper	27.0	100	100	115	115	mg/Kg	88	88	0.0	75-125	20	
Lead	25.8	100	100	118	117	mg/Kg	92	91	0.9	75-125	20	
Molybdenum	2.23	100	100	91.0	91.5	mg/Kg	89	89	0.5	75-125	20	

QCBatchID: QC1197967 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/26/2018 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197967MS1, QC1197967MSD1												**Source: 408720-041**
Nickel	17.6	100	100	112	112	mg/Kg	94	94	0.0	75-125	20	
Selenium	1.19	100	100	84.7	84.3	mg/Kg	84	83	0.5	75-125	20	
Silver	ND	100	100	93.2	93.8	mg/Kg	93	94	0.6	75-125	20	
Thallium	1.76	100	100	86.0	87.4	mg/Kg	84	86	1.6	75-125	20	
Vanadium	41.3	100	100	139	143	mg/Kg	98	102	2.8	75-125	20	
Zinc	104	100	100	179	177	mg/Kg	75	73	1.1	75-125	20	M

QCBatchID:	**QC1197968**	**Analyst:**	dswafford	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	11/26/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197968MB1					
Arsenic	**0.157 J**	mg/Kg	0.02	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1197968LCS1											
Arsenic	50		48.2		mg/Kg	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1197968MS1, QC1197968MSD1												**Source: 408720-001**
Arsenic	3.72	50	50	40.1	38.8	mg/Kg	73	70	3.3	75-125	20	M

QCBatchID: QC1197969 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 11/26/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197969MB1					
Arsenic	ND	mg/Kg	0.02	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197969LCS1											
Arsenic	50		47.2		mg/Kg	94			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197969MS1, QC1197969MSD1												**Source: 408720-041**
Arsenic	5.53	50	50	40.9	43.8	mg/Kg	71	77	6.8	75-125	20	M

QCBatchID:	**QC1197976**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	11/26/2018	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197976MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197976LCS1											
Mercury	0.83		0.83		mg/Kg	100			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197976MS1, QC1197976MSD1												**Source: 408720-041**
Mercury	ND	0.83	0.83	0.76	0.82	mg/Kg	92	99	7.6	75-125	20	

QCBatchID:	**QC1197977**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	11/26/2018	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197977MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197977LCS1											
Mercury	0.83		0.89		mg/Kg	107			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197977MS1, QC1197977MSD1												**Source: 408720-001**
Mercury	ND	0.83	0.83	0.88	0.83	mg/Kg	106	100	5.8	75-125	20	

QCBatchID:	**QC1198012**	**Analyst:**	ssabir	**Method:**	EPA 8015M
Matrix:	Solid	**Analyzed:**	11/26/2018	**Instrument:**	SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198012MB1					
TPH (C10 to C28)	ND	mg/Kg	10	10	
TPH (C13 to C22)	ND	mg/Kg	10	10	
TPH (C23 to C44)	ND	mg/Kg	20	20	
TPH (C6 to C12)	ND	mg/Kg	10	10	
TPH Diesel (SGT)	ND	mg/Kg	10	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198012LCS1											
TPH Diesel (SGT)	250		200		mg/Kg	80			36-138		

QCBatchID: QC1198051 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Water **Analyzed:** 11/27/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198051MB1					
Antimony	ND	mg/L	0.014	0.04	
Arsenic	ND	mg/L	0.008	0.01	
Barium	ND	mg/L	0.002	0.01	
Beryllium	ND	mg/L	0.001	0.005	
Cadmium	**0.003 J**	mg/L	0.001	0.005	
Chromium	ND	mg/L	0.002	0.01	
Cobalt	ND	mg/L	0.001	0.005	
Copper	ND	mg/L	0.004	0.01	
Lead	ND	mg/L	0.005	0.01	
Molybdenum	**0.0095 J**	mg/L	0.005	0.01	
Nickel	**0.005 J**	mg/L	0.003	0.02	
Selenium	ND	mg/L	0.016	0.03	
Silver	ND	mg/L	0.003	0.005	
Thallium	ND	mg/L	0.009	0.05	
Vanadium	ND	mg/L	0.002	0.005	
Zinc	**0.021 J**	mg/L	0.007	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198051LCS1											
Antimony	2		2.15		mg/L	108			80-120		
Arsenic	2		2.01		mg/L	101			80-120		
Barium	2		2.05		mg/L	103			80-120		
Beryllium	2		1.98		mg/L	99			80-120		
Cadmium	2		1.87		mg/L	94			80-120		
Chromium	2		1.80		mg/L	90			80-120		
Cobalt	2		1.95		mg/L	98			80-120		
Copper	2		1.89		mg/L	95			80-120		
Lead	2		2.15		mg/L	108			80-120		
Molybdenum	2		2.04		mg/L	102			80-120		
Nickel	2		2.00		mg/L	100			80-120		
Selenium	2		1.89		mg/L	95			80-120		
Silver	2		2.02		mg/L	101			80-120		
Thallium	2		1.97		mg/L	99			80-120		
Vanadium	2		2.04		mg/L	102			80-120		
Zinc	2		1.88		mg/L	94			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198051MS1, QC1198051MSD1												**Source: 408720-060**
Antimony	ND	1	1	1.12	1.14	mg/L	112	114	1.8	75-125	20	
Arsenic	ND	1	1	1.06	1.04	mg/L	106	104	1.9	75-125	20	
Barium	ND	1	1	1.12	1.13	mg/L	112	113	0.9	75-125	20	
Beryllium	ND	1	1	1.06	1.01	mg/L	106	101	4.8	75-125	20	
Cadmium	ND	1	1	1.03	1.03	mg/L	103	103	0.0	75-125	20	
Chromium	ND	1	1	0.952	0.919	mg/L	95	92	3.5	75-125	20	
Cobalt	ND	1	1	1.08	1.08	mg/L	108	108	0.0	75-125	20	
Copper	ND	1	1	0.983	0.956	mg/L	97	94	2.8	75-125	20	
Lead	ND	1	1	1.12	1.12	mg/L	112	112	0.0	75-125	20	
Molybdenum	0.0088	1	1	1.07	1.09	mg/L	106	108	1.9	75-125	20	

QCBatchID: QC1198051 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Water **Analyzed:** 11/27/2018 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198051MS1, QC1198051MSD1												**Source: 408720-060**
Nickel	ND	1	1	1.13	1.13	mg/L	113	113	0.0	75-125	20	
Selenium	ND	1	1	0.984	0.959	mg/L	98	96	2.6	75-125	20	
Silver	ND	1	1	1.08	1.10	mg/L	108	110	1.8	75-125	20	
Thallium	ND	1	1	1.04	1.03	mg/L	104	103	1.0	75-125	20	
Vanadium	ND	1	1	1.11	1.11	mg/L	111	111	0.0	75-125	20	
Zinc	0.015	1	1	1.05	1.09	mg/L	104	108	3.7	75-125	20	

QCBatchID:	**QC1198091**	**Analyst:**	sbailey-woo	**Method:**	EPA 7470A
Matrix:	Water	**Analyzed:**	11/28/2018	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198091MB1					
Mercury	ND	ug/L	0.094	0.4	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198091LCS1											
Mercury	5		4.90		ug/L	98			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198091MS1, QC1198091MSD1												**Source: 408695-039**
Mercury	ND	5	5	5.05	5.07	ug/L	101	101	0.4	75-125	20	

QCBatchID:	**QC1198120**	**Analyst:**	dswafford	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	11/28/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198120MB1					
Lead	ND	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1198120LCS1, QC1198120LCSD1											
Lead	2	2	2.11	2.17	mg/L	106	109	3	80-120	20	

QCBatchID: QC1198135	**Analyst:** Jarriaga		**Method:** EPA 8270C		
Matrix: Solid	**Analyzed:** 11/29/2018		**Instrument:** SVOA-MS (group)		

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198135MB1					
1,2,4-Trichlorobenzene	ND	ug/Kg	22	250	
1,2-Dichlorobenzene	ND	ug/Kg	37	250	
1,3-Dichlorobenzene	ND	ug/Kg	50	250	
1,4-Dichlorobenzene	ND	ug/Kg	31	250	
1-Methylnaphthalene	ND	ug/Kg	21	250	
2,4,5-Trichlorophenol	ND	ug/Kg	43	250	
2,4,6-Trichlorophenol	ND	ug/Kg	35	250	
2,4-Dichlorophenol	ND	ug/Kg	23	250	
2,4-Dimethylphenol	ND	ug/Kg	100	250	
2,4-Dinitrophenol	ND	ug/Kg	23	1200	
2,4-Dinitrotoluene	ND	ug/Kg	14	250	
2,6-Dinitrotoluene	ND	ug/Kg	33	250	
2-Chloronaphthalene	ND	ug/Kg	15	250	
2-Chlorophenol	ND	ug/Kg	15	250	
2-Methyl-4,6-dinitrophenol	ND	ug/Kg	21	250	
2-Methylnaphthalene	ND	ug/Kg	21	250	
2-Methylphenol (o-Cresol)	ND	ug/Kg	31	250	
2-Nitroaniline	ND	ug/Kg	31	250	
2-Nitrophenol	ND	ug/Kg	16	250	
3 and 4-Methylphenol (m and p-Cresol)	ND	ug/Kg	19	400	
3,3'-Dichlorobenzidine	ND	ug/Kg	54	1200	
3-Nitroaniline	ND	ug/Kg	37	250	
4-Bromophenyl phenyl ether	ND	ug/Kg	24	250	
4-Chloro-3-methylphenol	ND	ug/Kg	18	250	
4-Chloroaniline	ND	ug/Kg	73	250	
4-Chlorophenyl phenyl ether	ND	ug/Kg	19	250	
4-Nitroaniline	ND	ug/Kg	148	250	
4-Nitrophenol	ND	ug/Kg	117	250	
Acenaphthene	ND	ug/Kg	25	250	
Acenaphthylene	ND	ug/Kg	20	250	
Aniline	ND	ug/Kg	101	250	
Anthracene	ND	ug/Kg	23	250	
Azobenzene	ND	ug/Kg	67	250	
Benz(a)anthracene	ND	ug/Kg	22	250	
Benzidine	ND	ug/Kg	23	1200	
Benzo(a)pyrene	ND	ug/Kg	25	250	
Benzo(b)fluoranthene	ND	ug/Kg	27	250	
Benzo(g,h,i)perylene	ND	ug/Kg	29	250	
Benzo(k)fluoranthene	ND	ug/Kg	32	250	
Benzoic acid	ND	ug/Kg	36	1200	
Benzyl alcohol	ND	ug/Kg	36	250	
Bis(2-chloroethoxy)methane	ND	ug/Kg	15	250	
Bis(2-chloroethyl) Ether	ND	ug/Kg	25	1200	
Bis(2-chloroisopropyl) Ether	ND	ug/Kg	17	250	
Bis(2-ethylhexyl) phthalate	ND	ug/Kg	52	250	
Butylbenzyl Phthalate	ND	ug/Kg	44	250	
Carbazole	ND	ug/Kg	23	250	
Chrysene	ND	ug/Kg	20	250	
Dibenz(a,h)anthracene	ND	ug/Kg	21	250	
Dibenzofuran	ND	ug/Kg	14	250	
Diethyl phthalate	ND	ug/Kg	24	250	
Dimethyl phthalate	ND	ug/Kg	22	250	

QCBatchID: QC1198135 **Analyst:** Jarriaga **Method:** EPA 8270C

Matrix: Solid **Analyzed:** 11/29/2018 **Instrument:** SVOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198135MB1					
Di-n-butyl phthalate	ND	ug/Kg	67	250	
Di-n-octyl phthalate	ND	ug/Kg	23	250	
Fluoranthene	ND	ug/Kg	21	250	
Fluorene	ND	ug/Kg	27	250	
Hexachlorobenzene	ND	ug/Kg	15	250	
Hexachlorobutadiene	ND	ug/Kg	39	250	
Hexachlorocyclopentadiene	ND	ug/Kg	14	1200	
Hexachloroethane	ND	ug/Kg	43	250	
Indeno(1,2,3-cd)pyrene	ND	ug/Kg	90	250	
Isophorone	ND	ug/Kg	25	250	
Naphthalene	ND	ug/Kg	25	250	
Nitrobenzene	ND	ug/Kg	21	1200	
N-Nitrosodimethylamine (NDMA)	ND	ug/Kg	34	250	
N-Nitrosodi-n-propylamine (NDPA)	ND	ug/Kg	26	250	
N-Nitrosodiphenylamine	ND	ug/Kg	24	250	
Pentachlorophenol	ND	ug/Kg	55	1200	
Phenanthrene	ND	ug/Kg	22	250	
Phenol	ND	ug/Kg	26	250	
Pyrene	ND	ug/Kg	23	250	
Pyridine	ND	ug/Kg	21	250	
Total Cresol	ND	ug/Kg	400	400	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198135LCS1											
1,2,4-Trichlorobenzene	2000		1400		ug/Kg	70			43-111		
1,4-Dichlorobenzene	2000		1400		ug/Kg	70			30-116		
2,4,5-Trichlorophenol	2000		1600		ug/Kg	80			57-125		
2,4-Dimethylphenol	2000		1400		ug/Kg	70			50-112		
2,4-Dinitrotoluene	2000		1700		ug/Kg	85			57-124		
2-Chlorophenol	2000		1400		ug/Kg	70			48-114		
3 and 4-Methylphenol (m and p-Cresol)	2000		1500		ug/Kg	75			56-124		
4-Chloro-3-methylphenol	2000		1600		ug/Kg	80			61-122		
4-Nitrophenol	2000		1700		ug/Kg	85			54-126		
Acenaphthene	2000		1500		ug/Kg	75			53-112		
Benzo(b)fluoranthene	2000		1600		ug/Kg	80			61-125		
Chrysene	2000		1600		ug/Kg	80			59-117		
N-Nitrosodi-n-propylamine (NDPA)	2000		1400		ug/Kg	70			54-110		
Pentachlorophenol	2000		1600		ug/Kg	80			41-103		
Phenol	2000		1300		ug/Kg	65			51-111		
Pyrene	2000		1700		ug/Kg	85			63-119		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198135MS1, QC1198135MSD1												**Source: 408706-007**
1,2,4-Trichlorobenzene	ND	2000	2000	1400	1400	ug/Kg	70	70	0.0	35-93	30	
1,4-Dichlorobenzene	ND	2000	2000	1400	1400	ug/Kg	70	70	0.0	39-95	30	
2,4,5-Trichlorophenol	ND	2000	2000	1400	1300	ug/Kg	70	65	7.4	44-108	30	
2,4-Dimethylphenol	ND	2000	2000	1200	1100	ug/Kg	60	55	8.7	37-105	30	
2,4-Dinitrotoluene	ND	2000	2000	2500	2400	ug/Kg	125	120	4.1	48-109	30	M
2-Chlorophenol	ND	2000	2000	1300	1200	ug/Kg	65	60	8.0	42-102	30	

QCBatchID: QC1198135 **Analyst:** Jarriaga **Method:** EPA 8270C

Matrix: Solid **Analyzed:** 11/29/2018 **Instrument:** SVOA-MS (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198135MS1, QC1198135MSD1												**Source: 408706-007**
3 and 4-Methylphenol (m and p-Cresol)	ND	2000	2000	1400	1300	ug/Kg	70	65	7.4	33-116	30	
4-Chloro-3-methylphenol	ND	2000	2000	1300	1200	ug/Kg	65	60	8.0	33-120	30	
4-Nitrophenol	ND	2000	2000	3700	3400	ug/Kg	185	170	8.5	37-107	30	M
Acenaphthene	ND	2000	2000	1500	1400	ug/Kg	75	70	6.9	57-99	30	
Benzo(b)fluoranthene	ND	2000	2000	1300	1200	ug/Kg	65	60	8.0	59-126	30	
Chrysene	ND	2000	2000	1600	1500	ug/Kg	80	75	6.5	68-120	30	
N-Nitrosodi-n-propylamine (NDPA)	ND	2000	2000	1200	1200	ug/Kg	60	60	0.0	41-127	30	
Pentachlorophenol	ND	2000	2000	5000	4900	ug/Kg	250	245	2.0	43-120	30	M
Phenol	ND	2000	2000	1300	1300	ug/Kg	65	65	0.0	46-116	30	
Pyrene	ND	2000	2000	1600	1500	ug/Kg	80	75	6.5	53-129	30	

QCBatchID: QC1198143 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Water **Analyzed:** 11/29/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198143MB1					
Arsenic	ND	ug/L	0.31	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198143LCS1											
Arsenic	50		48.2		ug/L	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198143MS1, QC1198143MSD1												**Source: 408720-060**
Arsenic	ND	50	50	47.2	47.5	ug/L	94	95	0.6	75-125	20	

QCBatchID: QC1198412 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Solid **Analyzed:** 12/05/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198412MB1					
Arsenic	**0.022 J**	mg/Kg	0.02	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198412LCS1											
Arsenic	50		48.9		mg/Kg	98			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198412MS1, QC1198412MSD1												**Source: 408720-015**
Arsenic	3.57	50	50	49.7	49.6	mg/Kg	92	92	0.2	75-125	20	

QCBatchID: QC1198609 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 12/10/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198609MB1					
Aluminum	ND	mg/Kg	0.53	5	
Antimony	**0.91 J**	mg/Kg	0.37	3	
Arsenic	**0.65 J**	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	**0.84 J**	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Manganese	ND	mg/Kg	0.14	1	
Molybdenum	**0.43 J**	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	**0.70 J**	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	**1.07 J**	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198609LCS1											
Antimony	100		105		mg/Kg	105			80-120		
Arsenic	100		104		mg/Kg	104			80-120		
Barium	100		108		mg/Kg	108			80-120		
Beryllium	100		97.5		mg/Kg	98			80-120		
Cadmium	100		102		mg/Kg	102			80-120		
Chromium	100		98.1		mg/Kg	98			80-120		
Cobalt	100		106		mg/Kg	106			80-120		
Copper	100		100		mg/Kg	100			80-120		
Lead	100		108		mg/Kg	108			80-120		
Molybdenum	100		103		mg/Kg	103			80-120		
Nickel	100		110		mg/Kg	110			80-120		
Selenium	100		92.0		mg/Kg	92			80-120		
Silver	100		106		mg/Kg	106			80-120		
Thallium	100		99.8		mg/Kg	100			80-120		
Vanadium	100		107		mg/Kg	107			80-120		
Zinc	100		107		mg/Kg	107			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198609MS1, QC1198609MSD1												**Source: 409274-005**
Antimony	2.08	100	100	68.8	56.4	mg/Kg	67	54	19.8	75-125	20	M
Arsenic	2.06	100	100	122	119	mg/Kg	120	117	2.5	75-125	20	
Barium	79.1	100	100	212	217	mg/Kg	133	138	2.3	75-125	20	M
Beryllium	ND	100	100	100	99.9	mg/Kg	100	100	0.1	75-125	20	
Cadmium	0.39	100	100	101	105	mg/Kg	101	105	3.9	75-125	20	
Chromium	17.9	100	100	127	122	mg/Kg	109	104	4.0	75-125	20	
Cobalt	10.5	100	100	121	117	mg/Kg	111	107	3.4	75-125	20	
Copper	33.3	100	100	164	174	mg/Kg	131	141	5.9	75-125	20	M

QCBatchID: QC1198609 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 12/10/2018 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1198609MS1, QC1198609MSD1												**Source: 409274-005**
Lead	13.6	100	100	138	142	mg/Kg	124	128	2.9	75-125	20	M
Molybdenum	ND	100	100	111	108	mg/Kg	111	108	2.7	75-125	20	
Nickel	20.9	100	100	151	132	mg/Kg	130	111	13.4	75-125	20	M
Selenium	ND	100	100	105	102	mg/Kg	105	102	2.9	75-125	20	
Silver	ND	100	100	114	115	mg/Kg	114	115	0.9	75-125	20	
Thallium	1.92	100	100	101	102	mg/Kg	99	100	1.0	75-125	20	
Vanadium	44.3	100	100	164	167	mg/Kg	120	123	1.8	75-125	20	
Zinc	52.0	100	100	164	174	mg/Kg	112	122	5.9	75-125	20	

QCBatchID:	**QC1198825**	**Analyst:**	kedy	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	12/13/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1198825MB1					
Chromium	ND	mg/L	0.002	0.03	
Lead	ND	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1198825LCS1, QC1198825LCSD1											
Chromium	10	10	8.32	8.81	mg/L	83	88	6	80-120	20	
Lead	10	10	9.52	9.63	mg/L	95	96	1	80-120	20	

QCBatchID: QC1199884 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 01/10/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1199884MB1					
Chromium	ND	mg/L	0.002	0.05	
Lead	ND	mg/L	0.005	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1199884LCS1											
Chromium	2		1.850		mg/L	93			80-120		
Lead	2		1.946		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1199884MS1, QC1199884MSD1												**Source: 410082-001**
Chromium	0.252	1	1	0.895	0.861	mg/L	64	61	3.9	75-125	20	M
Lead	0.027	1	1	0.914	0.863	mg/L	89	84	5.7	75-125	20	

QCBatchID: QC1199885 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 01/10/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1199885MB1					
Lead	**0.010 J**	mg/L	0.005	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1199885LCS1											
Lead	2		1.995		mg/L	100			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1199885MS1, QC1199885MSD1												**Source: 408720-009**
Lead	0.035	1	1	0.935	0.917	mg/L	90	88	1.9	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 408720	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 1 of 10	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	6010B – CAM 17 Metals					Test Instructions / Comments
1	SB-1-0.5'	11/20/18	1009	Soil	1 Glass Jar	Ice		X	X		X					
2	SB-1-1.5'		1016					X	X		X					Hold
3	SB-2-0.5'		1234					X	X	X	X					Run a duplicate
4	SB-2-1.5'		1245					X	X	X	X					Hold
5	SB-3-0.5'		1049					X	X		X					
6	SB-3-1.5'		1055					X	X		X					Hold
7	SB-4-0.5'		1036					X	X		X					
8	SB-4-1.5'		1042					X	X		X					Hold
9	SB-5-0.5'		0954					X	X		X					
10	SB-5-1.5'		0959			Ice		X	X		X					Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	11/21/18 @ 1010
[1] Received By:		C.Hernandez	EA	11/21/18 10:16
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: Page: 2 of 10	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	CAM 17 Metals 6010B						Test Instructions / Comments
1	SB-6-0.5'	11/20/18	1026	Soil	1 Glass Jar	Ice		X	X		X						
2	SB-6-1.5'		1030					X	X		X						Hold
3	SB-7-0.5'		0935					X	X	X	X						
4	SB-7-1.5'		0940					X	X	X	X						Hold
5	SB-8-0.5'	11/19/18	1458					X	X		X						
6	SB-8-1.5'	11/19/18	1501					X	X		X						Hold
7	SB-9-0.5'	11/20/18	0918					X	X		X						
8	SB-9-1.5'	11/20/18	0923					X	X		X						Hold
9	SB-10-0.5'	11/19/18	1431					X	X		X						
10	SB-10-1.5'	11/19/18	1438			Ice		X	X		X						Hold

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	11/21/18 @ 1010
1 Received By:	[signature]	C Hernandez	ES	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: Page: 3 of 10	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	6010B-CAM 17 Metals						Test Instructions / Comments
1	SB-11-0.5'	11/20/18	0900	Soil	1 Glass Jar	Ice		X	X		X						
2	SB-11-1.5'	11/20/18	0905			Ice		X	X		X						Hold
3	~~SB-12-0.5'~~	~~11/19/18~~	~~1036~~														
4	~~SB-12-1.5'~~	~~11/19/18~~	~~1048~~														
5	~~SB-13-0.5'~~	~~11/19/18~~	~~1035~~														
6	~~SB-13-1.5'~~	~~11/19/18~~	~~1045~~														
7	~~SB-14-0.5'~~	~~11/19/18~~	~~1019~~														
8	~~SB-14-1.5'~~	~~11/19/18~~	~~1025~~														
9	SB-15-0.5'	11/20/18	0845			Ice		X	X		X						
10	SB-15-1.5'	11/20/18	0850			Ice		X	X		X						Hold

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	11/21/18 @ 1010
1 Received By:	[signature]	C Alexander	EA	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.		Chain of Custody Record		Turn Around Time (Rush by advanced notice only)							
806 N. Batavia St., Orange, CA 92868		Lab No:		Standard:	✓	4 Day:		3 Day:			
Phone: (714) 771-6900 Fax: (714)771-9933		Page: 4 of 10		2 Day:		1 Day:		Same Day:			
Billing: Enthalpy - SoCal		Matrix: A = Air DW = Drinking Water		Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3							
c/o Montrose Environmental Group		FL = Food Liquid FS = Food Solid L = Liquid		4 = H_2SO_4 5 = NaOH 6 = Other							
1 Park Plaza, Suite 1000, Irvine, CA 92614		PP = Pure Product S = Solid SeaW = Sea Water									
		SW = Swab W = Water WP = Wipe O = Other									

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	Cam 17 Metals 6010B	Test Instructions / Comments
1	SB-16-0.5'	11/20/18	0827	Soil	1 Glass Jar	Ice		X	X		X	
2	SB-16-1.5'	11/20/18	0833					X	X		X	Hold
3	SB-17-0.5'	11/19/18	1414					X	X		X	
4	SB-17-1.5'	11/19/18	1420					X	X		X	Hold
5	SB-18-0.5'	11/19/18	1358					X	X		X	
6	SB-18-1.5'	11/19/18	1405					X	X		X	Hold
7	SB-19-0.5'	11/19/18	1340					X	X		X	
8	SB-19-1.5'	11/19/18	1347			Ice		X	X		X	Hold
9	~~SB-20-0.5'~~	~~11/19/18~~	~~1155~~									
10	~~SB-20-1.5'~~	~~11/19/18~~	~~1209~~									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	11/21/18 @ 1010
[1] Received By:		C. Hernandez	ESI	11/21/18 1010
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: Page: 5 of 19	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

ENTHALPY analytical, inc.

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	Cam 17 Metals 6010B						Test Instructions / Comments
1	SB-21-0.5'	11/19/18	1232	Soil	1 Glass Jar	ICE		X	X		X						
2	SB-21-1.5'	11/19/18	1240					X	X		X						Hold
3	SB-22-0.5'	11/19/18	1222					X	X		X						
4	SB-22-1.5'	11/19/18	1224					X	X		X						Hold
~~5~~	~~SB-23-0.5'~~	~~11/19/18~~	~~1134~~														~~QR~~
~~6~~	~~SB-23-1.5'~~	~~11/19/18~~	~~1144~~														~~Hold~~ QR
7	SB-24-0.5'	11/20/18	0807					X	X		X						
8	SB-24-1.5'	11/20/18	0812					X	X		X						Hold
9	SB-25-0.5'	11/20/18	0750					X	X		X						
10	SB-25-1.5'	11/20/18	0800					X	X		X						Hold

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	11/21/18 @ 1010
1 Received By:	[signature]	Catherine Mendez	ES	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.		Chain of Custody Record	Turn Around Time (Rush by advanced notice only)					
806 N. Batavia St., Orange, CA 92868	ENTHALPY analytical, inc.	Lab No:	Standard:	✓	4 Day:		3 Day:	
Phone: (714) 771-6900 Fax: (714)771-9933		Page: 6 of 10	2 Day:		1 Day:		Same Day:	
Billing: Enthalpy - SoCal		**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other					
c/o Montrose Environmental Group								
1 Park Plaza, Suite 1000, Irvine, CA 92614								

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	Cam 17 Metals 6010B						Test Instructions / Comments
1	SB-26-0.5'	11/19/18	1512	Soil	1 Glass Jar	ICE		X	X		X						
2	SB-26-1.5'	11/19/18	1518					X	X		X						Hold
3	SB-27-0.5'	11/19/18	1523					X	X		X						
4	SB-27-1.5'	11/19/18	1530					X	X		X						Hold
5	SB-28-0.5'	11/19/18	1600					X	X		X						
6	SB-28-1.5'	11/19/18	1605					X	X		X						Hold
7	SB-29-3'	11/20/18	1129							X							
8	SB-30-0.5'	11/20/18	0912					X	X		X						
9	SB-30-1.5'	11/20/18	0918					X	X		X						Hold
10																	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	11/21/18 @ 1010
1 Received By:	[signature]	[signature]	ES	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: Page: 7 of 10	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

ENTHALPY analytical, inc.

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	Cam 17 Metals 6010B						Test Instructions / Comments
1	SB-31-0.5'	11/20/18	1106	Soil	1 Glass Jar	ICE		X	X		X						
2	SB-31-1.5'	11/20/18	1110					X	X		X						Hold
3	SB-32-0.5'	11/19/18	1206					X	X		X						
4	SB-32-1.5'	11/19/18	1212					X	X		X						Hold
5																	
6																	
7																	
8																	
9																	
10																	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	11/21/18 @ 1010
1 Received By:	[signature]	C. Hernandez	E.A	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 8 of 10	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3
c/o Montrose Environmental Group	FL = Food Liquid FS = Food Solid L = Liquid	4 = H_2SO_4 5 = NaOH 6 = Other
1 Park Plaza, Suite 1000, Irvine, CA 92614	PP = Pure Product S = Solid SeaW = Sea Water	
	SW = Swab W = Water WP = Wipe O = Other	

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	CAM 17 Metals 6010B	Test Instructions / Comments
1	SB-5-0.5' (DUP)	11/20/18	0959	Soil	1 Jar	Ice		X	X		X	
2	SB-11-0.5' (DUP)	11/20/18	0900					X	X		X	
3	SB-16-0.5' (DUP)	11/20/18	0827					X	X		X	
4	SB-25-0.5' (DUP)	11/20/18	0750					X	X		X	
5	SB-28-0.5' (DUP)	11/19/18	1600		1 Jar			X	X		X	
6	SB-2-0.5' (DUP)	11/20/18	12:34	Soil		Ice				X		
7												
8												
9												
10												

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	11/21/18 @ 1010
[1] Received By:		C. Hernandez	ES	11/21/18 1010
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: * 9 of *10	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1027691
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 8015B - TPH d/mo	EPA 8015B/5035-TPH-g	EPA 8260B/5035-VOCs	EPA 8082 - PCBs	EPA 8270 - SVOCs	EPA 8270 SIM - PAHs	EPA 8081 - OC Pesticides	EPA 8141 - OP Pesticides	EPA 8151 - Herbicides	EPA 6010B/7471A - CAM17 Metals	EPA 7199 - Hexavalent Chromium	EPA 6020 - Arsenic & Thallium	Test Instructions / Comments
1	Equipment Blank - Day 1	11/19/18	16:30	Water	Multiple	ICE	X	X	X	X	X	X	X	X	X	X	X	X	
2	Equipment Blank - Day 2	11/20/18	13:11	↓	↓	↓	X	X	X	X	X	X	X	X	X	X	X	X	
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	11/21/18 @ 1010
[1] Received By:		C. Hernandez	EA	11/21/18 1010
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 10 of 10	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1027691
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Total Lead (6010B)	Total Arsenic (6010B)	STLC Lead (6010B)	Organochlorine Pesticides (8081)	PCBs (8082)	TPH carbon chain (8015)	VOCs (8260B)	SVOCs (8270)	CAM 17 Metals (6010B)		Test Instructions / Comments
1	Soil Sample Composite	11/20/18	13:20	Soil	2 Jars	Ice	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	11/21/18 @ 1010
1 Received By:		C.Hernandez	E.A	11/21/18 1010
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: _____

Date Received: 11/21/18 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 3 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 4.4 #2: 1.3 #3: 3.6 #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 1.3 #2: 0.9 #3: 1.7 #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?		✓	
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Samples have possible water contamination from being submerged under ice water.

SB-2-0.5", and SB-2-0.5" DUP are using the same container

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☑ Email (email sent to/on): R.C. / 11/21/18

Project Manager's response:

Completed By: _____ Date: 11/21/18

Ranjit Clarke

From: Kristopher Kern
Sent: Monday, November 26, 2018 4:03 PM
To: Ranjit Clarke
Cc: trickard@es-online.com; Chris Guesnon; Dane Nygaard
Subject: RE: Shenandoah - Equipment Blanks

Hey Ranjit,

You were correct. Please only run the equipment blanks for OCPs, PCBs, Cam 17 Metals, and Arsenic.

Thank you,

Kris Kern
Project Geologist

ES ENGINEERING

ES Engineering Services, LLC
1 Park Plaza
Suite 1000
Irvine, CA 92614

t (714) 919-6530
f (949) 988-3514
m (805) 816-1776

kkern@es-online.com
www.es-online.com

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P *Please consider the environment before printing*

From: Ranjit Clarke [mailto:ranjit.clarke@enthalpy.com]
Sent: Monday, November 26, 2018 3:38 PM
To: Atis Srihiran; Chris Guesnon; Dane Nygaard; Kristopher Kern; Laura Skow; Sarah King; Tanner Rickard; Victor Paitimusa
Subject: RE: Shenandoah - Equipment Blanks

Here it is.

Ranjit Clarke

From: Chris Guesnon
Sent: Thursday, December 06, 2018 3:28 PM
To: Ranjit Clarke
Cc: Dane Nygaard; kkern@es-online.com; trickard@es-online.com
Subject: RE: Shenandoah Elementary School (11/20/18) - Enthalpy Analytical Final Report #408720

Hi Ranjit. Thanks for forwarding the sample results.

The analytical results indicate that lead exceeded the LAUSD accepted criteria (80 mg/kg) in 6 soil samples (SB-1-0.5, SB-3-0.5, SB-7-0.5, SB-15-0.5, SB-30-0.5).

Please run STLC on samples SB-1-0.5, SB-3-0.5, SB-7-0.5, SB-15-0.5, SB-30-0.5.

Please also analyze the deeper (1.5 foot) samples at each location (SB-1-1.5, SB-3-1.5, SB-7-1.5, SB-15-1.5, SB-30-1.5) for lead by EPA 6010.

Thank You.

ES ENGINEERING

Chris A. Guesnon
Senior Geologist
ES Engineering Services, LLC
1 Park Plaza
Suite 1000
Irvine, CA 92614

t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@es-online.com
www.es-online.com

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#

Sohdvh#frqvlghu#wkh#hqylurqphqw#ehiruh#sulqwlqj

From: Ranjit Clarke [mailto:ranjit.clarke@enthalpy.com]
Sent: Wednesday, December 05, 2018 4:05 PM
To: Atis Srihiran; Chris Guesnon; Dane Nygaard; Kristopher Kern; Laura Skow; Sarah King; Tanner Rickard; Victor Paitimusa
Subject: Shenandoah Elementary School (11/20/18) - Enthalpy Analytical Final Report #408720

Ranjit Clarke

From: Chris Guesnon
Sent: Thursday, December 06, 2018 3:54 PM
To: Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Tanner Rickard
Subject: RE: Shenandoah Elementary School (11/20/18) - Enthalpy Analytical Final Report #408720

Hey Ranjit. Please also include SB-5-0.5 for STLC and run SB-5-1.5 for lead by 6010.

Thank You.

Chris A. Guesnon
Senior Geologist
ES Engineering Services, LLC
1 Park Plaza
Suite 1000
Irvine, CA 92614

t (714) 919-6526
f (714) 919-6501
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#



From: Ranjit Clarke [mailto:ranjit.clarke@enthalpy.com]
Sent: Thursday, December 06, 2018 3:48 PM
To: Chris Guesnon
Cc: Dane Nygaard; Kristopher Kern; Tanner Rickard
Subject: RE: Shenandoah Elementary School (11/20/18) - Enthalpy Analytical Final Report #408720

No problem. I'll add these right now.

Ranjit Clarke

From: Chris Guesnon
Sent: Thursday, January 03, 2019 8:11 AM
To: Ranjit Clarke
Cc: Dane Nygaard
Subject: FW: Lab Results for Shenandoah PEA
Attachments: 408720-00092760-SIGNED.PDF

Flag Status: Flagged

Hey Ranjit. For Shenandoah Elementary School, please run TCLP on samples SB-1-0.5, SB-5-0.5 and SB-7-0.5.

Please Note: As of January 1, 2019, ES Engineering Services, LLC will be operating as Montrose Environmental. All contact information remains the same, and as shown below.

Thank You.

Chris A. Guesnon
Senior Geologist
Montrose Environmental
1 Park Plaza
Suite 1000
Irvine, CA 92614

t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@montrose-env.com
www.montrose-env.com

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#

Sdndvh#frqvlghu#wkh#hqylurqphqw#ehiruh#sulqwlqj

From: Hilario, Jennifer [mailto:jennifer.hilario@lausd.net]
Sent: Thursday, December 06, 2018 3:09 PM
To: Chris Guesnon
Cc: Dane Nygaard; kkern@es-online.com
Subject: RE: Lab Results for Shenandoah PEA

Hi Chris,
Hope you guys are having a good week so far…
Yes, please do run STLC on all those samples and have the lab analyze the deeper samples from those locations.

Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering
Address:	1 Park Plaza Suite #1000 Irvine, CA 92614
Attn:	Dane Nygaard

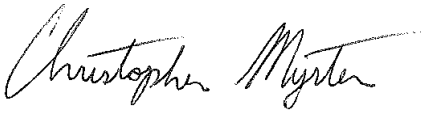
Lab Request:	408627
Report Date:	11/29/2018
Date Received:	11/19/2018
Client ID:	12860

Comments: Shenandoah Elementary School
029RC1-191395
PO1026791
2450 Shenandoah Street, Los Angeles, CA

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
408627-001	SB-12-0.5'
408627-002	SB-12-1.5'
408627-003	SB-13-0.5'
408627-004	SB-13-1.5'
408627-005	SB-14-0.5'
408627-006	SB-14-1.5'
408627-007	SB-23-0.5'
408627-008	SB-23-1.5'
408627-009	SB-20-0.5'
408627-010	SB-20-1.5'

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.



Report Review performed by: Chris Myrter, Project Specialist

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 10:36 **Site:**
Sample #: **408627-001** **Client Sample #:** SB-12-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197838		
Antimony	**1.05 J**	1	0.37	3	mg/Kg	11/20/18	11/20/18	KLN	B1,J
Barium	**98.8**	1	0.23	1	mg/Kg	11/20/18	11/20/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Cadmium	**1.49**	1	0.21	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Chromium	**23.2**	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Cobalt	**9.14**	1	0.19	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Copper	**16.6**	1	0.31	1	mg/Kg	11/20/18	11/20/18	KLN	
Lead	**4.92**	1	0.32	1	mg/Kg	11/20/18	11/20/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Nickel	**19.0**	1	0.2	1.5	mg/Kg	11/20/18	11/20/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/20/18	11/20/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/20/18	11/20/18	KLN	
Vanadium	**39.1**	1	0.37	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Zinc	**49.3**	1	0.28	5	mg/Kg	11/20/18	11/20/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197839		
Arsenic	**4.95**	10	0.2	3	mg/Kg	11/20/18	11/21/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197857		
Mercury	**0.10 J**	1	0.039	0.14	mg/Kg	11/20/18	11/20/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197848		
4,4'-DDD	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDE	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDT	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
a-BHC	ND	1	1.6	5	ug/Kg	11/20/18	11/21/18	TD	
Aldrin	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
b-BHC	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
Chlordane (technical)	ND	1	35	50	ug/Kg	11/20/18	11/21/18	TD	
d-BHC	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Dieldrin	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan I	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan II	ND	1	2.8	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin	ND	1	2.7	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin Ketone	ND	1	4.1	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor	ND	1	1.3	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	11/20/18	11/21/18	TD	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
Methoxychlor	ND	1	9.2	10	ug/Kg	11/20/18	11/21/18	TD	
Toxaphene	ND	1	54	100	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*69*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*72*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 10:48 **Site:**
Sample #: **408627-002** **Client Sample #:** SB-12-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 10:35 **Site:**
Sample #: **408627-003** **Client Sample #:** SB-13-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197838		
Antimony	**1.44 J**	1	0.37	3	mg/Kg	11/20/18	11/20/18	KLN	B1,J
Barium	**127**	1	0.23	1	mg/Kg	11/20/18	11/20/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Cadmium	**1.70**	1	0.21	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Chromium	**21.4**	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Cobalt	**10.4**	1	0.19	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Copper	**15.9**	1	0.31	1	mg/Kg	11/20/18	11/20/18	KLN	
Lead	**3.06**	1	0.32	1	mg/Kg	11/20/18	11/20/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Nickel	**18.4**	1	0.2	1.5	mg/Kg	11/20/18	11/20/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/20/18	11/20/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/20/18	11/20/18	KLN	
Vanadium	**40.6**	1	0.37	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Zinc	**59.2**	1	0.28	5	mg/Kg	11/20/18	11/20/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197839		
Arsenic	**5.64**	10	0.2	3	mg/Kg	11/20/18	11/21/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197857		
Mercury	ND	1	0.039	0.14	mg/Kg	11/20/18	11/20/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197848		
4,4'-DDD	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDE	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDT	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
a-BHC	ND	1	1.6	5	ug/Kg	11/20/18	11/21/18	TD	
Aldrin	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
b-BHC	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
Chlordane (technical)	ND	1	35	50	ug/Kg	11/20/18	11/21/18	TD	
d-BHC	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Dieldrin	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan I	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan II	ND	1	2.8	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin	ND	1	2.7	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin Ketone	ND	1	4.1	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor	ND	1	1.3	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	11/20/18	11/21/18	TD	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
Methoxychlor	ND	1	9.2	10	ug/Kg	11/20/18	11/21/18	TD	
Toxaphene	ND	1	54	100	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*67*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*75*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 10:45 **Site:**
Sample #: **408627-004** **Client Sample #:** SB-13-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 10:19	**Site:**			
Sample #:	**408627-005**	**Client Sample #:**	SB-14-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197838		
Antimony	**2.03 J**	1	0.37	3	mg/Kg	11/20/18	11/20/18	KLN	B1,J
Barium	**222**	1	0.23	1	mg/Kg	11/20/18	11/20/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Cadmium	**0.44 J**	1	0.21	0.5	mg/Kg	11/20/18	11/20/18	KLN	J
Chromium	**7.91**	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Cobalt	**10.7**	1	0.19	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Copper	**14.8**	1	0.31	1	mg/Kg	11/20/18	11/20/18	KLN	
Lead	**1.70**	1	0.32	1	mg/Kg	11/20/18	11/20/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Nickel	**8.01**	1	0.2	1.5	mg/Kg	11/20/18	11/20/18	KLN	
Selenium	ND	1	0.72	3	mg/Kg	11/20/18	11/20/18	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/20/18	11/20/18	KLN	
Vanadium	**20.9**	1	0.37	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Zinc	**42.4**	1	0.28	5	mg/Kg	11/20/18	11/20/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197839		
Arsenic	**2.15 J**	10	0.2	3	mg/Kg	11/20/18	11/21/18	JP	J
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197857		
Mercury	ND	1	0.039	0.14	mg/Kg	11/20/18	11/20/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197848		
4,4'-DDD	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDE	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDT	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
a-BHC	ND	1	1.6	5	ug/Kg	11/20/18	11/21/18	TD	
Aldrin	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
b-BHC	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
Chlordane (technical)	ND	1	35	50	ug/Kg	11/20/18	11/21/18	TD	
d-BHC	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Dieldrin	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan I	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan II	ND	1	2.8	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin	ND	1	2.7	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin Ketone	ND	1	4.1	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor	ND	1	1.3	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	11/20/18	11/21/18	TD	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
Methoxychlor	ND	1	9.2	10	ug/Kg	11/20/18	11/21/18	TD	
Toxaphene	ND	1	54	100	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*62*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*73*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197849		
PCB-1016	ND	1	3	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1221	ND	1	14	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1232	ND	1	9.5	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1242	ND	1	14	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1248	ND	1	19	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1254	ND	1	20	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1260	ND	1	6.9	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1262	ND	1	17	50	ug/Kg	11/20/18	11/21/18	TD	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 10:19	**Site:**			
Sample #:	**408627-005**	**Client Sample #:**	SB-14-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 10:25	**Site:**			
Sample #:	**408627-006**	**Client Sample #:**	SB-14-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 11:34	**Site:**			
Sample #:	**408627-007**	**Client Sample #:**	SB-23-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197838		
Antimony	**1.75 J**	1	0.37	3	mg/Kg	11/20/18	11/20/18	KLN	B1,J
Barium	**102**	1	0.23	1	mg/Kg	11/20/18	11/20/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Cadmium	**1.42**	1	0.21	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Chromium	**23.6**	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Cobalt	**9.28**	1	0.19	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Copper	**16.8**	1	0.31	1	mg/Kg	11/20/18	11/20/18	KLN	
Lead	**19.1**	1	0.32	1	mg/Kg	11/20/18	11/20/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Nickel	**18.2**	1	0.2	1.5	mg/Kg	11/20/18	11/20/18	KLN	
Selenium	**1.48 J**	1	0.72	3	mg/Kg	11/20/18	11/20/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/20/18	11/20/18	KLN	
Vanadium	**41.0**	1	0.37	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Zinc	**90.4**	1	0.28	5	mg/Kg	11/20/18	11/20/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197839		
Arsenic	**10.4**	10	0.2	3	mg/Kg	11/20/18	11/21/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197857		
Mercury	ND	1	0.039	0.14	mg/Kg	11/20/18	11/20/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197848		
4,4'-DDD	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDE	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDT	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
a-BHC	ND	1	1.6	5	ug/Kg	11/20/18	11/21/18	TD	
Aldrin	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
b-BHC	ND	1	1.5	5	ug/Kg	11/20/18	11/21/18	TD	
Chlordane (technical)	**130**	1	35	50	ug/Kg	11/20/18	11/21/18	TD	
d-BHC	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Dieldrin	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan I	ND	1	1.2	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan II	ND	1	2.8	5	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin	ND	1	2.7	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	11/20/18	11/21/18	TD	
Endrin Ketone	ND	1	4.1	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor	ND	1	1.3	5	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	11/20/18	11/21/18	TD	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	11/20/18	11/21/18	TD	
Methoxychlor	ND	1	9.2	10	ug/Kg	11/20/18	11/21/18	TD	
Toxaphene	ND	1	54	100	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*65*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*75*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197849		
PCB-1016	ND	1	3	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1221	ND	1	14	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1232	ND	1	9.5	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1242	ND	1	14	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1248	ND	1	19	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1254	ND	1	20	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1260	ND	1	6.9	50	ug/Kg	11/20/18	11/21/18	TD	
PCB-1262	ND	1	17	50	ug/Kg	11/20/18	11/21/18	TD	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 11:34	**Site:**			
Sample #:	**408627-007**	**Client Sample #:**	SB-23-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*72*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	11/19/2018 11:44	**Site:**			
Sample #:	**408627-008**	**Client Sample #:**	SB-23-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 11:55 **Site:**
Sample #: **408627-009** **Client Sample #:** SB-20-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197838		
Antimony	**0.66 J**	1	0.37	3	mg/Kg	11/20/18	11/20/18	KLN	B1,J
Barium	**110**	1	0.23	1	mg/Kg	11/20/18	11/20/18	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Cadmium	**1.52**	1	0.21	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Chromium	**25.2**	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Cobalt	**9.30**	1	0.19	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Copper	**17.5**	1	0.31	1	mg/Kg	11/20/18	11/20/18	KLN	
Lead	**7.16**	1	0.32	1	mg/Kg	11/20/18	11/20/18	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	11/20/18	11/20/18	KLN	
Nickel	**21.2**	1	0.2	1.5	mg/Kg	11/20/18	11/20/18	KLN	
Selenium	**1.28 J**	1	0.72	3	mg/Kg	11/20/18	11/20/18	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Thallium	ND	1	0.42	3	mg/Kg	11/20/18	11/20/18	KLN	
Vanadium	**43.8**	1	0.37	0.5	mg/Kg	11/20/18	11/20/18	KLN	
Zinc	**58.5**	1	0.28	5	mg/Kg	11/20/18	11/20/18	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1197839		
Arsenic	**5.96**	10	0.2	3	mg/Kg	11/20/18	11/21/18	JP	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1197857		
Mercury	ND	1	0.039	0.14	mg/Kg	11/20/18	11/20/18	SBW	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1197848		
4,4'-DDD	ND	5	10.5	25	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDE	ND	5	10	25	ug/Kg	11/20/18	11/21/18	TD	
4,4'-DDT	ND	5	10	25	ug/Kg	11/20/18	11/21/18	TD	
a-BHC	ND	5	8	25	ug/Kg	11/20/18	11/21/18	TD	
Aldrin	ND	5	7.5	25	ug/Kg	11/20/18	11/21/18	TD	
b-BHC	ND	5	7.5	25	ug/Kg	11/20/18	11/21/18	TD	
Chlordane (technical)	ND	5	175	250	ug/Kg	11/20/18	11/21/18	TD	
d-BHC	ND	5	6	25	ug/Kg	11/20/18	11/21/18	TD	
Dieldrin	ND	5	10.5	25	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan I	ND	5	6	25	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan II	ND	5	14	25	ug/Kg	11/20/18	11/21/18	TD	
Endosulfan sulfate	ND	5	17	25	ug/Kg	11/20/18	11/21/18	TD	
Endrin	ND	5	13.5	25	ug/Kg	11/20/18	11/21/18	TD	
Endrin aldehyde	ND	5	10.5	25	ug/Kg	11/20/18	11/21/18	TD	
Endrin Ketone	ND	5	20.5	25	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor	ND	5	6.5	25	ug/Kg	11/20/18	11/21/18	TD	
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	11/20/18	11/21/18	TD	
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	11/20/18	11/21/18	TD	
Methoxychlor	ND	5	46	50	ug/Kg	11/20/18	11/21/18	TD	
Toxaphene	ND	5	270	500	ug/Kg	11/20/18	11/21/18	TD	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*74*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*88*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/19/2018 12:09 **Site:**
Sample #: **408627-010** **Client Sample #:** SB-20-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: Prep Method:							QCBatchID:		
N/A	**N/A**	1							

QCBatchID: QC1197838 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/20/2018 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197838MB1					
Antimony	**0.85 J**	mg/Kg	0.37	3	
Arsenic	ND	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Boron	**1.522 J**	ug/Wipe	0.26	5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Molybdenum	**0.96 J**	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silicon, as Silica	ND	ug/Sample	11	11	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Tin	**1.148**	ug/Wipe	0.7	1	B
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	ND	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197838LCS1											
Antimony	100		110		mg/Kg	110			80-120		
Arsenic	100		94.8		mg/Kg	95			80-120		
Barium	100		106		mg/Kg	106			80-120		
Beryllium	100		93.7		mg/Kg	94			80-120		
Boron	100		98.0		mg/Kg	98			80-120		
Cadmium	100		105		mg/Kg	105			80-120		
Chromium	100		99.5		mg/Kg	100			80-120		
Cobalt	100		108		mg/Kg	108			80-120		
Copper	100		101		mg/Kg	101			80-120		
Lead	100		99.2		mg/Kg	99			80-120		
Molybdenum	100		103		mg/Kg	103			80-120		
Nickel	100		113		mg/Kg	113			80-120		
Selenium	100		98.4		mg/Kg	98			80-120		
Silver	100		116		mg/Kg	116			80-120		
Thallium	100		98.0		mg/Kg	98			80-120		
Vanadium	100		107		mg/Kg	107			80-120		
Zinc	100		109		mg/Kg	109			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197838MS1, QC1197838MSD1												**Source: 408562-005**
Antimony	2.99	100	100	33.0	38.0	mg/Kg	30	35	14.1	75-125	20	M
Arsenic	ND	100	100	99.0	99.7	mg/Kg	99	100	0.7	75-125	20	
Barium	166	100	100	276	292	mg/Kg	110	126	5.6	75-125	20	M
Beryllium	ND	100	100	102	101	mg/Kg	102	101	1.0	75-125	20	
Cadmium	1.07	100	100	96.4	105	mg/Kg	95	104	8.5	75-125	20	
Chromium	37.6	100	100	118	134	mg/Kg	80	96	12.7	75-125	20	

QCBatchID: QC1197838 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/20/2018 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197838MS1, QC1197838MSD1												**Source: 408562-005**
Cobalt	14.4	100	100	109	120	mg/Kg	95	106	9.6	75-125	20	
Copper	58.6	100	100	130	137	mg/Kg	71	78	5.2	75-125	20	M
Lead	77.2	100	100	133	136	mg/Kg	56	59	2.2	75-125	20	M
Molybdenum	6.55	100	100	91.6	105	mg/Kg	85	98	13.6	75-125	20	
Nickel	36.7	100	100	119	138	mg/Kg	82	101	14.8	75-125	20	
Selenium	ND	100	100	94.4	108	mg/Kg	94	108	13.4	75-125	20	
Silver	ND	100	100	111	122	mg/Kg	111	122	9.4	75-125	20	
Thallium	2.60	100	100	86.8	99.5	mg/Kg	84	97	13.6	75-125	20	
Vanadium	43.8	100	100	154	163	mg/Kg	110	119	5.7	75-125	20	
Zinc	113	100	100	200	232	mg/Kg	87	119	14.8	75-125	20	

QCBatchID:	**QC1197839**	**Analyst:**	dswafford	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	11/20/2018	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197839MB1					
Arsenic	ND	mg/Kg	0.02	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1197839LCS1											
Arsenic	50		48.2		mg/Kg	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1197839MS1, QC1197839MSD1												**Source: 408627-001**
Arsenic	4.95	50	50	50.1	48.0	mg/Kg	90	86	4.3	75-125	20	

QCBatchID: QC1197848 **Analyst:** ssabir **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 11/20/2018 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197848MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197848LCS1											
4,4'-DDD	50		32		ug/Kg	64			43-172		
4,4'-DDE	50		32		ug/Kg	64			44-163		
4,4'-DDT	50		43		ug/Kg	86			40-158		
a-BHC	50		32		ug/Kg	64			45-150		
Aldrin	50		32		ug/Kg	64			46-142		
b-BHC	50		34		ug/Kg	68			42-156		
d-BHC	50		31		ug/Kg	62			37-161		
Dieldrin	50		34		ug/Kg	68			47-151		
Endosulfan I	50		32		ug/Kg	64			47-141		
Endosulfan II	50		31		ug/Kg	62			44-156		
Endosulfan sulfate	50		35		ug/Kg	70			43-157		
Endrin	50		37		ug/Kg	74			47-160		
Endrin aldehyde	50		22		ug/Kg	44			32-127		
Endrin Ketone	50		33		ug/Kg	66			48-159		
Heptachlor	50		32		ug/Kg	64			50-144		
Heptachlor epoxide	50		31		ug/Kg	62			48-145		
Lindane (Gamma-BHC)	50		31		ug/Kg	62			47-151		
Methoxychlor	50		52		ug/Kg	104			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197848MS1, QC1197848MSD1												**Source: 408635-001**
4,4'-DDD	ND	50	50	49	50	ug/Kg	98	100	2.0	43-172	20	
4,4'-DDE	ND	50	50	48	50	ug/Kg	96	100	4.1	44-163	20	
4,4'-DDT	ND	50	50	60	60	ug/Kg	120	120	0.0	40-158	20	
a-BHC	ND	50	50	43	45	ug/Kg	86	90	4.5	45-150	20	

QCBatchID: QC1197848 **Analyst:** ssabir **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 11/20/2018 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197848MS1, QC1197848MSD1												**Source: 408635-001**
Aldrin	ND	50	50	49	52	ug/Kg	98	104	5.9	46-142	20	
b-BHC	ND	50	50	44	46	ug/Kg	88	92	4.4	42-156	20	
d-BHC	ND	50	50	52	45	ug/Kg	104	90	14.4	37-161	20	
Dieldrin	ND	50	50	52	50	ug/Kg	104	100	3.9	47-151	20	
Endosulfan I	ND	50	50	47	50	ug/Kg	94	100	6.2	47-141	20	
Endosulfan II	ND	50	50	44	48	ug/Kg	88	96	8.7	44-156	20	
Endosulfan sulfate	ND	50	50	50	52	ug/Kg	100	104	3.9	43-157	20	
Endrin	ND	50	50	58	61	ug/Kg	116	122	5.0	47-160	20	
Endrin aldehyde	ND	50	50	45	47	ug/Kg	90	94	4.3	32-127	20	
Endrin Ketone	ND	50	50	45	47	ug/Kg	90	94	4.3	48-159	20	
Heptachlor	ND	50	50	50	52	ug/Kg	100	104	3.9	50-144	20	
Heptachlor epoxide	ND	50	50	47	47	ug/Kg	94	94	0.0	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	46	47	ug/Kg	92	94	2.2	47-151	20	
Methoxychlor	ND	50	50	88	78	ug/Kg	176	156	12.0	36-182	20	

QCBatchID: QC1197849 **Analyst:** ssabir **Method:** EPA 8082

Matrix: Solid **Analyzed:** 11/20/2018 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197849MB1					
PCB-1016	ND	ug/Kg	3	50	
PCB-1221	ND	ug/Kg	14	50	
PCB-1232	ND	ug/Kg	9.5	50	
PCB-1242	ND	ug/Kg	14	50	
PCB-1248	ND	ug/Kg	19	50	
PCB-1254	ND	ug/Kg	20	50	
PCB-1260	ND	ug/Kg	6.9	50	
PCB-1262	ND	ug/Kg	17	50	
PCB-1268	ND	ug/Kg	8.6	50	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197849LCS1											
PCB-1016	500		540		ug/Kg	108			70-130		
PCB-1260	500		490		ug/Kg	98			70-130		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197849MS1, QC1197849MSD1												**Source: 408627-005**
PCB-1016	ND	500	500	480	510	ug/Kg	96	102	6.1	70-130	20	
PCB-1260	ND	500		450		ug/Kg	90			70-130		

QCBatchID:	**QC1197857**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	11/20/2018	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1197857MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197857LCS1											
Mercury	0.83		0.85		mg/Kg	102			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1197857MS1, QC1197857MSD1												**Source: 408562-005**
Mercury	0.09	0.83	0.83	1.01	0.93	mg/Kg	111	101	8.2	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 408627	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: of	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern / T. Rickard

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs	CAM 17 Metals	Test Instructions / Comments
1	SB-12-0.5'	11/19/18	10:36	Soil	1 Jar			X	X		X	
2	SB-12-1.5'		10:48					X	X		X	Hold
3	SB-13-0.5'		10:35					X	X		X	
4	SB-13-1.5'		10:45					X	X		X	Hold
5	SB-14-0.5'		10:19					X	X	X	X	
6	SB-14-1.5'	11/19/18	10:25	Soil	1 Jar			X	X	X	X	Hold
7	SB-23-0.5"	11/19/18	1134	Soil	1 Jar			X	X	X	X	
8	SB-23-1.5'	11/19/18	1144	Soil	1 Jar			X	X	X	X	Hold
9	SB-20-0.5'	11/19/18	11:55	Soil	1 Jar			X	X		X	
10	SB-20-1.5'	11/19/18	12:09	Soil	1 Jar			X	X		X	Hold

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Tanner Rickard	ES Tanner Rickard	11/19/18 12:15
1 Received By:		Ben Salgado	E.A	11/19/18 12:15
2 Relinquished By:		Ben Salgado	E.A	11/19/18 1445
2 Received By:			EA	11/19/18 1445
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Service, LLC Project: Shenandoah Elementary School

Date Received: 11/19/18 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 5.2 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 1.0 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			✓
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?			✓
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 11/9/18

Enthalpy Analytical, a subsidiary of Montrose Environmental Group, Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard

Lab Request: 412566
Report Date: 03/06/2019
Date Received: 02/18/2019
Client ID: 12860

Comments: Shenandoah Elementary School
029RC1-191395
2450 Shenandoah Street, Los Angeles, CA

Supplemental Report 1 - STLC and TCLP results have been added where requested.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID
412566-001	SB-1A-0.5'	412566-025	SB-30C-0.5'
412566-002	SB-1A-1.5'	412566-026	SB-30C-1.5'
412566-003	SB-1B-0.5'	412566-027	SB-15A-0.5'
412566-004	SB-1B-1.5'	412566-028	SB-15A-1.5'
412566-005	SB-1C-0.5'	412566-029	SB-15B-0.5'
412566-006	SB-1C-1.5'	412566-030	SB-15B-1.5'
412566-007	SB-5A-0.5'		
412566-008	SB-5A-1.5'		
412566-009	SB-5B-0.5'		
412566-010	SB-5B-1.5'		
412566-011	SB-5C-0.5'		
412566-012	SB-5C-1.5'		
412566-013	SB-3A-0.5'		
412566-014	SB-3A-1.5'		
412566-015	SB-3B-0.5'		
412566-016	SB-3B-1.5'		
412566-017	SB-7A-0.5'		
412566-018	SB-7A-1.5'		
412566-019	SB-7B-0.5'		
412566-020	SB-7B-1.5'		
412566-021	SB-30A-0.5'		
412566-022	SB-30A-1.5'		
412566-023	SB-30B-0.5'		
412566-024	SB-30B-1.5'		

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Ranjit K. K. Clarke

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:30 **Site:**
Sample #: **412566-001** **Client Sample #:** SB-1A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1211965		
Lead	**0.674**	1	0.005	0.05	mg/L	03/05/19	03/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**157**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1212021		
Lead	**24.0**	10	0.05	0.15	mg/L	03/05/19	03/06/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:33 **Site:**
Sample #: **412566-002** **Client Sample #:** SB-1A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**49.6**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:50 **Site:**
Sample #: **412566-003** **Client Sample #:** SB-1B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**6.23**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:52 **Site:**
Sample #: **412566-004** **Client Sample #:** SB-1B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**5.02**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:55 **Site:**
Sample #: **412566-005** **Client Sample #:** SB-1C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**9.84**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 09:59 **Site:**
Sample #: **412566-006** **Client Sample #:** SB-1C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**3.62**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:03 **Site:**
Sample #: **412566-007** **Client Sample #:** SB-5A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1211498		
Lead	**34.0**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:07 **Site:**
Sample #: **412566-008** **Client Sample #:** SB-5A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211498		
Lead	**6.21**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:10 **Site:**
Sample #: **412566-009** **Client Sample #:** SB-5B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211498		
Lead	**12.1**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:15 **Site:**
Sample #: **412566-010** **Client Sample #:** SB-5B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211498		
Lead	**5.64**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:45 **Site:**
Sample #: **412566-011** **Client Sample #:** SB-5C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**6.19**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:50 **Site:**
Sample #: **412566-012** **Client Sample #:** SB-5C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.78**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:50 **Site:**
Sample #: **412566-013** **Client Sample #:** SB-3A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.08**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:53 **Site:**
Sample #: **412566-014** **Client Sample #:** SB-3A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.79**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:55 **Site:**
Sample #: **412566-015** **Client Sample #:** SB-3B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**3.82**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 10:57 **Site:**
Sample #: **412566-016** **Client Sample #:** SB-3B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**4.28**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:03 **Site:**
Sample #: **412566-017** **Client Sample #:** SB-7A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**15.6**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:06 **Site:**
Sample #: **412566-018** **Client Sample #:** SB-7A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**4.36**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:08 **Site:**
Sample #: **412566-019** **Client Sample #:** SB-7B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**14.2**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:10 **Site:**
Sample #: **412566-020** **Client Sample #:** SB-7B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**11.2**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:12 **Site:**
Sample #: **412566-021** **Client Sample #:** SB-30A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**6.09**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:15 **Site:**
Sample #: **412566-022** **Client Sample #:** SB-30A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**4.62**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:32 **Site:**
Sample #: **412566-023** **Client Sample #:** SB-30B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.04**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:35 **Site:**
Sample #: **412566-024** **Client Sample #:** SB-30B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**3.65**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:33 **Site:**
Sample #: **412566-025** **Client Sample #:** SB-30C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**6.64**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:39 **Site:**
Sample #: **412566-026** **Client Sample #:** SB-30C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.13**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:42 **Site:**
Sample #: **412566-027** **Client Sample #:** SB-15A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**5.24**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:45 **Site:**
Sample #: **412566-028** **Client Sample #:** SB-15A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**3.09**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:48 **Site:**
Sample #: **412566-029** **Client Sample #:** SB-15B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**6.58**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 02/18/2019 11:50 **Site:**
Sample #: **412566-030** **Client Sample #:** SB-15B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1211499		
Lead	**3.90**	1	0.32	1	mg/Kg	02/20/19	02/21/19	KLN	

QCBatchID: QC1211498 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 02/20/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1211498MB1					
Antimony	ND	mg/Kg	0.37	3	
Arsenic	ND	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	**0.50 J**	mg/Kg	0.32	1	
Molybdenum	ND	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	ND	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211498LCS1											
Antimony	100		101		mg/Kg	101			80-120		
Arsenic	100		93.9		mg/Kg	94			80-120		
Barium	100		100		mg/Kg	100			80-120		
Beryllium	100		99.1		mg/Kg	99			80-120		
Cadmium	100		97.0		mg/Kg	97			80-120		
Chromium	100		96.7		mg/Kg	97			80-120		
Cobalt	100		99.9		mg/Kg	100			80-120		
Copper	100		99.9		mg/Kg	100			80-120		
Lead	100		98.5		mg/Kg	99			80-120		
Molybdenum	100		99.8		mg/Kg	100			80-120		
Nickel	100		100		mg/Kg	100			80-120		
Selenium	100		91.6		mg/Kg	92			80-120		
Silver	100		96.2		mg/Kg	96			80-120		
Thallium	100		95.2		mg/Kg	95			80-120		
Vanadium	100		99.3		mg/Kg	99			80-120		
Zinc	100		96.3		mg/Kg	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211498MS1, QC1211498MSD1												**Source: 412494-001**
Antimony	2.59	100	100	75.0	101	mg/Kg	72	98	29.5	75-125	20	M
Arsenic	ND	100	100	97.3	108	mg/Kg	97	108	10.4	75-125	20	
Barium	25.2	100	100	123	129	mg/Kg	98	104	4.8	75-125	20	
Beryllium	ND	100	100	101	109	mg/Kg	101	109	7.6	75-125	20	
Cadmium	ND	100	100	102	107	mg/Kg	102	107	4.8	75-125	20	
Chromium	0.56	100	100	103	106	mg/Kg	102	105	2.9	75-125	20	
Cobalt	0.21	100	100	106	112	mg/Kg	106	112	5.5	75-125	20	
Copper	3.49	100	100	112	117	mg/Kg	109	114	4.4	75-125	20	
Lead	1.46	100	100	103	112	mg/Kg	102	111	8.4	75-125	20	
Molybdenum	1.02	100	100	102	115	mg/Kg	101	114	12.0	75-125	20	

QCBatchID: QC1211498 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 02/20/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211498MS1, QC1211498MSD1												**Source: 412494-001**
Nickel	1.56	100	100	106	115	mg/Kg	104	113	8.1	75-125	20	
Selenium	1.18	100	100	94.3	106	mg/Kg	93	105	11.7	75-125	20	
Silver	ND	100	100	95.7	105	mg/Kg	96	105	9.3	75-125	20	
Thallium	0.48	100	100	85.0	107	mg/Kg	85	107	22.9	75-125	20	M
Vanadium	1.97	100	100	108	113	mg/Kg	106	111	4.5	75-125	20	
Zinc	5.50	100	100	111	107	mg/Kg	106	102	3.7	75-125	20	

QCBatchID:	**QC1211499**	**Analyst:**	dswafford	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	02/20/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1211499MB1					
Lead	**0.38 J**	mg/Kg	0.32	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211499LCS1											
Lead	100		109		mg/Kg	109			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211499MS1, QC1211499MSD1												**Source: 412566-011**
Lead	6.19	100	100	106	105	mg/Kg	100	99	0.9	75-125	20	

QCBatchID: QC1211965 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 03/05/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1211965MB1					
Arsenic	ND	mg/L	0.008	0.05	
Lead	**0.009 J**	mg/L	0.005	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211965LCS1											
Arsenic	2		2.06		mg/L	103			80-120		
Lead	2		1.908		mg/L	95			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1211965MS1, QC1211965MSD1												**Source: 412566-001**
Arsenic	0.026	1	1	1.136	1.082	mg/L	111	106	4.9	75-125	20	
Lead	0.674	1	1	1.731	1.612	mg/L	106	94	7.1	75-125	20	

QCBatchID: QC1212021 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 03/06/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1212021MB1					
Antimony	ND	mg/L	0.014	0.09	
Arsenic	ND	mg/L	0.008	0.03	
Barium	**0.003 J**	mg/L	0.002	0.03	
Beryllium	ND	mg/L	0.001	0.015	
Cadmium	**0.077**	mg/L	0.001	0.015	
Chromium	ND	mg/L	0.002	0.03	
Cobalt	ND	mg/L	0.001	0.015	
Copper	ND	mg/L	0.004	0.03	
Lead	**0.026**	mg/L	0.005	0.015	
Molybdenum	ND	mg/L	0.005	0.03	
Nickel	**0.046 J**	mg/L	0.003	0.06	
Selenium	**0.214**	mg/L	0.016	0.03	
Silver	ND	mg/L	0.003	0.015	
Thallium	ND	mg/L	0.009	0.015	
Vanadium	**0.026**	mg/L	0.002	0.015	
Zinc	ND	mg/L	0.007	0.06	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1212021LCS1, QC1212021LCSD1											
Antimony	20	20	22.7	23.1	mg/L	114	116	2	80-120	20	
Arsenic	20	20	23.2	25.6	mg/L	116	128	10	80-120	20	L
Barium	20	20	21.6	22.0	mg/L	108	110	2	80-120	20	
Beryllium	20	20	21.8	20.3	mg/L	109	102	7	80-120	20	
Cadmium	20	20	20.8	20.9	mg/L	104	105	0	80-120	20	
Chromium	20	20	21.0	21.5	mg/L	105	108	2	80-120	20	
Cobalt	20	20	21.2	21.3	mg/L	106	107	0	80-120	20	
Copper	20	20	22.2	23.1	mg/L	111	116	4	80-120	20	
Lead	20	20	19.0	22.2	mg/L	95	111	16	80-120	20	
Molybdenum	20	20	23.6	23.6	mg/L	118	118	0	80-120	20	
Nickel	20	20	20.4	20.4	mg/L	102	102	0	80-120	20	
Selenium	20	20	21.1	23.7	mg/L	106	119	12	80-120	20	
Silver	20	20	20.0	20.7	mg/L	100	104	3	80-120	20	
Thallium	20	20	19.2	21.3	mg/L	96	107	10	80-120	20	
Vanadium	20	20	22.0	22.4	mg/L	110	112	2	80-120	20	
Zinc	20	20	20.3	20.3	mg/L	102	102	0	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: 412566 Page: 1 of 3	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs							Test Instructions / Comments
1	SB-1A-0.5'	2/18/19	0930	Soil	1 Glass Jar	No	X										
2	SB-1A-1.5'		0933				X										
3	SB-1B-0.5'		0950				X										
4	SB-1B-1.5'		0952				X										
5	SB-1C-0.5'		0955				X										
6	SB-1C-1.5'		0959				X										
7	SB-5A-0.5'		1003				X										
8	SB-5A-1.5'		1007				X										
9	SB-5B-0.5'		1010				X										
10	SB-5B-1.5'		1015				X										

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Chris Guesnon	Montrose	2-18-19 / 1436
1 Received By:	[signature]	Cattemandez	E.A	2/18/19 1439
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.		Chain of Custody Record		Turn Around Time (Rush by advanced notice only)								
806 N. Batavia St., Orange, CA 92868		Lab No:		Standard:		✓	4 Day:			3 Day:		
Phone: (714) 771-6900 Fax: (714)771-9933		Page: 2 of 3		2 Day:			1 Day:			Same Day:		
Billing: Enthalpy - SoCal		**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other		**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other								
c/o Montrose Environmental Group												
1 Park Plaza, Suite 1000, Irvine, CA 92614												

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs							Test Instructions / Comments
1	SB-5C-0.5'	2/18/19	1045	Soil	1Glass Jar	NO	X										
2	SB-5C-1.5'		1050				X										
3	SB-3A-0.5'		1050				X										
4	SB-3A-1.5'		1053				X										
5	SB-3B-0.5'		1055				X										
6	SB-3B-1.5'		1057				X										
7	SB-7A-0.5		1103				X										
8	SB-7A-1.5		1106				X										
9	SB-7B-0.5		1108				X										
10	SB-7B-1.5		1110				X										

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Chris A Gueshon	Montrose	2-18-19 / 1436
1 Received By:		Fitzmaurice	EA	2/18/19 1439
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933	Lab No: Page: 3 of 3	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	EPA 8081 - OC Pesticides	EPA 8082 - PCBs							Test Instructions / Comments
1	SB-30A-0.5	2/18/19	1112	Soil	1 Glass Jar	No	X										
2	SB-30A-1.5		1115				X										
3	SB-30B-0.5		1132				X										
4	SB-30B-1.5		1135				X										
5	SB-30C-0.5		1133				X										
6	SB-30C-1.5		1139				X										
7	SB-15A-0.5		1142				X										
8	SB-15A-1.5		1145				X										
9	SB-15B-0.5		1148				X										
10	SB-15B-1.5		1150				X										

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Chris A. Guesnon	Montrose	2-18-19 / 1436
1 Received By:	[signature]	Cattemandez	E.A	2/18/19 1439
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: _____

Date Received: 02/18/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 8.7 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 2.4 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?			✓
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 2/18/19

Ranjit Clarke

From: Chris Guesnon
Sent: Tuesday, February 26, 2019 10:13 AM
To: Ranjit Clarke
Cc: dnygaard@montrose-env.com; kkern@montrose-env.com
Subject: RE: Shenandoah Elementary School (02/18/19) - PDF - Enthalpy Analytical Final Report #412566

Hey Ranjit. Yes, please run sample SB-1A-0.for STLC and TCLP.

Please Note: As of January 1, 2019, ES Engineering Services, LLC will be operating as Montrose Environmental. All contact information remains the same, and as shown below.

Thank You.

Chris A. Guesnon
Senior Geologist
Montrose Environmental
1 Park Plaza
Suite 1000
Irvine, CA 92614

t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@montrose-env.com
www.montrose-env.com

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Please consider the environment before printing

From: Ranjit Clarke [mailto:ranjit.clarke@enthalpy.com]
Sent: Monday, February 25, 2019 9:09 AM
To: Atis Srihiran; Chris Guesnon; Dane Nygaard; Kristopher Kern; Laura Skow; Sarah King; Sean Mitchell Hyde; Victor Paitimusa
Subject: Shenandoah Elementary School (02/18/19) - PDF - Enthalpy Analytical Final Report #412566

Hi Dane Nygaard,

Attached is your final report #412566. Sample SB-1A-0.5' exceeded the STLC and TCLP limits for Lead. Please let me know if you require additional analysis on this sample.

Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard

Lab Request: 414424
Report Date: 05/10/2019
Date Received: 04/17/2019
Client ID: 12860

Comments: Shenandoah Elementary School
029RC1-191395
2450 Shenandoah Street, Los Angeles, CA

Revised Report 2 - STLC and TCLP results are now included where requested.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID	Sample #	Client Sample ID
414424-001	SB-33-0.5'	414424-027	SB-43-2.5'	414424-053	SB-53-1.5'
414424-002	SB-33-1.5'	414424-028	SB-44-0.5'	414424-054	SB-54-0.5'
414424-003	SB-34-0.5'	414424-029	SB-44-1.5'	414424-055	SB-54-1.5'
414424-004	SB-34-1.5'	414424-030	SB-44-2.5'	414424-056	SB-55-0.5'
414424-005	SB-35-0.5'	414424-031	SB-45-0.5'	414424-057	SB-55-1.5'
414424-006	SB-35-1.5'	414424-032	SB-45-1.5'	414424-058	SB-56-0.5'
414424-007	SB-36-0.5'	414424-033	SB-45-2.5'	414424-059	SB-56-1.5'
414424-008	SB-36-1.5'	414424-034	SB-46-0.5'	414424-060	SB-56-2.5'
414424-009	SB-37-0.5'	414424-035	SB-46-1.5'	414424-061	SB-57-0.5'
414424-010	SB-37-1.5'	414424-036	SB-46-2.5'	414424-062	SB-57-1.5'
414424-011	SB-38-0.5'	414424-037	SB-47-0.5'	414424-063	SB-57-2.5'
414424-012	SB-38-1.5'	414424-038	SB-47-1.5'	414424-064	SB-58-0.5'
414424-013	SB-39-0.5'	414424-039	SB-47-2.5'	414424-065	SB-58-1.5'
414424-014	SB-39-1.5'	414424-040	SB-48-0.5'	414424-066	SB-58-2.5'
414424-015	SB-39-2.5'	414424-041	SB-48-1.5'	414424-067	SB-59-0.5'
414424-016	SB-40-0.5'	414424-042	SB-48-2.5'	414424-068	SB-59-1.5'
414424-017	SB-40-1.5'	414424-043	SB-49-0.5'	414424-069	SB-59-2.5'
414424-018	SB-40-2.5'	414424-044	SB-49-1.5'	414424-070	SB-39-0.5' (DUP)
414424-019	SB-41-0.5'	414424-045	SB-49-2.5'	414424-071	SB-43-0.5' (DUP)
414424-020	SB-41-1.5'	414424-046	SB-50-0.5'	414424-072	SB-47-1.5' (DUP)
414424-021	SB-41-2.5'	414424-047	SB-50-1.5'	414424-073	SB-49-1.5' (DUP)
414424-022	SB-42-0.5'	414424-048	SB-51-0.5'	414424-074	SB-53-0.5' (DUP)
414424-023	SB-42-1.5'	414424-049	SB-51-1.5'	414424-075	SB-55-1.5' (DUP)
414424-024	SB-42-2.5'	414424-050	SB-52-0.5'	414424-076	SB-60-0.5' (DUP)
414424-025	SB-43-0.5'	414424-051	SB-52-1.5'	414424-077	SB-60-0.5'
414424-026	SB-43-1.5'	414424-052	SB-53-0.5'	414424-078	SB-60-1.5'

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Ranjit K. K. Clarke

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Enthalpy Analytical, LLC

931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering
Address:	1 Park Plaza Suite #1000 Irvine, CA 92614
Attn:	Dane Nygaard

Lab Request:	414424
Report Date:	05/10/2019
Date Received:	04/17/2019
Client ID:	12860

Comments: Shenandoah Elementary School
029RC1-191395
2450 Shenandoah Street, Los Angeles, CA

Revised Report 2 - STLC and TCLP results are now included where requested.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
414424-079	Equipment Blank - Day 1
414424-080	Equipment Blank - Day 2

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 09:10	**Site:**			
Sample #:	**414424-001**	**Client Sample #:**	SB-33-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**1.54 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**122**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.59**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.6**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.4**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**11.7**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.82 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.3**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.58 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**42.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**60.6**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201038		
Arsenic	**14.4**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	2	3.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	2	70	100	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	2	5.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	2	6.8	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	2	5.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	2	8.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	2	2.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	2	4.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	2	18.4	20	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	2	108	200	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*79*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*67*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 09:17	**Site:**			
Sample #:	**414424-002**	**Client Sample #:**	SB-33-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**1.11 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**107**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.80**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.6**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.32**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.60 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.7**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.21 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**39.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**51.2**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.89**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*63*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*57*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 08:53	**Site:**			
Sample #:	**414424-003**	**Client Sample #:**	SB-34-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**4.68**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**131**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.37**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.8**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**14.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**72.2**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.48**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**17.3**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.82 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**47.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**64.4**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**4.03**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201024		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/17/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/17/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/17/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*93*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201025		
PCB-1016	ND	1	3	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/17/19	04/19/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 08:53	**Site:**			
Sample #:	**414424-003**	**Client Sample #:**	SB-34-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 08:58	**Site:**			
Sample #:	**414424-004**	**Client Sample #:**	SB-34-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**2.60 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**96.8**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.60**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.88**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.86**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.12**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**18.1**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**36.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**47.2**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.30**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201024		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/17/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/17/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/17/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*93*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*67*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201025		
PCB-1016	ND	1	3	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/17/19	04/19/19	MTS	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 08:58 **Site:**
Sample #: **414424-004** **Client Sample #:** SB-34-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 09:30 **Site:**
Sample #: **414424-005** **Client Sample #:** SB-35-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**1.43 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**138**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.47**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**30.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.4**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**14.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**9.61**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.58 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.89 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**48.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**55.5**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**3.93**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	2	3.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	2	70	100	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	2	5.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	2	6.8	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	2	5.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	2	8.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	2	2.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	2	4.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	2	18.4	20	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	2	108	200	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*84*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 09:35	**Site:**			
Sample #:	**414424-006**	**Client Sample #:**	SB-35-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**1.16 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**108**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.84**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.12**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.60 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.9**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.42 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**38.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**49.5**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.91**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*57*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 09:49	**Site:**			
Sample #:	**414424-007**	**Client Sample #:**	SB-36-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**107**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.94**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**6.16**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.92 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.7**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.96 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**54.7**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.44**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*59*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*52*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 09:51	**Site:**			
Sample #:	**414424-008**	**Client Sample #:**	SB-36-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**0.48 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**139**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.05**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**38.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**13.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**22.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**7.70**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.19**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**30.7**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.08 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**67.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**79.1**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**7.54**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*65*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*59*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:15	**Site:**			
Sample #:	**414424-009**	**Client Sample #:**	SB-37-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	**0.87 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**134**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.79**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.1**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.1**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.68**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.91 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**22.1**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.47 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**38.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**51.6**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.85**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*60*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:20	**Site:**			
Sample #:	**414424-010**	**Client Sample #:**	SB-37-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201035		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**107**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.65**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.1**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**12.1**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.88 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**22.1**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.17 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**41.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**60.6**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**14.8**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	2	3.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	2	70	100	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	2	5.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	2	6.8	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	2	5.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	2	8.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	2	2.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	2	4.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	2	18.4	20	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	2	108	200	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*62*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*61*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:03	**Site:**			
Sample #:	**414424-011**	**Client Sample #:**	SB-38-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.95 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**105**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.16**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.55**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**13.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**47.0**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.96 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**22.3**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**1.94 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**2.06 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**46.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**58.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**6.60**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*117*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*82*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:06	**Site:**			
Sample #:	**414424-012**	**Client Sample #:**	SB-38-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**104**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.06**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.57**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.25**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.93**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**17.5**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**3.94**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**38.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**44.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**6.79**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*63*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*64*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:55	**Site:**			
Sample #:	**414424-013**	**Client Sample #:**	SB-39-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**114**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.43**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**20.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.65**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**24.7**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.80 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**16.8**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**0.77 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**38.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**98.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**21.1**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*112*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*86*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:59	**Site:**			
Sample #:	**414424-014**	**Client Sample #:**	SB-39-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**1.50 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**105**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.65**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.37**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.60**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.79 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.4**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.00 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**38.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**43.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**6.30**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*61*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*59*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:05	**Site:**			
Sample #:	**414424-015**	**Client Sample #:**	SB-39-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**88.6**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.39**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.1**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.54**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**2.97**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.87 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.5**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**46.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**40.7**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**9.61**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*61*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*60*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:30	**Site:**			
Sample #:	**414424-016**	**Client Sample #:**	SB-40-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.80 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**154**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.71**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**7.31**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.93 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.1**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.44 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**44.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**51.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.66**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*65*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:37	**Site:**			
Sample #:	**414424-017**	**Client Sample #:**	SB-40-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**103**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.58**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.81**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.98**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.75 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.4**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**1.82 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**39.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**38.3**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.17**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*64*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*63*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:39	**Site:**			
Sample #:	**414424-018**	**Client Sample #:**	SB-40-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**3.05**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**99.9**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.57**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.88**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.62**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.23**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**20.2**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**44.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**46.0**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**7.95**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201045		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*56*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*62*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 15:04	**Site:**			
Sample #:	**414424-019**	**Client Sample #:**	SB-41-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.51 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**106**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.56**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**22.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.57**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.45**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.53 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**16.9**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**36.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**42.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**5.94**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*62*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*62*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 15:08	**Site:**			
Sample #:	**414424-020**	**Client Sample #:**	SB-41-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.74 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**99.4**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.50**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**28.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.59**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.10**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**20.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**49.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**45.8**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**6.76**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*68*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:12	**Site:**			
Sample #:	**414424-021**	**Client Sample #:**	SB-41-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**1.12 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**101**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.58**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**35.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**22.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.02**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.10**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**24.2**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**1.25 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**61.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**49.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201039		
Arsenic	**8.96**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*57*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*61*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:42	**Site:**			
Sample #:	**414424-022**	**Client Sample #:**	SB-42-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1201609		
Lead	**0.020 J**	1	0.005	0.05	mg/L	05/03/19	05/03/19	KLN	B1,J
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.98 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**159**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.45**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.1**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.1**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**110**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.51 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.8**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.47 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**45.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**69.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1201621		
Lead	**0.448**	10	0.05	0.15	mg/L	05/03/19	05/03/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**44.9**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201031		
4,4'-DDD	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	**5.1 J**	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	J
4,4'-DDT	**11**	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	2	3.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	2	70	100	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	2	5.6	10	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	2	6.8	10	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	2	5.4	10	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	2	8.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	2	2.6	10	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	2	4.6	10	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	2	18.4	20	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	2	108	200	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*72*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*74*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:46	**Site:**			
Sample #:	**414424-023**	**Client Sample #:**	SB-42-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**2.29 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**84.8**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.24**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.41**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**16.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.86**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.64 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.9**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**37.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**41.7**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.77**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*65*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:48	**Site:**			
Sample #:	**414424-024**	**Client Sample #:**	SB-42-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**83.4**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.23**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.1**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**7.78**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.56**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.89 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.1**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**37.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**41.3**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**9.57**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*72*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*71*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:15	**Site:**			
Sample #:	**414424-025**	**Client Sample #:**	SB-43-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**1.22 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**107**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.68**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.19**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.42**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.43 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.9**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**40.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**45.7**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.15**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*56*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*56*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:17	**Site:**			
Sample #:	**414424-026**	**Client Sample #:**	SB-43-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**0.83 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**94.6**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.58**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.0**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.24**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**15.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.58**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.49 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**21.8**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**0.76 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**35.2**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**42.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.22**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*62*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*65*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:20	**Site:**			
Sample #:	**414424-027**	**Client Sample #:**	SB-43-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**1.24 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**90.8**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.52**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**28.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.99**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.62**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.80 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.9**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**45.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**45.5**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**7.31**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*64*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*67*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:43	**Site:**			
Sample #:	**414424-028**	**Client Sample #:**	SB-44-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**3.43**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**201**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.28**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**16.5**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.44 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**17.1**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.73 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**43.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**61.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**48.5**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201024		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDT	**2.2 J**	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	J
a-BHC	ND	1	1.6	5	ug/Kg	04/17/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/17/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/17/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*82*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*57*	*50-150*	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201025		
PCB-1016	ND	1	3	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/17/19	04/19/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:43	**Site:**			
Sample #:	**414424-028**	**Client Sample #:**	SB-44-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*82*	*50-150*	*Surrogate reported from Pesticide run.*

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:49	**Site:**			
Sample #:	**414424-029**	**Client Sample #:**	SB-44-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**90.6**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.37**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**20.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.58**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**15.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.47**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.72 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**16.2**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**33.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**37.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.72**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201024		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/17/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/17/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/17/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*102*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*75*	*50-150*	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201025		
PCB-1016	ND	1	3	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/17/19	04/19/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:49	**Site:**			
Sample #:	**414424-029**	**Client Sample #:**	SB-44-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*57*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:52	**Site:**			
Sample #:	**414424-030**	**Client Sample #:**	SB-44-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201081		
Antimony	**1.27 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**90.7**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.46**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.15**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.00**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.70 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.97 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**41.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**44.0**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.75**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201024		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/17/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/17/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/17/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/17/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/17/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/17/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/17/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*103*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*84*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201025		
PCB-1016	ND	1	3	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/17/19	04/19/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/17/19	04/19/19	MTS	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/17/2019 08:52 **Site:**
Sample #: **414424-030** **Client Sample #:** SB-44-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/17/19	04/19/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*73*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 15:19 **Site:**
Sample #: **414424-031** **Client Sample #:** SB-45-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201036
Antimony	**1.46 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**90.7**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.48**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**7.90**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**15.4**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**15.0**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.24**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**17.5**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	**1.34 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.23 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**39.3**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**27.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201040
Arsenic	**6.02**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID:		QC1201048
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID:		QC1201072
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*51*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:23	**Site:**			
Sample #:	**414424-032**	**Client Sample #:**	SB-45-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**1.72 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**102**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.81**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.46**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**16.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.60**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.56**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**19.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	**1.65 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**3.50**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**37.2**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**47.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**5.00**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*56*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:26	**Site:**			
Sample #:	**414424-033**	**Client Sample #:**	SB-45-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**3.01**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**104**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.70**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**13.2**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**7.64**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**2.24**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**29.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	**2.52 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.15 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**58.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**59.8**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**9.83**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*66*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:26	**Site:**			
Sample #:	**414424-034**	**Client Sample #:**	SB-46-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**2.53 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**160**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.14**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**21.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.8**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**29.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**35.6**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.22 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.7**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.81 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**87.5**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**2.48**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	**6.6**	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	**4.3 J**	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	J
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*77*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:29	**Site:**			
Sample #:	**414424-035**	**Client Sample #:**	SB-46-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**0.89 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**107**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.85**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.7**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.78**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.84 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**38.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**63.5**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**5.17**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*74*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*64*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:35	**Site:**			
Sample #:	**414424-036**	**Client Sample #:**	SB-46-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**0.64 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**109**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.69**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**31.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.95**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.02**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**24.3**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**53.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**60.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**8.21**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*77*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:25	**Site:**			
Sample #:	**414424-037**	**Client Sample #:**	SB-47-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**1.43 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**152**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.00**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**22.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**15.0**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.21 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**15.4**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.93 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**44.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**63.3**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**25.9**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*78*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*65*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:32	**Site:**			
Sample #:	**414424-038**	**Client Sample #:**	SB-47-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**2.51 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**86.0**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.47**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**21.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.89**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**15.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.38**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.50 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**17.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.50 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**34.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**44.9**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**6.96**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201048		
Mercury	ND	1	0.039	0.14	mg/Kg	04/18/19	04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*84*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*72*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:38	**Site:**			
Sample #:	**414424-039**	**Client Sample #:**	SB-47-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**104**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.61**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**6.18**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.83 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**24.5**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**48.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**62.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**8.97**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*79*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:00	**Site:**			
Sample #:	**414424-040**	**Client Sample #:**	SB-48-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**121**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.96**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**30.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.1**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**11.5**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.83 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**44.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**68.8**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**30.6**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*73*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*65*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:03	**Site:**			
Sample #:	**414424-041**	**Client Sample #:**	SB-48-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**0.64 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**113**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.82**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.7**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.5**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.20**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.87 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.5**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.59 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**55.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201040		
Arsenic	**5.69**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*75*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*67*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:05	**Site:**			
Sample #:	**414424-042**	**Client Sample #:**	SB-48-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**108**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.88**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.8**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.95**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.54**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**25.2**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.04 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**51.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**61.8**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**7.14**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*80*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:18	**Site:**			
Sample #:	**414424-043**	**Client Sample #:**	SB-49-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**2.32 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**123**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.12**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**31.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.8**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.64**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.91 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**23.2**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**46.2**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**70.1**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.46**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*83*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:23	**Site:**			
Sample #:	**414424-044**	**Client Sample #:**	SB-49-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**2.45 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**116**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.72**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.2**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.94**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**1.17**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**25.1**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**50.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**63.2**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.30**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*71*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*61*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:25	**Site:**			
Sample #:	**414424-045**	**Client Sample #:**	SB-49-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**128**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.70**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**35.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.4**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.59**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.87 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**26.9**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**55.2**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**63.0**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**8.66**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201072		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*56*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:34	**Site:**			
Sample #:	**414424-046**	**Client Sample #:**	SB-50-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	**0.64 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**183**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.52**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.6**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**21.9**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.43 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.6**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.83 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**46.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**80.0**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**69.0**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1201705		
Arsenic	**2110**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*86*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 10:38	**Site:**			
Sample #:	**414424-047**	**Client Sample #:**	SB-50-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**179**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.24**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**31.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**13.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**683**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**56.4**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.65 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**21.4**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.11 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**43.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**121**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.98**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*67*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*54*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:11	**Site:**			
Sample #:	**414424-048**	**Client Sample #:**	SB-51-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1201036		
Antimony	**0.96 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**108**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.96**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.24**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**11.4**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.63 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.9**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**35.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**66.2**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 1311						QCBatchID: QC1201729		
Arsenic	**2450**	10	3.1	20	ug/L	05/08/19	05/08/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1201042		
Arsenic	**218**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1201705		
Arsenic	**9960**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A NELAC	Prep Method: EPA 3545						QCBatchID: QC1201080		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*70*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*59*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:16	**Site:**			
Sample #:	**414424-049**	**Client Sample #:**	SB-51-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**131**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.78**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**37.7**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**13.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**24.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.18**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.71 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**27.8**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**62.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**72.9**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**10.7**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*65*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*53*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:24	**Site:**			
Sample #:	**414424-050**	**Client Sample #:**	SB-52-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201036		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**199**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.62**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**14.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**29.4**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**40.4**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**19.0**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**43.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**123**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 1311							QCBatchID: QC1201729		
Arsenic	**2890**	10	3.1	20	ug/L	05/08/19	05/08/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**233**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1201705		
Arsenic	**10400**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	2	3.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	2	3	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	2	70	100	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	2	2.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	2	5.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	2	6.8	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	2	5.4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	2	4.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	2	8.2	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	2	2.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	2	4.6	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	2	4	10	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	2	18.4	20	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	2	108	200	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*85*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*67*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:27	**Site:**			
Sample #:	**414424-051**	**Client Sample #:**	SB-52-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**136**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.90**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.1**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.27**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.71**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**21.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**3.06**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**49.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**53.7**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.30**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*59*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:38	**Site:**			
Sample #:	**414424-052**	**Client Sample #:**	SB-53-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**1.76 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**127**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.46**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**28.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.08**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.05**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**1.59**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.82 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.8**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**6.79**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**129**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	**0.05 J**	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/19/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/19/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/19/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/19/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*110*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*78*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:41	**Site:**			
Sample #:	**414424-053**	**Client Sample #:**	SB-53-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**110**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.78**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.88**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.54**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.02**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**17.5**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**39.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**57.9**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.61**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*76*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:26	**Site:**			
Sample #:	**414424-054**	**Client Sample #:**	SB-54-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**1.31 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**146**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.28**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**31.7**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**32.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**23.4**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.87 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.9**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.71 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**48.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**88.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 1311							QCBatchID: QC1201729		
Arsenic	**1040**	10	3.1	20	ug/L	05/08/19	05/08/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**124**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1201705		
Arsenic	**5090**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*76*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*65*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:31	**Site:**			
Sample #:	**414424-055**	**Client Sample #:**	SB-54-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**115**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.66**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.10**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**18.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.93**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.56 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.5**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.63 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**50.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**5.59**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*68*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*60*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 13:45 **Site:**
Sample #: 414424-056 **Client Sample #:** SB-55-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**102**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.73**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**23.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.61**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.0**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**5.85**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.33 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.2**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.47 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**36.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**59.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 NELAC Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**59.7**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 NELAC Prep Method: STLC							QCBatchID: QC1201705		
Arsenic	**2610**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A NELAC Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A NELAC Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*76*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Method: EPA 8082 NELAC Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:45	**Site:**			
Sample #:	**414424-056**	**Client Sample #:**	SB-55-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*64*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:53	**Site:**			
Sample #:	**414424-057**	**Client Sample #:**	SB-55-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**0.72 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**101**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.53**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**25.5**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.48**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.83 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.1**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.75 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**41.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**47.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**6.90**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201049		
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*74*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 13:53 **Site:**
Sample #: **414424-057** **Client Sample #:** SB-55-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*67*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/17/2019 10:16 **Site:**
Sample #: **414424-058** **Client Sample #:** SB-56-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201082
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**129**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.83**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**6.05**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.57 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.1**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**1.00 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.80 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**48.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**46.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201042
Arsenic	**6.45**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID:		QC1201049
Mercury	ND	1	0.039	0.14	mg/Kg		04/19/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID:		QC1201080
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*81*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*71*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 10:20	**Site:**			
Sample #:	**414424-059**	**Client Sample #:**	SB-56-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**98.2**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.49**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**24.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.12**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**14.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.59**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.15 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**17.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**37.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**40.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**5.90**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*77*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*63*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 10:23	**Site:**			
Sample #:	**414424-060**	**Client Sample #:**	SB-56-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**0.67 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**115**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.84**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**34.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.2**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**24.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**6.20**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.21**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**24.8**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.56 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**55.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**58.3**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**7.86**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/19/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/19/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/19/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/19/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/19/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/19/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/19/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/19/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*84*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 10:31	**Site:**			
Sample #:	**414424-061**	**Client Sample #:**	SB-57-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**581**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.16**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**8.25**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**17.2**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.9**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**7.52**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**7.08**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.81 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**32.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**54.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201042		
Arsenic	**12.5**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/20/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/20/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/20/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/20/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/20/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/20/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*105*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*83*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 10:36	**Site:**			
Sample #:	**414424-062**	**Client Sample #:**	SB-57-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	ND	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	ND	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	ND	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	ND	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.49**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	ND	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**18.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	**0.17 J**	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	J
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	ND	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**43.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**5.38**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*72*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 10:36	**Site:**			
Sample #:	**414424-063**	**Client Sample #:**	SB-57-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**2.19 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**90.5**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.36**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**27.0**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.33**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**16.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.07**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.91 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**19.8**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**44.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**44.6**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**8.23**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*81*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:20	**Site:**			
Sample #:	**414424-064**	**Client Sample #:**	SB-58-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**103**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.42**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.2**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**8.94**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**16.4**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.95 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**17.4**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.29 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**44.3**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**72.0**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**7.17**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	**0.05 J**	1	0.039	0.14	mg/Kg		04/23/19	JP	J
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	**3.9 J**	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	J
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*77*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*70*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:20	**Site:**			
Sample #:	**414424-064**	**Client Sample #:**	SB-58-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:40	**Site:**			
Sample #:	**414424-065**	**Client Sample #:**	SB-58-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**1.97 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**135**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.10**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**35.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.8**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**24.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**16.4**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.57**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**23.6**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**59.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**73.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**9.06**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	**16**	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*76*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*66*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:40	**Site:**			
Sample #:	**414424-065**	**Client Sample #:**	SB-58-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*67*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:47	**Site:**			
Sample #:	**414424-066**	**Client Sample #:**	SB-58-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	**1.00 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**122**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.93**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.6**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.51**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.75 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.5**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**47.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**54.4**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**6.36**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*84*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*72*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 14:47	**Site:**			
Sample #:	**414424-066**	**Client Sample #:**	SB-58-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*74*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:09	**Site:**			
Sample #:	**414424-067**	**Client Sample #:**	SB-59-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**150**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.52**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.0**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**26.4**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**44.1**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.56 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**18.6**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**41.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**89.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**6.22**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	**0.06 J**	1	0.039	0.14	mg/Kg		04/23/19	JP	J
Method: EPA 8015B *NELAC* Prep Method: EPA 5035A							QCBatchID: QC1200658		
TPH (C6 to C12)	ND	0.86	0.20554	2.58	mg/Kg		04/18/19	EW	
Surrogate	*% Recovery*		*Limits*	*Notes*					
4-Bromofluorobenzene (SUR)	*100*		*60-140*						
Method: EPA 8015M Prep Method: EPA 3580A							QCBatchID: QC1201028		
TPH (C13 to C22)	ND	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	
TPH (C23 to C44)	**24**	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	
Surrogate	*% Recovery*		*Limits*	*Notes*					
Triacontane (SUR)	*126*		*50-150*						
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDE	**65**	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
4,4'-DDT	**30**	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/20/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:09	**Site:**			
Sample #:	**414424-067**	**Client Sample #:**	SB-59-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*		*Limits*	*Notes*					
Decachlorobiphenyl DCB (SUR)	*79*		*50-150*						
Tetrachloro-m-xylene TCMX (SUR)	*70*		*50-150*						
Method: EPA 8260B *NELAC* Prep Method: EPA 5035A							QCBatchID: QC1201001		
1,1,1,2-Tetrachloroethane	ND	0.8	0.192	4	ug/Kg		04/18/19	LZ	
1,1,1-Trichloroethane	ND	0.8	0.12	4	ug/Kg		04/18/19	LZ	
1,1,2,2-Tetrachloroethane	ND	0.8	0.232	4	ug/Kg		04/18/19	LZ	
1,1,2-Trichloroethane	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
1,1,2-Trichlorotrifluoroethane	ND	0.8	0.592	4	ug/Kg		04/18/19	LZ	
1,1-Dichloroethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
1,1-Dichloroethene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,1-Dichloropropene	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
1,2,3-Trichlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,2,3-Trichloropropane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
1,2,4-Trichlorobenzene	ND	0.8	0.264	4	ug/Kg		04/18/19	LZ	
1,2,4-Trimethylbenzene	ND	0.8	0.224	4	ug/Kg		04/18/19	LZ	
1,2-Dibromo-3-chloropropane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
1,2-Dibromoethane	ND	0.8	0.096	4	ug/Kg		04/18/19	LZ	
1,2-Dichlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,2-Dichloroethane	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
1,2-Dichloropropane	ND	0.8	0.272	4	ug/Kg		04/18/19	LZ	
1,3,5-Trimethylbenzene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
1,3-Dichlorobenzene	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
1,3-Dichloropropane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
1,4-Dichlorobenzene	ND	0.8	0.192	4	ug/Kg		04/18/19	LZ	
2,2-Dichloropropane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
2-Butanone (MEK)	**2.2 J**	0.8	0.576	80	ug/Kg		04/18/19	LZ	J
2-Chloroethyl Vinyl Ether	ND	0.8	0.24	4	ug/Kg		04/18/19	LZ	
2-Chlorotoluene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
4-Chlorotoluene	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
4-Isopropyltoluene	ND	0.8	0.216	4	ug/Kg		04/18/19	LZ	
4-Methyl-2-pentanone (MIBK)	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Acetone	ND	0.8	40	80	ug/Kg		04/18/19	LZ	
Allyl Chloride	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
Benzene	**0.25 J**	0.8	0.144	4	ug/Kg		04/18/19	LZ	J
Bromobenzene	ND	0.8	0.24	4	ug/Kg		04/18/19	LZ	
Bromochloromethane	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Bromodichloromethane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Bromoform	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Bromomethane	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
Carbon Tetrachloride	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Chlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Chlorodibromomethane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Chloroethane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Chloroform	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Chloromethane	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
cis-1,2-Dichloroethene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
cis-1,3-dichloropropene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
cis-1,4-dichloro-2-butene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Dibromomethane	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Dichlorodifluoromethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Di-isopropyl ether (DIPE)	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Ethylbenzene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Ethyl-tertbutylether (ETBE)	ND	0.8	0.336	4	ug/Kg		04/18/19	LZ	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:09	**Site:**			
Sample #:	**414424-067**	**Client Sample #:**	SB-59-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Hexachlorobutadiene	ND	0.8	0.336	4	ug/Kg		04/18/19	LZ	
Isopropylbenzene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
m and p-Xylene	ND	0.8	0.304	4	ug/Kg		04/18/19	LZ	
Methylene chloride	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Methyl-t-butyl Ether (MTBE)	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Naphthalene	ND	0.8	0.128	4	ug/Kg		04/18/19	LZ	
N-butylbenzene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
N-propylbenzene	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
o-Xylene	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Sec-butylbenzene	ND	0.8	0.224	4	ug/Kg		04/18/19	LZ	
Styrene	ND	0.8	0.104	4	ug/Kg		04/18/19	LZ	
t-Butyl alcohol (TBA)	ND	0.8	7.04	8	ug/Kg		04/18/19	LZ	
Tert-amylmethylether (TAME)	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Tert-butylbenzene	ND	0.8	0.272	4	ug/Kg		04/18/19	LZ	
Tetrachloroethene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Toluene	**0.22 J**	0.8	0.136	4	ug/Kg		04/18/19	LZ	J
trans-1,2-dichloroethene	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
trans-1,3-dichloropropene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
trans-1,4-dichloro-2-butene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Trichloroethene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Trichlorofluoromethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Vinyl Chloride	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
Xylenes (Total)	ND	0.8	0.304	4	ug/Kg		04/18/19	LZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*119*	*70-145*	
4-Bromofluorobenzene (SUR)	*110*	*70-145*	
Dibromofluoromethane (SUR)	*97*	*70-145*	
Toluene-d8 (SUR)	*100*	*70-145*	

Method: EPA 8270C *NELAC* Prep Method: EPA 3545 QCBatchID: QC1201027

1,2,4-Trichlorobenzene	ND	2	44	500	ug/Kg	04/18/19	04/19/19	DDo	D2
1,2-Dichlorobenzene	ND	2	74	500	ug/Kg	04/18/19	04/19/19	DDo	D2
1,3-Dichlorobenzene	ND	2	100	500	ug/Kg	04/18/19	04/19/19	DDo	D2
1,4-Dichlorobenzene	ND	2	62	500	ug/Kg	04/18/19	04/19/19	DDo	D2
1-Methylnaphthalene	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4,5-Trichlorophenol	ND	2	86	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4,6-Trichlorophenol	ND	2	70	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4-Dichlorophenol	ND	2	46	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4-Dimethylphenol	ND	2	200	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4-Dinitrophenol	ND	2	46	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
2,4-Dinitrotoluene	ND	2	28	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2,6-Dinitrotoluene	ND	2	66	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Chloronaphthalene	ND	2	30	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Chlorophenol	ND	2	30	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Methyl-4,6-dinitrophenol	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Methylnaphthalene	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Methylphenol (o-Cresol)	ND	2	62	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Nitroaniline	ND	2	62	500	ug/Kg	04/18/19	04/19/19	DDo	D2
2-Nitrophenol	ND	2	32	500	ug/Kg	04/18/19	04/19/19	DDo	D2
3 and 4-Methylphenol (m and p-Cresol)	ND	2	38	800	ug/Kg	04/18/19	04/19/19	DDo	D2
3,3'-Dichlorobenzidine	ND	2	108	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
3-Nitroaniline	ND	2	74	500	ug/Kg	04/18/19	04/19/19	DDo	D2
4-Bromophenyl phenyl ether	ND	2	48	500	ug/Kg	04/18/19	04/19/19	DDo	D2
4-Chloro-3-methylphenol	ND	2	36	500	ug/Kg	04/18/19	04/19/19	DDo	D2
4-Chloroaniline	ND	2	146	500	ug/Kg	04/18/19	04/19/19	DDo	D2

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:09	**Site:**			
Sample #:	**414424-067**	**Client Sample #:**	SB-59-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
4-Chlorophenyl phenyl ether	ND	2	38	500	ug/Kg	04/18/19	04/19/19	DDo	D2
4-Nitroaniline	ND	2	296	500	ug/Kg	04/18/19	04/19/19	DDo	D2
4-Nitrophenol	ND	2	234	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Acenaphthene	ND	2	50	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Acenaphthylene	ND	2	40	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Aniline	ND	2	202	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Anthracene	ND	2	46	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Azobenzene	ND	2	134	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benz(a)anthracene	ND	2	44	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzidine	ND	2	46	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzo(a)pyrene	ND	2	50	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzo(b)fluoranthene	ND	2	54	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzo(g,h,i)perylene	ND	2	58	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzo(k)fluoranthene	ND	2	64	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzoic acid	ND	2	72	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
Benzyl alcohol	ND	2	72	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Bis(2-chloroethoxy)methane	ND	2	30	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Bis(2-chloroethyl) Ether	ND	2	50	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
Bis(2-chloroisopropyl) Ether	ND	2	34	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Bis(2-ethylhexyl) phthalate	ND	2	104	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Butylbenzyl Phthalate	ND	2	88	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Carbazole	ND	2	46	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Chrysene	ND	2	40	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Dibenz(a,h)anthracene	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Dibenzofuran	ND	2	28	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Diethyl phthalate	ND	2	48	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Dimethyl phthalate	ND	2	44	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Di-n-butyl phthalate	**150 J**	2	134	500	ug/Kg	04/18/19	04/19/19	DDo	B1,J,D2
Di-n-octyl phthalate	ND	2	46	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Fluoranthene	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Fluorene	ND	2	54	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Hexachlorobenzene	ND	2	30	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Hexachlorobutadiene	ND	2	78	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Hexachlorocyclopentadiene	ND	2	28	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
Hexachloroethane	ND	2	86	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Indeno(1,2,3-cd)pyrene	ND	2	180	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Isophorone	ND	2	50	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Naphthalene	ND	2	50	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Nitrobenzene	ND	2	42	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
N-Nitrosodimethylamine (NDMA)	ND	2	68	500	ug/Kg	04/18/19	04/19/19	DDo	D2
N-Nitrosodi-n-propylamine (NDPA)	ND	2	52	500	ug/Kg	04/18/19	04/19/19	DDo	D2
N-Nitrosodiphenylamine	ND	2	48	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Pentachlorophenol	ND	2	110	2400	ug/Kg	04/18/19	04/19/19	DDo	D2
Phenanthrene	ND	2	44	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Phenol	ND	2	52	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Pyrene	ND	2	46	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Pyridine	ND	2	42	500	ug/Kg	04/18/19	04/19/19	DDo	D2
Total Cresol	ND	2	800	800	ug/Kg	04/18/19	04/19/19	DDo	D2

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:09	**Site:**			
Sample #:	**414424-067**	**Client Sample #:**	SB-59-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*			*Limits*	*Notes*				
2,4,6-Tribromophenol (SUR)	*78*			*34-143*					
2-Fluorobiphenyl (SUR)	*80*			*41-125*					
2-Fluorophenol (SUR)	*65*			*13-153*					
Nitrobenzene-d5 (SUR)	*73*			*27-125*					
p-Terphenyl (SUR)	*82*			*33-155*					
Phenol-d5 (SUR)	*73*			*10-110*					

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:17	**Site:**			
Sample #:	**414424-068**	**Client Sample #:**	SB-59-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**124**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.08**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**29.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.3**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**6.12**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.83 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**21.0**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**47.5**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**50.7**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1201084		
Arsenic	**6.37**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A NELAC	Prep Method: EPA 7471A						QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8015B NELAC	Prep Method: EPA 5035A						QCBatchID: QC1200658		
TPH (C6 to C12)	ND	0.81	0.19359	2.43	mg/Kg		04/18/19	EW	

Surrogate	*% Recovery*	*Limits*	*Notes*
4-Bromofluorobenzene (SUR)	*100*	*60-140*	

Method: EPA 8015M	Prep Method: EPA 3580A						QCBatchID: QC1201028		
TPH (C13 to C22)	ND	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	
TPH (C23 to C44)	ND	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	

Surrogate	*% Recovery*	*Limits*	*Notes*
Triacontane (SUR)	*123*	*50-150*	

Method: EPA 8081A NELAC	Prep Method: EPA 3545						QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/21/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/21/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/21/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/21/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/21/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/21/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/21/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/21/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/21/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:17	**Site:**			
Sample #:	**414424-068**	**Client Sample #:**	SB-59-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*		*Limits*	*Notes*					
Decachlorobiphenyl DCB (SUR)	*83*		*50-150*						
Tetrachloro-m-xylene TCMX (SUR)	*64*		*50-150*						
Method: EPA 8260B *NELAC* Prep Method: EPA 5035A							QCBatchID: QC1201001		
1,1,1,2-Tetrachloroethane	ND	0.8	0.192	4	ug/Kg		04/18/19	LZ	
1,1,1-Trichloroethane	ND	0.8	0.12	4	ug/Kg		04/18/19	LZ	
1,1,2,2-Tetrachloroethane	ND	0.8	0.232	4	ug/Kg		04/18/19	LZ	
1,1,2-Trichloroethane	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
1,1,2-Trichlorotrifluoroethane	ND	0.8	0.592	4	ug/Kg		04/18/19	LZ	
1,1-Dichloroethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
1,1-Dichloroethene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,1-Dichloropropene	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
1,2,3-Trichlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,2,3-Trichloropropane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
1,2,4-Trichlorobenzene	ND	0.8	0.264	4	ug/Kg		04/18/19	LZ	
1,2,4-Trimethylbenzene	**0.82 J**	0.8	0.224	4	ug/Kg		04/18/19	LZ	J
1,2-Dibromo-3-chloropropane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
1,2-Dibromoethane	ND	0.8	0.096	4	ug/Kg		04/18/19	LZ	
1,2-Dichlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
1,2-Dichloroethane	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
1,2-Dichloropropane	ND	0.8	0.272	4	ug/Kg		04/18/19	LZ	
1,3,5-Trimethylbenzene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
1,3-Dichlorobenzene	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
1,3-Dichloropropane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
1,4-Dichlorobenzene	ND	0.8	0.192	4	ug/Kg		04/18/19	LZ	
2,2-Dichloropropane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
2-Butanone (MEK)	**3.3 J**	0.8	0.576	80	ug/Kg		04/18/19	LZ	J
2-Chloroethyl Vinyl Ether	ND	0.8	0.24	4	ug/Kg		04/18/19	LZ	
2-Chlorotoluene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
4-Chlorotoluene	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
4-Isopropyltoluene	ND	0.8	0.216	4	ug/Kg		04/18/19	LZ	
4-Methyl-2-pentanone (MIBK)	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Acetone	ND	0.8	40	80	ug/Kg		04/18/19	LZ	
Allyl Chloride	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
Benzene	**0.29 J**	0.8	0.144	4	ug/Kg		04/18/19	LZ	J
Bromobenzene	ND	0.8	0.24	4	ug/Kg		04/18/19	LZ	
Bromochloromethane	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Bromodichloromethane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Bromoform	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Bromomethane	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
Carbon Tetrachloride	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Chlorobenzene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
Chlorodibromomethane	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Chloroethane	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Chloroform	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Chloromethane	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
cis-1,2-Dichloroethene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
cis-1,3-dichloropropene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
cis-1,4-dichloro-2-butene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Dibromomethane	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Dichlorodifluoromethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Di-isopropyl ether (DIPE)	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Ethylbenzene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Ethyl-tertbutylether (ETBE)	ND	0.8	0.336	4	ug/Kg		04/18/19	LZ	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 11:17 **Site:**
Sample #: **414424-068** **Client Sample #:** SB-59-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Hexachlorobutadiene	ND	0.8	0.336	4	ug/Kg		04/18/19	LZ	
Isopropylbenzene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
m and p-Xylene	ND	0.8	0.304	4	ug/Kg		04/18/19	LZ	
Methylene chloride	ND	0.8	0.168	4	ug/Kg		04/18/19	LZ	
Methyl-t-butyl Ether (MTBE)	ND	0.8	0.136	4	ug/Kg		04/18/19	LZ	
Naphthalene	ND	0.8	0.128	4	ug/Kg		04/18/19	LZ	
N-butylbenzene	ND	0.8	0.2	4	ug/Kg		04/18/19	LZ	
N-propylbenzene	ND	0.8	0.176	4	ug/Kg		04/18/19	LZ	
o-Xylene	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Sec-butylbenzene	ND	0.8	0.224	4	ug/Kg		04/18/19	LZ	
Styrene	ND	0.8	0.104	4	ug/Kg		04/18/19	LZ	
t-Butyl alcohol (TBA)	ND	0.8	7.04	8	ug/Kg		04/18/19	LZ	
Tert-amylmethylether (TAME)	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
Tert-butylbenzene	ND	0.8	0.272	4	ug/Kg		04/18/19	LZ	
Tetrachloroethene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Toluene	**0.18 J**	0.8	0.136	4	ug/Kg		04/18/19	LZ	J
trans-1,2-dichloroethene	ND	0.8	0.152	4	ug/Kg		04/18/19	LZ	
trans-1,3-dichloropropene	ND	0.8	0.144	4	ug/Kg		04/18/19	LZ	
trans-1,4-dichloro-2-butene	ND	0.8	0.16	4	ug/Kg		04/18/19	LZ	
Trichloroethene	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Trichlorofluoromethane	ND	0.8	0.184	4	ug/Kg		04/18/19	LZ	
Vinyl Chloride	ND	0.8	0.112	4	ug/Kg		04/18/19	LZ	
Xylenes (Total)	ND	0.8	0.304	4	ug/Kg		04/18/19	LZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*118*	*70-145*	
4-Bromofluorobenzene (SUR)	*111*	*70-145*	
Dibromofluoromethane (SUR)	*98*	*70-145*	
Toluene-d8 (SUR)	*99*	*70-145*	

Method: EPA 8270C *NELAC* Prep Method: EPA 3545 QCBatchID: QC1201027

1,2,4-Trichlorobenzene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
1,2-Dichlorobenzene	ND	1	37	250	ug/Kg	04/18/19	04/19/19	DDo	
1,3-Dichlorobenzene	ND	1	50	250	ug/Kg	04/18/19	04/19/19	DDo	
1,4-Dichlorobenzene	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
1-Methylnaphthalene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4,5-Trichlorophenol	ND	1	43	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4,6-Trichlorophenol	ND	1	35	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dichlorophenol	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dimethylphenol	ND	1	100	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dinitrophenol	ND	1	23	1200	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dinitrotoluene	ND	1	14	250	ug/Kg	04/18/19	04/19/19	DDo	
2,6-Dinitrotoluene	ND	1	33	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Chloronaphthalene	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Chlorophenol	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methyl-4,6-dinitrophenol	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methylnaphthalene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methylphenol (o-Cresol)	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Nitroaniline	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Nitrophenol	ND	1	16	250	ug/Kg	04/18/19	04/19/19	DDo	
3 and 4-Methylphenol (m and p-Cresol)	ND	1	19	400	ug/Kg	04/18/19	04/19/19	DDo	
3,3'-Dichlorobenzidine	ND	1	54	1200	ug/Kg	04/18/19	04/19/19	DDo	
3-Nitroaniline	ND	1	37	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Bromophenyl phenyl ether	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Chloro-3-methylphenol	ND	1	18	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Chloroaniline	ND	1	73	250	ug/Kg	04/18/19	04/19/19	DDo	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:17	**Site:**			
Sample #:	**414424-068**	**Client Sample #:**	SB-59-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
4-Chlorophenyl phenyl ether	ND	1	19	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Nitroaniline	ND	1	148	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Nitrophenol	ND	1	117	250	ug/Kg	04/18/19	04/19/19	DDo	
Acenaphthene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Acenaphthylene	ND	1	20	250	ug/Kg	04/18/19	04/19/19	DDo	
Aniline	ND	1	101	250	ug/Kg	04/18/19	04/19/19	DDo	
Anthracene	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Azobenzene	ND	1	67	250	ug/Kg	04/18/19	04/19/19	DDo	
Benz(a)anthracene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzidine	ND	1	23	1200	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(a)pyrene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(b)fluoranthene	ND	1	27	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(g,h,i)perylene	ND	1	29	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(k)fluoranthene	ND	1	32	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzoic acid	ND	1	36	1200	ug/Kg	04/18/19	04/19/19	DDo	
Benzyl alcohol	ND	1	36	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroethoxy)methane	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroethyl) Ether	ND	1	25	1200	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroisopropyl) Ether	ND	1	17	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-ethylhexyl) phthalate	ND	1	52	250	ug/Kg	04/18/19	04/19/19	DDo	
Butylbenzyl Phthalate	ND	1	44	250	ug/Kg	04/18/19	04/19/19	DDo	
Carbazole	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Chrysene	ND	1	20	250	ug/Kg	04/18/19	04/19/19	DDo	
Dibenz(a,h)anthracene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Dibenzofuran	ND	1	14	250	ug/Kg	04/18/19	04/19/19	DDo	
Diethyl phthalate	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
Dimethyl phthalate	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Di-n-butyl phthalate	**130 J**	1	67	250	ug/Kg	04/18/19	04/19/19	DDo	B1,J
Di-n-octyl phthalate	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Fluoranthene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Fluorene	ND	1	27	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorobenzene	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorobutadiene	ND	1	39	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorocyclopentadiene	ND	1	14	1200	ug/Kg	04/18/19	04/19/19	DDo	
Hexachloroethane	ND	1	43	250	ug/Kg	04/18/19	04/19/19	DDo	
Indeno(1,2,3-cd)pyrene	ND	1	90	250	ug/Kg	04/18/19	04/19/19	DDo	
Isophorone	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Naphthalene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Nitrobenzene	ND	1	21	1200	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodimethylamine (NDMA)	ND	1	34	250	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodi-n-propylamine (NDPA)	ND	1	26	250	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodiphenylamine	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
Pentachlorophenol	ND	1	55	1200	ug/Kg	04/18/19	04/19/19	DDo	
Phenanthrene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Phenol	ND	1	26	250	ug/Kg	04/18/19	04/19/19	DDo	
Pyrene	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Pyridine	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Total Cresol	ND	1	400	400	ug/Kg	04/18/19	04/19/19	DDo	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:17	**Site:**			
Sample #:	**414424-068**	**Client Sample #:**	SB-59-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*			*Limits*	*Notes*				
2,4,6-Tribromophenol (SUR)	*86*			*34-143*					
2-Fluorobiphenyl (SUR)	*78*			*41-125*					
2-Fluorophenol (SUR)	*64*			*13-153*					
Nitrobenzene-d5 (SUR)	*71*			*27-125*					
p-Terphenyl (SUR)	*88*			*33-155*					
Phenol-d5 (SUR)	*74*			*10-110*					

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:23	**Site:**			
Sample #:	**414424-069**	**Client Sample #:**	SB-59-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1201082		
Antimony	**0.61 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**128**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**2.08**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.6**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.4**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.75**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.79 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**23.3**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**52.0**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**56.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1201084		
Arsenic	**6.83**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC*	Prep Method: EPA 7471A						QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8015B *NELAC*	Prep Method: EPA 5035A						QCBatchID: QC1200658		
TPH (C6 to C12)	ND	0.86	0.20554	2.58	mg/Kg		04/18/19	EW	

Surrogate	*% Recovery*	*Limits*	*Notes*
4-Bromofluorobenzene (SUR)	*100*	*60-140*	

Method: EPA 8015M	Prep Method: EPA 3580A						QCBatchID: QC1201028		
TPH (C13 to C22)	ND	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	
TPH (C23 to C44)	ND	1	10	10	mg/Kg	04/18/19	04/19/19	DXN	

Surrogate	*% Recovery*	*Limits*	*Notes*
Triacontane (SUR)	*118*	*50-150*	

Method: EPA 8081A *NELAC*	Prep Method: EPA 3545						QCBatchID: QC1201080		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/18/19	04/21/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/18/19	04/21/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/18/19	04/21/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/18/19	04/21/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/18/19	04/21/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/18/19	04/21/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/18/19	04/21/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/18/19	04/21/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/18/19	04/21/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/18/19	04/21/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/18/19	04/21/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/18/19	04/21/19	MTS	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:23	**Site:**			
Sample #:	**414424-069**	**Client Sample #:**	SB-59-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*		*Limits*	*Notes*					
Decachlorobiphenyl DCB (SUR)	*76*		*50-150*						
Tetrachloro-m-xylene TCMX (SUR)	*62*		*50-150*						
Method: EPA 8260B *NELAC* Prep Method: EPA 5035A							QCBatchID: QC1201001		
1,1,1,2-Tetrachloroethane	ND	0.9	0.216	4.5	ug/Kg		04/18/19	LZ	
1,1,1-Trichloroethane	ND	0.9	0.135	4.5	ug/Kg		04/18/19	LZ	
1,1,2,2-Tetrachloroethane	ND	0.9	0.261	4.5	ug/Kg		04/18/19	LZ	
1,1,2-Trichloroethane	ND	0.9	0.198	4.5	ug/Kg		04/18/19	LZ	
1,1,2-Trichlorotrifluoroethane	ND	0.9	0.666	4.5	ug/Kg		04/18/19	LZ	
1,1-Dichloroethane	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
1,1-Dichloroethene	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
1,1-Dichloropropene	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
1,2,3-Trichlorobenzene	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
1,2,3-Trichloropropane	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
1,2,4-Trichlorobenzene	ND	0.9	0.297	4.5	ug/Kg		04/18/19	LZ	
1,2,4-Trimethylbenzene	ND	0.9	0.252	4.5	ug/Kg		04/18/19	LZ	
1,2-Dibromo-3-chloropropane	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
1,2-Dibromoethane	ND	0.9	0.108	4.5	ug/Kg		04/18/19	LZ	
1,2-Dichlorobenzene	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
1,2-Dichloroethane	ND	0.9	0.126	4.5	ug/Kg		04/18/19	LZ	
1,2-Dichloropropane	ND	0.9	0.306	4.5	ug/Kg		04/18/19	LZ	
1,3,5-Trimethylbenzene	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
1,3-Dichlorobenzene	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
1,3-Dichloropropane	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
1,4-Dichlorobenzene	ND	0.9	0.216	4.5	ug/Kg		04/18/19	LZ	
2,2-Dichloropropane	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
2-Butanone (MEK)	**3.2 J**	0.9	0.648	90	ug/Kg		04/18/19	LZ	J
2-Chloroethyl Vinyl Ether	ND	0.9	0.27	4.5	ug/Kg		04/18/19	LZ	
2-Chlorotoluene	ND	0.9	0.225	4.5	ug/Kg		04/18/19	LZ	
4-Chlorotoluene	ND	0.9	0.198	4.5	ug/Kg		04/18/19	LZ	
4-Isopropyltoluene	ND	0.9	0.243	4.5	ug/Kg		04/18/19	LZ	
4-Methyl-2-pentanone (MIBK)	ND	0.9	0.153	4.5	ug/Kg		04/18/19	LZ	
Acetone	ND	0.9	45	90	ug/Kg		04/18/19	LZ	
Allyl Chloride	ND	0.9	0.126	4.5	ug/Kg		04/18/19	LZ	
Benzene	**0.34 J**	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	J
Bromobenzene	ND	0.9	0.27	4.5	ug/Kg		04/18/19	LZ	
Bromochloromethane	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
Bromodichloromethane	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
Bromoform	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
Bromomethane	ND	0.9	0.198	4.5	ug/Kg		04/18/19	LZ	
Carbon Tetrachloride	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
Chlorobenzene	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
Chlorodibromomethane	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
Chloroethane	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
Chloroform	ND	0.9	0.153	4.5	ug/Kg		04/18/19	LZ	
Chloromethane	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
cis-1,2-Dichloroethene	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
cis-1,3-dichloropropene	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
cis-1,4-dichloro-2-butene	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
Dibromomethane	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
Dichlorodifluoromethane	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
Di-isopropyl ether (DIPE)	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
Ethylbenzene	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
Ethyl-tertbutylether (ETBE)	ND	0.9	0.378	4.5	ug/Kg		04/18/19	LZ	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:23	**Site:**			
Sample #:	**414424-069**	**Client Sample #:**	SB-59-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Hexachlorobutadiene	ND	0.9	0.378	4.5	ug/Kg		04/18/19	LZ	
Isopropylbenzene	ND	0.9	0.225	4.5	ug/Kg		04/18/19	LZ	
m and p-Xylene	ND	0.9	0.342	4.5	ug/Kg		04/18/19	LZ	
Methylene chloride	ND	0.9	0.189	4.5	ug/Kg		04/18/19	LZ	
Methyl-t-butyl Ether (MTBE)	ND	0.9	0.153	4.5	ug/Kg		04/18/19	LZ	
Naphthalene	ND	0.9	0.144	4.5	ug/Kg		04/18/19	LZ	
N-butylbenzene	ND	0.9	0.225	4.5	ug/Kg		04/18/19	LZ	
N-propylbenzene	ND	0.9	0.198	4.5	ug/Kg		04/18/19	LZ	
o-Xylene	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
Sec-butylbenzene	ND	0.9	0.252	4.5	ug/Kg		04/18/19	LZ	
Styrene	ND	0.9	0.117	4.5	ug/Kg		04/18/19	LZ	
t-Butyl alcohol (TBA)	ND	0.9	7.92	9	ug/Kg		04/18/19	LZ	
Tert-amylmethylether (TAME)	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
Tert-butylbenzene	ND	0.9	0.306	4.5	ug/Kg		04/18/19	LZ	
Tetrachloroethene	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
Toluene	ND	0.9	0.153	4.5	ug/Kg		04/18/19	LZ	
trans-1,2-dichloroethene	ND	0.9	0.171	4.5	ug/Kg		04/18/19	LZ	
trans-1,3-dichloropropene	ND	0.9	0.162	4.5	ug/Kg		04/18/19	LZ	
trans-1,4-dichloro-2-butene	ND	0.9	0.18	4.5	ug/Kg		04/18/19	LZ	
Trichloroethene	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
Trichlorofluoromethane	ND	0.9	0.207	4.5	ug/Kg		04/18/19	LZ	
Vinyl Chloride	ND	0.9	0.126	4.5	ug/Kg		04/18/19	LZ	
Xylenes (Total)	ND	0.9	0.342	4.5	ug/Kg		04/18/19	LZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*116*	*70-145*	
4-Bromofluorobenzene (SUR)	*108*	*70-145*	
Dibromofluoromethane (SUR)	*98*	*70-145*	
Toluene-d8 (SUR)	*98*	*70-145*	

Method: EPA 8270C *NELAC* Prep Method: EPA 3545 QCBatchID: QC1201027

1,2,4-Trichlorobenzene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
1,2-Dichlorobenzene	ND	1	37	250	ug/Kg	04/18/19	04/19/19	DDo	
1,3-Dichlorobenzene	ND	1	50	250	ug/Kg	04/18/19	04/19/19	DDo	
1,4-Dichlorobenzene	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
1-Methylnaphthalene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4,5-Trichlorophenol	ND	1	43	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4,6-Trichlorophenol	ND	1	35	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dichlorophenol	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dimethylphenol	ND	1	100	250	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dinitrophenol	ND	1	23	1200	ug/Kg	04/18/19	04/19/19	DDo	
2,4-Dinitrotoluene	ND	1	14	250	ug/Kg	04/18/19	04/19/19	DDo	
2,6-Dinitrotoluene	ND	1	33	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Chloronaphthalene	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Chlorophenol	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methyl-4,6-dinitrophenol	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methylnaphthalene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Methylphenol (o-Cresol)	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Nitroaniline	ND	1	31	250	ug/Kg	04/18/19	04/19/19	DDo	
2-Nitrophenol	ND	1	16	250	ug/Kg	04/18/19	04/19/19	DDo	
3 and 4-Methylphenol (m and p-Cresol)	ND	1	19	400	ug/Kg	04/18/19	04/19/19	DDo	
3,3'-Dichlorobenzidine	ND	1	54	1200	ug/Kg	04/18/19	04/19/19	DDo	
3-Nitroaniline	ND	1	37	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Bromophenyl phenyl ether	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Chloro-3-methylphenol	ND	1	18	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Chloroaniline	ND	1	73	250	ug/Kg	04/18/19	04/19/19	DDo	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:23	**Site:**			
Sample #:	**414424-069**	**Client Sample #:**	SB-59-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
4-Chlorophenyl phenyl ether	ND	1	19	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Nitroaniline	ND	1	148	250	ug/Kg	04/18/19	04/19/19	DDo	
4-Nitrophenol	ND	1	117	250	ug/Kg	04/18/19	04/19/19	DDo	
Acenaphthene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Acenaphthylene	ND	1	20	250	ug/Kg	04/18/19	04/19/19	DDo	
Aniline	ND	1	101	250	ug/Kg	04/18/19	04/19/19	DDo	
Anthracene	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Azobenzene	ND	1	67	250	ug/Kg	04/18/19	04/19/19	DDo	
Benz(a)anthracene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzidine	ND	1	23	1200	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(a)pyrene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(b)fluoranthene	ND	1	27	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(g,h,i)perylene	ND	1	29	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzo(k)fluoranthene	ND	1	32	250	ug/Kg	04/18/19	04/19/19	DDo	
Benzoic acid	ND	1	36	1200	ug/Kg	04/18/19	04/19/19	DDo	
Benzyl alcohol	ND	1	36	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroethoxy)methane	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroethyl) Ether	ND	1	25	1200	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-chloroisopropyl) Ether	ND	1	17	250	ug/Kg	04/18/19	04/19/19	DDo	
Bis(2-ethylhexyl) phthalate	ND	1	52	250	ug/Kg	04/18/19	04/19/19	DDo	
Butylbenzyl Phthalate	ND	1	44	250	ug/Kg	04/18/19	04/19/19	DDo	
Carbazole	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Chrysene	ND	1	20	250	ug/Kg	04/18/19	04/19/19	DDo	
Dibenz(a,h)anthracene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Dibenzofuran	ND	1	14	250	ug/Kg	04/18/19	04/19/19	DDo	
Diethyl phthalate	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
Dimethyl phthalate	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Di-n-butyl phthalate	**140 J**	1	67	250	ug/Kg	04/18/19	04/19/19	DDo	B1,J
Di-n-octyl phthalate	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Fluoranthene	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Fluorene	ND	1	27	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorobenzene	ND	1	15	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorobutadiene	ND	1	39	250	ug/Kg	04/18/19	04/19/19	DDo	
Hexachlorocyclopentadiene	ND	1	14	1200	ug/Kg	04/18/19	04/19/19	DDo	
Hexachloroethane	ND	1	43	250	ug/Kg	04/18/19	04/19/19	DDo	
Indeno(1,2,3-cd)pyrene	ND	1	90	250	ug/Kg	04/18/19	04/19/19	DDo	
Isophorone	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Naphthalene	ND	1	25	250	ug/Kg	04/18/19	04/19/19	DDo	
Nitrobenzene	ND	1	21	1200	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodimethylamine (NDMA)	ND	1	34	250	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodi-n-propylamine (NDPA)	ND	1	26	250	ug/Kg	04/18/19	04/19/19	DDo	
N-Nitrosodiphenylamine	ND	1	24	250	ug/Kg	04/18/19	04/19/19	DDo	
Pentachlorophenol	ND	1	55	1200	ug/Kg	04/18/19	04/19/19	DDo	
Phenanthrene	ND	1	22	250	ug/Kg	04/18/19	04/19/19	DDo	
Phenol	ND	1	26	250	ug/Kg	04/18/19	04/19/19	DDo	
Pyrene	ND	1	23	250	ug/Kg	04/18/19	04/19/19	DDo	
Pyridine	ND	1	21	250	ug/Kg	04/18/19	04/19/19	DDo	
Total Cresol	ND	1	400	400	ug/Kg	04/18/19	04/19/19	DDo	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 11:23	**Site:**			
Sample #:	**414424-069**	**Client Sample #:**	SB-59-2.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*			*Limits*	*Notes*				
2,4,6-Tribromophenol (SUR)	*81*			*34-143*					
2-Fluorobiphenyl (SUR)	*78*			*41-125*					
2-Fluorophenol (SUR)	*66*			*13-153*					
Nitrobenzene-d5 (SUR)	*75*			*27-125*					
p-Terphenyl (SUR)	*88*			*33-155*					
Phenol-d5 (SUR)	*72*			*10-110*					

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:55	**Site:**			
Sample #:	**414424-070**	**Client Sample #:**	SB-39-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201082		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**76.0**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.27**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**19.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**7.61**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**14.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**12.1**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.33 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**13.3**	1	0.2	1.5	mg/Kg	04/18/19	04/22/19	KLN	
Selenium	**1.04 J**	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	B1,J
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.53 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**32.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**53.1**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**7.98**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201080		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/18/19	04/21/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/18/19	04/21/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/18/19	04/21/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/18/19	04/21/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/18/19	04/21/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/18/19	04/21/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*91*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*78*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:15	**Site:**			
Sample #:	**414424-071**	**Client Sample #:**	SB-43-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**1.08 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**105**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.54**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**22.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**15.6**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.82**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.31 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**17.2**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.45 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**34.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**43.8**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**6.76**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*75*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*68*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 09:32	**Site:**			
Sample #:	**414424-072**	**Client Sample #:**	SB-47-1.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	ND	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	
Barium	**96.6**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.55**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.6**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.5**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.69**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.64 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**21.7**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**45.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**54.5**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**6.38**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*76*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 08:23	**Site:**			
Sample #:	**414424-073**	**Client Sample #:**	SB-49-1.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**0.85 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**121**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.87**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**28.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**19.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**4.15**	1	0.32	1	mg/Kg	04/18/19	04/19/19	KLN	
Molybdenum	**0.84 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**21.5**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**43.9**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**55.4**	1	0.28	5	mg/Kg	04/18/19	04/19/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**5.32**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*80*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*71*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:38	**Site:**			
Sample #:	**414424-074**	**Client Sample #:**	SB-53-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**2.47 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**166**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.67**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**32.9**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**11.7**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**35.7**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**44.1**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.17**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**19.4**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**1.64 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**47.4**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**146**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 1311							QCBatchID: QC1201729		
Arsenic	**3020**	10	3.1	20	ug/L	05/08/19	05/08/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**252**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1201705		
Arsenic	**12900**	100	13	200	ug/L	05/07/19	05/07/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	5	10.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
4,4'-DDE	ND	5	10	25	ug/Kg	04/19/19	04/20/19	MTS	D2
4,4'-DDT	ND	5	10	25	ug/Kg	04/19/19	04/20/19	MTS	D2
a-BHC	ND	5	8	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Aldrin	ND	5	7.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
b-BHC	ND	5	7.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Chlordane (technical)	ND	5	175	250	ug/Kg	04/19/19	04/20/19	MTS	D2
d-BHC	ND	5	6	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Dieldrin	ND	5	10.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endosulfan I	ND	5	6	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endosulfan II	ND	5	14	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endosulfan sulfate	ND	5	17	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endrin	ND	5	13.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endrin aldehyde	ND	5	10.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Endrin Ketone	ND	5	20.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Heptachlor	ND	5	6.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Heptachlor epoxide	ND	5	11.5	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Lindane (Gamma-BHC)	ND	5	10	25	ug/Kg	04/19/19	04/20/19	MTS	D2
Methoxychlor	ND	5	46	50	ug/Kg	04/19/19	04/20/19	MTS	D2
Toxaphene	ND	5	270	500	ug/Kg	04/19/19	04/20/19	MTS	D2

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*104*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*86*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:53	**Site:**			
Sample #:	**414424-075**	**Client Sample #:**	SB-55-1.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**0.49 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**88.4**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.22**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**26.4**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**9.15**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**17.3**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**2.40**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.69 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**16.4**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.45 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**40.7**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**49.0**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**6.16**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*66*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*59*	*50-150*	

Method: EPA 8082 *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201091		
PCB-1016	ND	1	3	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1232	ND	1	9.5	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	14	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	19	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	20	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	6.9	50	ug/Kg	04/19/19	04/20/19	MTS	
PCB-1262	ND	1	17	50	ug/Kg	04/19/19	04/20/19	MTS	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 13:53 **Site:**
Sample #: **414424-075** **Client Sample #:** SB-55-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1268	ND	1	8.6	50	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*60*	*50-150*	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 12:56 **Site:**
Sample #: **414424-076** **Client Sample #:** SB-60-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201083
Antimony	**2.49 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**123**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.08**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**35.8**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.9**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.8**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**8.64**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.21 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**20.6**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**40.1**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**58.2**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID:		QC1201084
Arsenic	**8.06**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID:		QC1201051
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID:		QC1201093
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	**210**	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	% Recovery	Limits	Notes
Decachlorobiphenyl DCB (SUR)	*84*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*73*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 12:56	**Site:**			
Sample #:	**414424-077**	**Client Sample #:**	SB-60-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**1.05 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**160**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.68**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**33.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**12.4**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**21.2**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**41.1**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**1.10**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Nickel	**19.2**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	**0.89 J**	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	J
Vanadium	**53.2**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**71.0**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**8.51**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	**160**	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*78*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*72*	*50-150*	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 13:05	**Site:**			
Sample #:	**414424-078**	**Client Sample #:**	SB-60-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201083		
Antimony	**1.84 J**	1	0.37	3	mg/Kg	04/18/19	04/19/19	KLN	J
Barium	**129**	1	0.23	1	mg/Kg	04/18/19	04/19/19	KLN	
Beryllium	ND	1	0.17	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Cadmium	**1.88**	1	0.21	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Chromium	**28.3**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	
Cobalt	**10.4**	1	0.19	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Copper	**20.1**	1	0.31	1	mg/Kg	04/18/19	04/19/19	KLN	
Lead	**3.25**	1	0.32	1	mg/Kg	04/18/19	04/22/19	KLN	
Molybdenum	**0.77 J**	1	0.13	1	mg/Kg	04/18/19	04/19/19	KLN	J
Nickel	**16.4**	1	0.2	1.5	mg/Kg	04/18/19	04/19/19	KLN	
Selenium	ND	1	0.72	3	mg/Kg	04/18/19	04/19/19	KLN	
Silver	ND	1	0.13	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Thallium	ND	1	0.42	3	mg/Kg	04/18/19	04/19/19	KLN	
Vanadium	**42.6**	1	0.37	0.5	mg/Kg	04/18/19	04/19/19	KLN	
Zinc	**51.8**	1	0.28	5	mg/Kg	04/18/19	04/22/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1201084		
Arsenic	**5.98**	1	0.108	0.3	mg/Kg	04/18/19	04/19/19	SBW	
Method: EPA 7471A *NELAC* Prep Method: EPA 7471A							QCBatchID: QC1201051		
Mercury	ND	1	0.039	0.14	mg/Kg		04/23/19	JP	
Method: EPA 8081A *NELAC* Prep Method: EPA 3545							QCBatchID: QC1201093		
4,4'-DDD	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDE	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
4,4'-DDT	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
a-BHC	ND	1	1.6	5	ug/Kg	04/19/19	04/20/19	MTS	
Aldrin	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
b-BHC	ND	1	1.5	5	ug/Kg	04/19/19	04/20/19	MTS	
Chlordane (technical)	ND	1	35	50	ug/Kg	04/19/19	04/20/19	MTS	
d-BHC	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Dieldrin	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan I	ND	1	1.2	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan II	ND	1	2.8	5	ug/Kg	04/19/19	04/20/19	MTS	
Endosulfan sulfate	ND	1	3.4	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin	ND	1	2.7	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin aldehyde	ND	1	2.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Endrin Ketone	ND	1	4.1	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor	ND	1	1.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Heptachlor epoxide	ND	1	2.3	5	ug/Kg	04/19/19	04/20/19	MTS	
Lindane (Gamma-BHC)	ND	1	2	5	ug/Kg	04/19/19	04/20/19	MTS	
Methoxychlor	ND	1	9.2	10	ug/Kg	04/19/19	04/20/19	MTS	
Toxaphene	ND	1	54	100	ug/Kg	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*81*	*50-150*	
Tetrachloro-m-xylene TCMX (SUR)	*69*	*50-150*	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:51	**Site:**			
Sample #:	**414424-079**	**Client Sample #:**	Equipment Blank - Day 1	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1201107		
Antimony	ND	1	0.014	0.04	mg/L	04/19/19	04/24/19	KLN	
Barium	ND	1	0.002	0.01	mg/L	04/19/19	04/23/19	KLN	
Beryllium	ND	1	0.001	0.005	mg/L	04/19/19	04/23/19	KLN	
Cadmium	ND	1	0.001	0.005	mg/L	04/19/19	04/24/19	KLN	
Chromium	ND	1	0.002	0.01	mg/L	04/19/19	04/23/19	KLN	
Cobalt	ND	1	0.001	0.005	mg/L	04/19/19	04/23/19	KLN	
Copper	**0.037**	1	0.004	0.01	mg/L	04/19/19	04/23/19	KLN	
Lead	ND	1	0.005	0.01	mg/L	04/19/19	04/24/19	KLN	
Molybdenum	ND	1	0.005	0.01	mg/L	04/19/19	04/24/19	KLN	
Nickel	ND	1	0.003	0.02	mg/L	04/19/19	04/24/19	KLN	
Selenium	ND	1	0.016	0.03	mg/L	04/19/19	04/24/19	KLN	
Silver	ND	1	0.003	0.005	mg/L	04/19/19	04/23/19	KLN	
Thallium	ND	1	0.009	0.05	mg/L	04/19/19	04/24/19	KLN	
Vanadium	ND	1	0.002	0.005	mg/L	04/19/19	04/23/19	KLN	
Zinc	ND	1	0.007	0.05	mg/L	04/19/19	04/24/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1201118		
Arsenic	ND	1	0.31	2	ug/L	04/19/19	04/22/19	SBW	
Method: EPA 7470A *NELAC* Prep Method: Method							QCBatchID: QC1201220		
Mercury	ND	1	0.094	0.4	ug/L	04/23/19	04/23/19	JP	
Method: EPA 8015B *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201041		
TPH (C13 to C22)	ND	1	0.04	0.2	mg/L	04/18/19	04/19/19	DXN	
TPH (C23 to C44)	ND	1	0.07	0.3	mg/L	04/18/19	04/19/19	DXN	
TPH (C6 to C12)	ND	1	0.06	0.3	mg/L	04/18/19	04/19/19	DXN	
Surrogate	*% Recovery*		*Limits*		*Notes*				
Triacontane (SUR)	*65*		*50-150*						
Method: EPA 8081A *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201088		
4,4'-DDD	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
4,4'-DDE	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
4,4'-DDT	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
a-BHC	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Aldrin	ND	1	0.007	0.1	ug/L	04/19/19	04/21/19	MTS	
b-BHC	ND	1	0.003	0.1	ug/L	04/19/19	04/21/19	MTS	
Chlordane (technical)	ND	1	0.27	1	ug/L	04/19/19	04/21/19	MTS	
d-BHC	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
Dieldrin	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan I	ND	1	0.004	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan II	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan sulfate	ND	1	0.012	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin	ND	1	0.008	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin aldehyde	ND	1	0.009	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin Ketone	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
Heptachlor	ND	1	0.003	0.1	ug/L	04/19/19	04/21/19	MTS	
Heptachlor epoxide	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Lindane (Gamma-BHC)	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Methoxychlor	ND	1	0.055	0.1	ug/L	04/19/19	04/21/19	MTS	
Toxaphene	ND	1	0.48	2	ug/L	04/19/19	04/21/19	MTS	
Surrogate	*% Recovery*		*Limits*		*Notes*				
Decachlorobiphenyl DCB (SUR)	*67*		*50-150*						
Tetrachloro-m-xylene TCMX (SUR)	*62*		*50-150*						
Method: EPA 8082 *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201090		
PCB-1016	ND	1	0.058	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	0.253	0.5	ug/L	04/19/19	04/20/19	MTS	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 04/16/2019 15:51 **Site:**
Sample #: **414424-079** **Client Sample #:** Equipment Blank - Day 1 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1232	ND	1	0.196	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	0.169	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	0.1	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	0.054	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	0.08	0.5	ug/L	04/19/19	04/20/19	MTS	L
PCB-1262	ND	1	0.045	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1268	ND	1	0.062	0.5	ug/L	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*58*	*50-150*	

Method: EPA 8260B *NELAC* Prep Method: EPA 5030B QCBatchID: QC1201026

1,1,1,2-Tetrachloroethane	ND	1	0.25	5	ug/L	04/18/19	LZ	
1,1,1-Trichloroethane	ND	1	0.38	5	ug/L	04/18/19	LZ	
1,1,2,2-Tetrachloroethane	ND	1	0.25	5	ug/L	04/18/19	LZ	
1,1,2-Trichloroethane	ND	1	0.25	5	ug/L	04/18/19	LZ	
1,1,2-Trichlorotrifluoroethane	ND	1	0.29	5	ug/L	04/18/19	LZ	
1,1-Dichloroethane	ND	1	0.32	5	ug/L	04/18/19	LZ	
1,1-Dichloroethene	ND	1	0.3	5	ug/L	04/18/19	LZ	
1,1-Dichloropropene	ND	1	0.25	5	ug/L	04/18/19	LZ	
1,2,3-Trichlorobenzene	ND	1	0.28	5	ug/L	04/18/19	LZ	
1,2,3-Trichloropropane	ND	1	0.16	5	ug/L	04/18/19	LZ	
1,2,4-Trichlorobenzene	ND	1	0.27	5	ug/L	04/18/19	LZ	
1,2,4-Trimethylbenzene	ND	1	0.28	5	ug/L	04/18/19	LZ	
1,2-Dibromo-3-chloropropane	ND	1	0.12	5	ug/L	04/18/19	LZ	
1,2-Dibromoethane	ND	1	0.19	5	ug/L	04/18/19	LZ	
1,2-Dichlorobenzene	ND	1	0.26	5	ug/L	04/18/19	LZ	
1,2-Dichloroethane	ND	1	0.2	5	ug/L	04/18/19	LZ	
1,2-Dichloropropane	ND	1	0.36	5	ug/L	04/18/19	LZ	
1,3,5-Trimethylbenzene	ND	1	0.24	5	ug/L	04/18/19	LZ	
1,3-Dichlorobenzene	ND	1	0.34	5	ug/L	04/18/19	LZ	
1,3-Dichloropropane	ND	1	0.19	5	ug/L	04/18/19	LZ	
1,4-Dichlorobenzene	ND	1	0.43	5	ug/L	04/18/19	LZ	
2,2-Dichloropropane	ND	1	0.32	5	ug/L	04/18/19	LZ	
2-Butanone (MEK)	**1.3 J**	1	0.78	100	ug/L	04/18/19	LZ	J
2-Chloroethyl Vinyl Ether	ND	1	0.23	10	ug/L	04/18/19	LZ	
2-Chlorotoluene	ND	1	0.33	5	ug/L	04/18/19	LZ	
4-Chlorotoluene	ND	1	0.31	5	ug/L	04/18/19	LZ	
4-Isopropyltoluene	ND	1	0.32	5	ug/L	04/18/19	LZ	
4-Methyl-2-pentanone (MIBK)	ND	1	0.12	5	ug/L	04/18/19	LZ	
Acetone	ND	1	50	100	ug/L	04/18/19	LZ	
Allyl Chloride	ND	1	0.19	5	ug/L	04/18/19	LZ	
Benzene	ND	1	0.18	1	ug/L	04/18/19	LZ	
Bromobenzene	ND	1	0.53	5	ug/L	04/18/19	LZ	
Bromochloromethane	ND	1	0.17	5	ug/L	04/18/19	LZ	
Bromodichloromethane	ND	1	0.31	5	ug/L	04/18/19	LZ	
Bromoform	ND	1	0.13	5	ug/L	04/18/19	LZ	
Bromomethane	ND	1	0.68	5	ug/L	04/18/19	LZ	
Carbon Tetrachloride	ND	1	0.27	5	ug/L	04/18/19	LZ	
Chlorobenzene	ND	1	0.19	5	ug/L	04/18/19	LZ	
Chlorodibromomethane	ND	1	0.21	5	ug/L	04/18/19	LZ	
Chloroethane	ND	1	0.45	5	ug/L	04/18/19	LZ	
Chloroform	ND	1	0.18	5	ug/L	04/18/19	LZ	
Chloromethane	ND	1	0.27	5	ug/L	04/18/19	LZ	
cis-1,2-Dichloroethene	ND	1	0.27	5	ug/L	04/18/19	LZ	
cis-1,3-dichloropropene	ND	1	0.25	5	ug/L	04/18/19	LZ	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:51	**Site:**			
Sample #:	**414424-079**	**Client Sample #:**	Equipment Blank - Day 1	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
cis-1,4-dichloro-2-butene	ND	1	0.17	5	ug/L		04/18/19	LZ	
Dibromomethane	ND	1	0.23	5	ug/L		04/18/19	LZ	
Dichlorodifluoromethane	ND	1	0.33	5	ug/L		04/18/19	LZ	
Di-isopropyl ether (DIPE)	ND	1	0.17	1	ug/L		04/18/19	LZ	
Ethylbenzene	ND	1	0.21	5	ug/L		04/18/19	LZ	
Ethyl-tertbutylether (ETBE)	ND	1	0.23	1	ug/L		04/18/19	LZ	
Hexachlorobutadiene	ND	1	0.51	5	ug/L		04/18/19	LZ	
Isopropylbenzene	ND	1	0.24	5	ug/L		04/18/19	LZ	
m and p-Xylene	ND	1	0.45	5	ug/L		04/18/19	LZ	
Methylene chloride	**1.1 J**	1	0.16	5	ug/L		04/18/19	LZ	B1,J
Methyl-t-butyl Ether (MTBE)	ND	1	0.19	1	ug/L		04/18/19	LZ	
Naphthalene	ND	1	0.25	5	ug/L		04/18/19	LZ	
N-butylbenzene	ND	1	0.25	5	ug/L		04/18/19	LZ	
N-propylbenzene	ND	1	0.31	5	ug/L		04/18/19	LZ	
o-Xylene	ND	1	0.29	5	ug/L		04/18/19	LZ	
Sec-butylbenzene	ND	1	0.32	5	ug/L		04/18/19	LZ	
Styrene	ND	1	0.22	5	ug/L		04/18/19	LZ	
t-Butyl alcohol (TBA)	ND	1	5.2	10	ug/L		04/18/19	LZ	
Tert-amylmethylether (TAME)	ND	1	0.19	5	ug/L		04/18/19	LZ	
Tert-butylbenzene	ND	1	0.4	5	ug/L		04/18/19	LZ	
Tetrachloroethene	ND	1	0.8	5	ug/L		04/18/19	LZ	
Toluene	ND	1	0.24	5	ug/L		04/18/19	LZ	
trans-1,2-dichloroethene	ND	1	0.33	5	ug/L		04/18/19	LZ	
trans-1,3-dichloropropene	ND	1	0.23	5	ug/L		04/18/19	LZ	
trans-1,4-dichloro-2-butene	ND	1	0.17	5	ug/L		04/18/19	LZ	
Trichloroethene	ND	1	0.39	5	ug/L		04/18/19	LZ	
Trichlorofluoromethane	ND	1	0.25	5	ug/L		04/18/19	LZ	
Vinyl Chloride	ND	1	0.18	5	ug/L		04/18/19	LZ	
Xylenes (Total)	ND	1	0.45	5	ug/L		04/18/19	LZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*108*	*70-145*	
4-Bromofluorobenzene (SUR)	*108*	*70-145*	
Dibromofluoromethane (SUR)	*115*	*70-145*	
Toluene-d8 (SUR)	*100*	*70-145*	

Method: EPA 8270C *NELAC* Prep Method: EPA 3510C QCBatchID: QC1201086

1,2,4-Trichlorobenzene	ND	0.9	1.71	9	ug/L	04/19/19	04/19/19	DDo	
1,2-Dichlorobenzene	ND	0.9	1.62	9	ug/L	04/19/19	04/19/19	DDo	
1,3-Dichlorobenzene	ND	0.9	1.71	9	ug/L	04/19/19	04/19/19	DDo	
1,4-Dichlorobenzene	ND	0.9	1.62	9	ug/L	04/19/19	04/19/19	DDo	
2,4,5-Trichlorophenol	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
2,4,6-Trichlorophenol	ND	0.9	0.504	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dichlorophenol	ND	0.9	1.26	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dimethylphenol	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dinitrophenol	ND	0.9	0.504	45	ug/L	04/19/19	04/19/19	DDo	
2,4-Dinitrotoluene	ND	0.9	0.369	9	ug/L	04/19/19	04/19/19	DDo	
2,6-Dinitrotoluene	ND	0.9	0.495	9	ug/L	04/19/19	04/19/19	DDo	
2-Chloronaphthalene	ND	0.9	1.26	9	ug/L	04/19/19	04/19/19	DDo	
2-Chlorophenol	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
2-Methyl-4,6-dinitrophenol	ND	0.9	0.351	45	ug/L	04/19/19	04/19/19	DDo	
2-Methylnaphthalene	ND	0.9	1.35	9	ug/L	04/19/19	04/19/19	DDo	
2-Methylphenol (o-Cresol)	ND	0.9	0.675	9	ug/L	04/19/19	04/19/19	DDo	
2-Nitroaniline	ND	0.9	0.45	45	ug/L	04/19/19	04/19/19	DDo	
2-Nitrophenol	ND	0.9	0.873	9	ug/L	04/19/19	04/19/19	DDo	
3 and 4-Methylphenol (m and p-Cresol)	ND	0.9	0.81	9	ug/L	04/19/19	04/19/19	DDo	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:51	**Site:**			
Sample #:	**414424-079**	**Client Sample #:**	Equipment Blank - Day 1	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
3,3'-Dichlorobenzidine	ND	0.9	0.576	22.5	ug/L	04/19/19	04/19/19	DDo	
3-Nitroaniline	ND	0.9	0.495	9	ug/L	04/19/19	04/19/19	DDo	
4-Bromophenyl phenyl ether	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
4-Chloro-3-methylphenol	ND	0.9	0.693	9	ug/L	04/19/19	04/19/19	DDo	
4-Chloroaniline	ND	0.9	0.36	9	ug/L	04/19/19	04/19/19	DDo	
4-Chlorophenyl phenyl ether	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
4-Nitroaniline	ND	0.9	0.603	9	ug/L	04/19/19	04/19/19	DDo	
4-Nitrophenol	ND	0.9	0.684	9	ug/L	04/19/19	04/19/19	DDo	
Acenaphthene	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Acenaphthylene	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Aniline	ND	0.9	0.738	9	ug/L	04/19/19	04/19/19	DDo	
Anthracene	ND	0.9	0.855	9	ug/L	04/19/19	04/19/19	DDo	
Azobenzene	ND	0.9	0.9	9	ug/L	04/19/19	04/19/19	DDo	
Benz(a)anthracene	ND	0.9	0.585	9	ug/L	04/19/19	04/19/19	DDo	
Benzidine	ND	0.9	1.17	45	ug/L	04/19/19	04/19/19	DDo	
Benzo(a)pyrene	ND	0.9	0.612	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(b)fluoranthene	ND	0.9	0.522	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(g,h,i)perylene	ND	0.9	0.864	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(k)fluoranthene	ND	0.9	0.711	9	ug/L	04/19/19	04/19/19	DDo	
Benzoic acid	ND	0.9	0.333	45	ug/L	04/19/19	04/19/19	DDo	
Benzyl alcohol	ND	0.9	7.2	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroethoxy)methane	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroethyl) Ether	ND	0.9	1.17	22.5	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroisopropyl) Ether	ND	0.9	1.17	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-ethylhexyl) phthalate	ND	0.9	0.891	9	ug/L	04/19/19	04/19/19	DDo	
Butylbenzyl Phthalate	ND	0.9	0.774	9	ug/L	04/19/19	04/19/19	DDo	
Carbazole	ND	0.9	0.63	9	ug/L	04/19/19	04/19/19	DDo	
Chrysene	ND	0.9	0.657	9	ug/L	04/19/19	04/19/19	DDo	
Dibenz(a,h)anthracene	ND	0.9	0.72	9	ug/L	04/19/19	04/19/19	DDo	
Dibenzofuran	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
Diethyl phthalate	ND	0.9	0.63	9	ug/L	04/19/19	04/19/19	DDo	
Dimethyl phthalate	ND	0.9	0.747	9	ug/L	04/19/19	04/19/19	DDo	
Di-n-butyl phthalate	**3.9 J**	0.9	0.819	9	ug/L	04/19/19	04/19/19	DDo	B1,J
Di-n-octyl phthalate	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
Fluoranthene	ND	0.9	0.684	9	ug/L	04/19/19	04/19/19	DDo	
Fluorene	ND	0.9	0.9	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorobenzene	ND	0.9	0.756	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorobutadiene	ND	0.9	1.89	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorocyclopentadiene	ND	0.9	1.71	22.5	ug/L	04/19/19	04/19/19	DDo	
Hexachloroethane	ND	0.9	1.8	9	ug/L	04/19/19	04/19/19	DDo	
Indeno(1,2,3-cd)pyrene	ND	0.9	0.783	9	ug/L	04/19/19	04/19/19	DDo	
Isophorone	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Naphthalene	ND	0.9	1.17	9	ug/L	04/19/19	04/19/19	DDo	
Nitrobenzene	ND	0.9	1.08	22.5	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodimethylamine (NDMA)	ND	0.9	0.216	9	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodi-n-propylamine (NDPA)	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodiphenylamine	ND	0.9	0.891	9	ug/L	04/19/19	04/19/19	DDo	
Pentachlorophenol	ND	0.9	1.17	22.5	ug/L	04/19/19	04/19/19	DDo	
Phenanthrene	ND	0.9	0.729	9	ug/L	04/19/19	04/19/19	DDo	
Phenol	ND	0.9	0.342	9	ug/L	04/19/19	04/19/19	DDo	
Pyrene	ND	0.9	0.801	9	ug/L	04/19/19	04/19/19	DDo	
Pyridine	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/16/2019 15:51	**Site:**			
Sample #:	**414424-079**	**Client Sample #:**	Equipment Blank - Day 1	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*			*Limits*	*Notes*				
2,4,6-Tribromophenol (SUR)	*54*			*39-137*					
2-Fluorobiphenyl (SUR)	*49*			*37-102*					
2-Fluorophenol (SUR)	*29*			*23-76*					
Nitrobenzene-d5 (SUR)	*50*			*30-115*					
p-Terphenyl (SUR)	*69*			*61-121*					
Phenol-d5 (SUR)	*18*			*17-56*					

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 12:16	**Site:**			
Sample #:	**414424-080**	**Client Sample #:**	Equipment Blank - Day 2	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1201107		
Antimony	ND	1	0.014	0.04	mg/L	04/19/19	04/24/19	KLN	
Barium	ND	1	0.002	0.01	mg/L	04/19/19	04/23/19	KLN	
Beryllium	ND	1	0.001	0.005	mg/L	04/19/19	04/23/19	KLN	
Cadmium	ND	1	0.001	0.005	mg/L	04/19/19	04/24/19	KLN	
Chromium	ND	1	0.002	0.01	mg/L	04/19/19	04/23/19	KLN	
Cobalt	ND	1	0.001	0.005	mg/L	04/19/19	04/23/19	KLN	
Copper	**0.032**	1	0.004	0.01	mg/L	04/19/19	04/23/19	KLN	
Lead	ND	1	0.005	0.01	mg/L	04/19/19	04/24/19	KLN	
Molybdenum	ND	1	0.005	0.01	mg/L	04/19/19	04/24/19	KLN	
Nickel	ND	1	0.003	0.02	mg/L	04/19/19	04/24/19	KLN	
Selenium	ND	1	0.016	0.03	mg/L	04/19/19	04/24/19	KLN	
Silver	ND	1	0.003	0.005	mg/L	04/19/19	04/23/19	KLN	
Thallium	ND	1	0.009	0.05	mg/L	04/19/19	04/24/19	KLN	
Vanadium	ND	1	0.002	0.005	mg/L	04/19/19	04/23/19	KLN	
Zinc	ND	1	0.007	0.05	mg/L	04/19/19	04/24/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1201118		
Arsenic	ND	1	0.31	2	ug/L	04/19/19	04/22/19	SBW	
Method: EPA 7470A *NELAC* Prep Method: Method							QCBatchID: QC1201220		
Mercury	ND	1	0.094	0.4	ug/L	04/23/19	04/23/19	JP	
Method: EPA 8015B *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201041		
TPH (C13 to C22)	ND	1	0.04	0.2	mg/L	04/18/19	04/19/19	DXN	
TPH (C23 to C44)	ND	1	0.07	0.3	mg/L	04/18/19	04/19/19	DXN	
TPH (C6 to C12)	ND	1	0.06	0.3	mg/L	04/18/19	04/19/19	DXN	
Surrogate	*% Recovery*			*Limits*		*Notes*			
Triacontane (SUR)	*74*			*50-150*					
Method: EPA 8081A *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201088		
4,4'-DDD	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
4,4'-DDE	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
4,4'-DDT	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
a-BHC	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Aldrin	ND	1	0.007	0.1	ug/L	04/19/19	04/21/19	MTS	
b-BHC	ND	1	0.003	0.1	ug/L	04/19/19	04/21/19	MTS	
Chlordane (technical)	ND	1	0.27	1	ug/L	04/19/19	04/21/19	MTS	
d-BHC	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
Dieldrin	ND	1	0.006	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan I	ND	1	0.004	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan II	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
Endosulfan sulfate	ND	1	0.012	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin	ND	1	0.008	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin aldehyde	ND	1	0.009	0.1	ug/L	04/19/19	04/21/19	MTS	
Endrin Ketone	ND	1	0.011	0.1	ug/L	04/19/19	04/21/19	MTS	
Heptachlor	ND	1	0.003	0.1	ug/L	04/19/19	04/21/19	MTS	
Heptachlor epoxide	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Lindane (Gamma-BHC)	ND	1	0.002	0.1	ug/L	04/19/19	04/21/19	MTS	
Methoxychlor	ND	1	0.055	0.1	ug/L	04/19/19	04/21/19	MTS	
Toxaphene	ND	1	0.48	2	ug/L	04/19/19	04/21/19	MTS	
Surrogate	*% Recovery*			*Limits*		*Notes*			
Decachlorobiphenyl DCB (SUR)	*70*			*50-150*					
Tetrachloro-m-xylene TCMX (SUR)	*60*			*50-150*					
Method: EPA 8082 *NELAC* Prep Method: EPA 3510C							QCBatchID: QC1201090		
PCB-1016	ND	1	0.058	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1221	ND	1	0.253	0.5	ug/L	04/19/19	04/20/19	MTS	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 04/17/2019 12:16 **Site:**
Sample #: **414424-080** **Client Sample #:** Equipment Blank - Day 2 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
PCB-1232	ND	1	0.196	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1242	ND	1	0.169	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1248	ND	1	0.1	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1254	ND	1	0.054	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1260	ND	1	0.08	0.5	ug/L	04/19/19	04/20/19	MTS	L
PCB-1262	ND	1	0.045	0.5	ug/L	04/19/19	04/20/19	MTS	
PCB-1268	ND	1	0.062	0.5	ug/L	04/19/19	04/20/19	MTS	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*61*	*50-150*	

Method: EPA 8260B *NELAC* Prep Method: EPA 5030B QCBatchID: QC1201026

1,1,1,2-Tetrachloroethane	ND	1	0.25	5	ug/L		04/18/19	LZ
1,1,1-Trichloroethane	ND	1	0.38	5	ug/L		04/18/19	LZ
1,1,2,2-Tetrachloroethane	ND	1	0.25	5	ug/L		04/18/19	LZ
1,1,2-Trichloroethane	ND	1	0.25	5	ug/L		04/18/19	LZ
1,1,2-Trichlorotrifluoroethane	ND	1	0.29	5	ug/L		04/18/19	LZ
1,1-Dichloroethane	ND	1	0.32	5	ug/L		04/18/19	LZ
1,1-Dichloroethene	ND	1	0.3	5	ug/L		04/18/19	LZ
1,1-Dichloropropene	ND	1	0.25	5	ug/L		04/18/19	LZ
1,2,3-Trichlorobenzene	ND	1	0.28	5	ug/L		04/18/19	LZ
1,2,3-Trichloropropane	ND	1	0.16	5	ug/L		04/18/19	LZ
1,2,4-Trichlorobenzene	ND	1	0.27	5	ug/L		04/18/19	LZ
1,2,4-Trimethylbenzene	ND	1	0.28	5	ug/L		04/18/19	LZ
1,2-Dibromo-3-chloropropane	ND	1	0.12	5	ug/L		04/18/19	LZ
1,2-Dibromoethane	ND	1	0.19	5	ug/L		04/18/19	LZ
1,2-Dichlorobenzene	ND	1	0.26	5	ug/L		04/18/19	LZ
1,2-Dichloroethane	ND	1	0.2	5	ug/L		04/18/19	LZ
1,2-Dichloropropane	ND	1	0.36	5	ug/L		04/18/19	LZ
1,3,5-Trimethylbenzene	ND	1	0.24	5	ug/L		04/18/19	LZ
1,3-Dichlorobenzene	ND	1	0.34	5	ug/L		04/18/19	LZ
1,3-Dichloropropane	ND	1	0.19	5	ug/L		04/18/19	LZ
1,4-Dichlorobenzene	ND	1	0.43	5	ug/L		04/18/19	LZ
2,2-Dichloropropane	ND	1	0.32	5	ug/L		04/18/19	LZ
2-Butanone (MEK)	ND	1	0.78	100	ug/L		04/18/19	LZ
2-Chloroethyl Vinyl Ether	ND	1	0.23	10	ug/L		04/18/19	LZ
2-Chlorotoluene	ND	1	0.33	5	ug/L		04/18/19	LZ
4-Chlorotoluene	ND	1	0.31	5	ug/L		04/18/19	LZ
4-Isopropyltoluene	ND	1	0.32	5	ug/L		04/18/19	LZ
4-Methyl-2-pentanone (MIBK)	ND	1	0.12	5	ug/L		04/18/19	LZ
Acetone	ND	1	50	100	ug/L		04/18/19	LZ
Allyl Chloride	ND	1	0.19	5	ug/L		04/18/19	LZ
Benzene	ND	1	0.18	1	ug/L		04/18/19	LZ
Bromobenzene	ND	1	0.53	5	ug/L		04/18/19	LZ
Bromochloromethane	ND	1	0.17	5	ug/L		04/18/19	LZ
Bromodichloromethane	ND	1	0.31	5	ug/L		04/18/19	LZ
Bromoform	ND	1	0.13	5	ug/L		04/18/19	LZ
Bromomethane	ND	1	0.68	5	ug/L		04/18/19	LZ
Carbon Tetrachloride	ND	1	0.27	5	ug/L		04/18/19	LZ
Chlorobenzene	ND	1	0.19	5	ug/L		04/18/19	LZ
Chlorodibromomethane	ND	1	0.21	5	ug/L		04/18/19	LZ
Chloroethane	ND	1	0.45	5	ug/L		04/18/19	LZ
Chloroform	ND	1	0.18	5	ug/L		04/18/19	LZ
Chloromethane	ND	1	0.27	5	ug/L		04/18/19	LZ
cis-1,2-Dichloroethene	ND	1	0.27	5	ug/L		04/18/19	LZ
cis-1,3-dichloropropene	ND	1	0.25	5	ug/L		04/18/19	LZ

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 12:16	**Site:**			
Sample #:	**414424-080**	**Client Sample #:**	Equipment Blank - Day 2	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
cis-1,4-dichloro-2-butene	ND	1	0.17	5	ug/L		04/18/19	LZ	
Dibromomethane	ND	1	0.23	5	ug/L		04/18/19	LZ	
Dichlorodifluoromethane	ND	1	0.33	5	ug/L		04/18/19	LZ	
Di-isopropyl ether (DIPE)	ND	1	0.17	1	ug/L		04/18/19	LZ	
Ethylbenzene	ND	1	0.21	5	ug/L		04/18/19	LZ	
Ethyl-tertbutylether (ETBE)	ND	1	0.23	1	ug/L		04/18/19	LZ	
Hexachlorobutadiene	ND	1	0.51	5	ug/L		04/18/19	LZ	
Isopropylbenzene	ND	1	0.24	5	ug/L		04/18/19	LZ	
m and p-Xylene	ND	1	0.45	5	ug/L		04/18/19	LZ	
Methylene chloride	**1.3 J**	1	0.16	5	ug/L		04/18/19	LZ	B1,J
Methyl-t-butyl Ether (MTBE)	ND	1	0.19	1	ug/L		04/18/19	LZ	
Naphthalene	ND	1	0.25	5	ug/L		04/18/19	LZ	
N-butylbenzene	ND	1	0.25	5	ug/L		04/18/19	LZ	
N-propylbenzene	ND	1	0.31	5	ug/L		04/18/19	LZ	
o-Xylene	ND	1	0.29	5	ug/L		04/18/19	LZ	
Sec-butylbenzene	ND	1	0.32	5	ug/L		04/18/19	LZ	
Styrene	ND	1	0.22	5	ug/L		04/18/19	LZ	
t-Butyl alcohol (TBA)	ND	1	5.2	10	ug/L		04/18/19	LZ	
Tert-amylmethylether (TAME)	ND	1	0.19	5	ug/L		04/18/19	LZ	
Tert-butylbenzene	ND	1	0.4	5	ug/L		04/18/19	LZ	
Tetrachloroethene	ND	1	0.8	5	ug/L		04/18/19	LZ	
Toluene	ND	1	0.24	5	ug/L		04/18/19	LZ	
trans-1,2-dichloroethene	ND	1	0.33	5	ug/L		04/18/19	LZ	
trans-1,3-dichloropropene	ND	1	0.23	5	ug/L		04/18/19	LZ	
trans-1,4-dichloro-2-butene	ND	1	0.17	5	ug/L		04/18/19	LZ	
Trichloroethene	ND	1	0.39	5	ug/L		04/18/19	LZ	
Trichlorofluoromethane	ND	1	0.25	5	ug/L		04/18/19	LZ	
Vinyl Chloride	ND	1	0.18	5	ug/L		04/18/19	LZ	
Xylenes (Total)	ND	1	0.45	5	ug/L		04/18/19	LZ	

Surrogate	*% Recovery*	*Limits*	*Notes*
1,2-Dichloroethane-d4 (SUR)	*124*	*70-145*	
4-Bromofluorobenzene (SUR)	*107*	*70-145*	
Dibromofluoromethane (SUR)	*113*	*70-145*	
Toluene-d8 (SUR)	*100*	*70-145*	

Method: EPA 8270C *NELAC* Prep Method: EPA 3510C QCBatchID: QC1201086

1,2,4-Trichlorobenzene	ND	0.9	1.71	9	ug/L	04/19/19	04/19/19	DDo	
1,2-Dichlorobenzene	ND	0.9	1.62	9	ug/L	04/19/19	04/19/19	DDo	
1,3-Dichlorobenzene	ND	0.9	1.71	9	ug/L	04/19/19	04/19/19	DDo	
1,4-Dichlorobenzene	ND	0.9	1.62	9	ug/L	04/19/19	04/19/19	DDo	
2,4,5-Trichlorophenol	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
2,4,6-Trichlorophenol	ND	0.9	0.504	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dichlorophenol	ND	0.9	1.26	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dimethylphenol	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
2,4-Dinitrophenol	ND	0.9	0.504	45	ug/L	04/19/19	04/19/19	DDo	
2,4-Dinitrotoluene	ND	0.9	0.369	9	ug/L	04/19/19	04/19/19	DDo	
2,6-Dinitrotoluene	ND	0.9	0.495	9	ug/L	04/19/19	04/19/19	DDo	
2-Chloronaphthalene	ND	0.9	1.26	9	ug/L	04/19/19	04/19/19	DDo	
2-Chlorophenol	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
2-Methyl-4,6-dinitrophenol	ND	0.9	0.351	45	ug/L	04/19/19	04/19/19	DDo	
2-Methylnaphthalene	ND	0.9	1.35	9	ug/L	04/19/19	04/19/19	DDo	
2-Methylphenol (o-Cresol)	ND	0.9	0.675	9	ug/L	04/19/19	04/19/19	DDo	
2-Nitroaniline	ND	0.9	0.45	45	ug/L	04/19/19	04/19/19	DDo	
2-Nitrophenol	ND	0.9	0.873	9	ug/L	04/19/19	04/19/19	DDo	
3 and 4-Methylphenol (m and p-Cresol)	ND	0.9	0.81	9	ug/L	04/19/19	04/19/19	DDo	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 12:16	**Site:**			
Sample #:	**414424-080**	**Client Sample #:**	Equipment Blank - Day 2	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
3,3'-Dichlorobenzidine	ND	0.9	0.576	22.5	ug/L	04/19/19	04/19/19	DDo	
3-Nitroaniline	ND	0.9	0.495	9	ug/L	04/19/19	04/19/19	DDo	
4-Bromophenyl phenyl ether	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
4-Chloro-3-methylphenol	ND	0.9	0.693	9	ug/L	04/19/19	04/19/19	DDo	
4-Chloroaniline	ND	0.9	0.36	9	ug/L	04/19/19	04/19/19	DDo	
4-Chlorophenyl phenyl ether	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
4-Nitroaniline	ND	0.9	0.603	9	ug/L	04/19/19	04/19/19	DDo	
4-Nitrophenol	ND	0.9	0.684	9	ug/L	04/19/19	04/19/19	DDo	
Acenaphthene	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Acenaphthylene	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Aniline	ND	0.9	0.738	9	ug/L	04/19/19	04/19/19	DDo	
Anthracene	ND	0.9	0.855	9	ug/L	04/19/19	04/19/19	DDo	
Azobenzene	ND	0.9	0.9	9	ug/L	04/19/19	04/19/19	DDo	
Benz(a)anthracene	ND	0.9	0.585	9	ug/L	04/19/19	04/19/19	DDo	
Benzidine	ND	0.9	1.17	45	ug/L	04/19/19	04/19/19	DDo	
Benzo(a)pyrene	ND	0.9	0.612	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(b)fluoranthene	ND	0.9	0.522	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(g,h,i)perylene	ND	0.9	0.864	9	ug/L	04/19/19	04/19/19	DDo	
Benzo(k)fluoranthene	ND	0.9	0.711	9	ug/L	04/19/19	04/19/19	DDo	
Benzoic acid	ND	0.9	0.333	45	ug/L	04/19/19	04/19/19	DDo	
Benzyl alcohol	ND	0.9	7.2	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroethoxy)methane	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroethyl) Ether	ND	0.9	1.17	22.5	ug/L	04/19/19	04/19/19	DDo	
Bis(2-chloroisopropyl) Ether	ND	0.9	1.17	9	ug/L	04/19/19	04/19/19	DDo	
Bis(2-ethylhexyl) phthalate	ND	0.9	0.891	9	ug/L	04/19/19	04/19/19	DDo	
Butylbenzyl Phthalate	ND	0.9	0.774	9	ug/L	04/19/19	04/19/19	DDo	
Carbazole	ND	0.9	0.63	9	ug/L	04/19/19	04/19/19	DDo	
Chrysene	ND	0.9	0.657	9	ug/L	04/19/19	04/19/19	DDo	
Dibenz(a,h)anthracene	ND	0.9	0.72	9	ug/L	04/19/19	04/19/19	DDo	
Dibenzofuran	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
Diethyl phthalate	ND	0.9	0.63	9	ug/L	04/19/19	04/19/19	DDo	
Dimethyl phthalate	ND	0.9	0.747	9	ug/L	04/19/19	04/19/19	DDo	
Di-n-butyl phthalate	**3.6 J**	0.9	0.819	9	ug/L	04/19/19	04/19/19	DDo	B1,J
Di-n-octyl phthalate	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
Fluoranthene	ND	0.9	0.684	9	ug/L	04/19/19	04/19/19	DDo	
Fluorene	ND	0.9	0.9	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorobenzene	ND	0.9	0.756	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorobutadiene	ND	0.9	1.89	9	ug/L	04/19/19	04/19/19	DDo	
Hexachlorocyclopentadiene	ND	0.9	1.71	22.5	ug/L	04/19/19	04/19/19	DDo	
Hexachloroethane	ND	0.9	1.8	9	ug/L	04/19/19	04/19/19	DDo	
Indeno(1,2,3-cd)pyrene	ND	0.9	0.783	9	ug/L	04/19/19	04/19/19	DDo	
Isophorone	ND	0.9	1.08	9	ug/L	04/19/19	04/19/19	DDo	
Naphthalene	ND	0.9	1.17	9	ug/L	04/19/19	04/19/19	DDo	
Nitrobenzene	ND	0.9	1.08	22.5	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodimethylamine (NDMA)	ND	0.9	0.216	9	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodi-n-propylamine (NDPA)	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	
N-Nitrosodiphenylamine	ND	0.9	0.891	9	ug/L	04/19/19	04/19/19	DDo	
Pentachlorophenol	ND	0.9	1.17	22.5	ug/L	04/19/19	04/19/19	DDo	
Phenanthrene	ND	0.9	0.729	9	ug/L	04/19/19	04/19/19	DDo	
Phenol	ND	0.9	0.342	9	ug/L	04/19/19	04/19/19	DDo	
Pyrene	ND	0.9	0.801	9	ug/L	04/19/19	04/19/19	DDo	
Pyridine	ND	0.9	0.99	9	ug/L	04/19/19	04/19/19	DDo	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	04/17/2019 12:16	**Site:**			
Sample #:	**414424-080**	**Client Sample #:**	Equipment Blank - Day 2	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Surrogate	*% Recovery*			*Limits*	*Notes*				
2,4,6-Tribromophenol (SUR)	*58*			*39-137*					
2-Fluorobiphenyl (SUR)	*58*			*37-102*					
2-Fluorophenol (SUR)	*32*			*23-76*					
Nitrobenzene-d5 (SUR)	*57*			*30-115*					
p-Terphenyl (SUR)	*76*			*61-121*					
Phenol-d5 (SUR)	*19*			*17-56*					

QCBatchID:	**QC1200658**	**Analyst:**	TWu	**Method:**	EPA 8015B
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	VOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1200658MB1					
TPH (C6 to C12)	ND	mg/Kg	0.239	3	
TPH Gasoline	ND	mg/Kg	0.239	3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1200658LCS1, QC1200658LCSD1											
TPH (C6 to C12)	5	5	5.3	5.6	mg/Kg	106	112	6	70-130	20	
TPH Gasoline	5	5	5.5	5.7	mg/Kg	110	114	4	70-130	20	

QCBatchID: QC1201001	**Analyst:** TWu	**Method:** EPA 8260B	
Matrix: Solid	**Analyzed:** 04/17/2019	**Instrument:** VOA-MS (group)	

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201001MB1					
1,1,1,2-Tetrachloroethane	ND	ug/Kg	0.24	5	
1,1,1-Trichloroethane	ND	ug/Kg	0.15	5	
1,1,2,2-Tetrachloroethane	ND	ug/Kg	0.29	5	
1,1,2-Trichloroethane	ND	ug/Kg	0.22	5	
1,1,2-Trichlorotrifluoroethane	ND	ug/Kg	0.74	5	
1,1-Dichloroethane	ND	ug/Kg	0.23	5	
1,1-Dichloroethene	ND	ug/Kg	0.18	5	
1,1-Dichloropropene	ND	ug/Kg	0.21	5	
1,2,3-Trichlorobenzene	ND	ug/Kg	0.18	5	
1,2,3-Trichloropropane	ND	ug/Kg	0.2	5	
1,2,4-Trichlorobenzene	ND	ug/Kg	0.33	5	
1,2,4-Trimethylbenzene	ND	ug/Kg	0.28	5	
1,2-Dibromo-3-chloropropane	ND	ug/Kg	0.2	5	
1,2-Dibromoethane	ND	ug/Kg	0.12	5	
1,2-Dichlorobenzene	ND	ug/Kg	0.18	5	
1,2-Dichloroethane	ND	ug/Kg	0.14	5	
1,2-Dichloropropane	ND	ug/Kg	0.34	5	
1,3,5-Trimethylbenzene	ND	ug/Kg	0.23	5	
1,3-Dichlorobenzene	ND	ug/Kg	0.21	5	
1,3-Dichloropropane	ND	ug/Kg	0.19	5	
1,4-Dichlorobenzene	ND	ug/Kg	0.24	5	
2,2-Dichloropropane	ND	ug/Kg	0.19	5	
2-Butanone (MEK)	ND	ug/Kg	0.72	100	
2-Chloroethyl Vinyl Ether	ND	ug/Kg	0.3	5	
2-Chlorotoluene	ND	ug/Kg	0.25	5	
4-Chlorotoluene	ND	ug/Kg	0.22	5	
4-Isopropyltoluene	ND	ug/Kg	0.27	5	
4-Methyl-2-pentanone (MIBK)	ND	ug/Kg	0.17	5	
Acetone	ND	ug/Kg	50	100	
Allyl Chloride	ND	ug/Kg	0.14	5	
Benzene	ND	ug/Kg	0.18	5	
Bromobenzene	ND	ug/Kg	0.3	5	
Bromochloromethane	ND	ug/Kg	0.18	5	
Bromodichloromethane	ND	ug/Kg	0.2	5	
Bromoform	ND	ug/Kg	0.19	5	
Bromomethane	ND	ug/Kg	0.22	5	
Carbon Tetrachloride	ND	ug/Kg	0.18	5	
Chlorobenzene	ND	ug/Kg	0.18	5	
Chlorodibromomethane	ND	ug/Kg	0.19	5	
Chloroethane	ND	ug/Kg	0.2	5	
Chloroform	ND	ug/Kg	0.17	5	
Chloromethane	ND	ug/Kg	0.21	5	
cis-1,2-Dichloroethene	ND	ug/Kg	0.2	5	
cis-1,3-dichloropropene	ND	ug/Kg	0.2	5	
cis-1,4-dichloro-2-butene	ND	ug/Kg	0.2	5	
Dibromomethane	ND	ug/Kg	0.23	5	
Dichlorodifluoromethane	ND	ug/Kg	0.23	5	
Di-isopropyl ether (DIPE)	ND	ug/Kg	0.21	5	
Ethylbenzene	ND	ug/Kg	0.25	5	
Ethyl-tertbutylether (ETBE)	ND	ug/Kg	0.42	5	
Hexachlorobutadiene	ND	ug/Kg	0.38	5	
Isopropylbenzene	ND	ug/Kg	0.17	5	

QCBatchID: QC1201001 **Analyst:** TWu **Method:** EPA 8260B

Matrix: Solid **Analyzed:** 04/17/2019 **Instrument:** VOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201001MB1					
m and p-Xylene	ND	ug/Kg	0.21	5	
Methylene chloride	**0.49 J**	ug/Kg	0.22	5	
Methyl-t-butyl Ether (MTBE)	ND	ug/Kg	0.25	5	
Naphthalene	ND	ug/Kg	0.28	5	
N-butylbenzene	ND	ug/Kg	0.16	5	
N-propylbenzene	ND	ug/Kg	0.19	5	
o-Xylene	ND	ug/Kg	0.13	5	
Sec-butylbenzene	ND	ug/Kg	0.34	5	
Styrene	ND	ug/Kg	0.23	5	
t-Butyl alcohol (TBA)	ND	ug/Kg	8.8	10	
Tert-amylmethylether (TAME)	ND	ug/Kg	0.19	5	
Tert-butylbenzene	ND	ug/Kg	0.18	5	
Tetrachloroethene	ND	ug/Kg	0.2	5	
Toluene	ND	ug/Kg	0.23	5	
trans-1,2-dichloroethene	ND	ug/Kg	0.23	5	
trans-1,3-dichloropropene	ND	ug/Kg	0.14	5	
trans-1,4-dichloro-2-butene	ND	ug/Kg	0.38	5	
Trichloroethene	ND	ug/Kg	0.39	5	
Trichlorofluoromethane	ND	ug/Kg	0.25	5	
Vinyl Chloride	ND	ug/Kg	0.18	5	
Xylenes (Total)	ND	ug/Kg	0.45	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201001LCS1											
1,1-Dichloroethene	50		47		ug/Kg	94			59-172		
Benzene	50		49		ug/Kg	98			62-137		
Chlorobenzene	50		46		ug/Kg	92			60-133		
Methyl-t-butyl Ether (MTBE)	50		48		ug/Kg	96			62-137		
Toluene	50		48		ug/Kg	96			59-139		
Trichloroethene	50		49		ug/Kg	98			66-142		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201001MS1, QC1201001MSD1												**Source: 414416-012**
1,1-Dichloroethene	ND	50	50	48	48	ug/Kg	96	96	0.0	59-172	22	
Benzene	ND	50	50	50	49	ug/Kg	100	98	2.0	62-137	24	
Chlorobenzene	ND	50	50	48	45	ug/Kg	96	90	6.5	60-133	24	
Methyl-t-butyl Ether (MTBE)	ND	50	50	54	51	ug/Kg	108	102	5.7	62-137	21	
Toluene	ND	50	50	49	47	ug/Kg	98	94	4.2	59-139	21	
Trichloroethene	ND	50	50	50	49	ug/Kg	100	98	2.0	66-142	21	

QCBatchID: QC1201024 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 01/01/1900 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201024MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201024LCS1											
4,4'-DDD	50		45		ug/Kg	90			43-172		
4,4'-DDE	50		43		ug/Kg	86			44-163		
4,4'-DDT	50		33		ug/Kg	66			40-158		
a-BHC	50		39		ug/Kg	78			45-150		
Aldrin	50		37		ug/Kg	74			46-142		
b-BHC	50		40		ug/Kg	80			42-156		
d-BHC	50		28		ug/Kg	56			37-161		
Dieldrin	50		40		ug/Kg	80			47-151		
Endosulfan I	50		39		ug/Kg	78			47-141		
Endosulfan II	50		41		ug/Kg	82			44-156		
Endosulfan sulfate	50		35		ug/Kg	70			43-157		
Endrin	50		43		ug/Kg	86			47-160		
Endrin aldehyde	50		17		ug/Kg	34			32-127		
Endrin Ketone	50		41		ug/Kg	82			48-159		
Heptachlor	50		40		ug/Kg	80			50-144		
Heptachlor epoxide	50		40		ug/Kg	80			48-145		
Lindane (Gamma-BHC)	50		39		ug/Kg	78			47-151		
Methoxychlor	50		40		ug/Kg	80			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201024MS1, QC1201024MSD1												**Source: 414404-010**
4,4'-DDD	ND	50	50	41	36	ug/Kg	82	72	13.0	43-172	20	
4,4'-DDE	ND	50	50	41	36	ug/Kg	82	72	13.0	44-163	20	
4,4'-DDT	ND	50	50	44	41	ug/Kg	88	82	7.1	40-158	20	
a-BHC	ND	50	50	36	32	ug/Kg	72	64	11.8	45-150	20	

QCBatchID: QC1201024 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 01/01/1900 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201024MS1, QC1201024MSD1												**Source: 414404-010**
Aldrin	ND	50	50	40	39	ug/Kg	80	78	2.5	46-142	20	
b-BHC	ND	50	50	39	36	ug/Kg	78	72	8.0	42-156	20	
d-BHC	ND	50	50	30	27	ug/Kg	60	54	10.5	37-161	20	
Dieldrin	ND	50	50	37	33	ug/Kg	74	66	11.4	47-151	20	
Endosulfan I	ND	50	50	37	33	ug/Kg	74	66	11.4	47-141	20	
Endosulfan II	ND	50	50	40	36	ug/Kg	80	72	10.5	44-156	20	
Endosulfan sulfate	ND	50	50	40	37	ug/Kg	80	74	7.8	43-157	20	
Endrin	ND	50	50	42	37	ug/Kg	84	74	12.7	47-160	20	
Endrin aldehyde	ND	50	50	37	33	ug/Kg	74	66	11.4	32-127	20	
Endrin Ketone	ND	50	50	43	39	ug/Kg	86	78	9.8	48-159	20	
Heptachlor	ND	50	50	37	33	ug/Kg	74	66	11.4	50-144	20	
Heptachlor epoxide	ND	50	50	38	34	ug/Kg	76	68	11.1	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	37	33	ug/Kg	74	66	11.4	47-151	20	
Methoxychlor	ND	50	50	46	41	ug/Kg	92	82	11.5	36-182	20	

QCBatchID: QC1201025 **Analyst:** bmorris **Method:** EPA 8082

Matrix: Solid **Analyzed:** 01/01/1900 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201025MB1					
PCB-1016	ND	ug/Kg	3	50	
PCB-1221	ND	ug/Kg	14	50	
PCB-1232	ND	ug/Kg	9.5	50	
PCB-1242	ND	ug/Kg	14	50	
PCB-1248	ND	ug/Kg	19	50	
PCB-1254	ND	ug/Kg	20	50	
PCB-1260	ND	ug/Kg	6.9	50	
PCB-1262	ND	ug/Kg	17	50	
PCB-1268	ND	ug/Kg	8.6	50	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201025LCS1											
PCB-1016	500		410		ug/Kg	82			70-130		
PCB-1260	500		420		ug/Kg	84			70-130		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201025MS1, QC1201025MSD1												**Source: 414404-010**
PCB-1016	ND	500	500	380	330	ug/Kg	76	66	14.1	70-130	20	M
PCB-1260	ND	500	500	370	320	ug/Kg	74	64	14.5	70-130	20	M

QCBatchID: QC1201026	**Analyst:** TWu	**Method:** EPA 8260B	
Matrix: Water	**Analyzed:** 04/18/2019	**Instrument:** VOA-MS (group)	

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201026MB1					
1,1,1,2-Tetrachloroethane	ND	ug/L	0.25	5	
1,1,1-Trichloroethane	ND	ug/L	0.38	5	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.25	5	
1,1,2-Trichloroethane	ND	ug/L	0.25	5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	0.29	5	
1,1-Dichloroethane	ND	ug/L	0.32	5	
1,1-Dichloroethene	ND	ug/L	0.3	5	
1,1-Dichloropropene	ND	ug/L	0.25	5	
1,2,3-Trichlorobenzene	ND	ug/L	0.28	5	
1,2,3-Trichloropropane	ND	ug/L	0.16	5	
1,2,4-Trichlorobenzene	ND	ug/L	0.27	5	
1,2,4-Trimethylbenzene	ND	ug/L	0.28	5	
1,2-Dibromo-3-chloropropane	ND	ug/L	0.12	5	
1,2-Dibromoethane	ND	ug/L	0.19	5	
1,2-Dichlorobenzene	ND	ug/L	0.26	5	
1,2-Dichloroethane	ND	ug/L	0.2	5	
1,2-Dichloropropane	ND	ug/L	0.36	5	
1,3,5-Trimethylbenzene	ND	ug/L	0.24	5	
1,3-Dichlorobenzene	ND	ug/L	0.34	5	
1,3-Dichloropropane	ND	ug/L	0.19	5	
1,4-Dichlorobenzene	ND	ug/L	0.43	5	
2,2-Dichloropropane	ND	ug/L	0.32	5	
2-Butanone (MEK)	ND	ug/L	0.78	100	
2-Chloroethyl Vinyl Ether	ND	ug/L	0.23	10	
2-Chlorotoluene	ND	ug/L	0.33	5	
4-Chlorotoluene	ND	ug/L	0.31	5	
4-Isopropyltoluene	ND	ug/L	0.32	5	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	0.12	5	
Acetone	ND	ug/L	50	100	
Allyl Chloride	ND	ug/L	0.19	5	
Benzene	ND	ug/L	0.18	1	
Bromobenzene	ND	ug/L	0.53	5	
Bromochloromethane	ND	ug/L	0.17	5	
Bromodichloromethane	ND	ug/L	0.31	5	
Bromoform	ND	ug/L	0.13	5	
Bromomethane	ND	ug/L	0.68	5	
Carbon Tetrachloride	ND	ug/L	0.27	5	
Chlorobenzene	ND	ug/L	0.19	5	
Chlorodibromomethane	ND	ug/L	0.21	5	
Chloroethane	ND	ug/L	0.45	5	
Chloroform	ND	ug/L	0.18	5	
Chloromethane	ND	ug/L	0.27	5	
cis-1,2-Dichloroethene	ND	ug/L	0.27	5	
cis-1,3-dichloropropene	ND	ug/L	0.25	5	
cis-1,4-dichloro-2-butene	ND	ug/L	0.17	5	
Dibromomethane	ND	ug/L	0.23	5	
Dichlorodifluoromethane	ND	ug/L	0.33	5	
Di-isopropyl ether (DIPE)	ND	ug/L	0.17	1	
Ethylbenzene	ND	ug/L	0.21	5	
Ethyl-tertbutylether (ETBE)	ND	ug/L	0.23	1	
Hexachlorobutadiene	ND	ug/L	0.51	5	
Isopropylbenzene	ND	ug/L	0.24	5	

QCBatchID: QC1201026 **Analyst:** TWu **Method:** EPA 8260B

Matrix: Water **Analyzed:** 04/18/2019 **Instrument:** VOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201026MB1					
m and p-Xylene	ND	ug/L	0.45	5	
Methylene chloride	**1.1 J**	ug/L	0.16	5	
Methyl-t-butyl Ether (MTBE)	ND	ug/L	0.19	1	
Naphthalene	ND	ug/L	0.25	5	
N-butylbenzene	ND	ug/L	0.25	5	
N-propylbenzene	ND	ug/L	0.31	5	
o-Xylene	ND	ug/L	0.29	5	
Sec-butylbenzene	ND	ug/L	0.32	5	
Styrene	ND	ug/L	0.22	5	
t-Butyl alcohol (TBA)	ND	ug/L	5.2	10	
Tert-amylmethylether (TAME)	ND	ug/L	0.19	5	
Tert-butylbenzene	ND	ug/L	0.4	5	
Tetrachloroethene	ND	ug/L	0.8	5	
Toluene	ND	ug/L	0.24	5	
trans-1,2-dichloroethene	ND	ug/L	0.33	5	
trans-1,3-dichloropropene	ND	ug/L	0.23	5	
trans-1,4-dichloro-2-butene	ND	ug/L	0.17	5	
Trichloroethene	ND	ug/L	0.39	5	
Trichlorofluoromethane	ND	ug/L	0.25	5	
Vinyl Chloride	ND	ug/L	0.18	5	
Xylenes (Total)	ND	ug/L	0.45	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201026LCS1											
1,1-Dichloroethene	50		45		ug/L	90			59-172		
Benzene	50		46		ug/L	92			62-137		
Chlorobenzene	50		44		ug/L	88			60-133		
Methyl-t-butyl Ether (MTBE)	50		55		ug/L	110			62-137		
Toluene	50		47		ug/L	94			59-139		
Trichloroethene	50		47		ug/L	94			66-142		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201026MS1, QC1201026MSD1												**Source: 414409-001**
1,1-Dichloroethene	ND	50	50	39	38	ug/L	78	76	2.6	59-172	22	
Benzene	ND	50	50	47	46	ug/L	94	92	2.2	62-137	24	
Chlorobenzene	ND	50	50	45	44	ug/L	90	88	2.2	60-133	24	
Methyl-t-butyl Ether (MTBE)	ND	50	50	46	45	ug/L	92	90	2.2	62-137	21	
Toluene	ND	50	50	43	41	ug/L	86	82	4.8	59-139	21	
Trichloroethene	ND	50	50	46	46	ug/L	92	92	0.0	66-142	21	

QCBatchID: QC1201027	Analyst: Jarriaga	Method: EPA 8270C
Matrix: Solid	Analyzed: 04/18/2019	Instrument: SVOA-MS (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201027MB1					
1,2,4-Trichlorobenzene	ND	ug/Kg	22	250	
1,2-Dichlorobenzene	ND	ug/Kg	37	250	
1,3-Dichlorobenzene	ND	ug/Kg	50	250	
1,4-Dichlorobenzene	ND	ug/Kg	31	250	
1-Methylnaphthalene	ND	ug/Kg	21	250	
2,4,5-Trichlorophenol	ND	ug/Kg	43	250	
2,4,6-Trichlorophenol	ND	ug/Kg	35	250	
2,4-Dichlorophenol	ND	ug/Kg	23	250	
2,4-Dimethylphenol	ND	ug/Kg	100	250	
2,4-Dinitrophenol	ND	ug/Kg	23	1200	
2,4-Dinitrotoluene	ND	ug/Kg	14	250	
2,6-Dinitrotoluene	ND	ug/Kg	33	250	
2-Chloronaphthalene	ND	ug/Kg	15	250	
2-Chlorophenol	ND	ug/Kg	15	250	
2-Methyl-4,6-dinitrophenol	ND	ug/Kg	21	250	
2-Methylnaphthalene	ND	ug/Kg	21	250	
2-Methylphenol (o-Cresol)	ND	ug/Kg	31	250	
2-Nitroaniline	ND	ug/Kg	31	250	
2-Nitrophenol	ND	ug/Kg	16	250	
3 and 4-Methylphenol (m and p-Cresol)	ND	ug/Kg	19	400	
3,3'-Dichlorobenzidine	ND	ug/Kg	54	1200	
3-Nitroaniline	ND	ug/Kg	37	250	
4-Bromophenyl phenyl ether	ND	ug/Kg	24	250	
4-Chloro-3-methylphenol	ND	ug/Kg	18	250	
4-Chloroaniline	ND	ug/Kg	73	250	
4-Chlorophenyl phenyl ether	ND	ug/Kg	19	250	
4-Nitroaniline	ND	ug/Kg	148	250	
4-Nitrophenol	ND	ug/Kg	117	250	
Acenaphthene	ND	ug/Kg	25	250	
Acenaphthylene	ND	ug/Kg	20	250	
Aniline	ND	ug/Kg	101	250	
Anthracene	ND	ug/Kg	23	250	
Azobenzene	ND	ug/Kg	67	250	
Benz(a)anthracene	ND	ug/Kg	22	250	
Benzidine	ND	ug/Kg	23	1200	
Benzo(a)pyrene	ND	ug/Kg	25	250	
Benzo(b)fluoranthene	ND	ug/Kg	27	250	
Benzo(g,h,i)perylene	ND	ug/Kg	29	250	
Benzo(k)fluoranthene	ND	ug/Kg	32	250	
Benzoic acid	ND	ug/Kg	36	1200	
Benzyl alcohol	ND	ug/Kg	36	250	
Bis(2-chloroethoxy)methane	ND	ug/Kg	15	250	
Bis(2-chloroethyl) Ether	ND	ug/Kg	25	1200	
Bis(2-chloroisopropyl) Ether	ND	ug/Kg	17	250	
Bis(2-ethylhexyl) phthalate	ND	ug/Kg	52	250	
Butylbenzyl Phthalate	ND	ug/Kg	44	250	
Carbazole	ND	ug/Kg	23	250	
Chrysene	ND	ug/Kg	20	250	
Dibenz(a,h)anthracene	ND	ug/Kg	21	250	
Dibenzofuran	ND	ug/Kg	14	250	
Diethyl phthalate	ND	ug/Kg	24	250	
Dimethyl phthalate	ND	ug/Kg	22	250	

QCBatchID: QC1201027 **Analyst:** Jarriaga **Method:** EPA 8270C

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** SVOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201027MB1					
Di-n-butyl phthalate	**150 J**	ug/Kg	67	250	
Di-n-octyl phthalate	ND	ug/Kg	23	250	
Fluoranthene	ND	ug/Kg	21	250	
Fluorene	ND	ug/Kg	27	250	
Hexachlorobenzene	ND	ug/Kg	15	250	
Hexachlorobutadiene	ND	ug/Kg	39	250	
Hexachlorocyclopentadiene	ND	ug/Kg	14	1200	
Hexachloroethane	ND	ug/Kg	43	250	
Indeno(1,2,3-cd)pyrene	ND	ug/Kg	90	250	
Isophorone	ND	ug/Kg	25	250	
Naphthalene	ND	ug/Kg	25	250	
Nitrobenzene	ND	ug/Kg	21	1200	
N-Nitrosodimethylamine (NDMA)	ND	ug/Kg	34	250	
N-Nitrosodi-n-propylamine (NDPA)	ND	ug/Kg	26	250	
N-Nitrosodiphenylamine	ND	ug/Kg	24	250	
Pentachlorophenol	ND	ug/Kg	55	1200	
Phenanthrene	ND	ug/Kg	22	250	
Phenol	ND	ug/Kg	26	250	
Pyrene	ND	ug/Kg	23	250	
Pyridine	ND	ug/Kg	21	250	
Total Cresol	ND	ug/Kg	400	400	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201027LCS1											
1,2,4-Trichlorobenzene	2000		1600		ug/Kg	80			43-111		
1,4-Dichlorobenzene	2000		1300		ug/Kg	65			30-116		
2,4,5-Trichlorophenol	2000		2200		ug/Kg	110			57-125		
2,4-Dimethylphenol	2000		1800		ug/Kg	90			50-112		
2,4-Dinitrotoluene	2000		2100		ug/Kg	105			57-124		
2-Chlorophenol	2000		1600		ug/Kg	80			48-114		
3 and 4-Methylphenol (m and p-Cresol)	2000		1900		ug/Kg	95			56-124		
4-Chloro-3-methylphenol	2000		2000		ug/Kg	100			61-122		
4-Nitrophenol	2000		2400		ug/Kg	120			54-126		
Acenaphthene	2000		1600		ug/Kg	80			53-112		
Benzo(b)fluoranthene	2000		1700		ug/Kg	85			61-125		
Chrysene	2000		1800		ug/Kg	90			59-117		
N-Nitrosodi-n-propylamine (NDPA)	2000		1900		ug/Kg	95			54-110		
Pentachlorophenol	2000		1800		ug/Kg	90			41-103		
Phenol	2000		1600		ug/Kg	80			51-111		
Pyrene	2000		1900		ug/Kg	95			63-119		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201027MS1, QC1201027MSD1												**Source: 414406-001**
1,2,4-Trichlorobenzene	ND	2000	2000	950	1100	ug/Kg	48	55	14.6	35-93	30	
1,4-Dichlorobenzene	ND	2000	2000	850	1000	ug/Kg	43	50	16.2	39-95	30	
2,4,5-Trichlorophenol	ND	2000	2000	1000	1300	ug/Kg	50	65	26.1	44-108	30	
2,4-Dimethylphenol	ND	2000	2000	880	1100	ug/Kg	44	55	22.2	37-105	30	
2,4-Dinitrotoluene	ND	2000	2000	720	940	ug/Kg	36	47	26.5	48-109	30	M
2-Chlorophenol	ND	2000	2000	890	1000	ug/Kg	45	50	11.6	42-102	30	

QCBatchID: QC1201027 **Analyst:** Jarriaga **Method:** EPA 8270C

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** SVOA-MS (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201027MS1, QC1201027MSD1												**Source: 414406-001**
3 and 4-Methylphenol (m and p-Cresol)	ND	2000	2000	950	1200	ug/Kg	48	60	23.3	33-116	30	
4-Chloro-3-methylphenol	ND	2000	2000	1100	1300	ug/Kg	55	65	16.7	33-120	30	
4-Nitrophenol	ND	2000	2000	950	1100	ug/Kg	48	55	14.6	37-107	30	
Acenaphthene	ND	2000	2000	1000	1200	ug/Kg	50	60	18.2	57-99	30	M
Benzo(b)fluoranthene	ND	2000	2000	1700	2500	ug/Kg	85	125	38.1	59-126	30	M
Chrysene	ND	2000	2000	1800	2600	ug/Kg	90	130	36.4	68-120	30	M
N-Nitrosodi-n-propylamine (NDPA)	ND	2000	2000	980	1100	ug/Kg	49	55	11.5	41-127	30	
Pentachlorophenol	ND	2000	2000	4300	4400	ug/Kg	215	220	2.3	43-120	30	M
Phenol	ND	2000	2000	940	1100	ug/Kg	47	55	15.7	46-116	30	
Pyrene	ND	2000	2000	2200	3000	ug/Kg	110	150	30.8	53-129	30	M

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1201027DUP1						**Source: 414406-001**
1,2,4-Trichlorobenzene	ND	0.0	ug/Kg	0.0	20	
1,2-Dichlorobenzene	ND	0.0	ug/Kg	0.0	20	
1,3-Dichlorobenzene	ND	0.0	ug/Kg	0.0	20	
1,4-Dichlorobenzene	ND	0.0	ug/Kg	0.0	20	
1-Methylnaphthalene	ND	0.0	ug/Kg	0.0	20	
2,4,5-Trichlorophenol	ND	0.0	ug/Kg	0.0	20	
2,4,6-Trichlorophenol	ND	0.0	ug/Kg	0.0	20	
2,4-Dichlorophenol	ND	0.0	ug/Kg	0.0	20	
2,4-Dimethylphenol	ND	0.0	ug/Kg	0.0	20	
2,4-Dinitrophenol	ND	0.0	ug/Kg	0.0	20	
2,4-Dinitrotoluene	ND	0.0	ug/Kg	0.0	20	
2,6-Dinitrotoluene	ND	0.0	ug/Kg	0.0	20	
2-Chloronaphthalene	ND	0.0	ug/Kg	0.0	20	
2-Chlorophenol	ND	0.0	ug/Kg	0.0	20	
2-Methyl-4,6-dinitrophenol	ND	0.0	ug/Kg	0.0	20	
2-Methylnaphthalene	ND	0.0	ug/Kg	0.0	20	
2-Methylphenol (o-Cresol)	ND	0.0	ug/Kg	0.0	20	
2-Nitroaniline	ND	ND	ug/Kg	0.0	20	
2-Nitrophenol	ND	0.0	ug/Kg	0.0	20	
3 and 4-Methylphenol (m and p-Cresol)	ND	0.0	ug/Kg	0.0	20	
3,3'-Dichlorobenzidine	ND	0.0	ug/Kg	0.0	20	
3-Nitroaniline	ND	ND	ug/Kg	0.0	20	
4-Bromophenyl phenyl ether	ND	0.0	ug/Kg	0.0	20	
4-Chloro-3-methylphenol	ND	0.0	ug/Kg	0.0	20	
4-Chloroaniline	ND	0.0	ug/Kg	0.0	20	
4-Chlorophenyl phenyl ether	ND	0.0	ug/Kg	0.0	20	
4-Nitroaniline	ND	0.0	ug/Kg	0.0	20	
4-Nitrophenol	ND	ND	ug/Kg	0.0	20	
Acenaphthene	ND	0.0	ug/Kg	0.0	20	
Acenaphthylene	ND	0.0	ug/Kg	0.0	20	
Aniline	ND	0.0	ug/Kg	0.0	20	
Anthracene	ND	ND	ug/Kg	0.0	20	
Azobenzene	ND	0.0	ug/Kg	0.0	20	
Benz(a)anthracene	ND	ND	ug/Kg	0.0	20	
Benzidine	ND	0.0	ug/Kg	0.0	20	
Benzo(a)pyrene	ND	ND	ug/Kg	0.0	20	
Benzo(b)fluoranthene	ND	ND	ug/Kg	0.0	20	
Benzo(g,h,i)perylene	ND	ND	ug/Kg	0.0	20	

QCBatchID: QC1201027 **Analyst:** Jarriaga **Method:** EPA 8270C

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** SVOA-MS (group)

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1201027DUP1						**Source: 414406-001**
Benzo(k)fluoranthene	ND	ND	ug/Kg	0.0	20	
Benzoic acid	ND	0.0	ug/Kg	0.0	20	
Benzyl alcohol	ND	0.0	ug/Kg	0.0	20	
Bis(2-chloroethoxy)methane	ND	0.0	ug/Kg	0.0	20	
Bis(2-chloroethyl) Ether	ND	0.0	ug/Kg	0.0	20	
Bis(2-chloroisopropyl) Ether	ND	0.0	ug/Kg	0.0	20	
Bis(2-ethylhexyl) phthalate	4000	750	ug/Kg	136.8	20	D
Butylbenzyl Phthalate	ND	ND	ug/Kg	0.0	20	
Carbazole	ND	ND	ug/Kg	0.0	20	
Chrysene	ND	ND	ug/Kg	0.0	20	
Dibenz(a,h)anthracene	ND	ND	ug/Kg	0.0	20	
Dibenzofuran	ND	0.0	ug/Kg	0.0	20	
Diethyl phthalate	ND	ND	ug/Kg	0.0	20	
Dimethyl phthalate	ND	ND	ug/Kg	0.0	20	
Di-n-butyl phthalate	ND	ND	ug/Kg	0.0	20	
Di-n-octyl phthalate	ND	0.0	ug/Kg	0.0	20	
Fluoranthene	ND	ND	ug/Kg	0.0	20	
Fluorene	ND	0.0	ug/Kg	0.0	20	
Hexachlorobenzene	ND	0.0	ug/Kg	0.0	20	
Hexachlorobutadiene	ND	0.0	ug/Kg	0.0	20	
Hexachlorocyclopentadiene	ND	0.0	ug/Kg	0.0	20	
Hexachloroethane	ND	0.0	ug/Kg	0.0	20	
Indeno(1,2,3-cd)pyrene	ND	ND	ug/Kg	0.0	20	
Isophorone	ND	0.0	ug/Kg	0.0	20	
Naphthalene	ND	0.0	ug/Kg	0.0	20	
Nitrobenzene	ND	0.0	ug/Kg	0.0	20	
N-Nitrosodimethylamine (NDMA)	ND	0.0	ug/Kg	0.0	20	
N-Nitrosodi-n-propylamine (NDPA)	ND	ND	ug/Kg	0.0	20	
N-Nitrosodiphenylamine	ND	0.0	ug/Kg	0.0	20	
Pentachlorophenol	ND	0.0	ug/Kg	0.0	20	
Phenanthrene	ND	ND	ug/Kg	0.0	20	
Phenol	ND	0.0	ug/Kg	0.0	20	
Pyrene	ND	ND	ug/Kg	0.0	20	
Pyridine	ND	0.0	ug/Kg	0.0	20	
Total Cresol	ND	ND	ug/Kg	0.0	20	

QCBatchID:	**QC1201028**	**Analyst:**	DNguyen	**Method:**	EPA 8015M
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201028MB1					
TPH (C10 to C28)	ND	mg/Kg	10	10	
TPH (C13 to C22)	ND	mg/Kg	10	10	
TPH (C23 to C40)	ND	mg/Kg	10	10	
TPH (C23 to C44)	ND	mg/Kg	10	10	
TPH (C6 to C12)	ND	mg/Kg	10	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201028LCS1											
TPH (C10 to C28)	250		220		mg/Kg	88			60-133		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1201028MS1, QC1201028MSD1												**Source: 414414-003**
TPH (C10 to C28)	18	250	250	220	220	mg/Kg	81	81	0.0	70-130	20	

QCBatchID: QC1201031 **Analyst:** MSolanki **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201031MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201031LCS1											
4,4'-DDD	50		50		ug/Kg	100			43-172		
4,4'-DDE	50		42		ug/Kg	84			44-163		
4,4'-DDT	50		48		ug/Kg	96			40-158		
a-BHC	50		41		ug/Kg	82			45-150		
Aldrin	50		39		ug/Kg	78			46-142		
b-BHC	50		39		ug/Kg	78			42-156		
d-BHC	50		32		ug/Kg	64			37-161		
Dieldrin	50		41		ug/Kg	82			47-151		
Endosulfan I	50		39		ug/Kg	78			47-141		
Endosulfan II	50		43		ug/Kg	86			44-156		
Endosulfan sulfate	50		42		ug/Kg	84			43-157		
Endrin	50		47		ug/Kg	94			47-160		
Endrin aldehyde	50		29		ug/Kg	58			32-127		
Endrin Ketone	50		44		ug/Kg	88			48-159		
Heptachlor	50		34		ug/Kg	68			50-144		
Heptachlor epoxide	50		39		ug/Kg	78			48-145		
Lindane (Gamma-BHC)	50		39		ug/Kg	78			47-151		
Methoxychlor	50		62		ug/Kg	124			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201031MS1, QC1201031MSD1												**Source: 414424-001**
4,4'-DDD	ND	50	50	46	49	ug/Kg	92	98	6.3	43-172	20	
4,4'-DDE	ND	50	50	43	49	ug/Kg	86	98	13.0	44-163	20	
4,4'-DDT	ND	50	50	56	55	ug/Kg	112	110	1.8	40-158	20	
a-BHC	ND	50	50	45	44	ug/Kg	90	88	2.2	45-150	20	

QCBatchID: QC1201031 **Analyst:** MSolanki **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201031MS1, QC1201031MSD1												**Source: 414424-001**
Aldrin	ND	50	50	47	49	ug/Kg	94	98	4.2	46-142	20	
b-BHC	ND	50	50	41	41	ug/Kg	82	82	0.0	42-156	20	
d-BHC	ND	50	50	35	36	ug/Kg	70	72	2.8	37-161	20	
Dieldrin	ND	50	50	44	45	ug/Kg	88	90	2.2	47-151	20	
Endosulfan I	ND	50	50	42	43	ug/Kg	84	86	2.4	47-141	20	
Endosulfan II	ND	50	50	47	45	ug/Kg	94	90	4.3	44-156	20	
Endosulfan sulfate	ND	50	50	44	50	ug/Kg	88	100	12.8	43-157	20	
Endrin	ND	50	50	51	54	ug/Kg	102	108	5.7	47-160	20	
Endrin aldehyde	ND	50	50	41	43	ug/Kg	82	86	4.8	32-127	20	
Endrin Ketone	ND	50	50	49	51	ug/Kg	98	102	4.0	48-159	20	
Heptachlor	ND	50	50	38	39	ug/Kg	76	78	2.6	50-144	20	
Heptachlor epoxide	ND	50	50	42	44	ug/Kg	84	88	4.7	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	43	41	ug/Kg	86	82	4.8	47-151	20	
Methoxychlor	ND	50	50	70	75	ug/Kg	140	150	6.9	36-182	20	

QCBatchID: QC1201035 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1201035MB1						
Antimony	ND		mg/Kg	0.37	3	
Arsenic	ND		mg/Kg	0.36	1	
Barium	ND		mg/Kg	0.23	1	
Beryllium	ND		mg/Kg	0.17	0.5	
Cadmium	ND		mg/Kg	0.21	0.5	
Chromium	ND		mg/Kg	0.13	1	
Cobalt	ND		mg/Kg	0.19	0.5	
Copper	ND		mg/Kg	0.31	1	
Lead	ND		mg/Kg	0.32	1	
Molybdenum	ND		mg/Kg	0.13	1	
Nickel	ND		mg/Kg	0.2	1.5	
Selenium	**2.18**	**J**	mg/Kg	0.72	3	
Silver	**0.23**	**J**	mg/Kg	0.13	0.5	
Thallium	ND		mg/Kg	0.42	3	
Vanadium	ND		mg/Kg	0.37	0.5	
Zinc	ND		mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201035LCS1											
Antimony	100		111		mg/Kg	111			80-120		
Arsenic	100		93.6		mg/Kg	94			80-120		
Barium	100		99.2		mg/Kg	99			80-120		
Beryllium	100		94.7		mg/Kg	95			80-120		
Cadmium	100		105		mg/Kg	105			80-120		
Chromium	100		96.7		mg/Kg	97			80-120		
Cobalt	100		102		mg/Kg	102			80-120		
Copper	100		94.4		mg/Kg	94			80-120		
Lead	100		103		mg/Kg	103			80-120		
Molybdenum	100		99.5		mg/Kg	100			80-120		
Nickel	100		103		mg/Kg	103			80-120		
Selenium	100		95.0		mg/Kg	95			80-120		
Silver	100		99.0		mg/Kg	99			80-120		
Thallium	100		93.5		mg/Kg	94			80-120		
Vanadium	100		97.7		mg/Kg	98			80-120		
Zinc	100		105		mg/Kg	105			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201035MS1, QC1201035MSD1												**Source: 414414-018**
Antimony	ND	100	100	54.9	52.5	mg/Kg	55	53	4.5	75-125	20	M
Arsenic	6.65	100	100	95.4	96.3	mg/Kg	89	90	0.9	75-125	20	
Barium	127	100	100	272	229	mg/Kg	145	102	17.2	75-125	20	M
Beryllium	ND	100	100	87.6	91.0	mg/Kg	88	91	3.8	75-125	20	
Cadmium	0.52	100	100	91.8	95.2	mg/Kg	91	95	3.6	75-125	20	
Chromium	12.0	100	100	102	103	mg/Kg	90	91	1.0	75-125	20	
Cobalt	10.3	100	100	106	102	mg/Kg	96	92	3.8	75-125	20	
Copper	18.4	100	100	103	108	mg/Kg	85	90	4.7	75-125	20	
Lead	9.49	100	100	103	103	mg/Kg	94	94	0.0	75-125	20	
Molybdenum	0.66	100	100	92.0	92.8	mg/Kg	91	92	0.9	75-125	20	

QCBatchID: QC1201035 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201035MS1, QC1201035MSD1												**Source: 414414-018**
Nickel	11.0	100	100	104	103	mg/Kg	93	92	1.0	75-125	20	
Selenium	ND	100	100	89.3	90.8	mg/Kg	89	91	1.7	75-125	20	
Silver	ND	100	100	88.6	90.2	mg/Kg	89	90	1.8	75-125	20	
Thallium	5.06	100	100	85.2	88.2	mg/Kg	80	83	3.5	75-125	20	
Vanadium	33.3	100	100	141	128	mg/Kg	108	95	9.7	75-125	20	
Zinc	54.9	100	100	148	144	mg/Kg	93	89	2.7	75-125	20	

QCBatchID: QC1201036 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201036MB1					
Antimony	ND	mg/Kg	0.37	3	
Arsenic	ND	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Molybdenum	ND	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	**0.19 J**	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	ND	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201036LCS1											
Antimony	100		119		mg/Kg	119			80-120		
Arsenic	100		98.5		mg/Kg	99			80-120		
Barium	100		102		mg/Kg	102			80-120		
Beryllium	100		101		mg/Kg	101			80-120		
Cadmium	100		108		mg/Kg	108			80-120		
Chromium	100		102		mg/Kg	102			80-120		
Cobalt	100		107		mg/Kg	107			80-120		
Copper	100		98.5		mg/Kg	99			80-120		
Lead	100		111		mg/Kg	111			80-120		
Molybdenum	100		107		mg/Kg	107			80-120		
Nickel	100		111		mg/Kg	111			80-120		
Selenium	100		101		mg/Kg	101			80-120		
Silver	100		102		mg/Kg	102			80-120		
Thallium	100		101		mg/Kg	101			80-120		
Vanadium	100		102		mg/Kg	102			80-120		
Zinc	100		107		mg/Kg	107			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201036MS1, QC1201036MSD1												**Source: 414424-031**
Antimony	1.46	100	100	40.6	41.2	mg/Kg	39	40	1.5	75-125	20	M
Arsenic	6.05	100	100	99.8	100	mg/Kg	94	94	0.2	75-125	20	
Barium	90.7	100	100	206	195	mg/Kg	115	104	5.5	75-125	20	
Beryllium	ND	100	100	94.8	88.9	mg/Kg	95	89	6.4	75-125	20	
Cadmium	1.48	100	100	104	93.9	mg/Kg	103	92	10.2	75-125	20	
Chromium	25.3	100	100	125	116	mg/Kg	100	91	7.5	75-125	20	
Cobalt	7.90	100	100	109	99.3	mg/Kg	101	91	9.3	75-125	20	
Copper	15.4	100	100	113	105	mg/Kg	98	90	7.3	75-125	20	
Lead	15.0	100	100	116	153	mg/Kg	101	138	27.5	75-125	20	M
Molybdenum	1.24	100	100	96.2	94.4	mg/Kg	95	93	1.9	75-125	20	

QCBatchID: QC1201036 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201036MS1, QC1201036MSD1												**Source: 414424-031**
Nickel	17.5	100	100	120	119	mg/Kg	103	102	0.8	75-125	20	
Selenium	1.34	100	100	97.5	94.7	mg/Kg	96	93	2.9	75-125	20	
Silver	ND	100	100	96.2	88.6	mg/Kg	96	89	8.2	75-125	20	
Thallium	1.23	100	100	90.1	90.7	mg/Kg	89	89	0.7	75-125	20	
Vanadium	39.3	100	100	146	135	mg/Kg	107	96	7.8	75-125	20	
Zinc	27.4	100	100	169	159	mg/Kg	142	132	6.1	75-125	20	M

QCBatchID: QC1201038 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201038MB1					
Arsenic	ND	mg/Kg	0.108	0.3	
Thallium	ND	mg/Kg	0.128	0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201038LCS1											
Arsenic	50		51.4		mg/Kg	103			80-120		
Thallium	50		52.5		mg/Kg	105			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201038MS1, QC1201038MSD1												**Source: 414404-001**
Arsenic	0.569	50	50	45.6	51.6	mg/Kg	90	102	12.3	75-125	20	
Thallium	ND	50	50	50.7	53.6	mg/Kg	101	107	5.6	75-125	20	

QCBatchID:	**QC1201039**	**Analyst:**	dswafford	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201039MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201039LCS1											
Arsenic	50		51.3		mg/Kg	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1201039MS1, QC1201039MSD1												**Source: 414424-002**
Arsenic	5.89	50	50	51.8	52.6	mg/Kg	92	93	1.5	75-125	20	

QCBatchID: QC1201040 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201040MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201040LCS1											
Arsenic	50		52.7		mg/Kg	105			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201040MS1, QC1201040MSD1												**Source: 414424-022**
Arsenic	44.9	50	50	87.9	80.9	mg/Kg	86	72	8.3	75-125	20	M

QCBatchID:	**QC1201041**	**Analyst:**	Abanh	**Method:**	EPA 8015B
Matrix:	Water	**Analyzed:**	04/18/2019	**Instrument:**	SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201041MB1					
TPH (C13 to C22)	ND	mg/L	0.04	0.2	
TPH (C23 to C44)	ND	mg/L	0.07	0.3	
TPH (C6 to C12)	**0.07 J**	mg/L	0.06	0.3	
TPH Diesel	ND	mg/L	0.04	0.1	
TPH Motor Oil	ND	mg/L	0.07	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201041LCS1, QC1201041LCSD1											
TPH Diesel	1	1	0.78	0.76	mg/L	78	76	3	70-130	20	

QCBatchID: QC1201042 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 04/18/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201042MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201042LCS1											
Arsenic	50		51.4		mg/Kg	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201042MS1, QC1201042MSD1												**Source: 414424-042**
Arsenic	7.14	50	50	40.7	43.3	mg/Kg	67	72	6.2	75-125	20	M

QCBatchID:	**QC1201045**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201045MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201045LCS1											
Mercury	0.83		0.97		mg/Kg	117			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201045MS1, QC1201045MSD1												**Source: 414424-011**
Mercury	ND	0.83	0.83	0.97	0.89	mg/Kg	117	107	8.6	75-125	20	

QCBatchID:	**QC1201048**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201048MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201048LCS1											
Mercury	0.83		0.96		mg/Kg	116			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1201048MS1, QC1201048MSD1												**Source: 414424-031**
Mercury	ND	0.83	0.83	0.87	0.89	mg/Kg	105	107	2.3	75-125	20	

QCBatchID:	**QC1201049**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201049MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201049LCS1											
Mercury	0.83		0.91		mg/Kg	110			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201049MS1, QC1201049MSD1												**Source: 414424-051**
Mercury	ND	0.83	0.83	0.88	0.88	mg/Kg	106	106	0.0	75-125	20	

QCBatchID:	**QC1201051**	**Analyst:**	sbailey-woo	**Method:**	EPA 7471A
Matrix:	Solid	**Analyzed:**	04/18/2019	**Instrument:**	AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201051MB1					
Mercury	ND	mg/Kg	0.039	0.14	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201051LCS1											
Mercury	0.83		0.85		mg/Kg	102			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201051MS1, QC1201051MSD1												**Source: 414424-059**
Mercury	ND	0.83	0.83	0.85	0.87	mg/Kg	102	105	2.3	75-125	20	

QCBatchID: QC1201072 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201072MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201072LCS1											
4,4'-DDD	50		45		ug/Kg	90			43-172		
4,4'-DDE	50		42		ug/Kg	84			44-163		
4,4'-DDT	50		51		ug/Kg	102			40-158		
a-BHC	50		40		ug/Kg	80			45-150		
Aldrin	50		41		ug/Kg	82			46-142		
b-BHC	50		43		ug/Kg	86			42-156		
d-BHC	50		33		ug/Kg	66			37-161		
Dieldrin	50		40		ug/Kg	80			47-151		
Endosulfan I	50		39		ug/Kg	78			47-141		
Endosulfan II	50		37		ug/Kg	74			44-156		
Endosulfan sulfate	50		39		ug/Kg	78			43-157		
Endrin	50		47		ug/Kg	94			47-160		
Endrin aldehyde	50		35		ug/Kg	70			32-127		
Endrin Ketone	50		42		ug/Kg	84			48-159		
Heptachlor	50		34		ug/Kg	68			50-144		
Heptachlor epoxide	50		38		ug/Kg	76			48-145		
Lindane (Gamma-BHC)	50		39		ug/Kg	78			47-151		
Methoxychlor	50		50		ug/Kg	100			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201072MS1, QC1201072MSD1												**Source: 414424-023**
4,4'-DDD	ND	50	50	39	43	ug/Kg	78	86	9.8	43-172	20	
4,4'-DDE	ND	50	50	35	41	ug/Kg	70	82	15.8	44-163	20	
4,4'-DDT	ND	50	50	46	55	ug/Kg	92	110	17.8	40-158	20	
a-BHC	ND	50	50	34	36	ug/Kg	68	72	5.7	45-150	20	

QCBatchID: QC1201072 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201072MS1, QC1201072MSD1												**Source: 414424-023**
Aldrin	ND	50	50	39	42	ug/Kg	78	84	7.4	46-142	20	
b-BHC	ND	50	50	36	40	ug/Kg	72	80	10.5	42-156	20	
d-BHC	ND	50	50	29	32	ug/Kg	58	64	9.8	37-161	20	
Dieldrin	ND	50	50	35	38	ug/Kg	70	76	8.2	47-151	20	
Endosulfan I	ND	50	50	33	37	ug/Kg	66	74	11.4	47-141	20	
Endosulfan II	ND	50	50	31	35	ug/Kg	62	70	12.1	44-156	20	
Endosulfan sulfate	ND	50	50	35	39	ug/Kg	70	78	10.8	43-157	20	
Endrin	ND	50	50	39	46	ug/Kg	78	92	16.5	47-160	20	
Endrin aldehyde	ND	50	50	31	34	ug/Kg	62	68	9.2	32-127	20	
Endrin Ketone	ND	50	50	32	40	ug/Kg	64	80	22.2	48-159	20	D
Heptachlor	ND	50	50	31	34	ug/Kg	62	68	9.2	50-144	20	
Heptachlor epoxide	ND	50	50	33	36	ug/Kg	66	72	8.7	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	34	38	ug/Kg	68	76	11.1	47-151	20	
Methoxychlor	ND	50	50	47	46	ug/Kg	94	92	2.2	36-182	20	

QCBatchID: QC1201080 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 01/01/1900 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201080MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201080LCS1											
4,4'-DDD	50		44		ug/Kg	88			43-172		
4,4'-DDE	50		45		ug/Kg	90			44-163		
4,4'-DDT	50		50		ug/Kg	100			40-158		
a-BHC	50		44		ug/Kg	88			45-150		
Aldrin	50		48		ug/Kg	96			46-142		
b-BHC	50		43		ug/Kg	86			42-156		
d-BHC	50		38		ug/Kg	76			37-161		
Dieldrin	50		45		ug/Kg	90			47-151		
Endosulfan I	50		43		ug/Kg	86			47-141		
Endosulfan II	50		45		ug/Kg	90			44-156		
Endosulfan sulfate	50		45		ug/Kg	90			43-157		
Endrin	50		48		ug/Kg	96			47-160		
Endrin aldehyde	50		43		ug/Kg	86			32-127		
Endrin Ketone	50		47		ug/Kg	94			48-159		
Heptachlor	50		43		ug/Kg	86			50-144		
Heptachlor epoxide	50		45		ug/Kg	90			48-145		
Lindane (Gamma-BHC)	50		42		ug/Kg	84			47-151		
Methoxychlor	50		50		ug/Kg	100			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201080MS1, QC1201080MSD1												**Source: 414424-046**
4,4'-DDD	ND	50	50	47	49	ug/Kg	94	98	4.2	43-172	20	
4,4'-DDE	ND	50	50	52	51	ug/Kg	104	102	1.9	44-163	20	
4,4'-DDT	ND	50	50	46	45	ug/Kg	92	90	2.2	40-158	20	
a-BHC	ND	50	50	45	43	ug/Kg	90	86	4.5	45-150	20	

QCBatchID: QC1201080 **Analyst:** bmorris **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 01/01/1900 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201080MS1, QC1201080MSD1												**Source: 414424-046**
Aldrin	ND	50	50	56	54	ug/Kg	112	108	3.6	46-142	20	
b-BHC	ND	50	50	46	53	ug/Kg	92	106	14.1	42-156	20	
d-BHC	ND	50	50	39	39	ug/Kg	78	78	0.0	37-161	20	
Dieldrin	ND	50	50	50	47	ug/Kg	100	94	6.2	47-151	20	
Endosulfan I	ND	50	50	51	47	ug/Kg	102	94	8.2	47-141	20	
Endosulfan II	ND	50	50	49	49	ug/Kg	98	98	0.0	44-156	20	
Endosulfan sulfate	ND	50	50	49	48	ug/Kg	98	96	2.1	43-157	20	
Endrin	ND	50	50	51	52	ug/Kg	102	104	1.9	47-160	20	
Endrin aldehyde	ND	50	50	49	47	ug/Kg	98	94	4.2	32-127	20	
Endrin Ketone	ND	50	50	54	47	ug/Kg	108	94	13.9	48-159	20	
Heptachlor	ND	50	50	46	46	ug/Kg	92	92	0.0	50-144	20	
Heptachlor epoxide	ND	50	50	50	49	ug/Kg	100	98	2.0	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	46	45	ug/Kg	92	90	2.2	47-151	20	
Methoxychlor	ND	50	50	54	48	ug/Kg	108	96	11.8	36-182	20	

QCBatchID: QC1201081 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1201081MB1						
Antimony	ND		mg/Kg	0.37	3	
Arsenic	ND		mg/Kg	0.36	1	
Barium	ND		mg/Kg	0.23	1	
Beryllium	ND		mg/Kg	0.17	0.5	
Cadmium	ND		mg/Kg	0.21	0.5	
Chromium	ND		mg/Kg	0.13	1	
Cobalt	ND		mg/Kg	0.19	0.5	
Copper	ND		mg/Kg	0.31	1	
Lead	ND		mg/Kg	0.32	1	
Molybdenum	ND		mg/Kg	0.13	1	
Nickel	ND		mg/Kg	0.2	1.5	
Selenium	**1.57**	**J**	mg/Kg	0.72	3	
Silver	ND		mg/Kg	0.13	0.5	
Thallium	ND		mg/Kg	0.42	3	
Vanadium	ND		mg/Kg	0.37	0.5	
Zinc	ND		mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201081LCS1											
Antimony	100		110		mg/Kg	110			80-120		
Arsenic	100		89.8		mg/Kg	90			80-120		
Barium	100		103		mg/Kg	103			80-120		
Beryllium	100		94.4		mg/Kg	94			80-120		
Cadmium	100		106		mg/Kg	106			80-120		
Chromium	100		102		mg/Kg	102			80-120		
Cobalt	100		106		mg/Kg	106			80-120		
Copper	100		100		mg/Kg	100			80-120		
Lead	100		102		mg/Kg	102			80-120		
Molybdenum	100		96.9		mg/Kg	97			80-120		
Nickel	100		102		mg/Kg	102			80-120		
Selenium	100		91.5		mg/Kg	92			80-120		
Silver	100		102		mg/Kg	102			80-120		
Thallium	100		93.4		mg/Kg	93			80-120		
Vanadium	100		101		mg/Kg	101			80-120		
Zinc	100		100		mg/Kg	100			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201081MS1, QC1201081MSD1												**Source: 414424-011**
Antimony	0.95	100	100	28.7	29.5	mg/Kg	28	29	2.7	75-125	20	M
Arsenic	6.22	100	100	99.9	101	mg/Kg	94	95	1.1	75-125	20	
Barium	105	100	100	212	201	mg/Kg	107	96	5.3	75-125	20	
Beryllium	ND	100	100	87.1	92.7	mg/Kg	87	93	6.2	75-125	20	
Cadmium	1.16	100	100	95.8	92.7	mg/Kg	95	92	3.3	75-125	20	
Chromium	27.9	100	100	124	119	mg/Kg	96	91	4.1	75-125	20	
Cobalt	9.55	100	100	104	102	mg/Kg	94	92	1.9	75-125	20	
Copper	13.8	100	100	109	108	mg/Kg	95	94	0.9	75-125	20	
Lead	47.0	100	100	131	160	mg/Kg	84	113	19.9	75-125	20	
Molybdenum	0.96	100	100	89.9	96.1	mg/Kg	89	95	6.7	75-125	20	

QCBatchID: QC1201081 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201081MS1, QC1201081MSD1												**Source: 414424-011**
Nickel	22.3	100	100	103	114	mg/Kg	81	92	10.1	75-125	20	
Selenium	1.94	100	100	87.9	95.4	mg/Kg	86	93	8.2	75-125	20	
Silver	ND	100	100	92.5	91.8	mg/Kg	93	92	0.8	75-125	20	
Thallium	2.06	100	100	85.0	91.8	mg/Kg	83	90	7.7	75-125	20	
Vanadium	46.0	100	100	147	141	mg/Kg	101	95	4.2	75-125	20	
Zinc	58.6	100	100	146	154	mg/Kg	87	95	5.3	75-125	20	

QCBatchID: QC1201082 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1201082MB1						
Antimony	ND		mg/Kg	0.37	3	
Arsenic	ND		mg/Kg	0.36	1	
Barium	ND		mg/Kg	0.23	1	
Beryllium	ND		mg/Kg	0.17	0.5	
Cadmium	ND		mg/Kg	0.21	0.5	
Chromium	ND		mg/Kg	0.13	1	
Cobalt	ND		mg/Kg	0.19	0.5	
Copper	ND		mg/Kg	0.31	1	
Lead	ND		mg/Kg	0.32	1	
Molybdenum	ND		mg/Kg	0.13	1	
Nickel	ND		mg/Kg	0.2	1.5	
Selenium	**1.41**	**J**	mg/Kg	0.72	3	
Silver	ND		mg/Kg	0.13	0.5	
Thallium	ND		mg/Kg	0.42	3	
Vanadium	ND		mg/Kg	0.37	0.5	
Zinc	ND		mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201082LCS1											
Antimony	100		116		mg/Kg	116			80-120		
Arsenic	100		104		mg/Kg	104			80-120		
Barium	100		106		mg/Kg	106			80-120		
Beryllium	100		96.3		mg/Kg	96			80-120		
Cadmium	100		110		mg/Kg	110			80-120		
Chromium	100		105		mg/Kg	105			80-120		
Cobalt	100		110		mg/Kg	110			80-120		
Copper	100		104		mg/Kg	104			80-120		
Lead	100		106		mg/Kg	106			80-120		
Molybdenum	100		111		mg/Kg	111			80-120		
Nickel	100		92.6		mg/Kg	93			80-120		
Selenium	100		103		mg/Kg	103			80-120		
Silver	100		106		mg/Kg	106			80-120		
Thallium	100		106		mg/Kg	106			80-120		
Vanadium	100		105		mg/Kg	105			80-120		
Zinc	100		114		mg/Kg	114			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201082MS1, QC1201082MSD1												**Source: 414424-051**
Antimony	ND	100	100	45.0	43.8	mg/Kg	45	44	2.7	75-125	20	M
Arsenic	8.99	100	100	99.1	102	mg/Kg	90	93	2.9	75-125	20	
Barium	136	100	100	211	223	mg/Kg	75	87	5.5	75-125	20	
Beryllium	ND	100	100	89.0	92.2	mg/Kg	89	92	3.5	75-125	20	
Cadmium	1.90	100	100	95.7	102	mg/Kg	94	100	6.4	75-125	20	
Chromium	29.4	100	100	124	134	mg/Kg	95	105	7.8	75-125	20	
Cobalt	12.1	100	100	103	110	mg/Kg	91	98	6.6	75-125	20	
Copper	19.6	100	100	110	116	mg/Kg	90	96	5.3	75-125	20	
Lead	5.27	100	100	96.3	98.9	mg/Kg	91	94	2.7	75-125	20	
Molybdenum	1.71	100	100	91.0	93.4	mg/Kg	89	92	2.6	75-125	20	

QCBatchID: QC1201082 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201082MS1, QC1201082MSD1												**Source: 414424-051**
Nickel	21.0	100	100	99.9	103	mg/Kg	79	82	3.1	75-125	20	
Selenium	ND	100	100	87.8	91.0	mg/Kg	88	91	3.6	75-125	20	
Silver	ND	100	100	90.4	93.6	mg/Kg	90	94	3.5	75-125	20	
Thallium	3.06	100	100	84.9	89.3	mg/Kg	82	86	5.1	75-125	20	
Vanadium	49.8	100	100	147	160	mg/Kg	97	110	8.5	75-125	20	
Zinc	53.7	100	100	121	126	mg/Kg	67	72	4.0	75-125	20	M

QCBatchID: QC1201083 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201083MB1					
Antimony	ND	mg/Kg	0.37	3	
Arsenic	ND	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Molybdenum	ND	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	ND	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201083LCS1											
Antimony	100		98.3		mg/Kg	98			80-120		
Arsenic	100		91.7		mg/Kg	92			80-120		
Barium	100		101		mg/Kg	101			80-120		
Beryllium	100		97.1		mg/Kg	97			80-120		
Cadmium	100		95.8		mg/Kg	96			80-120		
Chromium	100		100		mg/Kg	100			80-120		
Cobalt	100		101		mg/Kg	101			80-120		
Copper	100		103		mg/Kg	103			80-120		
Lead	100		92.6		mg/Kg	93			80-120		
Molybdenum	100		92.4		mg/Kg	92			80-120		
Nickel	100		98.6		mg/Kg	99			80-120		
Selenium	100		88.9		mg/Kg	89			80-120		
Silver	100		91.4		mg/Kg	91			80-120		
Thallium	100		95.6		mg/Kg	96			80-120		
Vanadium	100		103		mg/Kg	103			80-120		
Zinc	100		99.0		mg/Kg	99			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201083MS1, QC1201083MSD1												**Source: 414424-071**
Antimony	1.08	100	100	67.7	73.1	mg/Kg	67	72	7.7	75-125	20	M
Arsenic	9.10	100	100	112	118	mg/Kg	103	109	5.2	75-125	20	
Barium	105	100	100	201	213	mg/Kg	96	108	5.8	75-125	20	
Beryllium	ND	100	100	98.8	107	mg/Kg	99	107	8.0	75-125	20	
Cadmium	1.54	100	100	110	116	mg/Kg	108	114	5.3	75-125	20	
Chromium	22.8	100	100	129	138	mg/Kg	106	115	6.7	75-125	20	
Cobalt	10.5	100	100	114	122	mg/Kg	104	112	6.8	75-125	20	
Copper	15.6	100	100	115	123	mg/Kg	99	107	6.7	75-125	20	
Lead	4.82	100	100	118	122	mg/Kg	113	117	3.3	75-125	20	
Molybdenum	0.31	100	100	109	113	mg/Kg	109	113	3.6	75-125	20	

QCBatchID: QC1201083 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201083MS1, QC1201083MSD1												**Source: 414424-071**
Nickel	17.2	100	100	131	134	mg/Kg	114	117	2.3	75-125	20	
Selenium	ND	100	100	102	108	mg/Kg	102	108	5.7	75-125	20	
Silver	ND	100	100	87.3	92.8	mg/Kg	87	93	6.1	75-125	20	
Thallium	0.45	100	100	102	107	mg/Kg	102	107	4.8	75-125	20	
Vanadium	34.7	100	100	146	154	mg/Kg	111	119	5.3	75-125	20	
Zinc	43.8	100	100	143	148	mg/Kg	99	104	3.4	75-125	20	

QCBatchID: QC1201084 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201084MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201084LCS1											
Arsenic	50		50.6		mg/Kg	101			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201084MS1, QC1201084MSD1												**Source: 414424-062**
Arsenic	5.38	50	50	44.2	42.5	mg/Kg	78	74	3.9	75-125	20	M

QCBatchID: QC1201086	**Analyst:** Abanh		**Method:** EPA 8270C		
Matrix: Water	**Analyzed:** 04/19/2019		**Instrument:** SVOA-MS (group)		

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201086MB1					
1,2,4-Trichlorobenzene	ND	ug/L	1.9	10	
1,2-Dichlorobenzene	ND	ug/L	1.8	10	
1,2-Diphenylhydrazine	ND	ug/L	1	10	
1,3-Dichlorobenzene	ND	ug/L	1.9	10	
1,4-Dichlorobenzene	ND	ug/L	1.8	10	
1-Methylnapthalene	ND	ug/L	1.5	10	
2,4,5-Trichlorophenol	ND	ug/L	1.1	10	
2,4,6-Trichlorophenol	ND	ug/L	0.56	10	
2,4-Dichlorophenol	ND	ug/L	1.4	10	
2,4-Dimethylphenol	ND	ug/L	1.2	10	
2,4-Dinitrophenol	ND	ug/L	0.56	50	
2,4-Dinitrotoluene	ND	ug/L	0.41	10	
2,6-Dinitrotoluene	ND	ug/L	0.55	10	
2-Chloronaphthalene	ND	ug/L	1.4	10	
2-Chlorophenol	ND	ug/L	1.1	10	
2-Methyl-4,6-dinitrophenol	ND	ug/L	0.39	50	
2-Methylnaphthalene	ND	ug/L	1.5	10	
2-Methylphenol (o-Cresol)	ND	ug/L	0.75	10	
2-Nitroaniline	ND	ug/L	0.5	50	
2-Nitrophenol	ND	ug/L	0.97	10	
3 and 4-Methylphenol (m and p-Cresol)	ND	ug/L	0.9	10	
3,3'-Dichlorobenzidine	ND	ug/L	0.64	25	
3-Nitroaniline	ND	ug/L	0.55	10	
4-Bromophenyl phenyl ether	ND	ug/L	1.1	10	
4-Chloro-3-methylphenol	ND	ug/L	0.77	10	
4-Chloroaniline	ND	ug/L	0.4	10	
4-Chlorophenyl phenyl ether	ND	ug/L	1.2	10	
4-Nitroaniline	ND	ug/L	0.67	10	
4-Nitrophenol	ND	ug/L	0.76	10	
Acenaphthene	ND	ug/L	1.2	10	
Acenaphthylene	ND	ug/L	1.2	10	
Aniline	ND	ug/L	0.82	10	
Anthracene	ND	ug/L	0.95	10	
Azobenzene	ND	ug/L	1	10	
Benz(a)anthracene	ND	ug/L	0.65	10	
Benzidine	ND	ug/L	1.3	50	
Benzo(a)pyrene	ND	ug/L	0.68	10	
Benzo(b)fluoranthene	ND	ug/L	0.58	10	
Benzo(g,h,i)perylene	ND	ug/L	0.96	10	
Benzo(k)fluoranthene	ND	ug/L	0.79	10	
Benzoic acid	ND	ug/L	0.37	50	
Benzyl alcohol	ND	ug/L	8	10	
Bis(2-chloroethoxy)methane	ND	ug/L	1.2	10	
Bis(2-chloroethyl) Ether	ND	ug/L	1.3	25	
Bis(2-chloroisopropyl) Ether	ND	ug/L	1.3	10	
Bis(2-ethylhexyl) Adipate	ND	ug/L		10	
Bis(2-ethylhexyl) phthalate	ND	ug/L	0.99	10	
Butylbenzyl Phthalate	ND	ug/L	0.86	10	
Carbazole	ND	ug/L	0.7	10	
Chrysene	ND	ug/L	0.73	10	
Dibenz(a,h)anthracene	ND	ug/L	0.8	10	
Dibenzofuran	ND	ug/L	1.1	10	

QCBatchID: QC1201086 **Analyst:** Abanh **Method:** EPA 8270C

Matrix: Water **Analyzed:** 04/19/2019 **Instrument:** SVOA-MS (group)

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201086MB1					
Diethyl phthalate	ND	ug/L	0.7	10	
Dimethyl phthalate	ND	ug/L	0.83	10	
Di-n-butyl phthalate	**4.0 J**	ug/L	0.91	10	
Di-n-octyl phthalate	ND	ug/L	1.1	10	
Fluoranthene	ND	ug/L	0.76	10	
Fluorene	ND	ug/L	1	10	
Hexachlorobenzene	ND	ug/L	0.84	10	
Hexachlorobutadiene	ND	ug/L	2.1	10	
Hexachlorocyclopentadiene	ND	ug/L	1.9	25	
Hexachloroethane	ND	ug/L	2	10	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.87	10	
Isophorone	ND	ug/L	1.2	10	
Naphthalene	ND	ug/L	1.3	10	
Nitrobenzene	ND	ug/L	1.2	25	
N-Nitrosodimethylamine (NDMA)	ND	ug/L	0.24	10	
N-Nitrosodi-n-propylamine (NDPA)	ND	ug/L	1.1	10	
N-Nitrosodiphenylamine	ND	ug/L	0.99	10	
Pentachlorophenol	ND	ug/L	1.3	25	
Phenanthrene	ND	ug/L	0.81	10	
Phenol	ND	ug/L	0.38	10	
Pyrene	ND	ug/L	0.89	10	
Pyridine	ND	ug/L	1.1	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201086LCS1, QC1201086LCSD1											
1,2,4-Trichlorobenzene	40	40	27	26	ug/L	68	65	4	40-102	25	
1,4-Dichlorobenzene	40	40	25	24	ug/L	63	60	4	54-90	25	
2,4,5-Trichlorophenol	40	40	33	35	ug/L	83	88	6	57-117	25	
2,4-Dimethylphenol	40	40	32	32	ug/L	80	80	0	52-90	46	
2,4-Dinitrotoluene	40	40	34	37	ug/L	85	93	8	64-111	25	
2-Chlorophenol	40	40	32	31	ug/L	80	78	3	55-105	25	
3 and 4-Methylphenol (m and p-Cresol)	40	40	27	28	ug/L	68	70	4	45-96	25	
4-Chloro-3-methylphenol	40	40	34	35	ug/L	85	88	3	42-120	25	
4-Nitrophenol	40	40	15	16	ug/L	38	40	6	29-115	25	
Acenaphthene	40	40	30	31	ug/L	75	78	3	59-102	25	
Benzo(b)fluoranthene	40	40	32	34	ug/L	80	85	6	61-133	25	
Chrysene	40	40	31	33	ug/L	78	83	6	67-126	25	
N-Nitrosodi-n-propylamine (NDPA)	40	40	34	34	ug/L	85	85	0	35-115	25	
Pentachlorophenol	40	40	31	34	ug/L	78	85	9	37-120	25	
Phenol	40	40	15	16	ug/L	38	40	6	37-79	25	
Pyrene	40	40	33	36	ug/L	83	90	9	68-132	33	

QCBatchID: QC1201088 **Analyst:** Jarriaga **Method:** EPA 8081A

Matrix: Water **Analyzed:** 04/20/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201088MB1					
4,4'-DDD	ND	ug/L	0.011	0.1	
4,4'-DDE	ND	ug/L	0.006	0.1	
4,4'-DDT	ND	ug/L	0.011	0.1	
a-BHC	ND	ug/L	0.002	0.1	
Aldrin	ND	ug/L	0.007	0.1	
b-BHC	ND	ug/L	0.003	0.1	
Chlordane (technical)	ND	ug/L	0.27	1	
d-BHC	ND	ug/L	0.006	0.1	
Dieldrin	ND	ug/L	0.006	0.1	
Endosulfan I	ND	ug/L	0.004	0.1	
Endosulfan II	ND	ug/L	0.011	0.1	
Endosulfan sulfate	ND	ug/L	0.012	0.1	
Endrin	ND	ug/L	0.008	0.1	
Endrin aldehyde	ND	ug/L	0.009	0.1	
Endrin Ketone	ND	ug/L	0.011	0.1	
Heptachlor	ND	ug/L	0.003	0.1	
Heptachlor epoxide	ND	ug/L	0.002	0.1	
Lindane (Gamma-BHC)	ND	ug/L	0.002	0.1	
Methoxychlor	ND	ug/L	0.055	0.1	
Toxaphene	ND	ug/L	0.48	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201088LCS1, QC1201088LCSD1											
4,4'-DDD	0.5	0.5	0.40	0.40	ug/L	80	80	0	42-142	20	
4,4'-DDE	0.5	0.5	0.41	0.41	ug/L	82	82	0	48-133	20	
4,4'-DDT	0.5	0.5	0.42	0.44	ug/L	84	88	5	40-143	20	
a-BHC	0.5	0.5	0.39	0.39	ug/L	78	78	0	55-122	20	
Aldrin	0.5	0.5	0.37	0.38	ug/L	74	76	3	46-117	20	
b-BHC	0.5	0.5	0.39	0.40	ug/L	78	80	3	46-136	20	
d-BHC	0.5	0.5	0.31	0.32	ug/L	62	64	3	53-124	20	
Dieldrin	0.5	0.5	0.38	0.39	ug/L	76	78	3	49-129	20	
Endosulfan I	0.5	0.5	0.38	0.39	ug/L	76	78	3	54-122	20	
Endosulfan II	0.5	0.5	0.41	0.42	ug/L	82	84	2	46-132	20	
Endosulfan sulfate	0.5	0.5	0.39	0.41	ug/L	78	82	5	52-129	20	
Endrin	0.5	0.5	0.42	0.42	ug/L	84	84	0	57-145	20	
Endrin aldehyde	0.5	0.5	0.40	0.42	ug/L	80	84	5	48-116	20	
Endrin Ketone	0.5	0.5	0.41	0.43	ug/L	82	86	5	44-137	20	
Heptachlor	0.5	0.5	0.37	0.37	ug/L	74	74	0	51-128	20	
Heptachlor epoxide	0.5	0.5	0.39	0.40	ug/L	78	80	3	51-122	20	
Lindane (Gamma-BHC)	0.5	0.5	0.40	0.40	ug/L	80	80	0	54-128	20	
Methoxychlor	0.5	0.5	0.43	0.44	ug/L	86	88	2	52-158	20	

QCBatchID: QC1201090 **Analyst:** Jarriaga **Method:** EPA 8082

Matrix: Water **Analyzed:** 04/20/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201090MB1					
PCB-1016	ND	ug/L	0.076	0.5	
PCB-1221	ND	ug/L		0.5	
PCB-1232	ND	ug/L		0.5	
PCB-1242	ND	ug/L		0.5	
PCB-1248	ND	ug/L		0.5	
PCB-1254	ND	ug/L		0.5	
PCB-1260	ND	ug/L	0.082	0.5	
PCB-1262	ND	ug/L		0.5	
PCB-1268	ND	ug/L		0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201090LCS1, QC1201090LCSD1											
PCB-1016	5	5	3.8	3.6	ug/L	76	72	5	70-130	20	
PCB-1260	5	5	3.7	3.4	ug/L	74	68	8	70-130	20	L

QCBatchID: QC1201091 **Analyst:** Jarriaga **Method:** EPA 8082

Matrix: Solid **Analyzed:** 04/20/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201091MB1					
PCB-1016	ND	ug/Kg	3	50	
PCB-1221	ND	ug/Kg	14	50	
PCB-1232	ND	ug/Kg	9.5	50	
PCB-1242	ND	ug/Kg	14	50	
PCB-1248	ND	ug/Kg	19	50	
PCB-1254	ND	ug/Kg	20	50	
PCB-1260	ND	ug/Kg	6.9	50	
PCB-1262	ND	ug/Kg	17	50	
PCB-1268	ND	ug/Kg	8.6	50	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201091LCS1											
PCB-1016	500		540		ug/Kg	108			70-130		
PCB-1260	500		490		ug/Kg	98			70-130		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201091MS1, QC1201091MSD1												**Source: 414424-064**
PCB-1016	ND	500	500	480	490	ug/Kg	96	98	2.1	70-130	20	
PCB-1260	ND	500	500	460	460	ug/Kg	92	92	0.0	70-130	20	

QCBatchID: QC1201093 **Analyst:** Jarriaga **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201093MB1					
4,4'-DDD	ND	ug/Kg	2.1	5	
4,4'-DDE	ND	ug/Kg	2	5	
4,4'-DDT	ND	ug/Kg	2	5	
a-BHC	ND	ug/Kg	1.6	5	
Aldrin	ND	ug/Kg	1.5	5	
b-BHC	ND	ug/Kg	1.5	5	
Chlordane (technical)	ND	ug/Kg	35	50	
d-BHC	ND	ug/Kg	1.2	5	
Dieldrin	ND	ug/Kg	2.1	5	
Endosulfan I	ND	ug/Kg	1.2	5	
Endosulfan II	ND	ug/Kg	2.8	5	
Endosulfan sulfate	ND	ug/Kg	3.4	5	
Endrin	ND	ug/Kg	2.7	5	
Endrin aldehyde	ND	ug/Kg	2.1	5	
Endrin Ketone	ND	ug/Kg	4.1	5	
Heptachlor	ND	ug/Kg	1.3	5	
Heptachlor epoxide	ND	ug/Kg	2.3	5	
Lindane (Gamma-BHC)	ND	ug/Kg	2	5	
Methoxychlor	ND	ug/Kg	9.2	10	
Toxaphene	ND	ug/Kg	54	100	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201093LCS1											
4,4'-DDD	50		52		ug/Kg	104			43-172		
4,4'-DDE	50		47		ug/Kg	94			44-163		
4,4'-DDT	50		62		ug/Kg	124			40-158		
a-BHC	50		45		ug/Kg	90			45-150		
Aldrin	50		47		ug/Kg	94			46-142		
b-BHC	50		46		ug/Kg	92			42-156		
d-BHC	50		36		ug/Kg	72			37-161		
Dieldrin	50		44		ug/Kg	88			47-151		
Endosulfan I	50		42		ug/Kg	84			47-141		
Endosulfan II	50		45		ug/Kg	90			44-156		
Endosulfan sulfate	50		47		ug/Kg	94			43-157		
Endrin	50		54		ug/Kg	108			47-160		
Endrin aldehyde	50		43		ug/Kg	86			32-127		
Endrin Ketone	50		47		ug/Kg	94			48-159		
Heptachlor	50		40		ug/Kg	80			50-144		
Heptachlor epoxide	50		45		ug/Kg	90			48-145		
Lindane (Gamma-BHC)	50		45		ug/Kg	90			47-151		
Methoxychlor	50		63		ug/Kg	126			36-182		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201093MS1, QC1201093MSD1												**Source: 414424-064**
4,4'-DDD	ND	50	50	50	46	ug/Kg	100	92	8.3	43-172	20	
4,4'-DDE	3.9	50	50	43	40	ug/Kg	76	70	7.2	44-163	20	
4,4'-DDT	ND	50	50	53	54	ug/Kg	106	108	1.9	40-158	20	
a-BHC	ND	50	50	41	38	ug/Kg	82	76	7.6	45-150	20	

QCBatchID: QC1201093 **Analyst:** Jarriaga **Method:** EPA 8081A

Matrix: Solid **Analyzed:** 04/19/2019 **Instrument:** SVOA-GC (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201093MS1, QC1201093MSD1												**Source: 414424-064**
Aldrin	ND	50	50	43	40	ug/Kg	86	80	7.2	46-142	20	
b-BHC	ND	50	50	41	39	ug/Kg	82	78	5.0	42-156	20	
d-BHC	ND	50	50	34	31	ug/Kg	68	62	9.2	37-161	20	
Dieldrin	ND	50	50	41	41	ug/Kg	82	82	0.0	47-151	20	
Endosulfan I	ND	50	50	36	35	ug/Kg	72	70	2.8	47-141	20	
Endosulfan II	ND	50	50	37	37	ug/Kg	74	74	0.0	44-156	20	
Endosulfan sulfate	ND	50	50	40	44	ug/Kg	80	88	9.5	43-157	20	
Endrin	ND	50	50	49	43	ug/Kg	98	86	13.0	47-160	20	
Endrin aldehyde	ND	50	50	32	39	ug/Kg	64	78	19.7	32-127	20	
Endrin Ketone	ND	50	50	43	43	ug/Kg	86	86	0.0	48-159	20	
Heptachlor	ND	50	50	36	33	ug/Kg	72	66	8.7	50-144	20	
Heptachlor epoxide	ND	50	50	38	39	ug/Kg	76	78	2.6	48-145	20	
Lindane (Gamma-BHC)	ND	50	50	40	37	ug/Kg	80	74	7.8	47-151	20	
Methoxychlor	ND	50	50	67	67	ug/Kg	134	134	0.0	36-182	20	

QCBatchID: QC1201107 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Water **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201107MB1					
Antimony	ND	mg/L	0.014	0.04	
Arsenic	ND	mg/L	0.008	0.01	
Barium	ND	mg/L	0.002	0.01	
Beryllium	ND	mg/L	0.001	0.005	
Boron	ND	mg/L	0.03	0.05	
Cadmium	ND	mg/L	0.001	0.005	
Calcium	ND	mg/L	0.064	0.1	
Chromium	ND	mg/L	0.16	0.01	
Cobalt	ND	mg/L	0.002	0.005	
Copper	**0.004 J**	mg/L	0.001	0.01	
Iron	ND	mg/L	0.008	0.02	
Lead	ND	mg/L	0.005	0.01	
Magnesium	ND	mg/L	0.044	0.1	
Manganese	ND	mg/L	0.003	0.01	
Molybdenum	ND	mg/L	0.005	0.01	
Nickel	ND	mg/L	0.003	0.02	
Potassium	ND	mg/L	0.167	0.5	
Selenium	ND	mg/L	0.016	0.03	
Silver	ND	mg/L	0.003	0.005	
Sodium	**0.236 J**	mg/L	0.067	0.5	
Strontium	ND	mg/L	0.004	0.05	
Thallium	ND	mg/L	0.009	0.05	
Vanadium	ND	mg/L	0.002	0.005	
Zinc	ND	mg/L	0.007	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201107LCS1											
Antimony	2		1.88		mg/L	94			80-120		
Arsenic	2		1.93		mg/L	97			80-120		
Barium	2		1.90		mg/L	95			80-120		
Beryllium	2		1.97		mg/L	99			80-120		
Boron	2		1.90		mg/L	95			80-120		
Cadmium	2		1.81		mg/L	91			80-120		
Calcium	2		2.15		mg/L	108			80-120		
Chromium	2		1.93		mg/L	97			80-120		
Cobalt	2		1.86		mg/L	93			80-120		
Copper	2		1.99		mg/L	100			80-120		
Iron	2		1.89		mg/L	95			80-120		
Lead	2		1.78		mg/L	89			80-120		
Magnesium	2		2.19		mg/L	110			80-120		
Manganese	2		1.99		mg/L	100			80-120		
Molybdenum	2		1.84		mg/L	92			80-120		
Nickel	2		1.79		mg/L	90			80-120		
Potassium	20		19.8		mg/L	99			80-120		
Selenium	2		1.87		mg/L	94			80-120		
Silver	2		2.06		mg/L	103			80-120		
Sodium	2		2.14		mg/L	107			80-120		
Strontium	2		2.04		mg/L	102			80-120		
Thallium	2		1.78		mg/L	89			80-120		
Vanadium	2		1.98		mg/L	99			80-120		

QCBatchID: QC1201107	Analyst: dswafford	Method: EPA 6010B
Matrix: Water	Analyzed: 04/19/2019	Instrument: AAICP (group)

QC1201107LCS1						
Zinc	2	1.86	mg/L	93	80-120	

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201107MS1, QC1201107MSD1											**Source:**	**414410-001**
Antimony	ND	1	1	1.25	0.875	mg/L	125	88	35.3	75-125	20	M
Arsenic	ND	1	1	1.05	1.22	mg/L	105	122	15.0	75-125	20	
Barium	ND	1	1	0.870	0.881	mg/L	87	88	1.3	75-125	20	
Beryllium	ND	1	1	0.916	0.944	mg/L	92	94	3.0	75-125	20	
Boron	4.82	1	1	5.43	5.55	mg/L	61	73	2.2	75-125	20	NC
Cadmium	ND	1	1	0.921	0.937	mg/L	92	94	1.7	75-125	20	
Calcium	417	1	1	400	415	mg/L	0	0	3.7	75-125	20	NC
Chromium	ND	1	1	0.907	0.916	mg/L	91	92	1.0	75-125	20	
Cobalt	ND	1	1	0.871	0.868	mg/L	87	87	0.3	75-125	20	
Copper	ND	1	1	0.936	0.933	mg/L	94	93	0.3	75-125	20	
Iron	ND	1	1	0.548	0.532	mg/L	55	53	3.0	75-125	20	M
Lead	ND	1	1	0.906	0.884	mg/L	91	88	2.5	75-125	20	
Magnesium	1330	1	1	1280	1320	mg/L	0	0	3.1	75-125	20	NC
Manganese	ND	1	1	0.861	0.888	mg/L	86	89	3.1	75-125	20	
Molybdenum	ND	1	1	0.877	0.897	mg/L	88	90	2.3	75-125	20	
Nickel	ND	1	1	0.923	0.947	mg/L	92	95	2.6	75-125	20	
Potassium	418	10	10	412	428	mg/L	0	100	3.8	75-125	20	NC
Selenium	ND	1	1	-0.061	0.103	mg/L	0	10	781.0	75-125	20	M
Silver	ND	1	1	1.02	1.02	mg/L	102	102	0.0	75-125	20	
Sodium	10700	1	1	10600	9850	mg/L	0	0	7.3	75-125	20	NC
Strontium	6.92	10	1	8.95	8.81	mg/L	9	78	1.6	75-125	20	M
Thallium	ND	1	1	0.875	0.856	mg/L	88	86	2.2	75-125	20	
Vanadium	0.073	1	1	0.959	0.993	mg/L	89	92	3.5	75-125	20	
Zinc	ND	1	1	0.992	5.56	mg/L	99	556	139.4	75-125	20	M

QCBatchID: QC1201118 **Analyst:** sbailey-woo **Method:** EPA 6020

Matrix: Water **Analyzed:** 04/19/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201118MB1					
Aluminum	ND	ug/L	3.3	50	
Antimony	ND	ug/L	1.3	6	
Arsenic	ND	ug/L	0.31	2	
Lead	ND	ug/L	0.76	5	
Selenium	ND	ug/L	0.39	2	
Thallium	ND	ug/L	0.18	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201118LCS1											
Aluminum	50		46.0		ug/L	92			80-120		
Antimony	50		50.3		ug/L	101			80-120		
Arsenic	50		45.3		ug/L	91			80-120		
Lead	50		47.7		ug/L	95			80-120		
Selenium	50		43.1		ug/L	86			80-120		
Thallium	50		46.9		ug/L	94			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201118MS1, QC1201118MSD1												**Source: 414424-079**
Aluminum	ND	50	50	50.0	50.5	ug/L	100	101	1.0	75-125	20	
Antimony	ND	50	50	51.1	51.8	ug/L	102	104	1.4	75-125	20	
Arsenic	ND	50	50	44.6	46.1	ug/L	89	92	3.3	75-125	20	
Lead	ND	50	50	48.2	49.2	ug/L	96	98	2.1	75-125	20	
Selenium	ND	50	50	41.3	42.9	ug/L	83	86	3.8	75-125	20	
Thallium	ND	50	50	48.8	49.1	ug/L	98	98	0.6	75-125	20	

QCBatchID: QC1201220 **Analyst:** JParedes **Method:** EPA 7470A

Matrix: Water **Analyzed:** 04/23/2019 **Instrument:** AAICP-HG1

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201220MB1					
Mercury	ND	ug/L	0.094	0.4	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201220LCS1											
Mercury	5		5.02		ug/L	100			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201220MS1, QC1201220MSD1												**Source: 414403-001**
Mercury	0.11	5	5	5.09	5.05	ug/L	100	99	0.8	75-125	20	
QC1201220MS2												**Source: 414424-080**
Mercury	ND	5		5.10		ug/L	102			75-125		

QCBatchID: QC1201609 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 05/03/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201609MB1					
Arsenic	**0.012 J**	mg/L	0.008	0.05	
Lead	**0.010 J**	mg/L	0.005	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201609LCS1											
Arsenic	2		2.10		mg/L	105			80-120		
Lead	2		2.06		mg/L	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201609MS1, QC1201609MSD1												**Source: 414424-022**
Arsenic	0.089	1	1	1.075	1.076	mg/L	99	99	0.1	75-125	20	
Lead	0.020	1	1	0.962	0.942	mg/L	94	92	2.1	75-125	20	

QCBatchID:	**QC1201621**	**Analyst:**	dswafford	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	05/03/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201621MB1					
Arsenic	**0.015 J**	mg/L	0.008	0.03	
Lead	**0.027**	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201621LCS1, QC1201621LCSD1											
Arsenic	20	20	19.2	19.2	mg/L	96	96	0	80-120	20	
Lead	20	20	19.6	19.9	mg/L	98	100	2	80-120	20	

QCBatchID:	**QC1201705**	**Analyst:**	sbailey-woo	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	05/07/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201705MB1					
Arsenic	ND	ug/L	0.13	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1201705LCS1, QC1201705LCSD1											
Arsenic	500	500	535	531	ug/L	107	106	1	80-120	20	

QCBatchID: QC1201729 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 05/08/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1201729MB1					
Arsenic	ND	ug/L	0.31	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201729LCS1											
Arsenic	100		110		ug/L	110			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1201729MS1, QC1201729MSD1												**Source: 414424-074**
Arsenic	3020	100	100	3110	3240	ug/L	90	220	4.1	80-120		NC

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 414424	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 1 of 9	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
1	SB-33-0.5'	4/16/19	0910	Soil	1 8oz Jar	ICE	✓	✓	✓		
2	SB-33-1.5'	4/16/19	0917	Soil			✓	✓	✓		
3	SB-34-0.5'	4/16/19	0853	Soil			✓	✓	✓	✓	
4	SB-34-1.5'	4/16/19	0858	Soil			✓	✓	✓	✓	
5	SB-35-0.5'	4/16/19	0930	Soil			✓	✓	✓		
6	SB-35-1.5'	4/16/19	0935	Soil			✓	✓	✓		
7	SB-36-0.5'	4/16/19	0949	Soil			✓	✓	✓		
8	SB-36-1.5'	4/16/19	0951	Soil			✓	✓	✓		
9	SB-37-0.5'	4/16/19	1015	Soil			✓	✓	✓		
10	SB-37-1.5'	4/16/19	1020	Soil			✓	✓	✓		

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	4/17/19 @ 1534
[1] Received By:				4/17/19 1537
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933 Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	Lab No: Page: 2 of 9 **Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day: **Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

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Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
1	SB-38-0.5'	4/16/19	1003	Soil	8oz Jar	ICE	✓	✓	✓		
2	SB-38-1.5'	4/16/19	1006				✓	✓	✓		
3	SB-39-0.5'	4/17/19	0855				✓	✓	✓		
4	SB-39-1.5'	4/17/19	0859				✓	✓	✓		
5	SB-39-2.5'	4/17/19	0905				✓	✓	✓		
6	SB-40-0.5'	4/17/19	0880				✓	✓	✓		
7	SB-40-1.5'	4/17/19	0857				✓	✓	✓		
8	SB-40-2.5'	4/17/19	0859				✓	✓	✓		
9	SB-41-0.5'	4/16/19	1504				✓	✓	✓		
10	SB-41-1.5'	4/16/19	1508				✓	✓	✓		

	Signature	Print Name	Company / Title	Date / Time
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[1] Received By:				4/17/19 1534
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

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Phone: (714) 771-6900 Fax: (714)771-9933	Page: 3 of 9	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
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Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
1	SB-41-2.5'	4/16/19	1512	Soil	18oz J.	ICE	✓	✓	✓		
2	SB-42-0.5'	4/17/19	0942				✓	✓	✓		
3	SB-42-1.5'	4/17/19	0946				✓	✓	✓		
4	SB-42-2.5'	4/17/19	0948				✓	✓	✓		
5	SB-43-0.5'	4/17/19	0915				✓	✓	✓		
6	SB-43-1.5'	4/17/19	0917				✓	✓	✓		
7	SB-43-2.5'	4/17/19	0920				✓	✓	✓		
8	SB-44-0.5'	4/17/19	0843				✓	✓	✓	✓	
9	SB-44-1.5'	4/17/19	0849				✓	✓	✓	✓	
10	SB-44-2.5'	4/17/19	0852				✓	✓	✓	✓	

	Signature	Print Name	Company / Title	Date / Time
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[1] Received By:				4/17/19 1534
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[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

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ENTHALPY analytical, inc.

Chain of Custody Record

Lab No:

Page: 4 of 9

Turn Around Time (Rush by advanced notice only)

Standard:	✓	4 Day:		3 Day:	
2 Day:		1 Day:		Same Day:	

Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

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Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
1	SB-45-0.5'	4/16/19	1519	Soil	18oz Jar	ICE	✓	✓	✓		
2	SB-45-1.5'	4/16/19	1523				✓	✓	✓		
3	SB-45-2.5'	4/16/19	1526				✓	✓	✓		
4	SB-46-0.5'	4/17/19	0926				✓	✓	✓		
5	SB-46-1.5'	4/17/19	0929				✓	✓	✓		
6	SB-46-2.5'	4/17/19	0935				✓	✓	✓		
7	SB-47-0.5'	4/17/19	0925				✓	✓	✓		
8	SB-47-1.5'	4/17/19	0932				✓	✓	✓		
9	SB-47-2.5'	4/17/19	0938				✓	✓	✓		
10	SB-48-0.5'	4/17/19	0900				✓	✓	✓		

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	4/17/19 @ 1535
[1] Received By:				4/17/19 1535
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 5 of 9	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
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Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
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Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
1	SB-48-1.5'	4/17/19	0903	Soil	1 8oz Jar	ICE	✓	✓	✓		
2	SB-48-2.5'	4/17/19	0905				✓	✓	✓		
3	SB-49-0.5'	4/17/19	0818				✓	✓	✓		
4	SB-49-1.5'	4/17/19	0823				✓	✓	✓		
5	SB-49-2.5'	4/17/19	0825				✓	✓	✓		
6	SB-50-0.5'	4/16/19	1034				✓	✓	✓		
7	SB-50-1.5'	4/16/19	1038				✓	✓	✓		
8	SB-51-0.5'	4/16/19	1211				✓	✓	✓		
9	SB-51-1.5'	4/16/19	1216				✓	✓	✓		
10	SB-52-0.5'	4/16/19	1224				✓	✓	✓		

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	4/17/19 @ 1536
1 Received By:				4/17/19 1536
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 6 of 9	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

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Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	EPA 8015-TPHcc	EPA 8260 - VOCs	EPA 8270 - SVOCs				Test Instructions / Comments
1	SB-52-1.5'	4/16/19	1227	Soil	1 8oz Jar	ICE	✓	✓	✓								
2	SB-53-0.5'	4/16/19	1238				✓	✓	✓								
3	SB-53-1.5'	4/16/19	1241				✓	✓	✓								
4	SB-54-0.5'	4/16/19	1326				✓	✓	✓								
5	SB-54-1.5'	4/16/19	1331				✓	✓	✓								
6	SB-55-0.5'	4/16/19	1345				✓	✓	✓	✓	✓						
7	SB-55-1.5'	4/16/19	1353				✓	✓	✓	✓							
8	SB-56-0.5'	4/17/19	1016				✓	✓	✓								
9	SB-56-1.5'	4/17/19	1020				✓	✓	✓								
10	SB-56-2.5'	4/17/19	1023				✓	✓	✓								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	4/17/19 @ 1536
1 Received By:				4/17/19 1536
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

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ENTHALPY analytical, inc.

Chain of Custody Record

Lab No:

Page: 7 of 9

Turn Around Time (Rush by advanced notice only)

Standard:	4 Day:	3 Day:
✓		
2 Day:	1 Day:	Same Day:

Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

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	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	EPA 8015-TPHcc	EPA 8260 - VOCs	EPA 8270 - SVOCs				Test Instructions / Comments
1	SB-57-0.5'	4/17/19	1031	Soil	1 8oz Jar	ICE	✓	✓	✓								
2	SB-57-1.5'	4/17/19	1036				✓	✓	✓								
3	SB-57-2.5'	4/17/19	1036				✓	✓	✓								
4	SB-58-0.5'	4/16/19	1420				✓	✓	✓	✓							
5	SB-58-1.5'	4/16/19	1440				✓	✓	✓	✓							
6	SB-58-2.5'	4/16/19	1449				✓	✓	✓	✓							
7	SB-59-0.5'	4/17/19	1109		1 8oz Jar; 5 Vials		✓	✓	✓		X	X	X				
8	SB-59-1.5'	"	1117				✓	✓	✓		X	X	X				
9	SB-59-2.5'	"	1123				✓	✓	✓		X	X	X				
10							✓	✓	✓								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	4/17/19 @ 1537
[1] Received By:				4/17/19 1537
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No:	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 8 of 9	2 Day: 1 Day: Same Day:
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Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - CAM Metals	EPA 6020 - Arsenic	EPA 8081A - OCPs	EPA 8082 - PCBs	Test Instructions / Comments
10	1 SB-39-0.5' (DUP)	4/17/19	0855	Soil	1 6ws Jar	ICE	✓	✓	✓		
11	2 SB-43-0.5' (DUP)	4/17/19	0915	Soil			✓	✓	✓		
12	3 SB-47-1.5' (DUP)	4/17/19	0932				✓	✓	✓		
13	4 SB-49-1.5' (DUP)	4/17/19	0823				✓	✓	✓		
14	5 SB-53-0.5' (DUP)	4/16/19	1238				✓	✓	✓		
15	6 SB-[redacted]-1.5' (DUP)	4/16/19	[redacted] 1353				✓	✓	✓	✓	
16	7 [redacted] SB-60-0.5' (DUP)	4/16/19	[redacted] 1256				✓	✓	✓		
17	8 [redacted] SB-60-0.5'	4/16/19	1256				✓	✓	✓		
18	9 [redacted] SB-60-1.5'	4/16/19	1305				✓	✓	✓		
	10 [redacted]						✓	✓	✓		

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Kris Kern	ES	4/17/19 @ 1537
1 Received By:	[signature]	[signature]	[signature]	4/17/19 1537
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

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Chain of Custody Record

Lab No:

Page: 9 of 9

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Servic	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah Elementary Schol
Email:	dnygaard@es-online.com	Proj. #:	191395
Address:	1 Park Plaza, Suite 1,00	P.O. #:	
	Irvine, CA 92614	Address:	2450 Shenandoah Street
Phone:	(714) 974-6600	Global ID:	Los Angeles, CA
Fax:		Sampled By:	IAK

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	CAM Metals	Arsenic	OCP's	PCB's	TPHg, SVOCs, VOCs						Test Instructions / Comments
1	Equipment blank - Day 1	4/16/19	1551	Water	multiple	ICE	X	X	X	X	X						
2	Equipment blank - Day 2	4/17/19	1216	"	"	"	X	X	X	X	X						
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	4/17/19 @ 1537
[1] Received By:		Okun		4/17/19 1537
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

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SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Services LLC/Montrose Environmental Project: Shenandoah Elementary School

Date Received: 4/17/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 3 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 1.2 #2: 1.3 #3: 0.5 #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 0.3 #2: 2.3 #3: 1.8 #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)		✓	
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?		✓	
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Sample -063: COC sample time 10:36; Container label sample time: 10:39
Sample -003, -004, -009, -051: The sample jar caps were damaged and replaced in the lab. The samples were not compromised.

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 4/17/19

Ranjit Clarke

From: Chris Guesnon
Sent: Thursday, April 18, 2019 4:49 PM
To: Ranjit Clarke
Subject: Re: Shenandoah Elementary School (04/16/19)

Hey ranjit, let's removebor from 6010B list to avoid confusion.

On Thu, Apr 18, 2019 at 4:41 PM Ranjit Clarke <ranjit.clarke@enthalpy.com> wrote:

> Chris,
>
> Since we are reporting As by 6020, do you want us to remove that metal from the 6010B list, or do you want it reported for both methods?
>
> Ranjit
>
> In accordance with our paperless initiative, we are no longer mailing or faxing reports by default. If you require a hard copy, please inform your Project Manager.
>
> ENTHALPY ANALYTICAL
>
> Ranjit Clarke
>
> Senior Project Manager
>
> Enthalpy Analytical
>
> 931 W. Barkley Ave., Orange, CA 92868
>
> O: 714-771-9906 / M: 657-274-9864 / F: 714-538-1209
>
> Ranjit.Clarke@Enthalpy.com

Ranjit Clarke

From: Chris Guesnon
Sent: Monday, April 29, 2019 11:10 AM
To: Ranjit Clarke
Cc: Kristopher Kern
Subject: RE: Shenandoah Elementary School (04/16/19 - 04/17/19) - PDF - Enthalpy Analytical Final Report # 414424

Hi Ranjit. Based on the results, please run the following:
-STLC for arsenic for samples SB-50-0.5, SB-51-0.5, SB-52-0.5, SB-53-0.5, SB-54-0.5, SB-55-0.5
-STLC and TCLP for arsenic for samples SB-51-0.5, SB-52-0.5, SB-53-0.5, SB-54-0.5
-STLC and TCLP for lead for sample SB-42-0.5

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

MONTROSE
ENVIRONMENTAL

1 Park Plaza, Suite 1000, Irvine, CA 92614
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cguesnon@montrose-env.com
www.montrose-env.com

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Please consider the environment before printing

From: Ranjit Clarke [mailto:ranjit.clarke@enthalpy.com]
Sent: Friday, April 26, 2019 4:59 PM
To: Chris Guesnon
Cc: Kristopher Kern
Subject: RE: Shenandoah Elementary School (04/16/19 - 04/17/19) - PDF - Enthalpy Analytical Final Report #414424

10X STLC limits for STLC, 20x TCLP limits for TCLP.

ENTHALPY
ANALYTICAL

Ranjit Clarke

Ranjit Clarke

Subject: FW: Shenandoah Elementary School (04/16/19 - 04/17/19) - PDF - Enthalpy Analytical Final Report # 414424

From: Chris Guesnon <cguesnon@montrose-env.com>
Sent: Monday, April 29, 2019 4:10 PM
To: Ranjit Clarke <Ranjit.Clarke@enthalpy.com>
Cc: Kristopher Kern <kkern@montrose-env.com>
Subject: RE: Shenandoah Elementary School (04/16/19 - 04/17/19) - PDF - Enthalpy Analytical Final Report #414424

Hey Ranjit. Please run SB-53-0.5 (DUP) and drop SB-53-0.5.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

MONTROSE ENVIRONMENTAL
1 Park Plaza, Suite 1000, Irvine, CA 92614
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Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard
Comments: Shenandoah Elementary School
029RC1-191395
PO1035690
2450 Shenandoah Street, Los Angeles, CA

Lab Request: 416462
Report Date: 07/25/2019
Date Received: 06/19/2019
Client ID: 12860

Supplemental Report 1 - Additional Total As, STLC As, and TCLP As results are now included.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID	Sample #	Client Sample ID
416462-001	SB-33A-0.5'	416462-027	SB-42A-1.5'	416462-053	SB-47D-0.5'
416462-002	SB-33A-1.5'	416462-028	SB-42A-2.5'	416462-054	SB-47D-1.5'
416462-003	SB-33B-0.5'	416462-029	SB-42B-0.5'	416462-055	SB-47D-2.5'
416462-004	SB-33B-1.5'	416462-030	SB-42B-1.5'	416462-056	SB-48B-0.5'
416462-005	SB-33C-0.5'	416462-031	SB-42B-2.5'	416462-057	SB-48B-1.5'
416462-006	SB-33C-1.5'	416462-032	SB-42C-0.5'	416462-058	SB-48B-2.5'
416462-007	SB-33D-0.5'	416462-033	SB-42C-1.5'	416462-059	SB-48C-0.5'
416462-008	SB-33D-1.5'	416462-034	SB-42C-1.5' (DUP)	416462-060	SB-48C-1.5'
416462-009	SB-37A-0.5'	416462-035	SB-42C-2.5'	416462-061	SB-48C-2.5'
416462-010	SB-37A-1.5'	416462-036	SB-42D-0.5'	416462-062	SB-48D-0.5'
416462-011	SB-37B-0.5'	416462-037	SB-42D-1.5'	416462-063	SB-48D-1.5'
416462-012	SB-37B-1.5'	416462-038	SB-42D-2.5'	416462-064	SB-48D-2.5'
416462-013	SB-37C-0.5'	416462-039	SB-44B-0.5'	416462-065	SB-50A-0.5'
416462-014	SB-37C-1.5'	416462-040	SB-44B-1.5'	416462-066	SB-50A-1.5'
416462-015	SB-37D-0.5'	416462-041	SB-44B-1.5' (DUP)	416462-067	SB-50B-0.5'
416462-016	SB-37D-1.5'	416462-042	SB-44B-2.5	416462-068	SB-50B-1.5'
416462-017	SB-39A-0.5'	416462-043	SB-44D-0.5	416462-069	SB-50C-0.5'
416462-018	SB-39A-1.5'	416462-044	SB-44D-1.5'	416462-070	SB-50C-1.5'
416462-019	SB-39A-2.5'	416462-045	SB-44D-2.5'	416462-071	SB-50D-0.5'
416462-020	SB-39B-0.5'	416462-046	SB-47B-0.5'	416462-072	SB-50D-0.5' (DUP)
416462-021	SB-39B-1.5'	416462-047	SB-47B-0.5' (DUP)	416462-073	SB-50D-1.5'
416462-022	SB-39B-2.5'	416462-048	SB-47B-1.5'	416462-074	SB-51A-0.5'
416462-023	SB-39D-0.5'	416462-049	SB-47B-2.5'	416462-075	SB-51A-1.5'
416462-024	SB-39D-1.5'	416462-050	SB-47C-0.5'	416462-076	SB-51B-0.5'
416462-025	SB-39D-2.5'	416462-051	SB-47C-1.5'	416462-077	SB-51B-1.5'
416462-026	SB-42A-0.5'	416462-052	SB-47C-2.5'	416462-078	SB-51C-0.5'

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Ranjit K. K. Clarke

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard
Comments: Shenandoah Elementary School
029RC1-191395
PO1035690
2450 Shenandoah Street, Los Angeles, CA

Lab Request: 416462
Report Date: 07/25/2019
Date Received: 06/19/2019
Client ID: 12860

Supplemental Report 1 - Additional Total As, STLC As, and TCLP As results are now included.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID
416462-079	SB-51C-1.5'	416462-105	SB-54D-0.5'
416462-080	SB-51D-0.5'	416462-106	SB-54D-1.5'
416462-081	SB-51D-1.5'	416462-107	SB-55A-0.5'
416462-082	SB-52A-0.5'	416462-108	SB-55A-1.5'
416462-083	SB-52A-1.5'	416462-109	SB-55B-0.5'
416462-084	SB-52B-0.5'	416462-110	SB-55B-1.5'
416462-085	SB-52B-1.5'	416462-111	SB-55C-0.5'
416462-086	SB-52C-0.5'	416462-112	SB-55C-1.5'
416462-087	SB-52C-1.5'	416462-113	SB-55C-1.5' (DUP)
416462-088	SB-52D-0.5'	416462-114	SB-55D-0.5'
416462-089	SB-52D-1.5'	416462-115	SB-55D-1.5'
416462-090	SB-53A-0.5'	416462-116	SB-57A-0.5'
416462-091	SB-53A-1.5'	416462-117	SB-57A-1.5'
416462-092	Equipment Blank - Day 1	416462-118	SB-57A-2.5'
416462-093	Equipment Blank - Day 2	416462-119	SB-57B-0.5'
416462-094	SB-53B-0.5'	416462-120	SB-57B-1.5'
416462-095	SB-53B-1.5'	416462-121	SB-57B-2.5'
416462-096	SB-53B-1.5' (DUP)	416462-122	SB-57C-0.5'
416462-097	SB-53D-0.5'	416462-123	SB-57C-1.5'
416462-098	SB-53D-1.5'	416462-124	SB-57C-1.5' (DUP)
416462-099	SB-54A-0.5'	416462-125	SB-57C-2.5'
416462-100	SB-54A-1.5'	416462-126	SB-57D-0.5'
416462-101	SB-54B-0.5'	416462-127	SB-57D-1.5'
416462-102	SB-54B-1.5'	416462-128	SB-57D-2.5'
416462-103	SB-54C-0.5'	416462-129	SB-33C-0.5' (DUP)
416462-104	SB-54C-1.5'	416462-130	SB-37B-0.5' (DUP)

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 60 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:05 **Site:**
Sample #: **416462-001** **Client Sample #:** SB-33A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**5.02**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:09 **Site:**
Sample #: **416462-002** **Client Sample #:** SB-33A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:51 **Site:**
Sample #: **416462-003** **Client Sample #:** SB-33B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**6.18**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:59 **Site:**
Sample #: **416462-004** **Client Sample #:** SB-33B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:55 **Site:**
Sample #: **416462-005** **Client Sample #:** SB-33C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**29.2**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:01 **Site:**
Sample #: **416462-006** **Client Sample #:** SB-33C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:06 **Site:**
Sample #: **416462-007** **Client Sample #:** SB-33D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**5.45**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:10 **Site:**
Sample #: **416462-008** **Client Sample #:** SB-33D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:34 **Site:**
Sample #: 416462-009 **Client Sample #:** SB-37A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**5.44**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:44 **Site:**
Sample #: 416462-010 **Client Sample #:** SB-37A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:34 **Site:**
Sample #: 416462-011 **Client Sample #:** SB-37B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**27.5**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:41 **Site:**
Sample #: 416462-012 **Client Sample #:** SB-37B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:17 **Site:**
Sample #: 416462-013 **Client Sample #:** SB-37C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**89.9**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**4080**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:23 **Site:**
Sample #: 416462-014 **Client Sample #:** SB-37C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**7.61**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:11 **Site:**
Sample #: 416462-015 **Client Sample #:** SB-37D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**31.8**	1	0.108	0.3	mg/Kg	06/24/19	06/24/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:20 **Site:**
Sample #: **416462-016** **Client Sample #:** SB-37D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1204495
Arsenic	**7.90**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:14 **Site:**
Sample #: **416462-017** **Client Sample #:** SB-39A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203482
Arsenic	**6.16**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:20 **Site:**
Sample #: **416462-018** **Client Sample #:** SB-39A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:24 **Site:**
Sample #: **416462-019** **Client Sample #:** SB-39A-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:11 **Site:**
Sample #: **416462-020** **Client Sample #:** SB-39B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203482
Arsenic	**5.70**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:16 **Site:**
Sample #: **416462-021** **Client Sample #:** SB-39B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:22 **Site:**
Sample #: **416462-022** **Client Sample #:** SB-39B-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:32 **Site:**
Sample #: 416462-023 **Client Sample #:** SB-39D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**8.26**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:35 **Site:**
Sample #: 416462-024 **Client Sample #:** SB-39D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:39 **Site:**
Sample #: 416462-025 **Client Sample #:** SB-39D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:37 **Site:**
Sample #: 416462-026 **Client Sample #:** SB-42A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203480		
Lead	**29.0**	1	0.32	1	mg/Kg	06/24/19	06/25/19	KLN	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**99.7**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**4080**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:41 **Site:**
Sample #: 416462-027 **Client Sample #:** SB-42A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**5.39**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:47 **Site:**
Sample #: 416462-028 **Client Sample #:** SB-42A-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**6.81**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:48 **Site:**
Sample #: **416462-029** **Client Sample #:** SB-42B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203480		
Lead	**13.2**	1	0.32	1	mg/Kg	06/24/19	06/25/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203482		
Arsenic	**19.1**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:53 **Site:**
Sample #: **416462-030** **Client Sample #:** SB-42B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 10:55 **Site:**
Sample #: **416462-031** **Client Sample #:** SB-42B-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:03 **Site:**
Sample #: **416462-032** **Client Sample #:** SB-42C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203480		
Lead	**12.3**	1	0.32	1	mg/Kg	06/24/19	06/25/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203482		
Arsenic	**35.6**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:22 **Site:**
Sample #: **416462-033** **Client Sample #:** SB-42C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1204495		
Arsenic	**6.96**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:22 **Site:**
Sample #: **416462-034** **Client Sample #:** SB-42C-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:28 **Site:**
Sample #: **416462-035** **Client Sample #:** SB-42C-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1204495
Arsenic	**7.35**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:04 **Site:**
Sample #: **416462-036** **Client Sample #:** SB-42D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203481
Lead	**39.5**	1	0.32	1	mg/Kg	06/24/19	06/25/19	KLN	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203482
Arsenic	**33.8**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:09 **Site:**
Sample #: **416462-037** **Client Sample #:** SB-42D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1204495
Arsenic	**6.72**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:13 **Site:**
Sample #: **416462-038** **Client Sample #:** SB-42D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1204495
Arsenic	**6.66**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:40 **Site:**
Sample #: **416462-039** **Client Sample #:** SB-44B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203482
Arsenic	**4.67**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:46 **Site:**
Sample #: **416462-040** **Client Sample #:** SB-44B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:46 **Site:**
Sample #: **416462-041** **Client Sample #:** SB-44B-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:51 **Site:**
Sample #: **416462-042** **Client Sample #:** SB-44B-2.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:14 **Site:**
Sample #: **416462-043** **Client Sample #:** SB-44D-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203482		
Arsenic	**15.9**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:23 **Site:**
Sample #: **416462-044** **Client Sample #:** SB-44D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:29 **Site:**
Sample #: **416462-045** **Client Sample #:** SB-44D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:35 **Site:**
Sample #: **416462-046** **Client Sample #:** SB-47B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**13.2**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:35 **Site:**
Sample #: **416462-047** **Client Sample #:** SB-47B-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**27.0**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:40 **Site:**
Sample #: **416462-048** **Client Sample #:** SB-47B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:46 **Site:**
Sample #: **416462-049** **Client Sample #:** SB-47B-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:16 **Site:**
Sample #: **416462-050** **Client Sample #:** SB-47C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**1450**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**131**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**6980**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:25 **Site:**
Sample #: **416462-051** **Client Sample #:** SB-47C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**6.28**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:30 **Site:**
Sample #: **416462-052** **Client Sample #:** SB-47C-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**8.30**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:12 **Site:**
Sample #: **416462-053** **Client Sample #:** SB-47D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**6.18**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:15 **Site:**
Sample #: **416462-054** **Client Sample #:** SB-47D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:21 **Site:**
Sample #: **416462-055** **Client Sample #:** SB-47D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:07 **Site:**
Sample #: **416462-056** **Client Sample #:** SB-48B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**15.5**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:15 **Site:**
Sample #: **416462-057** **Client Sample #:** SB-48B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:21 **Site:**
Sample #: **416462-058** **Client Sample #:** SB-48B-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:30 **Site:**
Sample #: **416462-059** **Client Sample #:** SB-48C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**5.90**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:38 **Site:**
Sample #: **416462-060** **Client Sample #:** SB-48C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:43 **Site:**
Sample #: **416462-061** **Client Sample #:** SB-48C-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:52 **Site:**
Sample #: **416462-062** **Client Sample #:** SB-48D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**15.3**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 08:58 **Site:**
Sample #: **416462-063** **Client Sample #:** SB-48D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 09:03 **Site:**
Sample #: **416462-064** **Client Sample #:** SB-48D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:53 **Site:**
Sample #: **416462-065** **Client Sample #:** SB-50A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**22.8**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:57 **Site:**
Sample #: **416462-066** **Client Sample #:** SB-50A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:50 **Site:**
Sample #: **416462-067** **Client Sample #:** SB-50B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**2110**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**633**	10	1.08	3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**9310**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:56 **Site:**
Sample #: **416462-068** **Client Sample #:** SB-50B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**56.6**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:30 **Site:**
Sample #: **416462-069** **Client Sample #:** SB-50C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**7.71**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:43 **Site:**
Sample #: **416462-070** **Client Sample #:** SB-50C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:34 **Site:**
Sample #: **416462-071** **Client Sample #:** SB-50D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**69.0**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**2590**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:34 **Site:**
Sample #: **416462-072** **Client Sample #:** SB-50D-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**32.1**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:37 **Site:**
Sample #: **416462-073** **Client Sample #:** SB-50D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**6.39**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:15 **Site:**
Sample #: **416462-074** **Client Sample #:** SB-51A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**26.8**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:19 **Site:**
Sample #: **416462-075** **Client Sample #:** SB-51A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:15 **Site:**
Sample #: 416462-076 **Client Sample #:** SB-51B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**3850**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**395**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**38100**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:23 **Site:**
Sample #: 416462-077 **Client Sample #:** SB-51B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**11.0**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:58 **Site:**
Sample #: 416462-078 **Client Sample #:** SB-51C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**1000**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**136**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**6000**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:03 **Site:**
Sample #: 416462-079 **Client Sample #:** SB-51C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**8.42**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:59 **Site:**
Sample #: 416462-080 **Client Sample #:** SB-51D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1203483		
Arsenic	**92.9**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 NELAC	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**4240**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 09:03 **Site:**
Sample #: **416462-081** **Client Sample #:** SB-51D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1204495
Arsenic	**8.86**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:53 **Site:**
Sample #: **416462-082** **Client Sample #:** SB-52A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203483
Arsenic	**15.0**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 15:00 **Site:**
Sample #: **416462-083** **Client Sample #:** SB-52A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:50 **Site:**
Sample #: **416462-084** **Client Sample #:** SB-52B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203483
Arsenic	**5.52**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:54 **Site:**
Sample #: **416462-085** **Client Sample #:** SB-52B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:37 **Site:**
Sample #: **416462-086** **Client Sample #:** SB-52C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID:		QC1203483
Arsenic	**27.7**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:42 **Site:**
Sample #: **416462-087** **Client Sample #:** SB-52C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:14 **Site:**
Sample #: **416462-088** **Client Sample #:** SB-52D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203483		
Arsenic	**23.5**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:24 **Site:**
Sample #: **416462-089** **Client Sample #:** SB-52D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:43 **Site:**
Sample #: **416462-090** **Client Sample #:** SB-53A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203484		
Arsenic	**54.9**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:49 **Site:**
Sample #: **416462-091** **Client Sample #:** SB-53A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 07:35 **Site:**
Sample #: **416462-092** **Client Sample #:** Equipment Blank - Day 1 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1203406		
Lead	ND	1	0.005	0.01	mg/L	06/20/19	06/24/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1203535		
Arsenic	ND	1	0.31	2	ug/L	06/25/19	06/25/19	SBW	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 11:24 **Site:**
Sample #: **416462-093** **Client Sample #:** Equipment Blank - Day 2 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1203406		
Lead	ND	1	0.005	0.01	mg/L	06/20/19	06/25/19	KLN	
Method: EPA 6020 *NELAC* Prep Method: EPA 3010A							QCBatchID: QC1203535		
Arsenic	ND	1	0.31	2	ug/L	06/25/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 13:57 **Site:**
Sample #: **416462-094** **Client Sample #:** SB-53B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203484		
Arsenic	**65.3**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:05 **Site:**
Sample #: **416462-095** **Client Sample #:** SB-53B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:05 **Site:**
Sample #: **416462-096** **Client Sample #:** SB-53B-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:25 **Site:**
Sample #: **416462-097** **Client Sample #:** SB-53D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**1910**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**136**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**8990**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 14:42 **Site:**
Sample #: **416462-098** **Client Sample #:** SB-53D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**67.6**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:06 **Site:**
Sample #: **416462-099** **Client Sample #:** SB-54A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**5.35**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:10 **Site:**
Sample #: **416462-100** **Client Sample #:** SB-54A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 07:55 **Site:**
Sample #: **416462-101** **Client Sample #:** SB-54B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**8.83**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:00 **Site:**
Sample #: **416462-102** **Client Sample #:** SB-54B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 07:56 **Site:**
Sample #: **416462-103** **Client Sample #:** SB-54C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**5.65**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:07 **Site:**
Sample #: **416462-104** **Client Sample #:** SB-54C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:12 **Site:**
Sample #: **416462-105** **Client Sample #:** SB-54D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**9.40**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:17 **Site:**
Sample #: **416462-106** **Client Sample #:** SB-54D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:21 **Site:**
Sample #: **416462-107** **Client Sample #:** SB-55A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**6.41**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:25 **Site:**
Sample #: **416462-108** **Client Sample #:** SB-55A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:18 **Site:**
Sample #: **416462-109** **Client Sample #:** SB-55B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203484		
Arsenic	**87.3**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1204490		
Arsenic	**3760**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:24 **Site:**
Sample #: **416462-110** **Client Sample #:** SB-55B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1204495		
Arsenic	**8.35**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:30 **Site:**
Sample #: **416462-111** **Client Sample #:** SB-55C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203484		
Arsenic	**55.4**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: STLC							QCBatchID: QC1204490		
Arsenic	**2280**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:36 **Site:**
Sample #: **416462-112** **Client Sample #:** SB-55C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1204495		
Arsenic	**7.75**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:36 **Site:**
Sample #: **416462-113** **Client Sample #:** SB-55C-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD Prep Method:							QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:31 **Site:**
Sample #: **416462-114** **Client Sample #:** SB-55D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1203484		
Arsenic	**21.1**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 08:37 **Site:**
Sample #: **416462-115** **Client Sample #:** SB-55D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 12:04 **Site:**
Sample #: **416462-116** **Client Sample #:** SB-57A-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**6.03**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 12:09 **Site:**
Sample #: **416462-117** **Client Sample #:** SB-57A-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 12:11 **Site:**
Sample #: **416462-118** **Client Sample #:** SB-57A-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:35 **Site:**
Sample #: **416462-119** **Client Sample #:** SB-57B-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 1311						QCBatchID: QC1204491		
Arsenic	**791**	10	3.1	20	ug/L		07/23/19	JP	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**151**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: STLC						QCBatchID: QC1204490		
Arsenic	**5600**	100	13	200	ug/L	07/23/19	07/25/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:45 **Site:**
Sample #: **416462-120** **Client Sample #:** SB-57B-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1204495		
Arsenic	**5.42**	1	0.108	0.3	mg/Kg	07/23/19	07/23/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:50 **Site:**
Sample #: **416462-121** **Client Sample #:** SB-57B-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:24 **Site:**
Sample #: **416462-122** **Client Sample #:** SB-57C-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**6.95**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:31 **Site:**
Sample #: **416462-123** **Client Sample #:** SB-57C-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:31 **Site:**
Sample #: **416462-124** **Client Sample #:** SB-57C-1.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:33 **Site:**
Sample #: **416462-125** **Client Sample #:** SB-57C-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:44 **Site:**
Sample #: **416462-126** **Client Sample #:** SB-57D-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**6.86**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:49 **Site:**
Sample #: **416462-127** **Client Sample #:** SB-57D-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/18/2019 11:53 **Site:**
Sample #: **416462-128** **Client Sample #:** SB-57D-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: AL HOLD	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 06/19/2019 10:55 **Site:**
Sample #: **416462-129** **Client Sample #:** SB-33C-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**23.5**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	06/19/2019 10:34	**Site:**			
Sample #:	**416462-130**	**Client Sample #:**	SB-37B-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1203484		
Arsenic	**32.7**	1	0.108	0.3	mg/Kg	06/24/19	06/25/19	SBW	

QCBatchID: QC1203406 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Water **Analyzed:** 06/20/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1203406MB1						
Antimony	ND		mg/L	0.014	0.04	
Arsenic	ND		mg/L	0.008	0.01	
Barium	ND		mg/L	0.002	0.01	
Beryllium	ND		mg/L	0.001	0.005	
Boron	ND		mg/L	0.03	0.05	
Cadmium	ND		mg/L	0.001	0.005	
Chromium	ND		mg/L	0.002	0.01	
Cobalt	ND		mg/L	0.002	0.005	
Copper	**0.008**	**J**	mg/L	0.001	0.01	
Iron	**0.016**	**J**	mg/L	0.008	0.02	
Lead	ND		mg/L	0.005	0.01	
Manganese	ND		mg/L	0.003	0.01	
Molybdenum	**0.006**	**J**	mg/L	0.005	0.01	
Nickel	ND		mg/L	0.003	0.02	
Selenium	ND		mg/L	0.016	0.03	
Silver	ND		mg/L	0.003	0.005	
Sodium	**0.380**	**J**	mg/L	0.067	0.5	
Thallium	ND		mg/L	0.009	0.05	
Vanadium	**0.003**	**J**	mg/L	0.002	0.005	
Zinc	ND		mg/L	0.007	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203406LCS1											
Antimony	2		1.93		mg/L	97			80-120		
Arsenic	2		1.81		mg/L	91			80-120		
Barium	2		1.90		mg/L	95			80-120		
Beryllium	2		2.05		mg/L	103			80-120		
Cadmium	2		1.86		mg/L	93			80-120		
Chromium	2		2.02		mg/L	101			80-120		
Cobalt	2		1.96		mg/L	98			80-120		
Copper	2		1.89		mg/L	95			80-120		
Lead	2		1.90		mg/L	95			80-120		
Molybdenum	2		2.03		mg/L	102			80-120		
Nickel	2		1.97		mg/L	99			80-120		
Selenium	2		1.91		mg/L	96			80-120		
Silver	2		1.99		mg/L	100			80-120		
Thallium	2		1.89		mg/L	95			80-120		
Vanadium	2		2.09		mg/L	105			80-120		
Zinc	2		1.94		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203406MS1, QC1203406MSD1												**Source: 416462-092**
Antimony	ND	1	1	1.09	1.06	mg/L	109	106	2.8	75-125	20	
Arsenic	0.014	1	1	1.01	0.980	mg/L	100	97	3.0	75-125	20	
Barium	ND	1	1	0.919	0.983	mg/L	92	98	6.7	75-125	20	
Beryllium	ND	1	1	0.985	1.02	mg/L	99	102	3.5	75-125	20	
Cadmium	ND	1	1	0.910	0.964	mg/L	91	96	5.8	75-125	20	
Chromium	ND	1	1	0.976	1.03	mg/L	98	103	5.4	75-125	20	

QCBatchID: QC1203406 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Water **Analyzed:** 06/20/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203406MS1, QC1203406MSD1												**Source: 416462-092**
Cobalt	ND	1	1	0.982	1.04	mg/L	98	104	5.7	75-125	20	
Copper	0.006	1	1	0.871	0.887	mg/L	87	88	1.8	75-125	20	
Lead	ND	1	1	0.936	0.963	mg/L	94	96	2.8	75-125	20	
Molybdenum	ND	1	1	0.951	0.980	mg/L	95	98	3.0	75-125	20	
Nickel	ND	1	1	0.982	1.04	mg/L	98	104	5.7	75-125	20	
Selenium	ND	1	1	0.924	0.920	mg/L	92	92	0.4	75-125	20	
Silver	ND	1	1	1.13	1.17	mg/L	113	117	3.5	75-125	20	
Thallium	ND	1	1	0.949	0.982	mg/L	95	98	3.4	75-125	20	
Vanadium	ND	1	1	1.01	1.00	mg/L	101	100	1.0	75-125	20	
Zinc	ND	1	1	0.932	0.994	mg/L	93	99	6.4	75-125	20	

QCBatchID: QC1203480 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203480MB1					
Antimony	**1.28 J**	mg/Kg	0.37	3	
Arsenic	**0.99 J**	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	ND	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Molybdenum	**0.68 J**	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	ND	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	**0.86 J**	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203480LCS1											
Antimony	100		107		mg/Kg	107			80-120		
Arsenic	100		103		mg/Kg	103			80-120		
Barium	100		108		mg/Kg	108			80-120		
Beryllium	100		114		mg/Kg	114			80-120		
Cadmium	100		104		mg/Kg	104			80-120		
Chromium	100		100		mg/Kg	100			80-120		
Cobalt	100		107		mg/Kg	107			80-120		
Copper	100		102		mg/Kg	102			80-120		
Lead	100		101		mg/Kg	101			80-120		
Molybdenum	100		109		mg/Kg	109			80-120		
Nickel	100		105		mg/Kg	105			80-120		
Selenium	100		92.8		mg/Kg	93			80-120		
Silver	100		103		mg/Kg	103			80-120		
Thallium	100		101		mg/Kg	101			80-120		
Vanadium	100		114		mg/Kg	114			80-120		
Zinc	100		103		mg/Kg	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203480MS1, QC1203480MSD1												**Source: 416342-001**
Antimony	1.91	100	100	46.1	43.3	mg/Kg	44	41	6.3	75-125	20	M
Arsenic	3.16	100	100	105	100	mg/Kg	102	97	4.9	75-125	20	
Barium	29.2	100	100	136	131	mg/Kg	107	102	3.7	75-125	20	
Beryllium	ND	100	100	111	108	mg/Kg	111	108	2.7	75-125	20	
Cadmium	0.38	100	100	96.2	89.6	mg/Kg	96	89	7.1	75-125	20	
Chromium	33.3	100	100	134	126	mg/Kg	101	93	6.2	75-125	20	
Cobalt	7.42	100	100	104	99.5	mg/Kg	97	92	4.4	75-125	20	
Copper	12.6	100	100	106	102	mg/Kg	93	89	3.8	75-125	20	
Lead	5.18	100	100	100	96.2	mg/Kg	95	91	3.9	75-125	20	
Molybdenum	0.58	100	100	101	96.7	mg/Kg	100	96	4.4	75-125	20	

QCBatchID: QC1203480 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203480MS1, QC1203480MSD1												**Source: 416342-001**
Nickel	34.1	100	100	134	129	mg/Kg	100	95	3.8	75-125	20	
Selenium	ND	100	100	92.9	88.0	mg/Kg	93	88	5.4	75-125	20	
Silver	ND	100	100	99.2	93.9	mg/Kg	99	94	5.5	75-125	20	
Thallium	0.87	100	100	94.2	95.3	mg/Kg	93	94	1.2	75-125	20	
Vanadium	25.9	100	100	140	134	mg/Kg	114	108	4.4	75-125	20	
Zinc	27.0	100	100	124	109	mg/Kg	97	82	12.9	75-125	20	

QCBatchID: QC1203481 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203481MB1					
Antimony	ND	mg/Kg	0.37	3	
Arsenic	**0.79 J**	mg/Kg	0.36	1	
Barium	ND	mg/Kg	0.23	1	
Beryllium	ND	mg/Kg	0.17	0.5	
Cadmium	ND	mg/Kg	0.21	0.5	
Chromium	ND	mg/Kg	0.13	1	
Cobalt	ND	mg/Kg	0.19	0.5	
Copper	**0.38 J**	mg/Kg	0.31	1	
Lead	ND	mg/Kg	0.32	1	
Molybdenum	ND	mg/Kg	0.13	1	
Nickel	ND	mg/Kg	0.2	1.5	
Selenium	ND	mg/Kg	0.72	3	
Silver	**0.32 J**	mg/Kg	0.13	0.5	
Thallium	ND	mg/Kg	0.42	3	
Vanadium	ND	mg/Kg	0.37	0.5	
Zinc	ND	mg/Kg	0.28	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203481LCS1											
Antimony	100		113		mg/Kg	113			80-120		
Arsenic	100		101		mg/Kg	101			80-120		
Barium	100		93.0		mg/Kg	93			80-120		
Beryllium	100		95.8		mg/Kg	96			80-120		
Cadmium	100		93.8		mg/Kg	94			80-120		
Chromium	100		97.3		mg/Kg	97			80-120		
Cobalt	100		98.6		mg/Kg	99			80-120		
Copper	100		90.3		mg/Kg	90			80-120		
Lead	100		103		mg/Kg	103			80-120		
Molybdenum	100		111		mg/Kg	111			80-120		
Nickel	100		107		mg/Kg	107			80-120		
Selenium	100		93.9		mg/Kg	94			80-120		
Silver	100		99.8		mg/Kg	100			80-120		
Thallium	100		99.4		mg/Kg	99			80-120		
Vanadium	100		99.7		mg/Kg	100			80-120		
Zinc	100		104		mg/Kg	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203481MS1, QC1203481MSD1												**Source: 416470-001**
Antimony	ND	100	100	15.1	16.6	mg/Kg	15	17	9.5	75-125	20	M
Arsenic	8.87	100	100	95.1	113	mg/Kg	86	104	17.2	75-125	20	
Barium	136	100	100	277	290	mg/Kg	141	154	4.6	75-125	20	M
Beryllium	ND	100	100	95.9	102	mg/Kg	96	102	6.2	75-125	20	
Cadmium	2.18	100	100	85.6	94.6	mg/Kg	83	92	10.0	75-125	20	
Chromium	50.5	100	100	151	168	mg/Kg	101	118	10.7	75-125	20	
Cobalt	9.04	100	100	97.8	108	mg/Kg	89	99	9.9	75-125	20	
Copper	40.8	100	100	129	130	mg/Kg	88	89	0.8	75-125	20	
Lead	4.98	100	100	90.1	105	mg/Kg	85	100	15.3	75-125	20	
Molybdenum	7.55	100	100	83.4	98.0	mg/Kg	76	90	16.1	75-125	20	

QCBatchID: QC1203481 **Analyst:** dswafford **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203481MS1, QC1203481MSD1												**Source: 416470-001**
Nickel	62.0	100	100	148	178	mg/Kg	86	116	18.4	75-125	20	
Selenium	ND	100	100	80.8	102	mg/Kg	81	102	23.2	75-125	20	M
Silver	ND	100	100	83.1	87.1	mg/Kg	83	87	4.7	75-125	20	
Thallium	ND	100	100	78.0	94.2	mg/Kg	78	94	18.8	75-125	20	
Vanadium	46.1	100	100	148	165	mg/Kg	102	119	10.9	75-125	20	
Zinc	105	100	100	196	233	mg/Kg	91	128	17.2	75-125	20	M

QCBatchID: QC1203482 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203482MB1					
Antimony	**1.408**	mg/Kg	0.282	0.5	B
Arsenic	**0.158 J**	mg/Kg	0.108	0.3	
Barium	ND	mg/Kg	0.209	0.5	
Beryllium	ND	mg/Kg	0.16	0.5	
Cadmium	ND	mg/Kg	0.141	0.5	
Chromium	ND	mg/Kg	0.372	0.5	
Cobalt	ND	mg/Kg	0.13	0.5	
Copper	ND	mg/Kg	0.181	0.5	
Lead	ND	mg/Kg	0.128	0.5	
Molybdenum	**0.371 J**	mg/Kg	0.125	0.5	
Nickel	ND	mg/Kg	0.381	0.5	
Selenium	ND	mg/Kg	0.199	0.5	
Silver	ND	mg/Kg	0.136	0.5	
Thallium	ND	mg/Kg	0.128	0.5	
Vanadium	ND	mg/Kg	0.155	0.5	
Zinc	ND	mg/Kg	0.756	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203482LCS1											
Antimony	50		50.4		mg/Kg	101			80-120		
Arsenic	50		48.0		mg/Kg	96			80-120		
Barium	50		47.9		mg/Kg	96			80-120		
Beryllium	50		51.5		mg/Kg	103			80-120		
Cadmium	50		50.6		mg/Kg	101			80-120		
Chromium	50		48.2		mg/Kg	96			80-120		
Cobalt	50		47.1		mg/Kg	94			80-120		
Copper	50		46.3		mg/Kg	93			80-120		
Lead	50		48.3		mg/Kg	97			80-120		
Molybdenum	50		47.7		mg/Kg	95			80-120		
Nickel	50		47.4		mg/Kg	95			80-120		
Selenium	50		50.9		mg/Kg	102			80-120		
Silver	50		47.2		mg/Kg	94			80-120		
Thallium	50		46.4		mg/Kg	93			80-120		
Vanadium	50		50.0		mg/Kg	100			80-120		
Zinc	50		51.5		mg/Kg	103			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203482MS1, QC1203482MSD1												**Source: 416362-003**
Antimony	ND	50	50	2.52	3.18	mg/Kg	5	6	23.2	75-125	20	M,D
Arsenic	ND	50	50	47.7	48.4	mg/Kg	95	97	1.5	75-125	20	
Barium	11.0	50	50	61.7	63.2	mg/Kg	101	104	2.4	75-125	20	
Beryllium	ND	50	50	49.7	50.6	mg/Kg	99	101	1.8	75-125	20	
Cadmium	ND	50	50	52.5	50.4	mg/Kg	105	101	4.1	75-125	20	
Chromium	47.0	50	50	98.5	93.9	mg/Kg	103	94	4.8	75-125	20	
Cobalt	27.9	50	50	68.2	69.0	mg/Kg	81	82	1.2	75-125	20	
Copper	29.9	50	50	72.4	75.1	mg/Kg	85	90	3.7	75-125	20	
Lead	1.031	50	50	48.9	47.5	mg/Kg	96	93	2.9	75-125	20	
Molybdenum	ND	50	50	39.5	38.0	mg/Kg	79	76	3.9	75-125	20	

QCBatchID: QC1203482 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203482MS1, QC1203482MSD1												**Source: 416362-003**
Nickel	66.1	50	50	103	105	mg/Kg	74	78	1.9	75-125	20	M
Selenium	ND	50	50	55.7	56.2	mg/Kg	111	112	0.9	75-125	20	
Silver	ND	50	50	48.5	46.7	mg/Kg	97	93	3.8	75-125	20	
Thallium	0.174	50	50	46.5	44.7	mg/Kg	93	89	3.9	75-125	20	
Vanadium	61.2	50	50	99.4	101	mg/Kg	76	80	1.6	75-125	20	
Zinc	54.4	50	50	103	110	mg/Kg	97	111	6.6	75-125	20	

QCBatchID: QC1203483 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203483MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203483LCS1											
Arsenic	50		51.1		mg/Kg	102			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203483MS1, QC1203483MSD1												**Source: 416462-046**
Arsenic	13.2	50	50	53.7	53.0	mg/Kg	81	80	1.3	75-125	20	

QCBatchID: QC1203484 **Analyst:** dswafford **Method:** EPA 6020

Matrix: Solid **Analyzed:** 06/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203484MB1					
Arsenic	ND	mg/Kg	0.108	0.3	
Thallium	ND	mg/Kg	0.128	0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1203484LCS1											
Arsenic	50		49.9		mg/Kg	100			80-120		
Thallium	50		48.7		mg/Kg	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1203484MS1, QC1203484MSD1												**Source: 416462-090**
Arsenic	54.9	50	50	102	105	mg/Kg	94	100	2.9	75-125	20	
Thallium	0.258	50	50	44.4	47.3	mg/Kg	88	94	6.3	75-125	20	

QCBatchID: QC1203535 **Analyst:** sbailey-woo **Method:** EPA 6020

Matrix: Water **Analyzed:** 06/25/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1203535MB1					
Arsenic	ND	ug/L	0.31	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203535LCS1											
Arsenic	50		46.0		ug/L	92			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1203535MS1, QC1203535MSD1												**Source: 416462-092**
Arsenic	ND	50	50	45.3	46.0	ug/L	91	92	1.5	75-125	20	

QCBatchID:	**QC1204490**	**Analyst:**	cmorales	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	07/25/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1204490MB1					
Arsenic	ND	ug/L	0.13	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1204490LCS1, QC1204490LCSD1											
Arsenic	1000	1000	1010	1000	ug/L	101	100	1	80-120	20	

QCBatchID: QC1204491 **Analyst:** cmorales **Method:** EPA 6020

Matrix: Solid **Analyzed:** 07/23/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1204491MB1					
Arsenic	ND	ug/L	0.31	2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1204491LCS1											
Arsenic	50		52.6		ug/L	105			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1204491MS1, QC1204491MSD1												**Source: 416462-050**
Arsenic	1450	50	50	1400	1410	ug/L	0	0	0.7	80-120		NC

QCBatchID: QC1204495 **Analyst:** cmorales **Method:** EPA 6020

Matrix: Solid **Analyzed:** 07/23/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1204495MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1204495LCS1											
Arsenic	50		47.9		mg/Kg	96			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1204495MS1, QC1204495MSD1												**Source: 416462-120**
Arsenic	5.42	50	50	46.5	45.8	mg/Kg	82	81	1.5	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 1 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Lead	Analysis Request: EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-33A-0.5'	6/19/19	1105	Soil	1 glass Jar	ICE		X	
2	SB-33A-1.5'	"	1109	"	"	"		X	Hold
3	SB-33B-0.5'	"	1051	"	"	"		X	
4	SB-33B-1.5'	"	1059	"	"	"		X	Hold
5	SB-33C-0.5'	"	1055	"	"	"		X	
6	SB-33C-1.5'	"	1101	"	"	"		X	Hold
7	SB-33D-0.5'	"	1106	"	"	"		X	
8	SB-33D-1.5'	"	1110	"	"	"		X	Hold
9	SB-37A-0.5'	"	1034	"	"	"		X	
10	SB-37A-1.5'	"	1044	"	"	"		X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1539
[1] Received By:		Kris Kern	ES	6/19/19 1539
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 2 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-37B-0.5'	6/19/19	1034	Soil	1 Glass Jar	ICE		X	
2	SB-37B-1.5'	"	1041	"	"	"		X	Hold
3	SB-37C-0.5'	"	1017	"	"	"		X	
4	SB-37C-1.5'	"	1023	"	"	"		X	Hold
5	SB-37D-0.5'	"	1011	"	"	"		X	
6	SB-37D-1.5'	"	1120	"	"	"		X	Hold
7	SB-39A-0.5'	6/18/19	1014	"	"	"		X	
8	SB-39A-1.5'	"	1020	"	"	"		X	Hold
9	SB-39A-2.5'	"	1024	"	"	"		X	Hold
10									

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	6/19/19 @ 1540
1 Received By:				6/19/19 1540
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 3 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-39B-0.5'	6/18/19	1011	Soil	1 Glass Jar	ICE		X	
2	SB-39B-1.5'		1016					X	Hold
3	SB-39B-2.5'		1022					X	Hold
4	SB-39D-0.5'		1032					X	
5	SB-39D-1.5'		1035					X	Hold
6	SB-39D-2.5'		1039					X	Hold
7	SB-42A-0.5'		1037				X	X	
8	SB-42A-1.5'		1041				X	X	Hold
9	SB-42A-2.5'	"	1047	"	"	"	X	X	Hold
10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/18/19 @ 1540
[1] Received By:			EA	6/18/19 1540
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 4 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
29	1 SB-42B-0.5'	6/18/19	1048	Soil	1 6oz Jar	ICE	X	X	
30	2 SB-42B-1.5'	6/18/19	1053				X	X	Hold
31	3 SB-42B-2.5'		1055				X	X	Hold
32	4 SB-42C-0.5'		1103				X	X	
33	5 SB-42C-1.5'		1122				X	X	Hold
34	6 SB-42C-1.5' (DUP)		1122				X	X	Hold
35	7 SB-42C-2.5'		1126				X	X	Hold
36	8 SB-42D-0.5'		1104				X	X	
37	9 SB-42D-1.5'		1109				X	X	Hold
38	10 SB-42D-2.5'		1113				X	X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 7540
[1] Received By:				6/19/19 1540
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 5 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

		Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
39	1	SB-44B-0.5'	6/18/19	0940	Soil	1 6ker Jar	Ice		X	
40	2	SB-44B-1.5'	"	0946	"	"	"		X	Hold
41	3	SB-44B-1.5' (DUP)	"	0946	"	"	"		X	Hold
42	4	SB-44B-2.5'	"	0951	"	"	"		X	Hold
43	5	SB-44D-0.5'	"	0914	"	"	"		X	
44	6	SB-44D-1.5'	"	0923	"	"	"		X	Hold
45	7	SB-44D-2.5'	"	0929	"	"	"		X	Hold
46	8	SB-47B-0.5'	"	1335	"	"	"		X	
47	9	SB-47B-0.5' (DUP)	"	1335	"	"	"		X	
	10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1540
[1] Received By:		G Kim	GM	6/19/19 1540
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933 Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	Lab No: 416462 Page: 6 of 14 **Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day: **Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

		Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
48	1	SB-47B-1.5'	6/18/19	1340	Soil	16ozGlassJar	ICE		X	Hold
49	2	SB-47B-2.5'		1346					X	Hold
50	3	SB-47C-0.5'		1316					X	
51	4	SB-47C-1.5'		1325					X	Hold
52	5	SB-47C-2.5'		1330					X	Hold
53	6	SB-47D-0.5'		1312					X	
54	7	SB-47D-1.5'		1315					X	Hold
55	8	SB-47D-2.5'		1321					X	Hold
	9									
	10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 1540
[1] Received By:			CM	6/19/19 1540
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 7 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

		Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Lead	Analysis Request: EPA 6020 - Arsenic	Test Instructions / Comments
56	1	SB-48B-0.5'	6/18/19	0807	Soil	1 Glass Jar	Ice		X	
57	2	SB-48B-1.5'		0815					X	Hold
58	3	SB-48B-2.5'		0821					X	Hold
59	4	SB-48C-0.5'		0830					X	
60	5	SB-48C-1.5'		0838					X	Hold
61	6	SB-48C-2.5'		0843					X	Hold
62	7	SB-48D-0.5'		0852					X	
63	8	SB-48D-1.5'		0858					X	Hold
64	9	SB-48D-2.5'		0903					X	Hold
	10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1542
[1] Received By:		Kris Kern	GA	6/19/19 1542
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 8 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

		Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	Test Instructions / Comments
65	1	SB-50A-0.5'	6/19/19	0953	Soil	1 Glass Jar	ICE		X	
66	2	SB-50A-1.5'	"	0957	"	"	"		X	Hold
67	3	SB-50B-0.5'	"	0950	"	"	"		X	
68	4	SB-50B-1.5'	"	0956	"	"	"		X	Hold
69	5	SB-50C-0.5'	"	0930	"	"	"		X	
70	6	SB-50C-1.5'	"	0943	"	"	"		X	Hold
71	7	SB-50D-0.5'	"	0934	"	"	"		X	
72	8	SB-50D-0.5' (DUP)	"	0934	"	"	"		X	
73	9	SB-50D-1.5'	"	0937	"	"	"		X	Hold
	10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1542
[1] Received By:				6/19/19 1545
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933 Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	Lab No: 416462 Page: 9 of 14 **Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Standard: ✓ 4 Day: 3 Day: 2 Day: 1 Day: Same Day: **Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	Test Instructions / Comments
74	1 SB-51A-0.5'	6/19/19	0915	Soil	1 6oz Jar	ICE		X	
75	2 SB-51A-1.5'		0919					X	Hold
76	3 SB-51B-0.5'		0915					X	
77	4 SB-51B-1.5'		0923					X	Hold
78	5 SB-51C-0.5'		0858					X	
79	6 SB-51C-1.5'		0903					X	Hold
80	7 SB-51D-0.5'		0859					X	
81	8 SB-51D-1.5'	"	0903					X	Hold
82	9 SB-52A-0.5'	6/18/19	1453					X	
83	10 SB-52A-1.5'	6/18/19	1500	"	"	"		X	Hold

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	6/19/19 @ 1542
1 Received By:		GK	GT	6/19/19 1545
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 416462

Page: 10 of 14

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services LLC	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah Elementary School
Email:	dnygaard@es-online.com	Proj. #:	029RC1-191395
Address:	1 Park Plaza, Suite 1000	P.O. #:	PO 1035690
	Irvine, CA 92614	Address:	2450 Shenandoah St Los Angeles, CA
Phone:	714 919 6500	Global ID:	
Fax:	714 919 6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6020 - As	EPA 6010B - Pb	Test Instructions / Comments
1	SB-52B-0.5'	06.18.2019	1450	Soil	4oz (1) glass	Ice	X		~~HOLD~~ Run
2	SB-52B-1.5'	06.18.2019	1454	Soil	4oz (1) glass	Ice	X		HOLD
3	SB-52C-0.5'	06.18.2019	1437	Soil	4oz glass (1)	Ice	X		~~HOLD~~ Run
4	SB-52C-1.5'	06.18.2019	1442	Soil	4oz glass (1)	Ice	X		HOLD
5	SB-52D-0.5'	06.18.2019	1414	Soil	4oz glass (1)	ICE	X		~~HOLD~~ Run
6	SB-52D-1.5'	06.18.2019	1424	Soil	4oz glass (1)	ICE	X		HOLD
7	SB-53A-0.5'	06.18.2019	1343	Soil	4oz glass (1)	ICE	X		~~HOLD~~ Run
8	SB-53A-1.5'	06.18.2019	1349	Soil	4oz glass (1)	ICE	X		HOLD
9	Equipment Blank - Day 1	06.19.2019	0735	~~Water~~ Soil	one plastic bottle (1)	HNO_3 ICE	X	X	
10	Equipment Blank - Day 2	06.19.2019	1124	water	one plastic bottle	HNO_3 ICE	X	X	

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1545
[1] Received By:				6/19/19 1545
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 416462	Standard: ✓ 4 Day: 3 Day:
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 11 of 14	2 Day: 1 Day: Same Day:
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Lead	EPA 6020 -Arsenic	Test Instructions / Comments
94	1 SB-53B-0.5'	6/18/19	1357	Soil	1 Glass Jar	Ice		X	
95	2 SB-53B-1.5'	"	1405	"	"	"		X	Hold
96	3 SB-53B-1.5' (DUP)	"	1405	"	"	"		X	Hold
97	4 SB-53D-0.5'	"	1425	"	"	"		X	
98	5 SB-53D-1.5'	"	1442	"	"	"		X	Hold
99	6 SB-54A-0.5'	6/19/19	0806	"	"	"		X	
100	7 SB-54A-1.5'	"	0810	"	"	"		X	Hold
101	8 SB-54B-0.5'	"	0755	"	"	"		X	
102	9 SB-54B-1.5'	"	0800	"	"	"		X	Hold
	10								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 1545
[1] Received By:				6/19/19 1545
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 416462

Page: 12 of 14

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services LLC	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah Street Elementary
Email:	dnygaard@es-online.com	Proj. #:	029RC1-191395
Address:	1 Park Plaza	P.O. #:	PO 1035690
	Irvine, CA 92614	Address:	2450 Shenandoah St Los Angeles, CA
Phone:	714 919 6500	Global ID:	
Fax:	714 919 6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: 6020 EPA - As	Test Instructions / Comments
1	SB-54C-0.5'	06.19.2019	0756	Soil	4 oz glass (1)	ICE	X	
2	SB-54C-1.5'		0807				X	HOLD
3	SB-54D-0.5'		0812				X	
4	SB-54D-1.5'		0817				X	HOLD
5	SB-55A-0.5'		0821				X	
6	SB-55A-1.5'		0825				X	HOLD
7	SB-55B-0.5'		0818				X	
8	SB-55B-1.5'		0824				X	HOLD
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Kris Kern	ES	6/19/19 @ 1545
1 Received By:				6/19/19 1545
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 416462

Page: 13 of 14

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services	Quote #:	
Report To:	Dave Nygard	Proj. Name:	Shenandoah Elementary School
Email:	dnygard@es-online.com	Proj. #:	191395
Address:	1 Park Plaza, Suite 1,000	P.O. #:	1035690
	Irvine, CA 92614	Address:	2480 Shenandoah Street
Phone:	714 419-6500	~~Global ID:~~	Los Angeles, CA
Fax:		Sampled By:	Kris Kern / Sean Hyde

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-55C-0.5'	6/19/19	0830	Soil	1 Glass Jar	ICE	X	
2	SB-55C-1.5'		0836				X	Hold
3	SB-55C-1.5' (DUP)		0836				X	Hold
4	SB-55D-0.5'		0831				X	
5	SB-55D-1.5'		0837				X	Hold
6	SB-57A-0.5'	6/18/19	1204				X	
7	SB-57A-1.5'		1209				X	Hold
8	SB-57A-2.5'		1211				X	Hold
9								
10								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Kern	ES	6/19/19 @ 1545
[1] Received By:				6/19/19 1545
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 416462

Page: 14 of 14

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services	Quote #:	
Report To:	Don Nygaard	Proj. Name:	Shenandoah Elementary School
Email:	dnygaard	Proj. #:	191395
Address:	1 Park Plaza Suite 1000	P.O. #:	1035690
	Irvine CA 92614	Address:	2480 Shenandoah Street
Phone:	(714)978-6500	~~Global ID~~:	Los Angeles, CA
Fax:		Sampled By:	Kris Keon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-57B-0.5'	6/18/19	1135	Soil	1 Glass Jar	ICE	X	
2	SB-57B-1.5'		1145				X	Hold
3	SB-57B-2.5'		1150				X	Hold
4	SB-57C-0.5'		1124				X	
5	SB-57C-1.5'		1131				X	Hold
6	SB-57C-1.5' (DUP)		1131				X	Hold
7	SB-57C-2.5'		1133				X	Hold
8	SB-57D-0.5'		1144				X	
9	SB-57D-1.5'		1149				X	Hold
10	SB-57D-2.5'		1153				X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Kris Keon	ES	6/19/19 @ 1545
[1] Received By:				6/19/19 1545
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL, INC.

806 N. Batavia St., Orange, CA 92868

Phone: (714) 771-6900 Fax: (714)771-9933

Billing: Enthalpy - SoCal

c/o Montrose Environmental Group

1 Park Plaza, Suite 1000, Irvine, CA 92614

ENTHALPY analytical, inc.

Chain of Custody Record

Lab No: 416462.

Page: of

Turn Around Time (Rush by advanced notice only)

Standard:	✓	4 Day:		3 Day:			
2 Day:		1 Day:		Same Day:			

Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1035690
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Kris Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Lead	EPA 6020 - Arsenic	Test Instructions / Comments
1	SB-33C-0.5' (DUP)	06.19.2019	1055	Soil	4oz glass (1)	ICE		X	
2	SB-37B-0.5' (DUP)	06.19.2019	1034	Soil	4oz glass (1)	ICE		X	
3									
4									
5									
6									
7									
8									
9									
10									

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Sean Hyde	Montrose / Staff Geologist	06.19.2019 / 1550
[1] Received By:				
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By: *		ZAID PADILLA	EA/GL	6/20/19 0950

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering

Project: Shenandoah ~~Elemantry~~ Elementary @ 6/19/19

Date Received: 6/19/19

Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 2 ☐ No (skip section 2)

Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 0.3 #2: 0.2 #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: -1.2 #2: -0.8 #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives? @ 6/19/19	✓		✓
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

*"SB-33C-0.5'(DUP)" & "SB-37B-0.5'(DUP)" WERE RECEIVED 6/19/19 @ 15:39, COC WAS RECEIVED 6/20/19 @ 0950. (ZP)

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 6/19/19

Ranjit Clarke

From: Chris Guesnon
Sent: Friday, July 12, 2019 2:12 PM
To: Ranjit Clarke
Cc: dnygaard@montrose-env.com
Subject: FW: Exceedances at Shenandoah
Attachments: 416462-00101900-SIGNED.PDF; 191395-F2-step outs revised.pdf

Hi Ranjit. See below. We need to do extra analysis on the soil samples from Shenandoah. A standard TAT is fine for these samples. Thanks.
Based on the results of the recent soil sampling at Shenandoah, the lead results were below the EPA screening level (80 mg/kg). The high arsenic hits are tabulated below. Please let us know if we should request additional analyses, including the deeper samples of the following:

Sample ID	Arsenic Results (mg/kg)	Comment
SB-37C-0.5	89.9	Run STLC, Run 1.5 foot sample (As only)
SB-37D-0.5	31.8	Run 1.5 foot sample (As only)
SB-42A-0.5	99.7	Run STLC, Run 1.5 and 2.5 foot sample (As only)
SB-42C-0.5	35.6	Run 1.5 and 2.5 foot sample (As only)
SB-42D-0.5	33.8	Run 1.5 and 2.5 foot sample (As only)
SB-47C-0.5	131	Run STLC and TCLP, Run 1.5 and 2.5 sample (As only)
SB-50B-0.5	633	Haz Waste (>500 mg/kg), Run STLC and TCLP, Run 1.5 foot sample
SB-50D-0.5	69.0	Run STLC, Run 1.5 foot sample (As only)
SB-51B-0.5	395	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-51C-0.5	136	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-51D-0.5	92.9	Run STLC, Run 1.5 foot sample (As only)
SB-53D-0.5	136	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-55B-0.5	87.3	Run STLC, Run 1.5 foot sample (As only)
SB-55C-0.5	55.4	Run STLC, Run 1.5 foot sample (As only)
SB-57B-0.5	151	Run STLC and TCLP, Run 1.5 foot sample (As only)

Note: **Blue = Result <50 mg/kg**
Red = Result >50 mg/kg (run STLC)
Black = Result >100 mg/kg (run STLC and TCLP)
Purple = Result >500 mg/kg (Hazardous waste)

Chris A. Guesnon
Senior Geologist

Environmental Remediation and Compliance Services

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MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard

Lab Request: 418919
Report Date: 09/19/2019
Date Received: 09/03/2019
Client ID: 12860

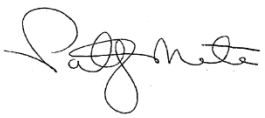
Comments: Shenandoah
029RC1-191395
PO# 1038854
2450 Shenandoah St., Los Angeles, CA

Report includes additional STLC, TCLP and Total Arsenic results per client's 9/12/19 email request.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID
418919-001	SB-37C2-0.5'	418919-025	EQUIPMENT BLANK
418919-002	SB-37C2-1.5'	418919-026	SB-37D2-0.5' (DUP)
418919-003	SB-37D2-0.5'		
418919-004	SB-37D2-1.5'		
418919-005	SB-42A2-0.5'		
418919-006	SB-42A2-1.5'		
418919-007	SB-42D2-0.5'		
418919-008	SB-42D2-1.5'		
418919-009	SB-50B2-0.5'		
418919-010	SB-50B2-1.5'		
418919-011	SB-50A2-0.5'		
418919-012	SB-50A2-1.5'		
418919-013	SB-50A2-2.5'		
418919-014	SB-50AB2-0.5'		
418919-015	SB-50AB2-1.5'		
418919-016	SB-53D2-0.5'		
418919-017	SB-53D2-1.5'		
418919-018	SB-55B2-0.5'		
418919-019	SB-55B2-1.5'		
418919-020	SB-50AB2-0.5' (DUP)		
418919-021	SB-55C2-0.5'		
418919-022	SB-55C2-1.5'		
418919-023	SB-57B2-0.5'		
418919-024	SB-57B2-1.5'		

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.



Report Review performed by: Patricia Mata, PM

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:03 **Site:**
Sample #: **418919-001** **Client Sample #:** SB-37C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**1.766**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**14.2**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**189**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:04 **Site:**
Sample #: **418919-002** **Client Sample #:** SB-37C2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**38.2**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:46 **Site:**
Sample #: **418919-003** **Client Sample #:** SB-37D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**2.68**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**57.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:48 **Site:**
Sample #: **418919-004** **Client Sample #:** SB-37D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**35.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:32 **Site:**
Sample #: **418919-005** **Client Sample #:** SB-42A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**43.2**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:36 **Site:**
Sample #: **418919-006** **Client Sample #:** SB-42A2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.37**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:00 **Site:**
Sample #: **418919-007** **Client Sample #:** SB-42D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**2.99**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**61.9**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:09 **Site:**
Sample #: **418919-008** **Client Sample #:** SB-42D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**7.52**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:15 **Site:**
Sample #: **418919-009** **Client Sample #:** SB-50B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**1.465**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**7.78**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**140**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:21 **Site:**
Sample #: **418919-010** **Client Sample #:** SB-50B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.62**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:54 **Site:**
Sample #: **418919-011** **Client Sample #:** SB-50A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**9.94**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:02 **Site:**
Sample #: **418919-012** **Client Sample #:** SB-50A2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:05 **Site:**
Sample #: **418919-013** **Client Sample #:** SB-50A2-2.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-014** **Client Sample #:** SB-50AB2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**6.34**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:43 **Site:**
Sample #: **418919-015** **Client Sample #:** SB-50AB2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**6.02**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:21 **Site:**
Sample #: **418919-016** **Client Sample #:** SB-53D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**0.907**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**5.30**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**118**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:25 **Site:**
Sample #: **418919-017** **Client Sample #:** SB-53D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**7.12**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:41 **Site:**
Sample #: **418919-018** **Client Sample #:** SB-55B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**4.08**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**86.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:46 **Site:**
Sample #: **418919-019** **Client Sample #:** SB-55B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method:	Prep Method:						QCBatchID:		
N/A	**N/A**	1							

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-020** **Client Sample #:** SB-50AB2-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**14.1**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:44 **Site:**
Sample #: **418919-021** **Client Sample #:** SB-55C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**1.556**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**6.67**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**128**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:49 **Site:**
Sample #: **418919-022** **Client Sample #:** SB-55C2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**17.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:46 **Site:**
Sample #: **418919-023** **Client Sample #:** SB-57B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**4.93**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**99.3**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:52 **Site:**
Sample #: **418919-024** **Client Sample #:** SB-57B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.01**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 13:30 **Site:**
Sample #: **418919-025** **Client Sample #:** EQUIPMENT BLANK **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3010A						QCBatchID: QC1206200		
Arsenic	ND	1	0.31	2	ug/L	09/04/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:46 **Site:**
Sample #: **418919-026** **Client Sample #:** SB-37D2-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**48.6**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

QCBatchID: QC1206185 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/03/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206185MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185LCS1											
Arsenic	50		46.7		mg/Kg	93			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185MS1, QC1206185MSD1												**Source: 416462-006**
Arsenic	11.1	50	50	49.6	49.7	mg/Kg	77	77	0.2	75-125	20	

QCBatchID: QC1206200 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Water **Analyzed:** 09/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206200MB1					
Arsenic	ND	ug/L	0.31	2	
Copper	ND	ug/L	0.12	3	
Zinc	**3.05 J**	ug/L	2.7	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200LCS1											
Arsenic	50		46.3		ug/L	93			80-120		
Copper	50		46.7		ug/L	93			80-120		
Zinc	50		50.4		ug/L	101			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200MS1, QC1206200MSD1												**Source: 418919-025**
Arsenic	ND	50	50	47.4	47.5	ug/L	95	95	0.2	75-125	20	
Copper	0.5	50	50	47.4	48.2	ug/L	94	95	1.7	75-125	20	
Zinc	3.50	50	50	50.3	51.4	ug/L	94	96	2.2	75-125	20	

QCBatchID: QC1206688 **Analyst:** wragsdale **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/16/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206688MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688LCS1											
Arsenic	100		96.5		mg/Kg	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688MS1, QC1206688MSD1												**Source: 418919-002**
Arsenic	38.2	100	100	122	107	mg/Kg	84	69	13.1	75-125	20	M

QCBatchID: QC1206690 **Analyst:** wragsdale **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/16/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1206690MB1						
Arsenic	**0.101**		mg/L	0.008	0.03	
Barium	**0.007**	**J**	mg/L	0.002	0.03	
Cadmium	**0.005**	**J**	mg/L	0.001	0.015	
Lead	**0.012**	**J**	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1206690LCS1, QC1206690LCSD1											
Arsenic	20	20	19.6	18.2	mg/L	98	91	7	80-120	20	
Barium	20	20	17.9	17.3	mg/L	90	87	3	80-120	20	
Cadmium	20	20	17.6	17.2	mg/L	88	86	2	80-120	20	
Lead	20	20	17.5	16.8	mg/L	88	84	4	80-120	20	

QCBatchID: QC1206731 **Analyst:** kedy **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/17/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1206731MB1						
Arsenic	ND		mg/L	0.008	0.05	
Barium	**0.13**	**J**	mg/L	0.002	0.5	
Beryllium	ND		mg/L	0.001	0.05	
Cadmium	ND		mg/L	0.001	0.05	
Chromium	**0.003**	**J**	mg/L	0.002	0.05	
Cobalt	**0.002**	**J**	mg/L	0.001	0.05	
Copper	**0.012**	**J**	mg/L	0.004	0.05	
Lead	ND		mg/L	0.005	0.05	
Molybdenum	**0.010**	**J**	mg/L	0.005	0.05	
Nickel	**0.006**	**J**	mg/L	0.003	0.05	
Selenium	ND		mg/L	0.016	0.05	
Silver	ND		mg/L	0.003	0.05	
Thallium	**0.011**	**J**	mg/L	0.009	0.05	
Vanadium	**0.005**	**J**	mg/L	0.002	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731LCS1											
Antimony	2		2.06		mg/L	103			80-120		
Arsenic	2		2.04		mg/L	102			80-120		
Barium	2		2.12		mg/L	106			80-120		
Beryllium	2		1.84		mg/L	92			80-120		
Cadmium	2		2.11		mg/L	106			80-120		
Chromium	2		2.02		mg/L	101			80-120		
Cobalt	2		1.92		mg/L	96			80-120		
Copper	2		2.08		mg/L	104			80-120		
Lead	2		1.880		mg/L	94			80-120		
Molybdenum	2		2.07		mg/L	104			80-120		
Nickel	2		1.82		mg/L	91			80-120		
Selenium	2		2.09		mg/L	105			80-120		
Silver	2		1.884		mg/L	94			80-120		
Thallium	2		1.63		mg/L	82			80-120		
Vanadium	2		2.07		mg/L	104			80-120		
Zinc	2		2.12		mg/L	106			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Arsenic	1.766	1	1	2.94	3.00	mg/L	117	123	2.0	75-125	20	
Barium	0.58	1	1	1.53	1.52	mg/L	95	94	0.7	75-125	20	
Beryllium	0.004	1	1	0.956	0.928	mg/L	95	92	3.0	75-125	20	
Cadmium	0.004	1	1	1.027	0.998	mg/L	102	99	2.9	75-125	20	
Chromium	0.012	1	1	1.015	0.998	mg/L	100	99	1.7	75-125	20	
Cobalt	0.007	1	1	0.942	0.905	mg/L	94	90	4.0	75-125	20	
Copper	0.022	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Lead	0.014	1	1	0.977	0.980	mg/L	96	97	0.3	75-125	20	
Molybdenum	0.010	1	1	1.06	1.08	mg/L	105	107	1.9	75-125	20	
Nickel	0.012	1	1	0.920	0.923	mg/L	91	91	0.3	75-125	20	
Selenium	ND	1	1	0.986	1.030	mg/L	99	103	4.4	75-125	20	
Silver	0.008	1	1	0.963	1.097	mg/L	96	109	13.0	75-125	20	

QCBatchID: QC1206731	**Analyst:** kedy	**Method:** EPA 6010B	
Matrix: Solid	**Analyzed:** 09/17/2019	**Instrument:** AAICP (group)	

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Thallium	0.032	1	1	0.857	0.886	mg/L	83	85	3.3	75-125	20	
Vanadium	0.017	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Zinc	0.281	1	1	1.353	1.265	mg/L	107	98	6.7	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 419819

Page: 1 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RCI-191395
Address:	1631 E. 1st Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA, CA
Phone:	7149196500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-37C2-0.5'	08/30/2019	1003	S	8oz glass	ICE	X	Hold all 1.5' samples
2	SB-37C2-1.5'	"	1004	"	"	"	X	Hold
3	SB-37D2-0.5'	"	0946	"	4oz glass	"	X	
4	SB-37D2-1.5'	"	0948	"	8oz glass	"	X	Hold
5	SB-42A2-0.5'	"	1132	"	"	"	X	
6	SB-42A2-1.5'	"	1136	"	"	"	X	Hold
7	SB-42D2-0.5'	"	1200	"	"	"	X	
8	SB-42D2-1.5'	"	1209	"	"	"	X	Hold
9	SB-50B2-0.5'	"	1015	"	"	"	X	
10	SB-50B2-1.5'	"	1021	"	"	"	X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:	Sean Hyde	Sean Hyde	Montrose - Geologist	09/03/2019 0900
[1] Received By:		Catherine Lopez	EA	9/3/19 900
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 2 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dan Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E. St. Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA/CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-50A2-0.5'	08/30/2019	1054	S	8 oz glass	ICE	X	Hold all 1.5' samples
2	SB-50A2-1.5'	"	1102	"	"	"	X	Hold
3	SB-50A2-2.5'	"	1105	"	"	"	X	Hold
4	SB-50AB2-0.5'	"	1040	"	4 oz glass	"	X	
5	SB-50AB2-1.5'	"	1043	"	8 oz glass	"	X	Hold
6	SB-53D2-0.5'	"	1221	"	"	"	X	
7	SB-53D2-1.5'	"	1225	"	"	"	X	Hold
8	SB-55B2-0.5'	"	1241	"	"	"	X	
9	SB-55B2-1.5'	"	1246	"	"	"	X	Hold
10	SB-50AB2-~~Dup 0.5~~ 0.5(DUP)	"	1040	"	4 oz glass	"	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Sean Hyde	Montrose — Geologist	0900 09/03/2019
1 Received By:		[illegible]	E.A	9/3/19 940
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 3 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E St Andrew Place	P.O. #:	PO ~~1035640~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S. Hyde / K Kern

Analysis Request

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-55C2-0.5'	08/30/2019	1244	S	8oz glass	ICE	X	
2	SB-55C2-1.5'	08/30/2019	1249				X	Hold
3	SB-57B2-0.5'		1146				X	
4	SB-57B2-1.5'		1152				X	Hold
5	EQUIPMENT BLANK 1		1330	W	2X 250 mL	HNO_3 + ~~ICE~~	X	
6	SB-37D2-0.5 (DUP)	08/30/2019	0946	S	4 oz glass	ICE	X	
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Sean Hyde	Montrose - geologist	09/03/2019 0900
1 Received By:	[signature]	Catherine Dea	EA	9/3/19 900
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: _____

Date Received: 09/03/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 6.6 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 0.1 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____ ☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 9/3/17

Patty Mata

From: Chris Guesnon
Sent: Thursday, September 12, 2019 1:07 PM
To: Patty Mata; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Sorry Patty. Thanks for pointing that out. Please run SB-50AB2-1.5. The Table below has been updated.

From: Patty Mata [mailto:patty.mata@enthalpy.com]
Sent: Thursday, September 12, 2019 12:55 PM
To: Chris Guesnon; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Chris,
I've added the STLC and TCLP tests to the 0.5' samples and I've added total As to the 1.5' samples as requested, except for the DUP sample. The DUP sample we received is the AB sample (SB-50AB2-0.5' (DUP)), not the A sample, and we only received the 0.5' depth. What would you like done for this sample?

With Regards,

Patty Mata
Project Manager
Direct (714) 771-9930

ENTHALPY ANALYTICAL

From: Chris Guesnon <cguesnon@montrose-env.com>
Sent: Thursday, September 12, 2019 12:08 PM
To: Patty Mata <patty.mata@enthalpy.com>; Ranjit Clarke <Ranjit.Clarke@enthalpy.com>
Cc: dnygaard@montrose-env.com; kkern@montrose-env.com; shyde@montrose-env.com
Subject: FW: Exceedances at Shenandoah

Hi Patty. Please complete the additional analyses for Shenandoah Elementary School, as listed below, on standard TAT:

Sample ID	Arsenic Results (mg/kg)	Comment
SB-37C2-0.5	189	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-37D2-0.5	57.4	Run STLC, Run 1.5 foot sample (As only)
SB-42A2-0.5	43.2	Run 1.5 foot sample (As only)
SB-42D2-0.5	61.9	Run STLC, Run 1.5 foot sample (As only)
SB-50AB2-0.5 (Dup)	14.1	Run 1.5 foot sample (As only)
SB-50B2-0.5	140	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-53D2-0.5	118	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-55B2-0.5	86.4	Run STLC, Run 1.5 foot sample (As only)
SB-55C2-0.5	128	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-57B2-0.5	99.3	Run STLC, Run 1.5 foot sample (As only)

Thank you.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

1631 E. St. Andrew Place, Santa Ana, CA 92705
t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@montrose-env.com
www.montrose-env.com

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Sdndvh#frqvlghu#wkh#hqylurqphqw#ehiruh#sulqwlqj

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering	Lab Request:	418919
Address:	1 Park Plaza	Report Date:	09/27/2019
	Suite #1000	Date Received:	09/03/2019
	Irvine, CA 92614	Client ID:	12860
Attn:	Dane Nygaard		

Comments: Shenandoah
029RC1-191395
PO# 1038854
2450 Shenandoah St., Los Angeles, CA

Report includes additional STLC, TCLP and Total Arsenic results per client's 9/12/19 email request, including sample SB-55B2-1.5.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
418919-001	SB-37C2-0.5'
418919-002	SB-37C2-1.5'
418919-003	SB-37D2-0.5'
418919-004	SB-37D2-1.5'
418919-005	SB-42A2-0.5'
418919-006	SB-42A2-1.5'
418919-007	SB-42D2-0.5'
418919-008	SB-42D2-1.5'
418919-009	SB-50B2-0.5'
418919-010	SB-50B2-1.5'
418919-011	SB-50A2-0.5'
418919-014	SB-50AB2-0.5'
418919-015	SB-50AB2-1.5'
418919-016	SB-53D2-0.5'
418919-017	SB-53D2-1.5'
418919-018	SB-55B2-0.5'
418919-019	SB-55B2-1.5'
418919-020	SB-50AB2-0.5' (DUP)
418919-021	SB-55C2-0.5'
418919-022	SB-55C2-1.5'
418919-023	SB-57B2-0.5'
418919-024	SB-57B2-1.5'
418919-025	EQUIPMENT BLANK
418919-026	SB-37D2-0.5' (DUP)

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Diane M. Galvan

Report Review performed by: Diane Galvan, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:03 **Site:**
Sample #: **418919-001** **Client Sample #:** SB-37C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**1.766**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**14.2**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**189**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:04 **Site:**
Sample #: **418919-002** **Client Sample #:** SB-37C2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**38.2**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:46 **Site:**
Sample #: **418919-003** **Client Sample #:** SB-37D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**2.68**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**57.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:48 **Site:**
Sample #: **418919-004** **Client Sample #:** SB-37D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**35.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:32 **Site:**
Sample #: **418919-005** **Client Sample #:** SB-42A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**43.2**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:36 **Site:**
Sample #: **418919-006** **Client Sample #:** SB-42A2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**5.37**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:00 **Site:**
Sample #: **418919-007** **Client Sample #:** SB-42D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**2.99**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**61.9**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:09 **Site:**
Sample #: **418919-008** **Client Sample #:** SB-42D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**7.52**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:15 **Site:**
Sample #: **418919-009** **Client Sample #:** SB-50B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**1.465**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**7.78**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**140**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:21 **Site:**
Sample #: **418919-010** **Client Sample #:** SB-50B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.62**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:54 **Site:**
Sample #: **418919-011** **Client Sample #:** SB-50A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**9.94**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-014** **Client Sample #:** SB-50AB2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**6.34**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:43 **Site:**
Sample #: **418919-015** **Client Sample #:** SB-50AB2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**6.02**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:21 **Site:**
Sample #: **418919-016** **Client Sample #:** SB-53D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**0.907**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**5.30**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**118**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:25 **Site:**
Sample #: **418919-017** **Client Sample #:** SB-53D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**7.12**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:41 **Site:**
Sample #: **418919-018** **Client Sample #:** SB-55B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**4.08**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**86.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:46 **Site:**
Sample #: **418919-019** **Client Sample #:** SB-55B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1207077		
Arsenic	**7.83**	5	0.54	1.5	mg/Kg	09/26/19	09/27/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-020** **Client Sample #:** SB-50AB2-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**14.1**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:44 **Site:**
Sample #: **418919-021** **Client Sample #:** SB-55C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**1.556**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**6.67**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**128**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 12:49	**Site:**			
Sample #:	**418919-022**	**Client Sample #:**	SB-55C2-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**17.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 11:46	**Site:**			
Sample #:	**418919-023**	**Client Sample #:**	SB-57B2-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**4.93**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**99.3**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 11:52	**Site:**			
Sample #:	**418919-024**	**Client Sample #:**	SB-57B2-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.01**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 13:30	**Site:**			
Sample #:	**418919-025**	**Client Sample #:**	EQUIPMENT BLANK	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3010A						QCBatchID: QC1206200		
Arsenic	ND	1	0.31	2	ug/L	09/04/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 09:46	**Site:**			
Sample #:	**418919-026**	**Client Sample #:**	SB-37D2-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**48.6**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

QCBatchID: QC1206185 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/03/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206185MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185LCS1											
Arsenic	50		46.7		mg/Kg	93			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185MS1, QC1206185MSD1												**Source: 416462-006**
Arsenic	11.1	50	50	49.6	49.7	mg/Kg	77	77	0.2	75-125	20	

QCBatchID: QC1206200 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Water **Analyzed:** 09/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206200MB1					
Arsenic	ND	ug/L	0.31	2	
Copper	ND	ug/L	0.12	3	
Zinc	**3.05 J**	ug/L	2.7	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200LCS1											
Arsenic	50		46.3		ug/L	93			80-120		
Copper	50		46.7		ug/L	93			80-120		
Zinc	50		50.4		ug/L	101			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200MS1, QC1206200MSD1												**Source: 418919-025**
Arsenic	ND	50	50	47.4	47.5	ug/L	95	95	0.2	75-125	20	
Copper	0.5	50	50	47.4	48.2	ug/L	94	95	1.7	75-125	20	
Zinc	3.50	50	50	50.3	51.4	ug/L	94	96	2.2	75-125	20	

QCBatchID: QC1206688 **Analyst:** wragsdale **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/16/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206688MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688LCS1											
Arsenic	100		96.5		mg/Kg	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688MS1, QC1206688MSD1												**Source: 418919-002**
Arsenic	38.2	100	100	122	107	mg/Kg	84	69	13.1	75-125	20	M

QCBatchID:	**QC1206690**	**Analyst:**	wragsdale	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	09/16/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1206690MB1						
Arsenic	**0.101**		mg/L	0.008	0.03	
Barium	**0.007**	**J**	mg/L	0.002	0.03	
Cadmium	**0.005**	**J**	mg/L	0.001	0.015	
Lead	**0.012**	**J**	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1206690LCS1, QC1206690LCSD1											
Arsenic	20	20	19.6	18.2	mg/L	98	91	7	80-120	20	
Barium	20	20	17.9	17.3	mg/L	90	87	3	80-120	20	
Cadmium	20	20	17.6	17.2	mg/L	88	86	2	80-120	20	
Lead	20	20	17.5	16.8	mg/L	88	84	4	80-120	20	

QCBatchID: QC1206731 **Analyst:** kedy **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/17/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206731MB1					
Arsenic	ND	mg/L	0.008	0.05	
Barium	**0.13 J**	mg/L	0.002	0.5	
Beryllium	ND	mg/L	0.001	0.05	
Cadmium	ND	mg/L	0.001	0.05	
Chromium	**0.003 J**	mg/L	0.002	0.05	
Cobalt	**0.002 J**	mg/L	0.001	0.05	
Copper	**0.012 J**	mg/L	0.004	0.05	
Lead	ND	mg/L	0.005	0.05	
Molybdenum	**0.010 J**	mg/L	0.005	0.05	
Nickel	**0.006 J**	mg/L	0.003	0.05	
Selenium	ND	mg/L	0.016	0.05	
Silver	ND	mg/L	0.003	0.05	
Thallium	**0.011 J**	mg/L	0.009	0.05	
Vanadium	**0.005 J**	mg/L	0.002	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731LCS1											
Antimony	2		2.06		mg/L	103			80-120		
Arsenic	2		2.04		mg/L	102			80-120		
Barium	2		2.12		mg/L	106			80-120		
Beryllium	2		1.84		mg/L	92			80-120		
Cadmium	2		2.11		mg/L	106			80-120		
Chromium	2		2.02		mg/L	101			80-120		
Cobalt	2		1.92		mg/L	96			80-120		
Copper	2		2.08		mg/L	104			80-120		
Lead	2		1.880		mg/L	94			80-120		
Molybdenum	2		2.07		mg/L	104			80-120		
Nickel	2		1.82		mg/L	91			80-120		
Selenium	2		2.09		mg/L	105			80-120		
Silver	2		1.884		mg/L	94			80-120		
Thallium	2		1.63		mg/L	82			80-120		
Vanadium	2		2.07		mg/L	104			80-120		
Zinc	2		2.12		mg/L	106			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Arsenic	1.766	1	1	2.94	3.00	mg/L	117	123	2.0	75-125	20	
Barium	0.58	1	1	1.53	1.52	mg/L	95	94	0.7	75-125	20	
Beryllium	0.004	1	1	0.956	0.928	mg/L	95	92	3.0	75-125	20	
Cadmium	0.004	1	1	1.027	0.998	mg/L	102	99	2.9	75-125	20	
Chromium	0.012	1	1	1.015	0.998	mg/L	100	99	1.7	75-125	20	
Cobalt	0.007	1	1	0.942	0.905	mg/L	94	90	4.0	75-125	20	
Copper	0.022	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Lead	0.014	1	1	0.977	0.980	mg/L	96	97	0.3	75-125	20	
Molybdenum	0.010	1	1	1.06	1.08	mg/L	105	107	1.9	75-125	20	
Nickel	0.012	1	1	0.920	0.923	mg/L	91	91	0.3	75-125	20	
Selenium	ND	1	1	0.986	1.030	mg/L	99	103	4.4	75-125	20	
Silver	0.008	1	1	0.963	1.097	mg/L	96	109	13.0	75-125	20	

QCBatchID: QC1206731	**Analyst:** kedy	**Method:** EPA 6010B	
Matrix: Solid	**Analyzed:** 09/17/2019	**Instrument:** AAICP (group)	

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Thallium	0.032	1	1	0.857	0.886	mg/L	83	85	3.3	75-125	20	
Vanadium	0.017	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Zinc	0.281	1	1	1.353	1.265	mg/L	107	98	6.7	75-125	20	

QCBatchID:	**QC1207077**	**Analyst:**	JParedes	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	09/26/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1207077MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1207077LCS1											
Arsenic	50		48.9		mg/Kg	98			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1207077MS1, QC1207077MSD1												**Source: 418919-019**
Arsenic	7.83	50	50	56.0	53.4	mg/Kg	96	91	4.8	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 419819

Page: 1 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RCI-191395
Address:	1631 E. 1st Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA, CA
Phone:	7149196500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-37C2-0.5'	08/30/2019	1003	S	8oz glass	ICE	X	Hold all 1.5' samples
2	SB-37C2-1.5'	"	1004	"	"	"	X	Hold
3	SB-37D2-0.5'	"	0946	"	4oz glass	"	X	
4	SB-37D2-1.5'	"	0948	"	8oz glass	"	X	Hold
5	SB-42A2-0.5'	"	1132	"	"	"	X	
6	SB-42A2-1.5'	"	1136	"	"	"	X	Hold
7	SB-42D2-0.5'	"	1200	"	"	"	X	
8	SB-42D2-1.5'	"	1209	"	"	"	X	Hold
9	SB-50B2-0.5'	"	1015	"	"	"	X	
10	SB-50B2-1.5'	"	1021	"	"	"	X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:	Sean Hyde	Sean Hyde	Montrose - Geologist	09/03/2019 0900
[1] Received By:		Catherine Lopez	EA	9/3/19 900
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 2 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

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Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dan Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E. St. Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA/CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-50A2-0.5'	08/30/2019	1054	S	8 oz glass	ICE	X	Hold all 1.5' samples
2	SB-50A2-1.5'	"	1102	"	"	"	X	Hold
3	SB-50A2-2.5'	"	1105	"	"	"	X	Hold
4	SB-50AB2-0.5'	"	1040	"	4 oz glass	"	X	
5	SB-50AB2-1.5'	"	1043	"	8 oz glass	"	X	Hold
6	SB-53D2-0.5'	"	1221	"	"	"	X	
7	SB-53D2-1.5'	"	1225	"	"	"	X	Hold
8	SB-55B2-0.5'	"	1241	"	"	"	X	
9	SB-55B2-1.5'	"	1246	"	"	"	X	Hold
10	SB-50AB2-~~Dup 0.5~~ 0.5(DUP)	"	1040	"	4 oz glass	"	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Sean Hyde	Montrose — Geologist	0900 09/03/2019
1 Received By:		[illegible]	E.A	9/3/19 940
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 3 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E St Andrew Place	P.O. #:	PO ~~1035640~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S. Hyde / K Kern

Analysis Request

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-55C2-0.5'	08/30/2019	1244	S	8oz glass	ICE	X	
2	SB-55C2-1.5'	08/30/2019	1249				X	Hold
3	SB-57B2-0.5'		1146				X	
4	SB-57B2-1.5'		1152				X	Hold
5	EQUIPMENT BLANK 1		1330	W	2X 250 mL	HNO_3 + ~~ICE~~	X	
6	SB-37D2-0.5 (DUP)	08/30/2019	0946	S	4 oz glass	ICE	X	
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Sean Hyde	Montrose - geologist	09/03/2019 0900
1 Received By:	[signature]	Catherine Dea	EA	9/3/19 900
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: _____

Date Received: 09/03/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 6.6 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 0.1 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____ ☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 9/3/17

Patty Mata

From: Chris Guesnon
Sent: Thursday, September 12, 2019 1:07 PM
To: Patty Mata; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Sorry Patty. Thanks for pointing that out. Please run SB-50AB2-1.5. The Table below has been updated.

From: Patty Mata [mailto:patty.mata@enthalpy.com]
Sent: Thursday, September 12, 2019 12:55 PM
To: Chris Guesnon; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Chris,
I've added the STLC and TCLP tests to the 0.5' samples and I've added total As to the 1.5' samples as requested, except for the DUP sample. The DUP sample we received is the AB sample (SB-50AB2-0.5' (DUP)), not the A sample, and we only received the 0.5' depth. What would you like done for this sample?

With Regards,

Patty Mata
Project Manager
Direct (714) 771-9930

ENTHALPY ANALYTICAL

From: Chris Guesnon <cguesnon@montrose-env.com>
Sent: Thursday, September 12, 2019 12:08 PM
To: Patty Mata <patty.mata@enthalpy.com>; Ranjit Clarke <Ranjit.Clarke@enthalpy.com>
Cc: dnygaard@montrose-env.com; kkern@montrose-env.com; shyde@montrose-env.com
Subject: FW: Exceedances at Shenandoah

Hi Patty. Please complete the additional analyses for Shenandoah Elementary School, as listed below, on standard TAT:

Sample ID	Arsenic Results (mg/kg)	Comment
SB-37C2-0.5	189	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-37D2-0.5	57.4	Run STLC, Run 1.5 foot sample (As only)
SB-42A2-0.5	43.2	Run 1.5 foot sample (As only)
SB-42D2-0.5	61.9	Run STLC, Run 1.5 foot sample (As only)
SB-50AB2-0.5 (Dup)	14.1	Run 1.5 foot sample (As only)
SB-50B2-0.5	140	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-53D2-0.5	118	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-55B2-0.5	86.4	Run STLC, Run 1.5 foot sample (As only)
SB-55C2-0.5	128	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-57B2-0.5	99.3	Run STLC, Run 1.5 foot sample (As only)

Thank you.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

1631 E. St. Andrew Place, Santa Ana, CA 92705
t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@montrose-env.com
www.montrose-env.com

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Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering	Lab Request:	419266
Address:	1 Park Plaza	Report Date:	10/01/2019
	Suite #1000	Date Received:	09/11/2019
	Irvine, CA 92614	Client ID:	12860
Attn:	Dane Nygaard		

Comments: Shenandoah
029RC1-191395
PO 1038854
2450 Shenandoah St., Los Angeles, CA

Supplemental Report 1 - STLC and TCLP results are now reported for sample "SB-37C3-0.5'".

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
419266-001	SB-37C3-0.5'
419266-002	SB-37C3-1.5'
419266-003	SB-50B3-0.5'
419266-004	SB-50B3-1.5'

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Ranjit K. K. Clarke

Report Review performed by: Ranjit Clarke, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 13:51 **Site:**
Sample #: **419266-001** **Client Sample #:** SB-37C3-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1207182		
Arsenic	**2.30**	1	0.008	0.05	mg/L		09/30/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1207165		
Arsenic	**10.6**	10	0.08	0.3	mg/L		09/30/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206569		
Arsenic	**136**	1	0.108	0.3	mg/Kg	09/12/19	09/12/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 13:56 **Site:**
Sample #: **419266-002** **Client Sample #:** SB-37C3-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206569		
Arsenic	**45.3**	1	0.108	0.3	mg/Kg	09/12/19	09/12/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 13:22 **Site:**
Sample #: **419266-003** **Client Sample #:** SB-50B3-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206569		
Arsenic	**9.12**	1	0.108	0.3	mg/Kg	09/12/19	09/12/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 13:26 **Site:**
Sample #: **419266-004** **Client Sample #:** SB-50B3-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206569		
Arsenic	**8.33**	1	0.108	0.3	mg/Kg	09/12/19	09/12/19	JP	

QCBatchID: QC1206569 **Analyst:** kedy **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/12/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206569MB1					
Arsenic	ND	mg/Kg	0.108	0.3	
Cadmium	ND	mg/Kg	0.141	0.5	
Thallium	ND	mg/Kg	0.128	0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1206569LCS1											
Arsenic	100		98.2		mg/Kg	98			80-120		
Cadmium	100		100		mg/Kg	100			80-120		
Thallium	100		95.1		mg/Kg	95			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1206569MS1, QC1206569MSD1												**Source: 419247-004**
Arsenic	1.416	100	100	77.3	74.2	mg/Kg	76	73	4.1	75-125	20	M
Cadmium	ND	100	100	89.9	84.9	mg/Kg	90	85	5.7	75-125	20	
Thallium	0.162	100	100	80.8	76.7	mg/Kg	81	77	5.2	75-125	20	

QCBatchID: QC1207165 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/30/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1207165MB1					
Arsenic	ND	mg/L	0.008	0.03	
Barium	ND	mg/L	0.002	0.03	
Lead	ND	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1207165LCS1, QC1207165LCSD1											
Arsenic	20	20	20.0	19.6	mg/L	100	98	2	80-120	20	
Barium	20	20	19.9	19.5	mg/L	100	98	2	80-120	20	
Lead	20	20	19.0	19.0	mg/L	95	95	0	80-120	20	

QCBatchID: QC1207182 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/30/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1207182MB1					
Arsenic	**0.011 J**	mg/L	0.008	0.05	
Barium	**0.09 J**	mg/L	0.002	0.5	
Cadmium	ND	mg/L	0.001	0.05	
Chromium	ND	mg/L	0.002	0.05	
Lead	**0.008 J**	mg/L	0.005	0.05	
Selenium	ND	mg/L	0.016	0.05	
Silver	ND	mg/L	0.003	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1207182LCS1											
Arsenic	2		1.946		mg/L	97			80-120		
Barium	2		1.93		mg/L	97			80-120		
Cadmium	2		1.909		mg/L	95			80-120		
Chromium	2		1.936		mg/L	97			80-120		
Lead	2		1.788		mg/L	89			80-120		
Selenium	2		1.783		mg/L	89			80-120		
Silver	2		1.983		mg/L	99			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1207182MS1, QC1207182MSD1												**Source: 419266-001**
Arsenic	2.30	1	1	3.21	3.30	mg/L	91	100	2.8	75-125	20	
Barium	0.58	1	1	1.46	1.47	mg/L	88	89	0.7	75-125	20	
Cadmium	0.002	1	1	0.888	0.884	mg/L	89	88	0.5	75-125	20	
Chromium	0.006	1	1	0.940	0.944	mg/L	93	94	0.4	75-125	20	
Lead	0.031	1	1	0.888	0.920	mg/L	86	89	3.5	75-125	20	
Selenium	0.044	1	1	0.851	0.940	mg/L	81	90	9.9	75-125	20	
Silver	ND	1	1	0.942	0.966	mg/L	94	97	2.5	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: ~~419266~~ ER 09/11/19 419266

Page: 1 of 1

Turn Around Time (rush by advanced notice only)

Standard:	√	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Sherandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E. St Andrew Place	P.O. #:	PO 1038854
	Santa Ana, CA	Address:	2450 Sherandoah St. LA, CA
Phone:	714 916 6500	Global ID:	
Fax:		Sampled By:	SHyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-37C3-0.5'	8/30/2019	1351	S	~~2x~~ 4oz glass	N/A	X	
2	SB-37C3-1.5'	"	1356	S	"	"	X	
3	SB-50B3-0.5'	"	1328	S	"	"	X	
4	SB-50B3-1.5'	"	1326	S	"	"	X	
5								
6								
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Sean Hyde	Montrose / Staff Geologist	09/11/2019 @ 1030
[1] Received By:		Elizabeth R	EA	09/11/19 1030
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

12.35

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: Montrose Eviromental Project: Sherandoah

Date Received: 9/11/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☐ Yes, How many? _____ ☑ No (skip section 2) Sample Temp (°C) (No Cooler): 22.3

Sample Temp (°C), One from each cooler: #1: _____ #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☐ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: _____ #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.		✓	
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?			✓
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

4 4oz jars were received without a cooler and dated from 08/04/2019.

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: EZ Date: 09/11/19

Ranjit Clarke

Subject: Shenandoah - Enthalpy Analytical Final Report #419266

From: Chris Guesnon <cguesnon@montrose-env.com>
Sent: Thursday, September 26, 2019 12:46 PM
To: Patty Mata <patty.mata@enthalpy.com>
Cc: dnygaard@montrose-env.com
Subject: FW: Shenandoah - Enthalpy Analytical Final Report #419266

Hi Patty. Please run STLC and TCLP for sample SB-37C3-0.5. Please provide results as soon as possible.

Thank you.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

MONTROSE ENVIRONMENTAL
1631 E. St. Andrew Place, Santa Ana, CA 92705
t (714) 919-6526
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www.montrose-env.com

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#
Sdndvh#frqvlghu#wkh#hqylurqphqw#ehiruh#sulqwlqj

From: Patty Mata [mailto:patty.mata@enthalpy.com]
Sent: Wednesday, September 18, 2019 11:56 AM
To: dnygaard@es-online.com
Cc: cguesnon@es-online.com; lskow@es-online.com; kkern@es-online.com; asrihiran@es-online.com; sking@es-online.com; vpaitimusa@es-online.com
Subject: Shenandoah - Enthalpy Analytical Final Report #419266

Hi Dane Nygaard,

Attached is your final report #419266.

Thank you.

In accordance with our paperless initiative, we are no longer mailing or faxing reports by default. If you require a hard copy, please inform your Project Manager.

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering	Lab Request:	418919
Address:	1 Park Plaza	Report Date:	09/27/2019
	Suite #1000	Date Received:	09/03/2019
	Irvine, CA 92614	Client ID:	12860
Attn:	Dane Nygaard		

Comments: Shenandoah
029RC1-191395
PO# 1038854
2450 Shenandoah St., Los Angeles, CA

Report includes additional STLC, TCLP and Total Arsenic results per client's 9/12/19 email request, including sample SB-55B2-1.5.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
418919-001	SB-37C2-0.5'
418919-002	SB-37C2-1.5'
418919-003	SB-37D2-0.5'
418919-004	SB-37D2-1.5'
418919-005	SB-42A2-0.5'
418919-006	SB-42A2-1.5'
418919-007	SB-42D2-0.5'
418919-008	SB-42D2-1.5'
418919-009	SB-50B2-0.5'
418919-010	SB-50B2-1.5'
418919-011	SB-50A2-0.5'
418919-014	SB-50AB2-0.5'
418919-015	SB-50AB2-1.5'
418919-016	SB-53D2-0.5'
418919-017	SB-53D2-1.5'
418919-018	SB-55B2-0.5'
418919-019	SB-55B2-1.5'
418919-020	SB-50AB2-0.5' (DUP)
418919-021	SB-55C2-0.5'
418919-022	SB-55C2-1.5'
418919-023	SB-57B2-0.5'
418919-024	SB-57B2-1.5'
418919-025	EQUIPMENT BLANK
418919-026	SB-37D2-0.5' (DUP)

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Diane M. Galvan

Report Review performed by: Diane Galvan, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:03 **Site:**
Sample #: **418919-001** **Client Sample #:** SB-37C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**1.766**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**14.2**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**189**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:04 **Site:**
Sample #: **418919-002** **Client Sample #:** SB-37C2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**38.2**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:46 **Site:**
Sample #: **418919-003** **Client Sample #:** SB-37D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**2.68**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**57.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 09:48 **Site:**
Sample #: **418919-004** **Client Sample #:** SB-37D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**35.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:32 **Site:**
Sample #: **418919-005** **Client Sample #:** SB-42A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**43.2**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 11:36 **Site:**
Sample #: **418919-006** **Client Sample #:** SB-42A2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**5.37**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:00 **Site:**
Sample #: **418919-007** **Client Sample #:** SB-42D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**2.99**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**61.9**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:09 **Site:**
Sample #: **418919-008** **Client Sample #:** SB-42D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**7.52**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:15 **Site:**
Sample #: **418919-009** **Client Sample #:** SB-50B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 1311/3010A						QCBatchID: QC1206731		
Arsenic	**1.465**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**7.78**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**140**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:21 **Site:**
Sample #: **418919-010** **Client Sample #:** SB-50B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.62**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:54 **Site:**
Sample #: **418919-011** **Client Sample #:** SB-50A2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**9.94**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-014** **Client Sample #:** SB-50AB2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**6.34**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:43 **Site:**
Sample #: **418919-015** **Client Sample #:** SB-50AB2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 NELAC	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**6.02**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:21 **Site:**
Sample #: **418919-016** **Client Sample #:** SB-53D2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**0.907**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**5.30**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**118**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:25 **Site:**
Sample #: **418919-017** **Client Sample #:** SB-53D2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206688		
Arsenic	**7.12**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:41 **Site:**
Sample #: **418919-018** **Client Sample #:** SB-55B2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**4.08**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**86.4**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:46 **Site:**
Sample #: **418919-019** **Client Sample #:** SB-55B2-1.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1207077		
Arsenic	**7.83**	5	0.54	1.5	mg/Kg	09/26/19	09/27/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 10:40 **Site:**
Sample #: **418919-020** **Client Sample #:** SB-50AB2-0.5' (DUP) **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**14.1**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 08/30/2019 12:44 **Site:**
Sample #: **418919-021** **Client Sample #:** SB-55C2-0.5' **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1206731		
Arsenic	**1.556**	1	0.008	0.05	mg/L		09/17/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1206690		
Arsenic	**6.67**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1206185		
Arsenic	**128**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 12:49	**Site:**			
Sample #:	**418919-022**	**Client Sample #:**	SB-55C2-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**17.5**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 11:46	**Site:**			
Sample #:	**418919-023**	**Client Sample #:**	SB-57B2-0.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1206690		
Arsenic	**4.93**	10	0.08	0.3	mg/L		09/18/19	SBW	
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**99.3**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 11:52	**Site:**			
Sample #:	**418919-024**	**Client Sample #:**	SB-57B2-1.5'	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206688		
Arsenic	**5.01**	1	0.108	0.3	mg/Kg		09/16/19	JP	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 13:30	**Site:**			
Sample #:	**418919-025**	**Client Sample #:**	EQUIPMENT BLANK	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3010A						QCBatchID: QC1206200		
Arsenic	ND	1	0.31	2	ug/L	09/04/19	09/04/19	JP	

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	08/30/2019 09:46	**Site:**			
Sample #:	**418919-026**	**Client Sample #:**	SB-37D2-0.5' (DUP)	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6020 *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206185		
Arsenic	**48.6**	10	1.08	3	mg/Kg	09/03/19	09/04/19	JP	

QCBatchID: QC1206185 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/03/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206185MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185LCS1											
Arsenic	50		46.7		mg/Kg	93			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206185MS1, QC1206185MSD1												**Source: 416462-006**
Arsenic	11.1	50	50	49.6	49.7	mg/Kg	77	77	0.2	75-125	20	

QCBatchID: QC1206200 **Analyst:** JParedes **Method:** EPA 6020

Matrix: Water **Analyzed:** 09/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206200MB1					
Arsenic	ND	ug/L	0.31	2	
Copper	ND	ug/L	0.12	3	
Zinc	**3.05 J**	ug/L	2.7	10	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200LCS1											
Arsenic	50		46.3		ug/L	93			80-120		
Copper	50		46.7		ug/L	93			80-120		
Zinc	50		50.4		ug/L	101			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206200MS1, QC1206200MSD1												**Source: 418919-025**
Arsenic	ND	50	50	47.4	47.5	ug/L	95	95	0.2	75-125	20	
Copper	0.5	50	50	47.4	48.2	ug/L	94	95	1.7	75-125	20	
Zinc	3.50	50	50	50.3	51.4	ug/L	94	96	2.2	75-125	20	

QCBatchID: QC1206688 **Analyst:** wragsdale **Method:** EPA 6020

Matrix: Solid **Analyzed:** 09/16/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206688MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688LCS1											
Arsenic	100		96.5		mg/Kg	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206688MS1, QC1206688MSD1												**Source: 418919-002**
Arsenic	38.2	100	100	122	107	mg/Kg	84	69	13.1	75-125	20	M

QCBatchID:	**QC1206690**	**Analyst:**	wragsdale	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	09/16/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result		Units	MDL	RDL	Notes
QC1206690MB1						
Arsenic	**0.101**		mg/L	0.008	0.03	
Barium	**0.007**	**J**	mg/L	0.002	0.03	
Cadmium	**0.005**	**J**	mg/L	0.001	0.015	
Lead	**0.012**	**J**	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1206690LCS1, QC1206690LCSD1											
Arsenic	20	20	19.6	18.2	mg/L	98	91	7	80-120	20	
Barium	20	20	17.9	17.3	mg/L	90	87	3	80-120	20	
Cadmium	20	20	17.6	17.2	mg/L	88	86	2	80-120	20	
Lead	20	20	17.5	16.8	mg/L	88	84	4	80-120	20	

QCBatchID: QC1206731 **Analyst:** kedy **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 09/17/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206731MB1					
Arsenic	ND	mg/L	0.008	0.05	
Barium	**0.13 J**	mg/L	0.002	0.5	
Beryllium	ND	mg/L	0.001	0.05	
Cadmium	ND	mg/L	0.001	0.05	
Chromium	**0.003 J**	mg/L	0.002	0.05	
Cobalt	**0.002 J**	mg/L	0.001	0.05	
Copper	**0.012 J**	mg/L	0.004	0.05	
Lead	ND	mg/L	0.005	0.05	
Molybdenum	**0.010 J**	mg/L	0.005	0.05	
Nickel	**0.006 J**	mg/L	0.003	0.05	
Selenium	ND	mg/L	0.016	0.05	
Silver	ND	mg/L	0.003	0.05	
Thallium	**0.011 J**	mg/L	0.009	0.05	
Vanadium	**0.005 J**	mg/L	0.002	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731LCS1											
Antimony	2		2.06		mg/L	103			80-120		
Arsenic	2		2.04		mg/L	102			80-120		
Barium	2		2.12		mg/L	106			80-120		
Beryllium	2		1.84		mg/L	92			80-120		
Cadmium	2		2.11		mg/L	106			80-120		
Chromium	2		2.02		mg/L	101			80-120		
Cobalt	2		1.92		mg/L	96			80-120		
Copper	2		2.08		mg/L	104			80-120		
Lead	2		1.880		mg/L	94			80-120		
Molybdenum	2		2.07		mg/L	104			80-120		
Nickel	2		1.82		mg/L	91			80-120		
Selenium	2		2.09		mg/L	105			80-120		
Silver	2		1.884		mg/L	94			80-120		
Thallium	2		1.63		mg/L	82			80-120		
Vanadium	2		2.07		mg/L	104			80-120		
Zinc	2		2.12		mg/L	106			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Arsenic	1.766	1	1	2.94	3.00	mg/L	117	123	2.0	75-125	20	
Barium	0.58	1	1	1.53	1.52	mg/L	95	94	0.7	75-125	20	
Beryllium	0.004	1	1	0.956	0.928	mg/L	95	92	3.0	75-125	20	
Cadmium	0.004	1	1	1.027	0.998	mg/L	102	99	2.9	75-125	20	
Chromium	0.012	1	1	1.015	0.998	mg/L	100	99	1.7	75-125	20	
Cobalt	0.007	1	1	0.942	0.905	mg/L	94	90	4.0	75-125	20	
Copper	0.022	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Lead	0.014	1	1	0.977	0.980	mg/L	96	97	0.3	75-125	20	
Molybdenum	0.010	1	1	1.06	1.08	mg/L	105	107	1.9	75-125	20	
Nickel	0.012	1	1	0.920	0.923	mg/L	91	91	0.3	75-125	20	
Selenium	ND	1	1	0.986	1.030	mg/L	99	103	4.4	75-125	20	
Silver	0.008	1	1	0.963	1.097	mg/L	96	109	13.0	75-125	20	

QCBatchID: QC1206731	**Analyst:** kedy	**Method:** EPA 6010B	
Matrix: Solid	**Analyzed:** 09/17/2019	**Instrument:** AAICP (group)	

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206731MS1, QC1206731MSD1												**Source: 418919-001**
Thallium	0.032	1	1	0.857	0.886	mg/L	83	85	3.3	75-125	20	
Vanadium	0.017	1	1	1.04	1.02	mg/L	102	100	1.9	75-125	20	
Zinc	0.281	1	1	1.353	1.265	mg/L	107	98	6.7	75-125	20	

QCBatchID:	**QC1207077**	**Analyst:**	JParedes	**Method:**	EPA 6020
Matrix:	Solid	**Analyzed:**	09/26/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1207077MB1					
Arsenic	ND	mg/Kg	0.108	0.3	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1207077LCS1											
Arsenic	50		48.9		mg/Kg	98			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1207077MS1, QC1207077MSD1												**Source: 418919-019**
Arsenic	7.83	50	50	56.0	53.4	mg/Kg	96	91	4.8	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 419819

Page: 1 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RCI-191395
Address:	1631 E. 1st Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA, CA
Phone:	7149196500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-37C2-0.5'	08/30/2019	1003	S	8oz glass	ICE	X	Hold all 1.5' samples
2	SB-37C2-1.5'	"	1004	"	"	"	X	Hold
3	SB-37D2-0.5'	"	0946	"	4oz glass	"	X	
4	SB-37D2-1.5'	"	0948	"	8oz glass	"	X	Hold
5	SB-42A2-0.5'	"	1132	"	"	"	X	
6	SB-42A2-1.5'	"	1136	"	"	"	X	Hold
7	SB-42D2-0.5'	"	1200	"	"	"	X	
8	SB-42D2-1.5'	"	1209	"	"	"	X	Hold
9	SB-50B2-0.5'	"	1015	"	"	"	X	
10	SB-50B2-1.5'	"	1021	"	"	"	X	Hold

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:	Sean Hyde	Sean Hyde	Montrose - Geologist	09/03/2019 0900
[1] Received By:		Catherine Lopez	EA	9/3/19 900
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 2 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

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Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dan Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E. St. Andrew Place	P.O. #:	PO ~~1035690~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA/CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S Hyde / K Kern

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-50A2-0.5'	08/30/2019	1054	S	8 oz glass	ICE	X	Hold all 1.5' samples
2	SB-50A2-1.5'	"	1102	"	"	"	X	Hold
3	SB-50A2-2.5'	"	1105	"	"	"	X	Hold
4	SB-50AB2-0.5'	"	1040	"	4 oz glass	"	X	
5	SB-50AB2-1.5'	"	1043	"	8 oz glass	"	X	Hold
6	SB-53D2-0.5'	"	1221	"	"	"	X	
7	SB-53D2-1.5'	"	1225	"	"	"	X	Hold
8	SB-55B2-0.5'	"	1241	"	"	"	X	
9	SB-55B2-1.5'	"	1246	"	"	"	X	Hold
10	SB-50AB2-~~Dup 0.5~~ 0.5(DUP)	"	1040	"	4 oz glass	"	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Sean Hyde	Montrose — Geologist	0900 09/03/2019
1 Received By:		[illegible]	E.A	9/3/19 940
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 418919

Page: 3 of 3

Turn Around Time (rush by advanced notice only)

Standard:	✓	5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

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931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Montrose Environmental	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E St Andrew Place	P.O. #:	PO ~~103 5640~~ 1038854
	Santa Ana, CA	Address:	2450 Shenandoah St, LA CA
Phone:	714 919 6500	Global ID:	
Fax:		Sampled By:	S. Hyde / K Kern

Analysis Request

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Arsenic (EPA 6020)	Test Instructions / Comments
1	SB-55C2-0.5'	08/30/2019	1244	S	8oz glass	ICE	X	
2	SB-55C2-1.5'	08/30/2019	1249				X	Hold
3	SB-57B2-0.5'		1146				X	
4	SB-57B2-1.5'		1152				X	Hold
5	EQUIPMENT BLANK 1		1330	W	2X 250 mL	HNO_3 + ~~ICE~~	X	
6	SB-37D2-0.5 (DUP)	08/30/2019	0946	S	4 oz glass	ICE	X	
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Sean Hyde	Montrose - geologist	09/03/2019 0900
1 Received By:	[signature]	Catherine Dea	EA	9/3/19 900
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: _____

Date Received: 09/03/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 6.6 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 0.1 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)	✓		
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____ ☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 9/3/17

Patty Mata

From: Chris Guesnon
Sent: Thursday, September 12, 2019 1:07 PM
To: Patty Mata; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Sorry Patty. Thanks for pointing that out. Please run SB-50AB2-1.5. The Table below has been updated.

From: Patty Mata [mailto:patty.mata@enthalpy.com]
Sent: Thursday, September 12, 2019 12:55 PM
To: Chris Guesnon; Ranjit Clarke
Cc: Dane Nygaard; Kristopher Kern; Sean Mitchell Hyde
Subject: RE: Exceedances at Shenandoah

Chris,
I've added the STLC and TCLP tests to the 0.5' samples and I've added total As to the 1.5' samples as requested, except for the DUP sample. The DUP sample we received is the AB sample (SB-50AB2-0.5' (DUP)), not the A sample, and we only received the 0.5' depth. What would you like done for this sample?

With Regards,

Patty Mata
Project Manager
Direct (714) 771-9930

ENTHALPY ANALYTICAL

From: Chris Guesnon <cguesnon@montrose-env.com>
Sent: Thursday, September 12, 2019 12:08 PM
To: Patty Mata <patty.mata@enthalpy.com>; Ranjit Clarke <Ranjit.Clarke@enthalpy.com>
Cc: dnygaard@montrose-env.com; kkern@montrose-env.com; shyde@montrose-env.com
Subject: FW: Exceedances at Shenandoah

Hi Patty. Please complete the additional analyses for Shenandoah Elementary School, as listed below, on standard TAT:

Sample ID	Arsenic Results (mg/kg)	Comment
SB-37C2-0.5	189	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-37D2-0.5	57.4	Run STLC, Run 1.5 foot sample (As only)
SB-42A2-0.5	43.2	Run 1.5 foot sample (As only)
SB-42D2-0.5	61.9	Run STLC, Run 1.5 foot sample (As only)
SB-50AB2-0.5 (Dup)	14.1	Run 1.5 foot sample (As only)
SB-50B2-0.5	140	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-53D2-0.5	118	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-55B2-0.5	86.4	Run STLC, Run 1.5 foot sample (As only)
SB-55C2-0.5	128	Run STLC and TCLP, Run 1.5 foot sample (As only)
SB-57B2-0.5	99.3	Run STLC, Run 1.5 foot sample (As only)

Thank you.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

1631 E. St. Andrew Place, Santa Ana, CA 92705
t (714) 919-6526
f (714) 919-6501
m (714) 514-9056
cguesnon@montrose-env.com
www.montrose-env.com

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Sdndvh#frqvlghu#wkh#hqylurqphqw#ehiruh#sulqwlqj

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	ES Engineering
Address:	1 Park Plaza Suite #1000 Irvine, CA 92614
Attn:	Dane Nygaard

Lab Request:	419651
Report Date:	09/24/2019
Date Received:	09/21/2019
Client ID:	12860

Comments: Shenandoah Elementary School
Number: 029RC1-191395
P.O#: PO1026791
24560 Shenandoah Street, Los Angeles, CA

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
419651-001	SB-61-0.5
419651-002	SB-61-1.5
419651-003	SB-62-0.5
419651-004	SB-62-1.5
419651-005	SB-63-0.5
419651-006	SB-63-1.5
419651-007	SB-64-0.5
419651-008	SB-64-1.5
419651-009	SB-64-2.5
419651-010	Equipment Blank

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Report Review performed by: Patricia Mata, PM

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

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Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 07:35	**Site:**									
Sample #: **419651-001**	**Client Sample #:** SB-61-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**9.85**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 07:40	**Site:**									
Sample #: **419651-002**	**Client Sample #:** SB-61-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**6.64**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 08:15	**Site:**									
Sample #: **419651-003**	**Client Sample #:** SB-62-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**14.7**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 08:20	**Site:**									
Sample #: **419651-004**	**Client Sample #:** SB-62-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**8.73**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 07:55	**Site:**									
Sample #: **419651-005**	**Client Sample #:** SB-63-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**25.8**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 08:00	**Site:**									
Sample #: **419651-006**	**Client Sample #:** SB-63-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**8.22**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 08:30	**Site:**									
Sample #: **419651-007**	**Client Sample #:** SB-64-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**7.18**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 09/21/2019 08:35	**Site:**									
Sample #: **419651-008**	**Client Sample #:** SB-64-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986			
Arsenic	**8.81**	1	0.67	1	mg/Kg		09/24/19	SBW		

Matrix:	Solid	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	09/21/2019 08:40	**Site:**			
Sample #:	**419651-009**	**Client Sample #:**	SB-64-2.5	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1206986		
Arsenic	**9.64**	1	0.67	1	mg/Kg		09/24/19	SBW	

Matrix:	Water	**Client:**	ES Engineering	**Collector:**	Client
Sampled:	09/21/2019 09:00	**Site:**			
Sample #:	**419651-010**	**Client Sample #:**	Equipment Blank	**Sample Type:**	

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3010A						QCBatchID: QC1206987		
Arsenic	ND	1	0.008	0.01	mg/L		09/24/19	SBW	

QCBatchID:	**QC1206986**	**Analyst:**	kedy	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	09/24/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206986MB1					
Arsenic	ND	mg/Kg	0.67	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1206986LCS1											
Arsenic	50		43.1		mg/Kg	86			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1206986MS1, QC1206986MSD1												**Source: 419651-001**
Arsenic	9.85	50	50	54.7	50.1	mg/Kg	90	81	8.8	75-125	20	

QCBatchID: QC1206987 **Analyst:** kedy **Method:** EPA 6010B

Matrix: Water **Analyzed:** 09/24/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1206987MB1					
Antimony	ND	mg/L	0.014	0.04	
Arsenic	ND	mg/L	0.008	0.01	
Barium	ND	mg/L	0.002	0.01	
Beryllium	ND	mg/L	0.001	0.005	
Cadmium	ND	mg/L	0.002	0.005	
Chromium	ND	mg/L	0.002	0.01	
Cobalt		mg/L	0.002	0.005	
Copper	ND	mg/L	0.001	0.01	
Lead	ND	mg/L	0.005	0.01	
Molybdenum	ND	mg/L	0.005	0.01	
Nickel		mg/L	0.003	0.02	
Selenium	**0.018 J**	mg/L	0.016	0.03	
Silver		mg/L	0.003	0.005	
Thallium	ND	mg/L	0.009	0.05	
Vanadium	ND	mg/L	0.002	0.005	
Zinc	ND	mg/L	0.017	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206987LCS1											
Antimony	2		1.84		mg/L	92			80-120		
Arsenic	2		1.77		mg/L	89			80-120		
Barium	2		1.77		mg/L	89			80-120		
Beryllium	2		1.78		mg/L	89			80-120		
Cadmium	2		1.84		mg/L	92			80-120		
Chromium	2		2.00		mg/L	100			80-120		
Cobalt	2				mg/L				80-120		
Copper	2		1.97		mg/L	99			80-120		
Lead	2		1.80		mg/L	90			80-120		
Molybdenum	2		1.89		mg/L	95			80-120		
Nickel	2				mg/L				80-120		
Selenium	2		1.74		mg/L	87			80-120		
Silver	1				mg/L				80-120		
Thallium	2		1.85		mg/L	93			80-120		
Vanadium	2		1.87		mg/L	94			80-120		
Zinc	2		1.84		mg/L	92			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206987MS1, QC1206987MSD1												**Source: 419651-010**
Antimony	ND	1	1	0.822	0.827	mg/L	82	83	0.6	75-125	20	
Arsenic	ND	1	1	0.804	0.788	mg/L	80	79	2.0	75-125	20	
Barium	ND	1	1	0.954	0.906	mg/L	95	91	5.2	75-125	20	
Beryllium	ND	1	1	0.825	0.868	mg/L	83	87	5.1	75-125	20	
Cadmium	ND	1	1	0.940	0.875	mg/L	94	88	7.2	75-125	20	
Chromium	0.003	1	1	1.10	1.03	mg/L	110	103	6.6	75-125	20	
Cobalt		1	1			mg/L				75-125	20	
Copper	ND	1	1	0.998	1.05	mg/L	100	105	5.1	75-125	20	
Lead	ND	1	1	0.882	0.864	mg/L	88	86	2.1	75-125	20	
Molybdenum	ND	1	1	0.889	0.862	mg/L	89	86	3.1	75-125	20	

QCBatchID: QC1206987 **Analyst:** kedy **Method:** EPA 6010B

Matrix: Water **Analyzed:** 09/24/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1206987MS1, QC1206987MSD1												**Source: 419651-010**
Nickel		1	1			mg/L				75-125	20	
Selenium	ND	1	1	0.765	0.769	mg/L	77	77	0.5	75-125	20	
Silver		0.5	0.5			mg/L				75-125	20	
Thallium	ND	1	1	0.863	0.846	mg/L	86	85	2.0	75-125	20	
Vanadium	ND	1	1	0.959	1.01	mg/L	96	101	5.2	75-125	20	
Zinc	ND	1	1	0.912	0.848	mg/L	91	85	7.3	75-125	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPHY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868 Phone: (714) 771-6900 Fax: (714)771-9933 Billing: Enthalpy - SoCal c/o Montrose Environmental Group 1 Park Plaza, Suite 1000, Irvine, CA 92614	Lab No: 419651 Page: of **Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Standard: X 4 Day: 3 Day: 2 Day: CAB 9-21-19 1 Day: X Same Day: **Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Arsenic	Test Instructions / Comments
1	SB-61-0.5	9-21-19	0735	S			X	
2	SB-61-1.5		0740				X	
3	SB-62-0.5		0815				X	
4	SB-62-1.5		0820				X	
5	SB-63-0.5		0755				X	
6	SB-63-1.5		0800				X	
7	SB-64-0.5		0830				X	
8	SB-64-1.5		0835				X	
9	SB-64-2.5	9-21-19	0840				X	
10	~~Equipment~~							

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Chris Guesnon	Montrose / PM	9/21/19 1040
[1] Received By:		Leslie Hernandez	E.A	9/21/19 1040
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

4.7 / 156.9

ENTHALPHY ANALYTICAL, INC.		Chain of Custody Record		Turn Around Time (Rush by advanced notice only)								
806 N. Batavia St., Orange, CA 92868		Lab No: 419651		Standard:	X	4 Day:		3 Day:				
Phone: (714) 771-6900 Fax: (714)771-9933		Page:	of	2 Day:	CWT	1 Day:	X	Same Day:				
Billing: Enthalpy - SoCal		Matrix: A = Air DW = Drinking Water		9-21-19								
c/o Montrose Environmental Group		FL = Food Liquid FS = Food Solid L = Liquid		Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3								
1 Park Plaza, Suite 1000, Irvine, CA 92614		PP = Pure Product S = Solid SeaW = Sea Water		4 = H_2SO_4 5 = NaOH 6 = Other								
		SW = Swab W = Water WP = Wipe O = Other										

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1026791
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Arsenic	Test Instructions / Comments
1	Equipment Blank	9-21-19	0900	W	1 - 1/2 Liter	Nitric Acid	X	
2								
3								
4								
5								
6								
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Chris Guesnon	Montrose / PM	9-21-19 / 1040
[1] Received By:		Leslie Hernandez	EA	9/21/19 1040
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Enineering Services, LLC Project: Shenandoah Elementary School

Date Received: 9/21/2019 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler): _____

Sample Temp (°C), One from each cooler: #1: 18.9 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 4.7 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			✓
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

~~The samples were not within acceptable temperature range.~~ ZP 9/22/19

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 9/21/19

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client: ES Engineering
Address: 1 Park Plaza
Suite #1000
Irvine, CA 92614
Attn: Dane Nygaard

Lab Request: 420919
Report Date: 11/13/2019
Date Received: 11/04/2019
Client ID: 12860

Comments: Shenandoah Elementary School
#029RC1-191395
2450 Shenandoah Street, Los Angeles, California

This report includes additional STLC and TCLP test results as requested.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID	Sample #	Client Sample ID	Sample #	Client Sample ID
420919-001	SB-65-0.5	420919-025	SB-73-0.5	420919-049	SB-81-0.5
420919-002	SB-65-1.0	420919-026	SB-73-1.0	420919-050	SB-81-1.0
420919-003	SB-65-1.5	420919-027	SB-73-1.5	420919-051	SB-81-1.5
420919-004	SB-66-0.5	420919-028	SB-74-0.5	420919-052	SB-82-0.5
420919-005	SB-66-1.0	420919-029	SB-74-1.0	420919-053	SB-82-1.0
420919-006	SB-66-1.5	420919-030	SB-74-1.5	420919-054	SB-82-1.5
420919-007	SB-67-0.5	420919-031	SB-75-0.5	420919-055	SB-83-0.5
420919-008	SB-67-1.0	420919-032	SB-75-1.0	420919-056	SB-83-1.0
420919-009	SB-67-1.5	420919-033	SB-75-1.5	420919-057	SB-83-1.5
420919-010	SB-68-0.5	420919-034	SB-76-0.5	420919-058	SB-84-0.5
420919-011	SB-68-1.0	420919-035	SB-76-1.0	420919-059	SB-84-1.0
420919-012	SB-68-1.5	420919-036	SB-76-1.5	420919-060	SB-84-1.5
420919-013	SB-69-0.5	420919-037	SB-77-0.5	420919-061	EQUIPMENT BLANK
420919-014	SB-69-1.0	420919-038	SB-77-1.0		
420919-015	SB-69-1.5	420919-039	SB-77-1.5		
420919-016	SB-70-0.5	420919-040	SB-78-0.5		
420919-017	SB-70-1.0	420919-041	SB-78-1.0		
420919-018	SB-70-1.5	420919-042	SB-78-1.5		
420919-019	SB-71-0.5	420919-043	SB-79-0.5		
420919-020	SB-71-1.0	420919-044	SB-79-1.0		
420919-021	SB-71-1.5	420919-045	SB-79-1.5		
420919-022	SB-72-0.5	420919-046	SB-80-0.5		
420919-023	SB-72-1.0	420919-047	SB-80-1.0		
420919-024	SB-72-1.5	420919-048	SB-80-1.5		

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Report Review performed by: Patricia Mata, PM

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

The reports of the Enthalpy Analytical, Inc. are confidential property of our clients and may not be reproduced or used for publication in part or in full without our written permission. This is for the mutual protection of the public, our clients, and ourselves.

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:37 **Site:**
Sample #: **420919-001** **Client Sample #:** SB-65-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**7.94**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:40 **Site:**
Sample #: **420919-002** **Client Sample #:** SB-65-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1208571		
Arsenic	**1.689**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**190**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**9.43**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:41 **Site:**
Sample #: **420919-003** **Client Sample #:** SB-65-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**11.8**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:45 **Site:**
Sample #: **420919-004** **Client Sample #:** SB-66-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**33.4**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:47 **Site:**
Sample #: **420919-005** **Client Sample #:** SB-66-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1208571		
Arsenic	**1.815**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**144**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**9.39**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:50 **Site:**
Sample #: **420919-006** **Client Sample #:** SB-66-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208379		
Arsenic	**12.6**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:55 **Site:**
Sample #: **420919-007** **Client Sample #:** SB-67-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**68.8**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**2.38**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 07:58 **Site:**
Sample #: **420919-008** **Client Sample #:** SB-67-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1208571		
Arsenic	**3.89**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**271**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**16.1**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 08:00 **Site:**
Sample #: **420919-009** **Client Sample #:** SB-67-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**74.4**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**2.70**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:17 **Site:**
Sample #: **420919-010** **Client Sample #:** SB-68-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**8.18**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:20 **Site:**
Sample #: **420919-011** **Client Sample #:** SB-68-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**9.45**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:21 **Site:**
Sample #: **420919-012** **Client Sample #:** SB-68-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**8.24**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:03 **Site:**
Sample #: **420919-013** **Client Sample #:** SB-69-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1208571		
Arsenic	**1.157**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**260**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**6.67**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:05 **Site:**
Sample #: **420919-014** **Client Sample #:** SB-69-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**8.34**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:08 **Site:**
Sample #: **420919-015** **Client Sample #:** SB-69-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**9.13**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:50 **Site:**
Sample #: **420919-016** **Client Sample #:** SB-70-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 1311/3010A						QCBatchID: QC1208571		
Arsenic	**1.405**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**115**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**6.22**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:52 **Site:**
Sample #: **420919-017** **Client Sample #:** SB-70-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**6.98**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:54 **Site:**
Sample #: **420919-018** **Client Sample #:** SB-70-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208380		
Arsenic	**9.27**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:33 **Site:**
Sample #: **420919-019** **Client Sample #:** SB-71-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**63.0**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**2.51**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:34 **Site:**
Sample #: **420919-020** **Client Sample #:** SB-71-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**8.77**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:36 **Site:**
Sample #: **420919-021** **Client Sample #:** SB-71-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**27.0**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:09 **Site:**
Sample #: **420919-022** **Client Sample #:** SB-72-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**32.1**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:10 **Site:**
Sample #: **420919-023** **Client Sample #:** SB-72-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**13.0**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:11 **Site:**
Sample #: **420919-024** **Client Sample #:** SB-72-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**16.7**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:21 **Site:**
Sample #: **420919-025** **Client Sample #:** SB-73-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**84.2**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**3.58**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:30 **Site:**
Sample #: **420919-026** **Client Sample #:** SB-73-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208380		
Arsenic	**9.70**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 11:32 **Site:**
Sample #: **420919-027** **Client Sample #:** SB-73-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**6.59**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:48 **Site:**
Sample #: **420919-028** **Client Sample #:** SB-74-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**47.1**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:51 **Site:**
Sample #: **420919-029** **Client Sample #:** SB-74-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**8.41**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:54 **Site:**
Sample #: **420919-030** **Client Sample #:** SB-74-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**20.9**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:44 **Site:**
Sample #: **420919-031** **Client Sample #:** SB-75-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 1311/3010A							QCBatchID: QC1208571		
Arsenic	**0.850**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**111**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC* Prep Method: STLC							QCBatchID: QC1208644		
Arsenic	**4.60**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:48 **Site:**
Sample #: **420919-032** **Client Sample #:** SB-75-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC* Prep Method: EPA 3050B							QCBatchID: QC1208381		
Arsenic	**9.16**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:50 **Site:**
Sample #: **420919-033** **Client Sample #:** SB-75-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**4.71**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:14 **Site:**
Sample #: **420919-034** **Client Sample #:** SB-76-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**53.9**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B *NELAC*	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**2.42**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:18 **Site:**
Sample #: **420919-035** **Client Sample #:** SB-76-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**5.09**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:30 **Site:**
Sample #: **420919-036** **Client Sample #:** SB-76-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**8.73**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:32 **Site:**
Sample #: **420919-037** **Client Sample #:** SB-77-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**5.74**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:35 **Site:**
Sample #: **420919-038** **Client Sample #:** SB-77-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**8.23**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:37 **Site:**
Sample #: **420919-039** **Client Sample #:** SB-77-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**5.30**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:24	**Site:**								
Sample #: **420919-040**	**Client Sample #:** SB-78-0.5					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**5.56**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:28	**Site:**								
Sample #: **420919-041**	**Client Sample #:** SB-78-1.0					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**6.50**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:31	**Site:**								
Sample #: **420919-042**	**Client Sample #:** SB-78-1.5					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**7.22**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:15	**Site:**								
Sample #: **420919-043**	**Client Sample #:** SB-79-0.5					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**9.60**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:19	**Site:**								
Sample #: **420919-044**	**Client Sample #:** SB-79-1.0					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**10.7**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:21	**Site:**								
Sample #: **420919-045**	**Client Sample #:** SB-79-1.5					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**7.53**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:00	**Site:**								
Sample #: **420919-046**	**Client Sample #:** SB-80-0.5					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208381		
Arsenic	**13.4**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client			
Sampled: 11/02/2019 09:03	**Site:**								
Sample #: **420919-047**	**Client Sample #:** SB-80-1.0					**Sample Type:**			
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**5.84**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:06	**Site:**									
Sample #: **420919-048**	**Client Sample #:** SB-80-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**7.95**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 08:54	**Site:**									
Sample #: **420919-049**	**Client Sample #:** SB-81-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**18.7**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:03	**Site:**									
Sample #: **420919-050**	**Client Sample #:** SB-81-1.0					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**19.8**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:06	**Site:**									
Sample #: **420919-051**	**Client Sample #:** SB-81-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**5.68**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:50	**Site:**									
Sample #: **420919-052**	**Client Sample #:** SB-82-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**12.1**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:51	**Site:**									
Sample #: **420919-053**	**Client Sample #:** SB-82-1.0					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**6.78**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:53	**Site:**									
Sample #: **420919-054**	**Client Sample #:** SB-82-1.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**4.94**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid	**Client:** ES Engineering					**Collector:** Client				
Sampled: 11/02/2019 09:40	**Site:**									
Sample #: **420919-055**	**Client Sample #:** SB-83-0.5					**Sample Type:**				
Analyte	**Result**	**DF**	**MDL**	**RDL**	**Units**	**Prepared**	**Analyzed**	**By**	**Notes**	
Method: EPA 6010B *NELAC*	Prep Method: EPA 3050B						QCBatchID: QC1208382			
Arsenic	**7.61**	1	0.67	1	mg/Kg		11/05/19	SBW		

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 09:42 **Site:**
Sample #: **420919-056** **Client Sample #:** SB-83-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**6.99**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 09:46 **Site:**
Sample #: **420919-057** **Client Sample #:** SB-83-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**7.49**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 09:59 **Site:**
Sample #: **420919-058** **Client Sample #:** SB-84-0.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 1311/3010A						QCBatchID: QC1208571		
Arsenic	**1.497**	1	0.008	0.05	mg/L		11/08/19	SBW	
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**153**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**8.52**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:02 **Site:**
Sample #: **420919-059** **Client Sample #:** SB-84-1.0 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**71.6**	1	0.67	1	mg/Kg		11/05/19	SBW	
Method: EPA 6010B NELAC	Prep Method: STLC						QCBatchID: QC1208644		
Arsenic	**3.88**	10	0.08	0.3	mg/L		11/13/19	SBW	

Matrix: Solid **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 10:05 **Site:**
Sample #: **420919-060** **Client Sample #:** SB-84-1.5 **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3050B						QCBatchID: QC1208382		
Arsenic	**10.9**	1	0.67	1	mg/Kg		11/05/19	SBW	

Matrix: Water **Client:** ES Engineering **Collector:** Client
Sampled: 11/02/2019 12:37 **Site:**
Sample #: **420919-061** **Client Sample #:** EQUIPMENT BLANK **Sample Type:**

Analyte	Result	DF	MDL	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 6010B NELAC	Prep Method: EPA 3010A						QCBatchID: QC1208394		
Arsenic	ND	1	0.008	0.01	mg/L		11/04/19	SBW	

QCBatchID: QC1208379 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208379MB1					
Aluminum	**7.34**	mg/Kg	2	5	B
Antimony	ND	mg/Kg	1.6	3	
Arsenic	ND	mg/Kg	0.67	1	
Barium	ND	mg/Kg	0.11	1	
Beryllium	ND	mg/Kg	0.067	0.5	
Cadmium	ND	mg/Kg	0.094	0.5	
Calcium	**2.16 J**	mg/Kg	1.5	50	
Chromium	ND	mg/Kg	0.096	1	
Cobalt	ND	mg/Kg	0.086	0.5	
Copper	ND	mg/Kg	0.42	1	
Iron	**1.99 J**	mg/Kg	1.1	5	
Lead	ND	mg/Kg	0.84	1	
Magnesium	ND	mg/Kg	3.3	25	
Manganese	ND	mg/Kg	0.24	1	
Molybdenum	ND	mg/Kg	0.59	1	
Nickel	ND	mg/Kg	0.26	1.5	
Selenium	ND	mg/Kg	1.8	3	
Silicon	**0.81 J**	mg/Kg	0.24	50	
Silver	ND	mg/Kg	0.16	0.5	
Thallium	ND	mg/Kg	1.1	3	
Vanadium	ND	mg/Kg	0.26	0.5	
Zinc	ND	mg/Kg	0.75	5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208379LCS1											
Antimony	100		104		mg/Kg	104			80-120		
Arsenic	100		103		mg/Kg	103			80-120		
Barium	100		110		mg/Kg	110			80-120		
Beryllium	100		98.8		mg/Kg	99			80-120		
Cadmium	100		108		mg/Kg	108			80-120		
Chromium	100		107		mg/Kg	107			80-120		
Cobalt	100		110		mg/Kg	110			80-120		
Copper	100		101		mg/Kg	101			80-120		
Lead	100		106		mg/Kg	106			80-120		
Molybdenum	100		106		mg/Kg	106			80-120		
Nickel	100		110		mg/Kg	110			80-120		
Selenium	100		97.5		mg/Kg	98			80-120		
Silver	100		90.8		mg/Kg	91			80-120		
Thallium	100		108		mg/Kg	108			80-120		
Vanadium	100		112		mg/Kg	112			80-120		
Zinc	100		110		mg/Kg	110			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208379MS1, QC1208379MSD1												**Source: 420906-001**
Antimony	5.73	100	100	75.3	83.6	mg/Kg	70	78	10.4	75-125	20	M
Arsenic	2.49	100	100	88.4	94.6	mg/Kg	86	92	6.8	75-125	20	
Barium	142	100	100	220	239	mg/Kg	78	97	8.3	75-125	20	
Beryllium	ND	100	100	97.7	104	mg/Kg	98	104	6.2	75-125	20	

QCBatchID: QC1208379 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/04/2019 **Instrument:** AAICP (group)

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208379MS1, QC1208379MSD1												**Source: 420906-001**
Cadmium	1.45	100	100	101	104	mg/Kg	100	103	2.9	75-125	20	
Chromium	80.4	100	100	138	141	mg/Kg	58	61	2.2	75-125	20	M
Cobalt	5.79	100	100	103	111	mg/Kg	97	105	7.5	75-125	20	
Copper	71.8	100	100	142	143	mg/Kg	70	71	0.7	75-125	20	M
Lead	18.6	100	100	121	122	mg/Kg	102	103	0.8	75-125	20	
Molybdenum	5.76	100	100	105	111	mg/Kg	99	105	5.6	75-125	20	
Nickel	111	100	100	117	122	mg/Kg	6	11	4.2	75-125	20	M
Selenium	ND	100	100	82.0	84.2	mg/Kg	82	84	2.6	75-125	20	
Silver	ND	100	50	81.6	85.8	mg/Kg	82	172	5.0	75-125	20	M
Thallium	ND	100	100	89.2	93.5	mg/Kg	89	94	4.7	75-125	20	
Vanadium	24.2	100	100	129	130	mg/Kg	105	106	0.8	75-125	20	
Zinc	1280	100	100	2540	1040	mg/Kg	1260	0	83.8	75-125	20	NC,D

QCBatchID:	**QC1208380**	**Analyst:**	rvenegas	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	11/04/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208380MB1					
Arsenic	ND	mg/Kg	0.67	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208380LCS1											
Arsenic	100		89.2		mg/Kg	89			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208380MS1, QC1208380MSD1												**Source: 420919-007**
Arsenic	68.8	100	100	159	152	mg/Kg	90	83	4.5	75-125	20	

QCBatchID:	**QC1208381**	**Analyst:**	rvenegas	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	11/04/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208381MB1					
Arsenic	ND	mg/Kg	0.67	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1208381LCS1											
Arsenic	100		89.7		mg/Kg	90			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1208381MS1, QC1208381MSD1												**Source: 420919-027**
Arsenic	6.59	100	100	94.7	94.2	mg/Kg	88	88	0.5	75-125	20	

QCBatchID: QC1208382 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208382MB1					
Arsenic	ND	mg/Kg	0.67	1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208382LCS1											
Arsenic	100		94.8		mg/Kg	95			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208382MS1, QC1208382MSD1												**Source: 420919-047**
Arsenic	5.84	100	100	102	99.5	mg/Kg	96	94	2.5	75-125	20	

QCBatchID: QC1208394 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Water **Analyzed:** 11/04/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208394MB1					
Arsenic	ND	mg/L	0.008	0.01	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208394LCS1											
Arsenic	2		1.76		mg/L	88			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208394MS1, QC1208394MSD1												**Source: 420919-061**
Arsenic	ND	1	1	0.927	0.921	mg/L	93	92	0.6	75-125	20	

QCBatchID: QC1208571 **Analyst:** rvenegas **Method:** EPA 6010B

Matrix: Solid **Analyzed:** 11/08/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208571MB1					
Arsenic	ND	mg/L	0.008	0.05	
Lead	**0.021 J**	mg/L	0.005	0.05	
Silver	ND	mg/L	0.003	0.05	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208571LCS1											
Arsenic	2		2.12		mg/L	106			80-120		
Lead	2		2.14		mg/L	107			80-120		
Silver	2		2.18		mg/L	109			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208571MS1, QC1208571MSD1												**Source: 420689-002**
Arsenic	0.040	1	1	1.058	1.059	mg/L	102	102	0.1	75-125	20	
Lead	0.274	1	1	1.223	1.237	mg/L	95	96	1.1	75-125	20	
Silver	0.004	1	1	0.980	0.866	mg/L	98	86	12.4	75-125	20	

QCBatchID:	**QC1208644**	**Analyst:**	rvenegas	**Method:**	EPA 6010B
Matrix:	Solid	**Analyzed:**	11/11/2019	**Instrument:**	AAICP (group)

Blank Summary

Analyte	Blank Result	Units	MDL	RDL	Notes
QC1208644MB1					
Arsenic	**0.197**	mg/L	0.008	0.03	
Copper	ND	mg/L	0.004	0.03	
Lead	**0.025**	mg/L	0.005	0.015	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1208644LCS1, QC1208644LCSD1											
Arsenic	20	20	20.5	22.9	mg/L	103	115	11	80-120	20	
Copper	20	20	17.5	16.8	mg/L	88	84	4	80-120	20	
Lead	20	20	20.8	24.0	mg/L	104	120	14	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

Patty Mata

From: Chris Guesnon <cguesnon@montrose-env.com> on behalf of Chris Guesnon
Sent: Wednesday, November 06, 2019 1:37 PM
To: Patty Mata
Cc: Sean Mitchell Hyde; dnygaard@es-online.com
Subject: RE: Shenandoah (11/2/19) - Enthalpy Analytical Final Report #420919

Hi Patty. Thank you for getting us the results for Shenandoah. Based on the results, arsenic exceeded the screening levels in a number of samples and are tabulated below. Please complete additional analyses for either STLC and TCLP for the following:

Sample ID	Arsenic Results (mg/kg)	Comment
SB-65-1.0	190	Run STLC and TCLP
SB-66-0.5	33.4	
SB-66-1.0	144	Run STLC and TCLP
SB-66-1.5	12.6	
SB-67-0.5	68.8	Run STLC
SB-67-1.0	271	Run STLC and TCLP
SB-67-1.5	74.4	Run STLC
SB-69-0.5	260	Run STLC and TCLP
SB-70-0.5	115	Run STLC and TCLP
SB-71-0.5	63.0	Run STLC
SB-71-1.5	27.0	
SB-72-0.5	32.1	
SB-72-1.0	13.0	
SB-72-1.5	16.7	
SB-73-0.5	84.2	Run STLC
SB-74-0.5	47.1	
SB-74-1.5	20.9	
SB-75-0.5	111	Run STLC and TCLP
SB-76-0.5	53.9	Run STLC
SB-80-0.5	13.4	
SB-81-0.5	18.7	
SB-81-1.0	19.8	
SB-82-0.5	12.1	
SB-84-0.5	153	Run STLC and TCLP
SB-84-1.0	71.6	Run STLC

Thank you.

Chris A. Guesnon
Senior Geologist
Environmental Remediation and Compliance Services

MONTROSE
Environmental

1631 E. St. Andrew Place, Santa Ana, CA 92705
t (714) 919-6526

f (714) 919-6501
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www.montrose-env.com

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#



From: Patty Mata [mailto:patty.mata@enthalpy.com]
Sent: Wednesday, November 06, 2019 12:22 PM
To: dnygaard@es-online.com
Cc: asrihiran@montrose-env.com; cguesnon@montrose-env.com; kkern@montrose-env.com; Laura Skow; sking@es-online.com; shyde@montrose-env.com
Subject: Shenandoah (11/2/19) - Enthalpy Analytical Final Report #420919

Hi Dane Nygaard,

Attached is your final report #420919.

Thank you.

In accordance with our paperless initiative, we are no longer mailing or faxing reports by default. If you require a hard copy, please inform your Project Manager.

Data qualifiers and additional information necessary for the interpretation of the test results are contained in the PDF file and may not be included in the EDD.

With Regards,

Patty Mata
Project Manager

ENTHALPY ANALYTICAL

931 W. Barkley Ave., Orange, CA 92868
O: 714.771.6900
D: 714.771.9930
Patty.mata@enthalpy.com

To help protect the air we breathe, the water we drink, and the soil that feeds us.

Please take a moment to provide customer feedback.

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 420919	Standard: ☐ 4 Day: ☐ 3 Day: ☐
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 1 of 7	2 Day: ☑ 1 Day: ☐ Same Day: ☐
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1041682
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Arsenic	Test Instructions / Comments
1	SB-65-0.5	11-2-19	0737	S	1-4oz	ice	X	~~Hold 1.0' and 1.5' Samples~~
2	SB-65-1.0	"	0740	"	"	"	X	
3	SB-65-1.5	"	0741	"	"	"	X	
4	SB-66-0.5	"	0745	"	"	"	X	
5	SB-66-1.0	"	0747	"	"	"	X	
6	SB-66-1.5	"	0750	"	"	"	X	
7	SB-67-0.5	"	0755	"	"	"	X	
8	SB-67-1.0	"	0758	"	"	"	X	
9	SB-67-1.5	"	0800	"	"	"	X	
10	SB-69-0.5	11-2-19	1217	S	1-4oz	ice	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	Sean Hyde	Sean Hyde	Montrose / Staff Geologist	11.4.19 @ 0800
1 Received By:	Mar Montiel	Mar Montiel	Enthalpy	11/4/19 0919
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 4209/9	Standard: ☐ 4 Day: ☐ 3 Day: ☐
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 2 of 7	2 Day: ☑ 1 Day: ☐ Same Day: ☐
Billing: Enthalpy - SoCal	**Matrix:** A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	**Preservatives:** 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1041682
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Arsenic	Test Instructions / Comments
1	SB-68-1.0	11-2-19	1220	S	1-4oz	Ice	X	
2	SB-68-1.5		1221				X	
3	SB-69-0.5		1203				X	
4	SB-69-1.0		1205				X	
5	SB-69-1.5		1208				X	
6	SB-70-0.5		1150				X	
7	SB-70-1.0		1152				X	
8	SB-70-1.5		1154				X	
9	SB-71-0.5		1133				X	
10	SB-71-1.0	11-2-19	1134	S	1-4oz	Ice	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Sean Hyde	Montrose / Geologist	11.4.19 @ 0800
1 Received By:		Max Montiel	Enthalpy A	11/4/19 0 [illegible]
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPHY ANALYTICAL, INC.
806 N. Batavia St., Orange, CA 92868
Phone: (714) 771-6900 Fax: (714)771-9933
Billing: Enthalpy - SoCal
c/o Montrose Environmental Group
1 Park Plaza, Suite 1000, Irvine, CA 92614

ENTHALPY analytical, inc.

Chain of Custody Record
Lab No: 420919
Page: 3 of 7

Turn Around Time (Rush by advanced notice only)

Standard:		4 Day:		3 Day:	
2 Day:	✓	1 Day:		Same Day:	

Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1041682
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

Analysis Request

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B -Arsenic	Test Instructions / Comments
1	SB-71-1.5	11-2-19	1136	S	1-4oz	ice	X	
2	SB-72-0.5		1109				X	
3	SB-72-1.0		1110				X	
4	SB-72-1.5		1111				X	
5	SB-73-0.5		1121				X	
6	SB-73-1.0		1130				X	
7	SB-73-1.5		1132				X	
8	SB-74-0.5		1048				X	
9	SB-74-1.0		1051				X	
10	SB-74-1.5	11-2-19	1054	S	1-4oz	ice	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:	[signature]	Sean Hyde	Montrose / Geologist	11.4.19 @ 0800
1 Received By:	[signature]	Max Montiel	Enthalpy A	11/4/19 0816
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL, INC.	Chain of Custody Record	Turn Around Time (Rush by advanced notice only)
806 N. Batavia St., Orange, CA 92868	Lab No: 420919	Standard: ☐ 4 Day: ☐ 3 Day: ☐
Phone: (714) 771-6900 Fax: (714)771-9933	Page: 4 of 7	2 Day: ✓ 1 Day: ☐ Same Day: ☐
Billing: Enthalpy - SoCal	Matrix: A = Air DW = Drinking Water FL = Food Liquid FS = Food Solid L = Liquid PP = Pure Product S = Solid SeaW = Sea Water SW = Swab W = Water WP = Wipe O = Other	Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other
c/o Montrose Environmental Group		
1 Park Plaza, Suite 1000, Irvine, CA 92614		

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services, LLC	Name:	Shenandoah Elementary School
Report To:	Dane Nygaard	Number:	029RC1-191395
Email:	dnygaard@es-online.com	P.O. #:	PO1041682
Address:	1 Park Plaza, Suite 1000	Address:	2450 Shenandoah Street
	Irvine, CA 92614		Los Angeles, California
Phone:	714-919-6500	Global ID:	
Fax:	714-919-6501	Sampled By:	Chris Guesnon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: EPA 6010B -Arsenic	Test Instructions / Comments
1	SB-75-0.5	11-2-19	1044	S	1-4oz	ice	X	
2	SB-75-1.0		1048				X	
3	SB-75-1.5		1050				X	
4	SB-76-0.5		1014				X	
5	SB-76-1.0		1018				X	
6	SB-76-1.5		1030				X	
7	SB-77-0.5		1032				X	
8	SB-77-1.0		1035				X	
9	SB-77-1.5		1037				X	
10	SB-78-0.5	11-2-19	0924	S	1 4oz	Ice	X	

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Sean Hyde	Montrose/ Geologist	11.4.19 @ 0800
1 Received By:		MIKE MONTIEL	ENTHALPY A	11/4/19 @ 0818
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 420919

Page: 5 of 7

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:	X	1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	BS Engineering	Quote #:	
Report To:	Dane Wygaard	Proj. Name:	Shenandoah Elementary
Email:	Dwygaard@bcs-online	Proj. #:	019 RKI-191395
Address:	1 Park Plaza Ste 1000	P.O. #:	PO 1041682
	Irvine 92618	Address:	2450 Shenandoah St
Phone:	(714)919-6500	Global ID:	Los Angeles
Fax:		Sampled By:	Chris Evesmon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B - Arsenic	Test Instructions / Comments
1	SB-78-1.0	11-2-19	0928	S	1-4oz	ice	X	
2	SB-78-1.5		0931				X	
3	SB-79-0.5		0915				X	
4	SB-79-1.0		0919				X	
5	SB-79-1.5		0921				X	
6	SB-80-0.5		0900				X	
7	SB-80-1.0		0903				X	
8	SB-80-1.5		0906				X	
9	SB-81-0.5		0859				X	
10	SB-81-1.0	11-2-19	0903	S	1-4oz	ice	X	

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Sean Hyde	Montrose / Geologist	11.4.19 @ 0800
[1] Received By:		Max Montiel	Enthalpy IA	11/4/19 0919
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 420919

Page: 6 of 7

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:	X	1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah Elementary
Email:	Dnygaard@es-online	Proj. #:	029RC1-191395
Address:	1 Park Plaza, Ste 600	P.O. #:	PO1041682
	Irvine 92614	Address:	2450 Shenandoah St
Phone:	(714)919-6500	Global ID:	Los Angeles
Fax:		Sampled By:	Chris Gueshon

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	EPA 6010B (Arsenic)	Test Instructions / Comments
1	SB-81-1.5	11-2-19	0906	S	1-4oz	Ice	X	
2	SB-82-0.5		0950				X	
3	SB-82-1.0		0957				X	
4	SB-82-1.5		0953				X	
5	SB-83-0.5		0940				X	
6	SB-83-1.0		0942				X	
7	SB-83-1.5		0946				X	
8	SB-84-0.5		0959				X	
9	SB-84-1.0		1002				X	
10	SB-84-1.5	11-2-19	1005	S	1-4oz	Ice	X	

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Sean Hyde	Montrose / Geologist	11.4.19 @ 0800
[1] Received By:		Max Montiel	Enthalpy A	11/4/19 0818
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 420919

Page: 7 of 7

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:	X	1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	ES Engineering Services	Quote #:	
Report To:	Dane Nygaard	Proj. Name:	Shenandoah Elementary School
Email:	dnygaard@montrose-env.com	Proj. #:	029RC1-191395
Address:	1631 E St. Andrew place	P.O. #:	PO 1041682
	Santa Ana, CA 92705	Address:	2450 S. Shenandoah LA, CA
Phone:	714 919 6500	Global ID:	
Fax:	714 919 6501	Sampled By:	Chris Guerra

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: Arsenic 6010 B	Test Instructions / Comments
1	Equipment Blank	11/2/19	1237	W	500 mL HDPE	HNO_3	X	
2								
3								
4								
5								
6								
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		Sean Hyde	Montrose / Geologist	11.4.19 @ 0800
[1] Received By:		Max Montiel	Enthalpy A	11/4/19 0818
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: ES Engineering Project: Shenandoah Elementary School

Date Received: 11/4/19 Sampler's Name Present: ☑ Yes ☐ No

Section 2

Sample(s) received in a cooler? ☐ Yes, How many? _____ ☑ No (skip section 2) Sample Temp (°C) (No Cooler): 12.1

Sample Temp (°C), One from each cooler: #1: _____ #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☐ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: _____ #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			✓
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 11/4/19

APPENDIX D

Waste Manifests

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
Not Required	1	888-423-6060	0720191012

GENERATOR

5. Generator's Name and Mailing Address
Los Angeles Unified School District
333 S. Beaudry Ave.
Los Angeles CA 90017
Generator's Phone: 213 241-4261

Generator's Site Address (if different than mailing address)
Shenandoah Elementary School
2460 Shenandoah Street
Los Angeles CA

6. Transporter 1 Company Name
American Integrated Services, Inc.

U.S. EPA ID Number
CAR000148338

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address
Crosby & Overton, Inc.
1630 W. 17th Street
Long Beach CA 90813
Facility's Phone: 562 432-5445

U.S. EPA ID Number
CAD023409019

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-Hazardous Waste Liquid (Decon water)	1	DM	55	G	
2.	Non-Hazardous Waste Solid (Soil)	2	DM	1000	P	
3.						
4.						

13. Special Handling Instructions and Additional Information
Wear proper PPE while handling. Weights and volumes are approximate.
Project No. 39030-44-1 Profile No 9b1.) 111287 9b2.) 111286

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: As Agent For LAUSD - SEMS
Signature:
Month: 7 Day: 10 Year: 19

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name:
Signature:
Month: 7 Day: 10 Year: 19

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)

U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name:
Signature:
Month: Day: Year:

GENERATOR'S/SHIPPER'S INITIAL COPY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
				03680

5. Generator's Name and Mailing Address: Shenancoah Elementary Sch

Generator's Site Address (if different than mailing address):

Generator's Phone:

6. Transporter 1 Company Name: Slaby Environmental Inc 887 801 5600 — U.S. EPA ID Number: N/A

7. Transporter 2 Company Name: — U.S. EPA ID Number:

8. Designated Facility Name and Site Address: Filter Recycling Corp 909 140 W Mobile Ave Rialto Ca 92376 421-2012 — U.S. EPA ID Number: CAD 982444481

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non Hazardous Waste Solid (Soil)	001	DM	295	P
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name — Signature — Month Day Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Ron Neidstedt — Signature: [signature] — Month 11 Day 18 Year 19

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

Appendix G

Noise Memo

VISTA
ENVIRONMENTAL

September 23, 2019

Meghan Gibson
Chambers Group, Inc.
600 West Broadway, Suite 250
Glendale, CA 91204

Subject: Los Angeles Unified School District – Shenandoah Elementary School Comprehensive Modernization Project Noise Technical Memorandum

Dear Ms. Gibson:

Vista Environmental has conducted this analysis to evaluate if the proposed Shenandoah Elementary School Comprehensive Modernization Project (proposed project) would cause significant noise and vibration impacts. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.).

Project Site Location and Study Area

The approximately 7.6-acre school site is located at 2450 Shenandoah Street within the City of Los Angeles (City). The project site is bounded by both multi-family and single-family homes to the north, single-family homes and Halm Avenue to the east, a preschool, single-family homes and the terminus of Bedford Street to the south, and Shenandoah Street and single-family homes to the west. The nearest freeway is Interstate 10 that is located as near as 650 feet to the southeast of the project site, the nearest railroad is the Metro Expo Line located as near as 0.7 mile to the south, and the nearest airport is Santa Monica Airport located as near as 3.7 miles to the southwest.

Proposed Project Description

The proposed project would include removal of 33 classrooms that total 30,719 square feet of building space that are currently in portable buildings. In their place, a new two-story classroom building (Classroom Building 300) approximately 32,290 square feet in size would be constructed. In addition, 21,214 square feet of the existing Administration Building and 12,002 square feet of the existing North Classroom Building would be remodeled with Americans with Disabilities Act (ADA) upgrades, systems upgrades, internet protocol convergence, and various exterior/interior finish upgrades. The lunch shelter and lunch pavilion located on the south side of the Main Administration Building that is 2,965 square feet would be demolished and a new lunch shelter that is approximately 4,000 square feet would be constructed that will span to the new Classroom Building 300.

A new kindergarten Play Area will be constructed on the south side of the new Classroom Building 300. In addition, the existing parking area in the southwest end of campus will be reconfigured and will be constructed with 77 parking spaces. The hardcourt play areas will be reconfigured to create Physical Education (P.E.) stations, a turf play area, and other onsite amenities per the current LAUSD standards.

Other Campus-Wide upgrades include the following:

- Major site-wide infrastructure, including water, irrigation, HVAC, gas, sewer, fire, telephone and data systems, electrical, and storm drainage;
- Programmatic access requirements to meet and address ADA;
- Landscape and hardscape improvements (new parking and playgrounds, described above);
- Improvements to various safety conditions, including site lighting, fencing/gates, and/or closed-circuit television (CCTV) systems as needed; and
- Application of fresh exterior paint to provide a uniform appearance and enhance curb appeal.

The proposed project would not change the current capacity of the school or affect student enrollment. No changes to traditional school operations, school-related events, or community use would occur as a result of the proposed project.

Existing Noise Setting

The primary sources of noise within the study area consists of vehicle traffic on local roads and Interstate 10 that is located as near as 650 feet to the southeast of the project site, aircraft overflights, and from onsite activities that include children playing outside. In order to quantify the existing noise environment as well as to quantify noise sources that may be altered as part of the proposed project, five noise measurements were taken in the vicinity of the project site. All noise measurements were taken for a period of 10 minutes and the results of the noise level measurements are presented in Table A. The noise measurement printouts are attached to this letter along with Figure 1 that depicts the locations of the noise measurements and a photo index showing the locations of the noise measurements.

Table A – Existing (Ambient) Noise Level Measurements

Site No.	Description	Primary Noise Source	Start Time of Measurement	Noise Level (dBA L_{eq}/L_{max})
1	Located on the northeast corner of the south parking lot.	AC Units on portables and classroom noise	11:18 a.m.	53.5/63.6
2	Located on the south side of the west parking lot	Parking lot activities and Interstate 10	11:30 a.m.	52.7/59.7
3	Located near the southeast corner of the lunch waiting area shade shelter, approximately 10 feet from kids waiting lines and 50 feet from nearest lunch table	Kids waiting in line and eating lunch	11:47 a.m.	69.4/77.1
4	Located approximately 5 feet north of the kindergarten play area on the northwest side of the campus	Kindergarten kids playing	11:59 a.m.	69.8/82.0
5	Located approximately 5 feet south of the campus and kids playing during lunch in front yard of 2510 Bedford Street	Older kids playing	12:15 p.m.	68.1/87.3

Source: Noise measurements taken with a Larson Davis Model 831 Type 1 precision sound level meter on Wednesday, September 18, 2019.

Regulatory Setting

The LAUSD has developed Standard Conditions of Approval for construction, upgrades and improvement projects on their campuses, where the applicable noise standards are detailed below:

SC-N-1 LAUSD shall design new buildings and other noise-generating sources to include features such as sound walls, building configuration, and other design features that attenuate exterior noise levels on a school campus to less than 67 dBA Leq.

SC-N-2 LAUSD shall analyze the acoustical environment of the site (such as traffic) and the characteristics of planned building components (such as Heating, Ventilation, and Air Conditioning [HVAC]), and designs shall achieve interior classroom noise levels of less than 45 dBA Leq with a target of 40 dBA Leq (unoccupied), and a reverberation time of 0.6 seconds.

SC-N-3 LAUSD shall incorporate long-term permanent noise attenuation measures between new playgrounds, stadiums, and other noise-generating facilities and adjacent noise-sensitive land uses, to reduce noise levels to meet jurisdictional standards or an increase of 3 dB or less over ambient.

SC-N-4 LAUSD or its Construction Contractor shall consult and coordinate with the school principal or site administrator, and other nearby noise sensitive land uses prior to construction to schedule high noise or vibration producing activities to minimize disruption. Coordination between the school, nearby land uses and the Construction Contractor shall continue on an as-needed basis throughout the construction phase of the project to reduce school and other noise sensitive land use disruptions.

SC-N-8 Projects within 500 feet of a non-LAUSD sensitive receptor, such as a residence, shall be reviewed by OEHS to determine what, if any, feasible project specific noise reduction measures are needed.

The Construction Contractor shall implement project specific noise reduction measures identified by OEHS. Noise reduction measures may include, but are not limited to, the following:

<u>Source Controls</u>

- Time Constraints – prohibiting work during sensitive nighttime hours.
- Scheduling – performing noise work during less sensitive time periods (on operating campus: delay the loudest noise generation until class instruction at the nearest classrooms has ended; residential only between 7:00 AM and 7:00 PM).
- Equipment Restrictions – restricting the type of equipment used.
- Substitute Methods – using quieter methods and/or equipment.
- Exhaust Mufflers – ensuring equipment has quality mufflers installed.
- Lubrication & Maintenance – well maintained equipment is quieter.
- Reduced Power Operation – use only necessary size and power.
- Limit Equipment On-Site – only have necessary equipment on-site.
- Noise Compliance Monitoring – technician on site to ensure compliance.

- Quieter Backup Alarms – manually-adjustable or ambient sensitive types.

Path Controls

- Noise Barriers – semi-permanent or portable wooden or concrete barriers.
- Noise Curtains – flexible intervening curtain systems hung from supports.
- Enclosures – encasing localized and stationary noise sources.
- Increased Distance – perform noise activities farther away from receptors, including operation of portable equipment, storage and maintenance of equipment.

Receptor Controls

- Window Treatments – reinforcing the building's noise reduction ability.
- Community Participation – open dialog to involve affected residents.
- Noise Complaint Process – ability to log and respond to noise complaints. Advance notice of the start of construction shall be delivered to all noise sensitive receptors adjacent to the project area. The notice shall state specifically where and when construction activities will occur, and provide contact information for filing noise complaints with the Construction Contractor and the District. In the event of noise complaints noise shall be monitored from the construction activity to ensure that construction noise is not obtrusive.

SC-N-9 Construction Contractor shall ensure that LAUSD interior classroom noise and exterior noise standards are met to the maximum extent feasible, or that construction noise is not disruptive to the school environment, through implementation of noise control measures, as necessary. Noise control measures may include, but are not limited to:

Path Controls

- Noise Attenuation Barriers – Temporary noise attenuation barriers installed blocking the line of sight between the noise source and the receiver. Intervening barriers already present, such as berms or buildings, may provide sufficient noise attenuation, eliminating the need for installing noise attenuation barriers.
- Scheduling – performing noise work during less sensitive time periods (on operating campus: delay the loudest noise generation until class instruction at the nearest classrooms has ended; residential only between 7:00 AM and 7:00 PM).

Source Controls

- Scheduling - performing noisy work during less sensitive time periods (on operating campus: delay the loudest noise generation until class instruction at the nearest classrooms has ended; residential areas: only between 7:00 AM and 7:00 PM).
- Substitute Methods – using quieter methods and/or equipment.
- Exhaust Mufflers – ensuring equipment has quality mufflers installed.
- Lubrication & Maintenance – well maintained equipment is quieter.

- Reduced Power Operation – use only necessary size and power.
- Limit Equipment On-Site – only have necessary equipment on-site.
- Quieter Backup Alarms – manually-adjustable or ambient sensitive types.

City of Los Angeles Noise Standards

The City of Los Angeles Municipal Code establishes the following applicable standards related to construction noise.

Section 41.40 Noise Due to Construction, Excavation Work – When Prohibited

(a) No person shall, between the hours of 9:00 P.M. and 7:00 A.M. of the following day, perform any construction or repair work of any kind upon, or any excavating for, any building or structure, where any of the foregoing entails the use of any power driven drill, riveting machine excavator or any other machine, tool, device or equipment which makes loud noises to the disturbance of persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited during the hours herein specified. Any person who knowingly and wilfully violates the foregoing provision shall be deemed guilty of a misdemeanor punishable as elsewhere provided in this Code.

(j) As determined by the Executive Director of the Board, the provisions of Subsection (c) shall not apply to major public works construction by the City of Los Angeles and its proprietary Departments, including all structures and operations necessary to regulate or direct traffic due to construction activities. The Board, through its Executive Director, pursuant to Subsection (b) will grant a variance for this work and construction activities will be subject to all conditions of the variance as granted. Concurrent with the request for a variance, the City Department that will conduct the construction work will notify each affected Council district office and established Neighborhood Council of projects where proposed Sunday and/or Holiday work will occur.

Section 112.03 Construction Noise

Noise due to construction or repair work shall be regulated as provided by Section 41.40 of this Code.

Project Impacts

Consistent with CEQA and the State CEQA Guidelines, a significant impact related to noise and vibration would occur if the proposed project is determined to:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

Generation of Noise Levels in Excess of Standards

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards other agencies. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the LAUSD and City standards.

Construction-Related Noise

The first phase of construction is anticipated to occur over three months and would consist of either removal or demolition of 33 classrooms currently in portables and demolition of approximately 265,000 square feet of pavement. The second phase of construction is anticipated to occur over three months and would consist of site preparation (grading) the portion of the project site to be improved. Building construction activities would occur after the completion of the site preparation phase and is anticipated to occur over 12 months and would consist of construction of Classroom Building 300 as well as the proposed lunch shelter. The final phase would consist of the onsite asphalt paving and off-site street work, which is anticipated to occur over three months.

Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are single-family homes located adjacent to the south and east sides of the project site and multi-family homes located adjacent to the north side of the project site.

Construction activities for the proposed project would be required to adhere to LAUSD Standard Conditions SC-N-8 that would limit construction noise impacts to the nearby residents and SC-N-9 that would limit construction noise impacts to the nearby classrooms while the classrooms are occupied. In addition, Section 41.40(a) of the City of Los Angeles Municipal Code exempts construction activities from the City's noise standards provided construction activities do not take place between the hours of 9:00 p.m. and 7:00 a.m. However, neither the LAUSD nor the City construction noise standards provide any limits to the noise levels that may be created from construction activities when construction activities are allowed. As such, even with adherence to the LAUSD and City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby residents.

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, the FTA construction noise criteria thresholds have been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 90 dBA Leq hourly at any of the nearby homes[1].

Construction noise impacts to the nearest homes to each construction phase have been calculated through use of the FHWA's Roadway Construction Noise Model (RCNM) Version 1.1. The construction equipment utilized in the RCNM model for each phase of construction activities was obtained from Table 3-2 provided in the Project Description for the proposed project. For each phase of construction, the equipment was placed at the distance to nearest home and then each subsequent piece of equipment

[1] Source: Table 7-2 from *Transit Noise and Vibration Impact Assessment Manual*, prepared by FTA, September 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

was placed an additional 50 feet away. The results are shown below in Table B and the RCNM printouts are provided in Appendix D.

Table B – Construction Noise Levels at the Nearest Homes

Construction Phase	Distance to Nearest Home (feet)	Noise Level at Nearest Homes (dBA Leq)
Demolition	10	85
Site Preparation	10	86
Building Construction and Painting	65	72
Paving	10	83
FTA Construction Noise Threshold		**90**
Exceed Threshold?		**No**

Source: RCNM Version 1.1, Federal Highway Administration, 2018

Table B shows that the greatest noise impacts would occur during the site preparation phase of construction, with a noise level as high as 86 dBA Leq at the nearest homes. Table B also shows that none of the construction phases would exceed the FTA construction noise standard of 90 dBA for residential uses. Therefore, through implementation of LAUSD Standard Conditions SC-N-8 that would limit construction noise impacts to the nearby residents and SC-N-9 that would limit construction noise impacts to the nearby classrooms while the classrooms are occupied as well as adherence to allowable construction times provided in Section 41.40(a) of the City of Los Angeles Municipal Code, the construction activities for the proposed project would not create a substantial temporary increase in ambient noise levels that are in excess of applicable noise standards. Impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of implementation and operation of various modernization features at the campus. Development of the proposed project would not result in an increase in employee or student capacity at the School. As such, this operational noise analysis has been limited to potential noise impacts to the proposed school buildings and potential noise impacts from reconfiguration of onsite campus activities.

Operational Noise Impacts to Proposed School Buildings

The proposed project would include construction of a new classroom building (Classroom Building 300) and a new lunch shelter. LAUSD Standard Condition SC-N-1 requires that new campus buildings be designed to include features such as sound walls to attenuate the exterior noise level to 67 dBA Leq or less and Standard Condition SC-N-2 requires that the interior of new campus buildings (unoccupied) be limited to 45 dBA Leq or less.

Since the campus is located in a residential neighborhood and the noise measurements taken on the project site (see Table A above) show that the existing noise level is as low as 52.7 dBA on the project site (when away from children activities), the proposed project site is in conformance with Standard Condition SC-N-1 that requires the noise level to be 67 dBA Leq or less at the exterior of new campus buildings. It should be noted that standard construction methods provide a minimum of 25 dB of exterior to interior noise reduction or attenuation. This would result in an interior noise level created by the outside

environment of 27.7 dBA Leq, and the proposed Classroom Building 300 would be in compliance of Standard Condition SC-N-2 that requires the interior noise level to be 45 dBA Leq or less for new unoccupied buildings. Therefore, no operational noise impacts are anticipated to the proposed school buildings. No impact would occur.

Operational Noise Impacts to Nearby Residents

Potential operational noise impacts to the nearby residents from implementation of the proposed project may be created from relocation of the lunch shelter, relocation of the kindergarten play area, and reconfiguration and new delivery area and secondary waiting area. LAUSD Standard Condition SC-N-3 requires that new noise generating facilities on LAUSD campuses be designed to either meet the local jurisdictions noise standards or be limited to a 3 dB or less noise increase over ambient (existing) conditions. Since the local jurisdiction (City of Los Angeles) does not provide any noise standards for noise created by children on school property, this analysis has been limited to the LAUSD noise standard of a 3 dB increase over existing conditions.

In order to determine the operational noise impacts that may be created by implementation of the proposed project, the existing noise measurements shown in Table A along with the standard noise drop-off rate of 6 dB per doubling distance has been utilized to calculate the noise created from the new lunch shelter, new kindergarten play area, and new delivery and secondary waiting area. Table C shows the anticipated noise level from each source at the nearest off-site receptors.

Table C – Operational Noise Levels at the Nearest Homes

New Noise Source	Distance - Noise Source to Nearest Home (feet)	Existing Noise Level[1] (dBA Leq)	With Project Noise Level[1] (dBA Leq)	Project Noise Increase
New Lunch Shelter[2]	150	53.5	45.9	-7.6 dB
New Kindergarten Play Area[3]	45	53.5	50.7	-2.8 dB
New Delivery and Secondary Waiting Area[4]	60	49.4	31.1	-18.3 dB
			LAUSD Noise Standard	+3 dB
			Exceed LAUSD Noise Standard?	No

Notes:

[1] The noise levels were calculated through use of geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver. Does not account for noise attenuation associated with the existing walls at nearby homes.

[2] The nearest home to the relocated lunch shelter is at 2509 Bedford Street. Noise Measurement Site 1 captured the existing noise level adjacent to the northwest corner of the home with a noise level of 53.5 dBA. Noise Measurement Site 3 captured the existing lunch area noise level of 69.4 dBA at 10 feet from activities.

[3] The nearest home to the new kindergarten play area is at 2509 Bedford Street. Noise Measurement Site 1 captured the existing noise level adjacent to the northwest corner of the home with a noise level of 53.5 dBA. Noise Measurement Site 4 captured an existing kindergarten play area noise level of 69.8 dBA at 5 feet from activities.

[4] The nearest home to the new delivery and secondary waiting area is at 8901 25th Street. Since no noise measurement was taken at the home, the noise created from the existing lunch shelter that is currently located at this proposed use was utilized for the existing noise level. Noise Measurement Site 2 captured the noise from the existing parking lot where delivery trucks currently park.

Table C shows that the noise levels created from the new lunch shelter, new kindergarten play area, and new delivery and secondary waiting area, would all be below the existing noise levels at the nearest homes. As such, the proposed project would be in compliance of Standard Condition SC-N-3 that requires new noise generating facilities on LAUSD campuses be designed to either meet the local jurisdictions noise

standards or be limited to a 3 dB or less noise increase over ambient (existing) conditions. Therefore, no operational noise impacts are anticipated to nearby homes. No impact would occur.

Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The first phase of construction is anticipated to occur over three months and would consist of either removal or demolition of 33 classrooms currently in portables and demolition of approximately 265,000 square feet of pavement. The second phase of construction is anticipated to occur over three months and would consist of site preparation. Building construction activities would occur after the completion of the site preparation phase and is anticipated to occur over 12 months and would consist of construction of Classroom Building 300 as well as the proposed lunch shelter. The final phase would consist of the onsite asphalt paving and off-site street work, which is anticipated to occur over three months. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are single-family homes located adjacent to the south and east sides of the project site and multi-family homes located adjacent to the north side of the project site.

LAUSD Standard Condition SC-N-4 requires the construction contractor to consult with the school and nearby land uses prior to performing construction activities that have the potential to create high noise or vibration levels. However, neither LAUSD nor the City of Los Angeles provides a quantifiable vibration threshold level for construction activities, Caltrans guidance has been utilized[2], which defines the threshold of perception from transient sources at 0.25 inch-per-second peak particle velocity (PPV). Table D gives approximate vibration levels for particular construction activities. The data in Table D provides a reasonable estimate for a wide range of soil conditions.

Table D – Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration, 2018.

From the list of equipment shown in Table D, a vibratory roller would create the highest vibration levels during construction of the proposed project with a vibration level of 0.210 inch-per-second PPV. Based on

[2] From *Transportation and Construction Vibration Guidance Manual,* prepared by Caltrans, September 2013.

typical propagation rates, the vibration level at the nearest offsite residential structure (10 feet away) would be as high as 0.58 inch-per-second PPV. The vibration level at the nearest offsite residential structure would exceed the 0.25 inch-per-second PPV threshold detailed above. This would be considered a significant impact.

The following Mitigation Measure NOI-1 has been included in this analysis that would restrict the operation of vibratory rollers within 25 feet of any residential structure. As shown above in Table D, at 25 feet a vibratory roller would create a vibration level of 0.21 inch-per-second PPV and would be within the 0.25 inch-per-second PPV threshold detailed above. Therefore, through implementation of Mitigation Measure NOI-1, construction-related vibration impacts would be reduced to a less than significant level.

> Mitigation Measure NOI-1
> The project applicant shall require that all construction contractors for the proposed project restrict the use of vibratory rollers within 25 feet of a residential structure (garages and storage sheds are exempt from this measure).

Operations-Related Vibration Impacts

The on-going operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is the Santa Monica Airport, located approximately 3.7 miles southwest of the project site. The project site is located outside of the 60 dBA CNEL noise contours of Santa Monica Airport. No impacts would occur from aircraft noise.

Please let me know if you have any questions or need additional information with regard to the above analysis. I can be reached at (949) 510-5355, or email me at greg@vistalb.com.

Sincerely,



Greg Tonkovich, INCE
Vista Environmental
949 510 5355

Encl.: Figure 1 Noise Measurement Locations
Photo Index of Noise Measurements
Noise Measurement Printouts
RCNM Model Printouts



SOURCE: Google Maps.

VISTA ENVIRONMENTAL

Figure 1
Noise Measurement Locations



Noise Measurement Site 1 - looking north



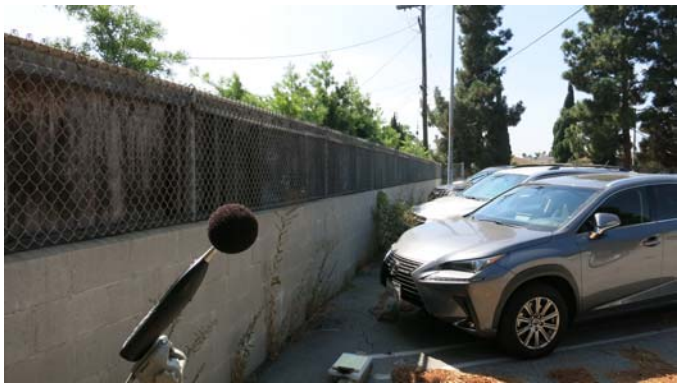
Noise Measurement Site 1 - looking northeast



Noise Measurement Site 1 - looking east



Noise Measurement Site 1 - looking southeast



Noise Measurement Site 1 - looking south



Noise Measurement Site 1 - looking southwest



Noise Measurement Site 1 - looking west



Noise Measurement Site 1 - looking northwest



Noise Measurement Site 2 - looking north



Noise Measurement Site 2 - looking northeast



Noise Measurement Site 2 - looking east



Noise Measurement Site 2 - looking southeast



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking southwest



Noise Measurement Site 2 - looking west



Noise Measurement Site 2 - looking northwest



Noise Measurement Site 3 - looking northeast



Noise Measurement Site 3 - looking east



Noise Measurement Site 3 - looking southeast



Noise Measurement Site 3 - looking south



Noise Measurement Site 3 - looking southwest



Noise Measurement Site 3 - looking west (no pictures were taken with children present)



Noise Measurement Site 4 - looking north



Noise Measurement Site 4 - looking northeast



Noise Measurement Site 4 - looking east



Noise Measurement Site 4 - looking southeast



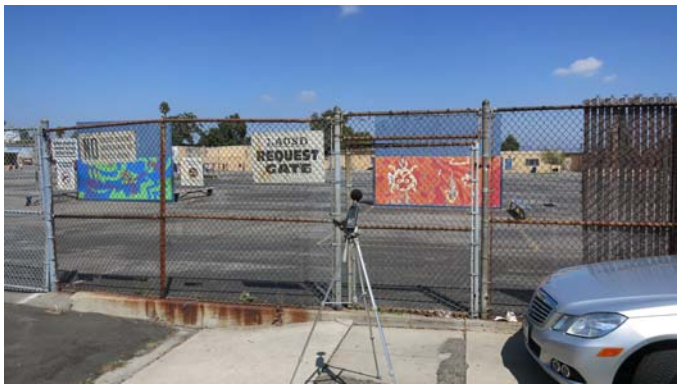
Noise Measurement Site 4 - looking south



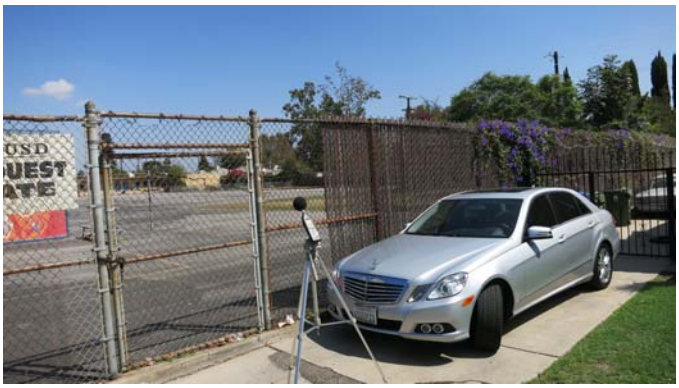
Noise Measurement Site 4 - looking west (no pictures of children taken)



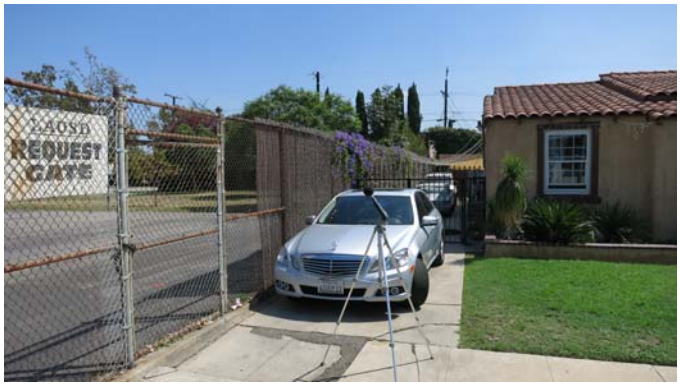
Noise Measurement Site 4 - looking northwest



Noise Measurement Site 5 - looking north



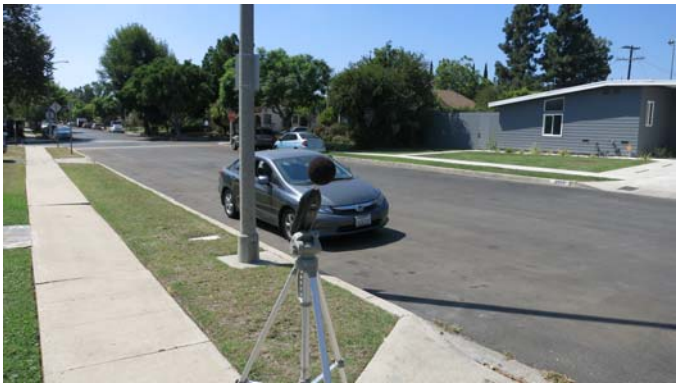
Noise Measurement Site 5 - looking northeast



Noise Measurement Site 5 - looking east


Noise Measurement Site 5 - looking southeast


Noise Measurement Site 5 - looking south


Noise Measurement Site 5 - looking southwest


Noise Measurement Site 5 - looking west



Noise Measurement Site 5 - looking northwest

General Information

Serial Number	02509
Model	831
Firmware Version	2.314
Filename	831_Data.001
User	GT
Job Description	Shenandoah ES
Location	NE Corner of South Parking Lot
Measurement Description	
Start Time	Wednesday, 2019 September 18 11:18:07
Stop Time	Wednesday, 2019 September 18 11:28:07
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	Wednesday, 2019 September 18 11:09:09
Post Calibration	None
Calibration Deviation	---

Note

Noise from Portables AC Units _Classroom noise
78F, 29.71 in Hg, 55% hu, no wind, partly cloudy

Overall Data

LAeq		53.5	dB
LASmax	2019 Sep 18 11:22:34	63.6	dB
LZpeak (max)	2019 Sep 18 11:18:07	102.9	dB
LASmin	2019 Sep 18 11:21:59	51.7	dB
LCeq		65.7	dB
LAeq		53.5	dB
LCeq - LAeq		12.2	dB
LAIeq		57.2	dB
LAeq		53.5	dB
LAIeq - LAeq		3.6	dB
Ldn		53.5	dB
LDay 07:00-22:00		53.5	dB
LNight 22:00-07:00		---	dB
Lden		53.5	dB
LDay 07:00-19:00		53.5	dB
LEvening 19:00-22:00		---	dB
LNight 22:00-07:00		---	dB
LAE		81.3	dB
# Overloads		0	
Overload Duration		0.0	s
# OBA Overloads		0	
OBA Overload Duration		0.0	s

Statistics

LAS5.00	55.8	dBA
LAS10.00	54.5	dBA
LAS33.30	53.3	dBA
LAS50.00	52.9	dBA
LAS66.60	52.6	dBA
LAS90.00	52.2	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	26.5	dB
Under Range Peak	78.6	dB
Noise Floor	17.3	dB
Overload	144.2	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	58.9	58.7	56.7	60.5	63.5	52.4	47.4	49.0	44.0	39.6	35.1	28.1
LZSmax	83.1	73.1	64.8	71.5	68.3	68.1	58.5	58.9	56.9	56.6	53.8	47.1
LZSmin	49.8	52.6	51.9	55.3	62.1	46.8	43.7	46.9	41.3	36.0	30.9	21.9

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	55.0	54.8	52.6	54.0	54.8	52.8	51.9	51.1	52.6	58.4	55.7	49.2
LZSmax	78.8	79.1	71.9	71.6	64.7	64.2	60.9	61.2	62.6	70.3	69.1	66.8
LZSmin	41.8	42.3	43.3	46.2	48.0	47.2	46.1	45.8	47.2	52.0	47.6	39.4

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	50.9	63.1	49.8	48.5	47.9	45.9	43.3	42.0	42.5	44.1	43.5	45.0
LZSmax	66.4	66.2	61.1	65.1	60.3	63.3	56.1	53.7	50.8	52.0	55.1	54.5
LZSmin	44.7	61.7	44.6	41.0	42.8	39.4	38.5	37.1	39.4	41.4	41.1	42.3

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	40.1	39.0	38.3	35.7	34.6	33.7	31.1	30.0	29.5	25.9	22.8	18.0
LZSmax	53.2	53.2	52.7	52.2	52.1	51.2	49.7	49.1	47.5	45.2	40.8	37.0
LZSmin	36.6	35.7	34.8	32.3	30.4	29.4	26.7	25.2	23.8	19.6	16.0	11.8

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	18 Sep 2019 11:09:07	-26.6
PRM831	07 Aug 2019 12:27:09	-27.3
PRM831	07 Aug 2019 05:49:21	-27.0
PRM831	06 Aug 2019 15:11:44	-26.3
PRM831	06 Aug 2019 12:24:00	-26.0
PRM831	22 Jul 2019 10:48:48	-26.3
PRM831	12 Jul 2019 20:18:07	-26.0
PRM831	29 May 2019 13:46:43	-25.9
PRM831	07 May 2019 12:46:08	-24.7
PRM831	07 May 2019 11:41:50	-25.6
PRM831	29 Apr 2019 09:04:32	-25.7

General Information

Serial Number	02509
Model	831
Firmware Version	2.314
Filename	831_Data.002
User	GT
Job Description	Shenandoah ES
Location	SE Side of West Parking Lot

Measurement Description	
Start Time	Wednesday, 2019 September 18 11:30:43
Stop Time	Wednesday, 2019 September 18 11:40:43
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	Wednesday, 2019 September 18 11:09:07
Post Calibration	None
Calibration Deviation	---

Note

Noise from cars _delivery vehicles in parking lot, I-10 Fwy (1,000 ft to SE) and kids walking to Lunch
78F, 29.71 in Hg, 55% hu, no wind, partly cloudy

Overall Data

LAeq		52.7	dB
LASmax	2019 Sep 18 11:37:10	59.7	dB
LZpeak (max)	2019 Sep 18 11:30:43	102.4	dB
LASmin	2019 Sep 18 11:34:34	49.7	dB
LCeq		62.7	dB
LAeq		52.7	dB
LCeq - LAeq		10.0	dB
LAIeq		55.4	dB
LAeq		52.7	dB
LAIeq - LAeq		2.8	dB
Ldn		52.7	dB
LDay 07:00-22:00		52.7	dB
LNight 22:00-07:00		---	dB
Lden		52.7	dB
LDay 07:00-19:00		52.7	dB
LEvening 19:00-22:00		---	dB
LNight 22:00-07:00		---	dB
LAE		80.4	dB
# Overloads		0	
Overload Duration		0.0	s
# OBA Overloads		0	
OBA Overload Duration		0.0	s

Statistics

LAS5.00	55.6	dBA
LAS10.00	54.7	dBA
LAS33.30	52.5	dBA
LAS50.00	51.9	dBA
LAS66.60	51.4	dBA
LAS90.00	50.7	dBA

LAS > 65.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	26.5	dB
Under Range Peak	78.6	dB
Noise Floor	17.3	dB
Overload	144.2	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	60.1	59.0	61.1	58.4	54.8	51.0	48.9	48.5	44.9	39.0	33.0	34.2
LZSmax	82.4	80.3	84.3	73.7	63.4	59.9	56.9	55.4	58.0	51.3	51.1	57.1
LZSmin	49.5	53.1	54.4	53.7	51.6	48.2	45.3	45.5	40.3	33.2	24.2	15.8

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	56.1	55.9	54.1	53.7	54.5	54.5	58.0	54.9	54.9	54.4	54.8	50.2
LZSmax	76.9	79.5	71.6	71.0	74.6	77.4	82.9	75.5	69.2	73.9	68.1	63.7
LZSmin	39.3	41.1	45.8	46.3	42.0	42.0	48.5	47.0	50.3	46.8	49.0	44.0

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	49.8	52.2	46.1	46.8	45.7	46.0	43.9	44.5	43.9	43.9	44.2	43.1
LZSmax	62.2	58.6	56.0	57.0	57.9	57.6	55.3	52.9	54.6	54.9	51.8	52.8
LZSmin	44.7	48.0	40.0	43.3	42.3	42.6	40.3	40.4	39.5	39.0	40.9	39.7

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	41.1	40.9	37.8	35.3	34.1	32.6	29.7	27.8	25.8	27.9	29.0	31.1
LZSmax	54.1	57.9	49.6	47.2	45.8	47.2	46.3	45.8	46.0	54.3	52.7	55.4
LZSmin	37.0	35.2	32.8	30.1	27.6	24.6	21.2	18.6	15.0	12.8	9.9	9.4

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	18 Sep 2019 11:09:07	-26.6
PRM831	07 Aug 2019 12:27:09	-27.3
PRM831	07 Aug 2019 05:49:21	-27.0
PRM831	06 Aug 2019 15:11:44	-26.3
PRM831	06 Aug 2019 12:24:00	-26.0
PRM831	22 Jul 2019 10:48:48	-26.3
PRM831	12 Jul 2019 20:18:07	-26.0
PRM831	29 May 2019 13:46:43	-25.9
PRM831	07 May 2019 12:46:08	-24.7
PRM831	07 May 2019 11:41:50	-25.6
PRM831	29 Apr 2019 09:04:32	-25.7

General Information

Serial Number	02509
Model	831
Firmware Version	2.314
Filename	831_Data.003
User	GT
Job Description	Shenandoah ES
Location	SE Corner of Lunch Waiting Area - Approx 50 ft from Lunch Shelter
Measurement Description	
Start Time	Wednesday, 2019 September 18 11:47:47
Stop Time	Wednesday, 2019 September 18 11:57:47
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	Wednesday, 2019 September 18 11:09:07
Post Calibration	None
Calibration Deviation	---

Note

Noise from Kids eating lunch and waiting for recess

Overall Data

LAeq		69.4	dB
LASmax	2019 Sep 18 11:54:37	77.1	dB
LZpeak (max)	2019 Sep 18 11:47:47	101.6	dB
LASmin	2019 Sep 18 11:49:57	62.1	dB
LCeq		70.2	dB
LAeq		69.4	dB
LCeq - LAeq		0.7	dB
LAIeq		73.4	dB
LAeq		69.4	dB
LAIeq - LAeq		3.9	dB
Ldn		69.4	dB
LDay 07:00-22:00		69.4	dB
LNight 22:00-07:00		---	dB
Lden		69.4	dB
LDay 07:00-19:00		69.4	dB
LEvening 19:00-22:00		---	dB
LNight 22:00-07:00		---	dB
LAE		97.2	dB
# Overloads		0	
Overload Duration		0.0	s
# OBA Overloads		0	
OBA Overload Duration		0.0	s

Statistics

LAS5.00	73.8	dBA
LAS10.00	72.6	dBA
LAS33.30	69.7	dBA
LAS50.00	68.0	dBA
LAS66.60	66.6	dBA
LAS90.00	64.7	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	5 / 585.4	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	26.5	dB
Under Range Peak	78.6	dB
Noise Floor	17.3	dB
Overload	144.2	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	64.1	58.8	57.5	60.1	56.8	57.0	61.4	66.1	64.0	56.8	44.2	31.3
LZSmax	82.7	72.3	66.7	67.4	63.1	63.0	72.0	75.1	73.1	67.1	55.9	43.5
LZSmin	51.8	47.0	53.1	56.3	53.5	48.6	56.7	57.9	54.9	48.3	35.6	21.7

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	61.2	59.0	57.0	55.1	53.8	52.9	53.1	51.7	53.2	54.7	55.7	55.6
LZSmax	78.8	78.9	70.4	71.1	67.5	60.9	64.0	60.1	62.5	65.8	60.7	67.0
LZSmin	42.1	40.4	48.0	45.3	43.3	47.4	47.9	42.7	46.7	48.2	47.9	47.4

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	52.1	52.9	50.5	49.8	51.5	54.3	55.6	56.9	57.4	58.8	62.1	62.3
LZSmax	62.3	58.5	58.8	60.9	57.5	59.9	61.7	66.2	71.8	70.0	73.5	73.9
LZSmin	46.4	47.9	44.6	45.6	44.2	41.9	50.5	51.0	45.4	52.9	52.7	51.8

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	60.5	59.3	57.2	53.5	52.3	48.6	42.8	36.5	33.1	28.9	26.3	20.8
LZSmax	71.2	69.9	66.7	63.1	61.3	64.4	54.6	49.3	47.9	42.1	40.2	35.4
LZSmin	51.0	49.8	47.1	44.7	43.0	39.6	33.6	27.7	24.6	19.8	15.2	11.2

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	18 Sep 2019 11:09:07	-26.6
PRM831	07 Aug 2019 12:27:09	-27.3
PRM831	07 Aug 2019 05:49:21	-27.0
PRM831	06 Aug 2019 15:11:44	-26.3
PRM831	06 Aug 2019 12:24:00	-26.0
PRM831	22 Jul 2019 10:48:48	-26.3
PRM831	12 Jul 2019 20:18:07	-26.0
PRM831	29 May 2019 13:46:43	-25.9
PRM831	07 May 2019 12:46:08	-24.7
PRM831	07 May 2019 11:41:50	-25.6
PRM831	29 Apr 2019 09:04:32	-25.7

General Information

Serial Number	02509
Model	831
Firmware Version	2.314
Filename	831_Data.004
User	GT
Job Description	Shenandoah ES
Location	Approx 5 ft from Kinder Play Area on West Side
Measurement Description	
Start Time	Wednesday, 2019 September 18 11:59:52
Stop Time	Wednesday, 2019 September 18 12:09:52
Duration	00:10:00.0
Run Time	00:09:47.0
Pause	00:00:13.0
Pre Calibration	Wednesday, 2019 September 18 11:09:07
Post Calibration	None
Calibration Deviation	---

Note

Noise from kids playing in Kindergarten Play Area
78F, 29.71 in Hg, 55% hu, no wind, partly cloudy

Overall Data

LAeq		69.8	dB
LASmax	2019 Sep 18 12:01:08	82.0	dB
LZpeak (max)	2019 Sep 18 11:59:52	103.5	dB
LASmin	2019 Sep 18 12:00:09	55.1	dB
LCeq		72.5	dB
LAeq		69.8	dB
LCeq - LAeq		2.7	dB
LAIeq		74.8	dB
LAeq		69.8	dB
LAIeq - LAeq		5.0	dB
Ldn		69.8	dB
LDay 07:00-22:00		69.8	dB
LNight 22:00-07:00		---	dB
Lden		69.8	dB
LDay 07:00-19:00		69.8	dB
LEvening 19:00-22:00		---	dB
LNight 22:00-07:00		---	dB
LAE		97.5	dB
# Overloads		0	
Overload Duration		0.0	s
# OBA Overloads		0	
OBA Overload Duration		0.0	s

Statistics

LAS5.00	74.9	dBA
LAS10.00	73.0	dBA
LAS33.30	69.2	dBA
LAS50.00	67.5	dBA
LAS66.60	66.0	dBA
LAS90.00	60.9	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	15 / 487.7	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	26.5	dB
Under Range Peak	78.6	dB
Noise Floor	17.3	dB
Overload	144.2	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	62.6	60.8	62.2	66.4	65.1	62.0	61.5	66.0	64.2	58.1	44.4	32.7
LZSmax	82.3	75.5	82.2	81.9	86.2	78.6	74.3	78.7	79.2	72.2	57.8	45.5
LZSmin	52.6	54.3	53.2	53.5	56.0	55.4	52.4	49.3	45.4	37.4	26.3	17.2

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	59.1	58.5	57.9	56.3	56.4	55.1	60.5	53.4	54.6	60.3	61.0	62.9
LZSmax	76.8	77.4	77.4	71.2	72.0	69.6	81.9	66.4	64.9	75.5	75.1	79.3
LZSmin	43.0	44.1	47.9	46.2	47.6	46.7	47.9	45.9	45.3	48.4	48.7	50.3

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	58.2	57.5	63.0	56.5	57.2	56.9	55.8	56.3	58.0	57.3	61.3	63.2
LZSmax	73.5	67.5	85.9	75.6	74.1	74.0	69.7	67.3	74.0	71.8	77.2	75.5
LZSmin	49.2	51.8	49.1	48.7	49.9	48.1	46.4	47.4	44.4	45.3	44.5	43.4

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	60.2	59.4	58.4	56.3	51.9	48.3	42.7	37.1	34.3	30.6	27.0	22.5
LZSmax	75.8	77.1	73.3	72.2	66.1	63.5	57.0	52.2	47.7	43.5	42.7	39.9
LZSmin	41.4	39.8	36.8	34.7	32.5	28.3	23.8	20.7	18.0	14.0	11.4	9.9

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	18 Sep 2019 11:09:07	-26.6
PRM831	07 Aug 2019 12:27:09	-27.3
PRM831	07 Aug 2019 05:49:21	-27.0
PRM831	06 Aug 2019 15:11:44	-26.3
PRM831	06 Aug 2019 12:24:00	-26.0
PRM831	22 Jul 2019 10:48:48	-26.3
PRM831	12 Jul 2019 20:18:07	-26.0
PRM831	29 May 2019 13:46:43	-25.9
PRM831	07 May 2019 12:46:08	-24.7
PRM831	07 May 2019 11:41:50	-25.6
PRM831	29 Apr 2019 09:04:32	-25.7

General Information

Serial Number	02509
Model	831
Firmware Version	2.314
Filename	831_Data.005
User	GT
Job Description	Shenandoah ES
Location	Approx 5 ft South of School - Front Yard of 2510 Bedford St
Measurement Description	
Start Time	Wednesday, 2019 September 18 12:15:51
Stop Time	Wednesday, 2019 September 18 12:25:51
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	Wednesday, 2019 September 18 11:09:07
Post Calibration	None
Calibration Deviation	---

Note

Approx 5 ft from Outdoor Play Area during Lunch Recess
80 F, 29.76 in Hg, 55% hu, 3 mph wind, partly cloudy

Overall Data

LAeq		68.1	dB
LASmax	2019 Sep 18 12:18:29	87.3	dB
LZpeak (max)	2019 Sep 18 12:15:52	104.6	dB
LASmin	2019 Sep 18 12:25:26	49.8	dB
LCeq		68.7	dB
LAeq		68.1	dB
LCeq - LAeq		0.6	dB
LAIeq		74.7	dB
LAeq		68.1	dB
LAIeq - LAeq		6.7	dB
Ldn		68.1	dB
LDay 07:00-22:00		68.1	dB
LNight 22:00-07:00		---	dB
Lden		68.1	dB
LDay 07:00-19:00		68.1	dB
LEvening 19:00-22:00		---	dB
LNight 22:00-07:00		---	dB
LAE		95.8	dB
# Overloads		0	
Overload Duration		0.0	s
# OBA Overloads		0	
OBA Overload Duration		0.0	s

Statistics

LAS5.00	74.3	dBA
LAS10.00	69.4	dBA
LAS33.30	61.9	dBA
LAS50.00	57.5	dBA
LAS66.60	54.0	dBA
LAS90.00	51.6	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	25 / 158.5	s
LAS > 85.0 dB (Exceedence Counts / Duration)	1 / 1.7	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	26.5	dB
Under Range Peak	78.6	dB
Noise Floor	17.3	dB
Overload	144.2	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	66.9	61.2	58.9	58.2	56.6	53.0	58.0	63.6	64.1	54.8	41.1	29.4
LZSmax	84.5	76.1	72.3	68.9	66.8	62.5	72.9	81.7	85.6	73.5	61.1	46.9
LZSmin	48.3	51.7	42.3	52.6	51.2	46.5	46.7	45.9	39.7	29.4	16.8	13.5

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	63.6	62.3	59.4	57.6	56.4	55.2	54.3	53.5	54.4	53.9	53.4	52.9
LZSmax	77.4	81.9	75.6	74.8	69.3	70.5	72.9	65.0	64.9	68.1	63.5	61.4
LZSmin	43.6	41.7	43.5	45.2	45.4	44.4	46.6	45.0	47.2	47.0	47.7	47.5

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	52.0	52.7	50.4	48.9	47.3	48.3	50.9	54.0	54.3	55.8	59.5	60.1
LZSmax	62.0	62.9	60.2	58.1	57.4	61.9	65.2	70.2	70.3	72.8	80.3	79.0
LZSmin	46.1	46.2	44.1	42.0	41.0	41.3	41.4	41.1	41.2	41.8	41.4	39.4

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	60.1	57.9	59.4	52.1	49.3	46.8	38.9	35.2	31.4	27.3	23.5	18.8
LZSmax	82.5	76.8	85.2	68.7	67.6	70.2	60.9	55.7	49.8	44.4	43.4	37.3
LZSmin	37.3	34.0	30.7	26.9	23.4	19.1	14.1	11.1	9.3	8.4	8.6	9.2

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	18 Sep 2019 11:09:07	-26.6
PRM831	07 Aug 2019 12:27:09	-27.3
PRM831	07 Aug 2019 05:49:21	-27.0
PRM831	06 Aug 2019 15:11:44	-26.3
PRM831	06 Aug 2019 12:24:00	-26.0
PRM831	22 Jul 2019 10:48:48	-26.3
PRM831	12 Jul 2019 20:18:07	-26.0
PRM831	29 May 2019 13:46:43	-25.9
PRM831	07 May 2019 12:46:08	-24.7
PRM831	07 May 2019 11:41:50	-25.6
PRM831	29 Apr 2019 09:04:32	-25.7

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/23/2019
Case Description: Shenandoah ES Modernization Project - Demolition

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	53.5	53.5	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	10	5
Jackhammer	Yes	20		88.9	60	5
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	110	5
Front End Loader	No	40		79.1	160	5
All Other Equipment > 5 HP	No	50	85		210	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	88.1	84.1	N/A	N/A	N/A	N/A
Jackhammer	82.3	75.3	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	78.4	71.4	N/A	N/A	N/A	N/A
Front End Loader	64.0	60.0	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	67.5	64.5	N/A	N/A	N/A	N/A
Total	**88**	**85**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/23/2019
Case Description: Shenandoah ES Modernization Project - Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home	Residential	53.5	53.5	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	10	5
Compactor (ground)	No	20		83.2	60	5
Vibrating Hopper	No	50		87	110	5
Roller	No	20		80	160	5
Front End Loader	No	40		79.1	210	5
Front End Loader	No	40		79.1	260	5
Excavator	No	40		80.7	310	5

Equipment		Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Excavator		89.7	85.7	N/A	N/A	N/A	N/A
Compactor (ground)		76.6	69.7	N/A	N/A	N/A	N/A
Vibrating Hopper		75.2	72.1	N/A	N/A	N/A	N/A
Roller		64.9	57.9	N/A	N/A	N/A	N/A
Front End Loader		61.6	57.7	N/A	N/A	N/A	N/A
Front End Loader		59.8	55.8	N/A	N/A	N/A	N/A
Excavator		59.9	55.9	N/A	N/A	N/A	N/A
	Total	**90**	**86**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/23/2019
Case Description: Shenandoah ES Modernization Project - Building/Painting

				---- Receptor #1 ----
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Home	Residential	53.5	53.5	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	65	5
Crane	No	16		80.6	115	5
Gradall	No	40		83.4	165	5
Gradall	No	40		83.4	215	5
Gradall	No	40		83.4	265	5
Gradall	No	40		83.4	315	5
Pumps	No	50		80.9	365	5
Backhoe	No	40		77.6	415	5
Compressor (air)	No	40		77.7	465	5

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	77.1	70.1	N/A	N/A	N/A	N/A
Crane	68.3	60.4	N/A	N/A	N/A	N/A
Gradall	68.0	64.1	N/A	N/A	N/A	N/A
Gradall	65.7	61.8	N/A	N/A	N/A	N/A
Gradall	63.9	59.9	N/A	N/A	N/A	N/A
Gradall	62.4	58.4	N/A	N/A	N/A	N/A
Pumps	58.7	55.7	N/A	N/A	N/A	N/A
Backhoe	54.2	50.2	N/A	N/A	N/A	N/A
Compressor (air)	53.3	49.3	N/A	N/A	N/A	N/A
Total	**77**	**72**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/23/2019
Case Description: Shenandoah ES Modernization Project - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Home	Residential	53.5	53.5	53.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	10	5
Roller	No	20		80	60	5
Front End Loader	No	40		79.1	110	5

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Paver	86.2	83.2	N/A	N/A	N/A	N/A
Roller	73.4	66.4	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A
Total	**86**	**83**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Appendix H

Pedestrian and Safety Study

MEMORANDUM

To:	Mr. Edward S. Paek LAUSD - Office of Environmental Health & Safety	Date:	November 5, 2019
From:	Clare M. Look-Jaeger, P.E. CL-Jaeger Chin S. Taing, PTP CST Linscott, Law & Greenspan, Engineers	LLG Ref:	1-18-4323-1
Subject:	**Pedestrian and Safety Study for Shenandoah Street Elementary School Comprehensive Modernization Project, City of Los Angeles**		

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This traffic and pedestrian safety assessment has been prepared by Linscott, Law & Greenspan, Engineers (LLG) to review the traffic and pedestrian circulation associated with the peak construction activities and operations related to the Comprehensive Modernization Project (the "proposed Project") at Shenandoah Street Elementary School (Shenandoah Street ES). The proposed Project is located at 2450 South Shenandoah Street in the West Adams-Baldwin Hills-Leimert Community Plan Area of the City of Los Angeles, California. The Los Angeles Unified School District (LAUSD) has identified schools within the District in critical need of building replacement, renovations, and reconfiguration. The Project is part of the LAUSD's School Upgrade Program (SUP) that seeks to improve and modernize aging schools. This memorandum was prepared in accordance with the LAUSD Standard Conditions (SCs) of Approval for District Construction, Upgrade, and Improvement Projects[1] as it relates to pedestrian safety and transportation and circulation.

This memorandum includes a summary of the following: 1) existing site conditions; 2) proposed Project description; 3) existing overall traffic volumes and general observed circulation patterns; 4) planned construction schedule and estimated peak construction traffic trip generation; 5) review of City of Los Angeles High Injury Network; and 6) recommendations for usage of the loading zones at Project completion. General measures were also recommended for the School as it relates to pick-up/drop-off loading zones and general School policies regarding notification of overall pick-up and drop-off procedures following completion of the proposed Project.

Existing Site Conditions

The existing Shenandoah Street ES campus is developed on a 7.6-acre parcel located at 2450 South Shenandoah Street in the West Adams-Baldwin Hills-Leimert Community Plan Area of the City of Los Angeles, California. The School campus is bounded by existing residential uses to the north, Beverlywood Street to the south,

[1] Los Angeles Unified School District Standard Conditions of Approval for District Construction, Upgrade, and Improvement Projects, updated 2018.

existing single family residential uses to the east, and Shenandoah Street to the west. The Project site location is shown in ***Figure 1***.

The existing Shenandoah Street ES campus is operated by the Los Angeles Unified School District (LAUSD) and contains three permanent buildings and 23 portable buildings and structures to serve students in grades Kindergarten (K) through fifth grade. The current bell schedule for the School is 8:05 AM to 2:27 PM for regular school days and 8:05 AM to 12:45 PM during minimum days. The existing site conditions of the study area, including signage and parking restrictions in the area are illustrated in ***Figure 2***. As shown in *Figure 2*, the main pick-up/drop-off loading zones are located along the west side of the Shenandoah Street ES campus: 1) along the east side of Shenandoah Street between 24th Street and 25th Street; and 2) along the east side of Shenandoah Street between 25th Street and Beverlywood Street. These zones are designated for drop-off/pick-up loading activities before and after school (i.e., between 6:30 AM and 9:00 AM and 1:30 PM and 4:00 PM) during school days only (Mondays through Fridays). Time-restricted (i.e., two-hour) parking is permitted between 9:00 AM and 1:30 PM. The School also operates two school buses with bus loading/unloading activities also occurring along the campus frontage on the east side of Shenandoah Street. It should be noted that the Early Education Children's Center at the northeast corner of Shenandoah Street and Beverlywood Street is not part of the Project site.

Vehicular access to the on-site parking area is provided via a single driveway on Shenandoah Street (for access to the on-site surface parking lot). Another gated access is provided via the northerly terminus of Bedford Street near the southeastern portion of the campus. All of the on-site parking spaces are currently utilized by only the staff/administration for the School.

Project Description

The Shenandoah Street ES Comprehensive Modernization Project is intended to revitalize the existing campus to provide 21st century learning environments to support specialized programs that distinguish Shenandoah Street ES as a school offering unique learning opportunities. The Project provides for the replacement of permanent and portable buildings along with hardscape, landscape and parking areas. General objectives of the Project are to ensure the overall functionality and utility of the campus by providing seismic upgrades to buildings, providing a primary point of entry that is secure and welcoming for the School population as well as visitors, reducing reliance on portable classrooms and providing permanent classroom facilities, improving campus access and circulation for emergency access, and completing improvements as required by the ADA, under LAUSD's SUP. The Project consists of the removal of 33 classrooms currently in portable buildings as

well as other structures on campus totaling 33,684 square feet; replacement with construction of 26,870 square feet for a new classroom building; and modernization of two existing buildings (i.e., Main Administration Building, North Classroom Building) including repairs and repainting of 33,216 square feet. No changes to the student enrollment capacity are contemplated with the completion of the proposed Project.

Based on the site organization diagram shown in ***Figure 3***, the proposed Project would not change the existing use of the site, increase the student enrollment capacity of the School, or alter the sidewalk surrounding the Project site. The proposed Project is limited to modernizing the campus itself, including repaving ground surfaces to facilitate ADA access, repainting the existing buildings to remain, and demolishing and replacing other buildings/structures on campus. Development zones are grouped into the following program uses for the campus:

- New Building Zone
- Classroom Zone
- Lunch Shelter Area
- Designated Waiting Areas
- Surface Parking Zones

As part of the site enhancements of the proposed Project, two separate parent/guardian waiting areas are planned in the western portion of campus: 1) near the main Administration building, and 2) near the on-site parking lot entrance to the Shenandoah Street ES campus. The primary passenger loading zones will continue to be provided along the east side of Shenandoah Street similar to current conditions. Any late arrivals or access to campus during school hours would require controlled entry and access via Shenandoah Street with check-in required at the Administration Office. The proposed Project would re-design the surface parking lot in a T-shaped configuration for teachers/visitors in the southern portion of the campus by extending the existing parking lot to Bedford Street to the east and to Beverlywood Street to the south.

Existing Traffic Volumes

Manual counts of vehicular turning movements were conducted at five (5) intersections in the vicinity of the Shenandoah Street ES campus during the weekday morning (AM) and afternoon (PM) school peak periods to determine the peak hour traffic volumes. The traffic counts were conducted by an independent traffic count

subconsultant (City Traffic Counters) from 7:00 AM to 9:00 AM to determine the weekday school AM peak hour, and from 1:30 PM to 3:30 PM to determine the weekday school PM peak hour. In conjunction with the manual turning movement vehicle counts, a count of bicycle and pedestrian volumes were also collected during the peak periods. It is noted that all of the traffic counts were conducted on Wednesday, April 3, 2018 during a typical regular mid-week school day. The subject count locations are summarized as follows and also illustrated in *Figure 1*:

- Shenandoah Street/Cadillac Avenue
- Shenandoah Street/24th Street
- Shenandoah Street/25th Street
- Shenandoah Street/Beverlywood Street
- Halm Avenue/Cadillac Avenue

The weekday AM and PM peak hour manual counts of vehicle turning movements at the subject intersections are shown in ***Figure 4***. Summary data worksheets of the manual traffic counts at the subject intersections, as well as the pedestrian and bicycle counts, are contained in ***Attachment A***.

As mentioned previously, a count of the pedestrian volumes was also conducted during the morning and afternoon school peak periods in conjunction with the vehicle counts. The weekday AM and PM peak hour manual counts of pedestrian crossings at the subject intersections are depicted in ***Figure 5***.

General Observed Inbound and Outbound Circulation Patterns

Field observations were conducted at the Shenandoah Street ES loading areas during the morning drop-off peak period (i.e., between 7:30 AM and 8:30 AM) and afternoon pick-up peak period (i.e., between 2:00 PM and 3:00 PM) during a typical school day (Monday, February 11, 2019). During the morning drop-off period, the majority of guardians conducted student drop-off procedures by entering the on-street loading zones along Shenandoah Street. The loading zones are currently posted with signage indicating "Passenger Loading Only" between 6:30 AM and 9:00 AM, and 1:30 PM and 4:00 PM during school days. Time-restricted parking (i.e., two-hour parking) is permitted between 9:00 AM and 1:30 PM during school days. Some guardians utilized the loading zone while others were observed to conduct drop-off operations outside of the loading zones.

Vehicles were observed to park within the area located on the east side of Shenandoah Street immediately north of 24th Street which is currently signed as Tow

Away No Stopping (TANS) between 7:00 AM to 5:00 PM on school days, with school buses being exempt. No traffic monitor was stationed at the Shenandoah Street loading zones to help facilitate the loading/unloading activities. One vehicle arriving to the site via southbound Shenandoah Street was observed to stop along the east side of Shenandoah Street for unloading activities (i.e., with the child exiting the vehicle and entering the roadway right-of-way) and then the motorist continued to proceed southbound on Shenandoah Street.

Vehicles were also observed to double park on Shenandoah Street to conduct unloading activities. School buses were observed to park within the passenger loading zone along the east side of Shenandoah Street. Vehicles were observed to approach the campus from both northbound and southbound Shenandoah Street as well as eastbound on the residential streets (i.e., via David Avenue, 24th Street, 25th Street, and Beverlywood Street).

No safety valets were stationed near the School's gated pedestrian access on Shenandoah Street to assist in the processing of vehicles within and approaching the Shenandoah Street loading zones. Some guardians were observed to cross Shenandoah Street mid-block without utilizing the crosswalk at the Shenandoah Street/24th Street intersection. ***Figure 5*** illustrates all pedestrian crossing volumes at the study intersections (i.e., including both student and guardian crossings) during the morning and afternoon peak hours. As shown in *Figure 5*, the majority of the pedestrian crossings occurred at the existing crosswalk at the north and west legs of the Shenandoah Street/24th Street intersection, the west leg of the Shenandoah Street/25th Street intersection, across the east leg of the Shenandoah Street/Beverlywood Street intersection, and along the west leg of the Halm Avenue/Cadillac Avenue intersection. Only one crossing guard was observed at the intersection of Halm Avenue/Cadillac Avenue intersection located northeast of the Shenandoah ES campus.

The vehicle circulation pattern for the afternoon pick-up period is generally similar to the morning drop-off period. As is typical for schools, the processing time for students to be located and ready for arriving parents/guardians generally took longer than the morning drop-off activities. ***Figure 6*** depicts the existing overall inbound and outbound circulation routes for both loading areas (i.e., along Shenandoah Street).

Construction Schedule

Based on coordination with the team and preliminary information provided to LLG, it has been determined that the duration of the Project construction activities is expected to total 36 months, beginning in the third quarter of year 2021. In order to maintain

active school operation during the construction phase, less than 50 percent of the campus would be disturbed at any one time. Thus, while the exact phasing of the work has not yet been determined, this analysis assumes that there will be two general overall phases (i.e., each approximately 18 months in duration). The actual duration of construction would likely be longer; however, by assuming the shortest expected construction duration, this study is taking a more conservative approach due to the higher intensity of the construction activities.

The general construction activities and duration for each sub-phase are as follows:

- Demolition/Interim Housing/Modernization (3 months)
- Site Preparation/Modernization (3 months)
- Building Construction/Modernization (12 months)
- Asphalt Paving and Off-Site Street Work (3 months)

Based on information provided, an average of 50 workers would be on-site when students are present and a maximum of 150 workers would be on-site during peak periods (i.e., during summer break). No summer school sessions are currently held or planned to be held during the summer months. It is anticipated that construction worker parking would generally be accommodated on-site in the staging area during all phases of construction. Construction workers would not be permitted to park on local streets and would therefore not affect the current usage of street parking.

To the extent feasible, construction-related activities would be scheduled to occur during daylight hours. Construction-related traffic and deliveries would be scheduled to avoid student pick-up/drop-off hours, and during noise sensitive times as coordinated with the School administration. The City's Noise Ordinance currently limits construction hours on Mondays through Fridays to no earlier than 7:00 AM and no later than 9:00 PM. On Saturdays, construction hours are limited to no earlier than 8:00 AM and no later than 6:00 PM. No construction is permitted on Sundays.

It has been determined that the most intensive period of overall construction activity and construction truck traffic generation is expected to occur during the Site Preparation/Modernization sub-phase for an approximate three-month period. Other phases of construction are expected to be less intensive in terms of overall construction truck traffic generation. The most intensive period in terms of the other miscellaneous delivery trucks would occur during the Building Construction/Modernization sub-phase for an approximate 12-month period. While it is recognized that these two sub-phases are not expected to overlap (i.e., Site Preparation/Modernization and Building Construction/Modernization), they were

assumed to be concurrent in order to provide a conservative analysis and to provide greater flexibility as the actual phasing of the work has not yet been determined.

Peak Construction Traffic Trip Generation

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Trip generation equations and/or rates provided in the ITE *Trip Generation Manual* publication[2] were not utilized to forecast traffic generation for the construction activities, as the ITE document does not contain trip rates for specifically this type of expected construction-related hauling operation. Therefore, the construction trip generation forecast was derived based on the development of construction worker and truck forecasts given the expected hauling/delivery capacities as well as the application of passenger car equivalency (PCE) factors, as described more fully below.

Haul Trucks

In developing the forecast of peak truck trip generation, several factors were taken into consideration:

- Hours of Hauling Operation
- Capacity of Haul Trucks
- Application of PCE Factors

It is anticipated that construction vehicles related to the export activities will have a capacity of approximately 14 cubic yards per truck. It has also been assumed for analysis purposes that all hauling activities would be limited to no earlier than 9:00 AM and end no later than 5:00 PM. As noted above, in order to account for the effect that trucks have on overall intersection operations, PCE factors were incorporated into the analysis of potential construction-related traffic impacts. Based on a review of the size of haul trucks expected to be utilized, a PCE factor of 2.5 was incorporated into the traffic analysis (i.e., it is assumed that a single 14 cubic yard haul truck has the same overall effect on traffic operations as 2.5 passenger cars). This assumption is conservative and accounts for the heavy vehicle type and slower speeds when fully loaded. The traffic generation forecast assuming the use of 14-cubic yard capacity haul trucks is summarized in ***Table 1***.

The most intensive period of overall construction activity and construction truck traffic generation is expected to occur during the Site Preparation/Modernization phase for an approximate three-month period. During the peak, up to 82 trucks per

[2] *Trip Generation Manual*, Institute of Transportation Engineers, 10th Edition, 2017.

day (i.e., 41 inbound trucks and 41 outbound trucks) are anticipated. Assuming a total of eight hours of hauling activities each day, it is estimated that approximately six truck loads (i.e., resulting in six inbound trucks and six outbound trucks) would occur per hour. When accounting for the application of a passenger car equivalency (PCE) factor of 2.5 to account for the heavier weight and larger size haul trucks, a total of 15 inbound truck PCE trips and 15 outbound truck PCE trips could potentially occur during the weekday AM and PM peak hours.

Equipment and Delivery Trucks

In addition to construction haul trucks, additional trips may be generated by miscellaneous trucks traveling to and from the Project site. These trucks may consist of trucks delivering equipment and/or construction materials to the Project site. In addition, smaller pick-up trucks or four-wheel drive vehicles used by construction supervisors and/or City inspectors are expected to be generated to and from the site. During the peak phase for deliveries (i.e., Building Construction/Modernization), up to 12 delivery trucks are anticipated for this phase. It is estimated that if these deliveries all occur on a single day of that phase, up to 24 trucks per day (i.e., 12 inbound trucks and 12 outbound trucks) would be generated to and from the site. To conservatively estimate the equivalent number of passenger vehicles associated with the trucks, a PCE factor of 2.0 was utilized based on standard traffic engineering practice. Therefore, assuming 24 daily trucks per day, it is estimated that the trucks would generate approximately 48 daily PCE vehicle trips (i.e., 24 inbound PCE trips and 24 outbound PCE trips). It is also estimated that approximately eight (8) PCE vehicle trips (4 inbound PCE trips and 4 outbound PCE trips) could occur during each of the weekday AM and PM peak hours.

Construction Workers/Employees

The most intensive period in terms of the number of construction workers would occur during the summer months with up to a maximum of 150 workers during the peak periods. Based on confirmation from School representatives, summer school classes are not held at this campus and would not overlap with the 150 workers which are anticipated to be on-site during the summer months. During the overlap with concurrent School operations, it is anticipated that an average of 50 workers would be on-site. For purposes of this review, the number of construction workers were reviewed during the concurrent operation of the School when students are present on-site. Construction workers are expected to arrive at the Project site before 7:00 AM. Since the construction work day would commence by 7:00 AM, these trips would occur outside of the weekday commute AM peak hour, but could occur during the weekday PM peak hour. Assuming the typical work day ends at 3:30 PM, fifty percent (50%) of the workers are assumed to leave the site between 3:30 PM and 4:00

PM, twenty-five percent (25%) between 4:00 PM and 4:30 PM, and the remaining twenty-five percent (25%) after 4:30 PM (including supervisors). Thus, while these construction worker trips would generally occur outside of the commute PM peak hour of adjacent street traffic, fifty-percent (50%) of the work force (i.e., 25 workers) has been assumed to overlap with the weekday commute PM peak hour (i.e., between 5:00 PM and 6:00 PM) in order to provide a conservative forecast of construction worker traffic generation. The construction worker arrival and departure times are expected to occur outside of the peak hour of student pick-up/drop-off operations as well (i.e., before 7:00 AM and after 3:30 PM).

It is anticipated that construction workers would primarily remain on-site throughout the day. The number of construction worker vehicles is estimated using an average vehicle ridership (AVR) factor of 1.135 persons per vehicle (as provided in the South Coast Air Quality Management District in its CEQA Air Quality Handbook). Therefore, it is estimated that approximately 88 vehicle trips (44 inbound trips and 44 outbound trips) on a daily basis would be generated to/from the site by the construction workers during the peak period when a total of 50 construction workers are expected to be on-site. With 50% of the workers conservatively assumed to overlap with the weekday PM peak hour, this would result in 22 outbound construction worker vehicle trips.

Total Construction Traffic Generation

Taken together as summarized in *Table 1*, the construction haul trucks, miscellaneous delivery vehicles, and construction worker vehicles are forecast to generate up to 38 weekday AM peak hour PCE vehicle trips (i.e., 19 inbound PCE trips and 19 outbound PCE trips). During the PM peak hour, the construction traffic generation is expected to total 60 PCE vehicle trips (i.e., 19 inbound PCE trips and 41 outbound PCE trips). Over a 24-hour period, the construction traffic generation is forecast to generate an increase of 342 daily PCE trip ends during a typical weekday (171 inbound PCE trips and 171 outbound PCE trips).

For comparison purposes, traffic generation for the existing Shenandoah ES campus was estimated based on the trip generation rates published in the ITE *Trip Generation Manual* for Land Use Code 520 (Elementary School) and applied to the number of students. When compared to the traffic generated by the operations of the School (i.e., 452 AM peak hour vehicle trips, 115 PM peak hour vehicle trips, and 1,276 daily vehicle trips), the short-term construction traffic anticipated during the peak construction activities are anticipated to be significantly less than the daily operations of the Shenandoah ES.

Congestion Management Program Traffic Impact Assessment

The Congestion Management Program (CMP) was previously a state-mandated program that was enacted by the California State Legislature with the passage of Proposition 111 in 1990 that primarily utilized a level of service (LOS) performance metric. Senate Bill 743 contains amendments to current congestion management law that allows counties to opt out of the LOS standards that would otherwise apply in areas where CMPs are utilized. Pursuant to California Government Code §65088.3, local jurisdictions may opt out of the CMP requirement without penalty if a majority of the local jurisdictions representing a majority of the County's population formally adopt resolutions requesting to opt out of the program. As of October 2019, the majority of local agencies representing the majority of the County's population have adopted resolutions to opt out of the program. Therefore, the CMP is no longer applicable in Los Angeles County.

Emergency Access During Construction Activities

The potential traffic impacts during Project construction have been analyzed as summarized above. Having stated this, emergency vehicle access throughout the study area must be maintained during the construction activities. It is important to note that as required by the State of California Vehicle Code (i.e., specifically Section 21806, Authorized Emergency Vehicles), "upon the immediate approach of an authorized emergency vehicle which is sounding a siren and which has at least one lighted lamp exhibiting red light that is visible, under normal atmospheric conditions, from a distance of 1,000 feet in front of a vehicle, the surrounding traffic shall, except as otherwise directed by a traffic officer, do the following:

(a) (1) Except as required under paragraph (2), the driver of every other vehicle shall yield the right-of-way and shall immediately drive to the right-hand edge or curb of the highway, clear of any intersection, and thereupon shall stop and remain stopped until the authorized emergency vehicle has passed.

(2) A person driving a vehicle in an exclusive or preferential use lane shall exit that lane immediately upon determining that the exit can be accomplished with reasonable safety.

(b) The operator of every street car shall immediately stop the street car, clear of any intersection, and remain stopped until the authorized emergency vehicle has passed.

(c) All pedestrians upon the highway shall proceed to the nearest curb or place of safety and remain there until the authorized emergency vehicle has passed."[3]

During the construction of the proposed Project, it is expected that emergency vehicles will continue to utilize the surrounding street system even though some travel lanes along certain portions of some roadways may be temporarily used for construction staging and/or material delivery. If required, drivers of emergency vehicles are also trained to utilize center turn lanes, or travel in opposing through lanes to pass through crowded intersections or streets. Thus, the respect entitled to emergency vehicles and driver training allow emergency vehicles to negotiate typical street conditions in urban areas including areas near any temporary travel lane closure(s).

Construction Management and Haul Route Approval

Approvals required by the City of Los Angeles and the State of California Department of Transportation (Caltrans) for implementation of the proposed Project include a Truck Haul Route program approved by the City and an encroachment permit obtained by Caltrans. With regard to other construction traffic-related issues, construction equipment would be stored within the perimeter fence of the site.

As a general contractor has not yet been selected, the exact extent of the construction work site boundary cannot be determined at this time. Pursuant to Standard Condition Measure SC-T-4, the construction contractor will be required to submit a Construction Worksite Traffic Control Plan to OEHS for review prior to the start of construction activities. Given the number of pedestrians (i.e., guardians and children) walking to/from the campus, it is recommended that certain lanes/sidewalks along Shenandoah Street and Cadillac Avenue remain open during construction. Should the closure of any lanes/sidewalks be determined to be necessary, appropriate pedestrian detours will be required to be established along with the appropriate advance warning signage directing pedestrians to other available sidewalks and crosswalks/crossings. Should any such pedestrian detours or temporary travel lane closures be proposed, traffic control/management plans will be prepared for the required review and approval by the City of Los Angeles Department of Transportation. In addition, a Construction Staging and Traffic Management Plan (CSTMP) will also be required for review and approval by the City outlining all of the above details.

With the required haul route approval and other construction management practices, construction activity impacts would be less than significant. Potential construction

[3] Source: State of California Department of Motor Vehicles website; https://www.dmv.ca.gov/portal/dmv; Amended Sec. 68, Ch. 1154, Stats 1996 Effective September 30, 1996.

traffic impacts can be further reduced with the implementation of the following design features as part of the CSTMP:

- Maintain existing access for school campus and on-site parking facilities;
- Limit any potential roadway lane closures to off-peak travel periods;
- Schedule receipt of construction materials to non-peak travel periods, to the extent possible;
- Coordinate deliveries to reduce the potential of trucks waiting to unload for protracted periods of times; and
- Prohibit parking by construction workers on adjacent residential streets and direct all construction workers to designated on-site parking areas.

City of Los Angeles High Injury Network Review

Vision Zero is a policy which prioritizes the safety of pedestrians and bicyclists on public streets, with the understanding that roads which are safe for vulnerable users will be safer for all users, in an effort to eliminate traffic fatalities. Key elements of the policy, such as reducing traffic speeds, are founded on the principles of engineering, education, enforcement, evaluation, and equity. Originating in Sweden, the policy has been adopted in numerous other North American cities, including California cities such as San Francisco and San Diego.

Mayor Eric Garcetti issued Executive Directive No. 10 in August 2015, formally launching the Vision Zero initiative in Los Angeles. Vision Zero is also a stated safety objective in the Mobility Plan 2035, which sets the goal of zero traffic deaths by 2035. Jointly directed by the Department of Transportation and the Police Department, Vision Zero takes a multi-disciplinary approach to identifying safety risk factors and implementing solutions on a citywide scale. Using a methodology originally developed by the San Francisco Public Health Department, the Vision Zero Task Force has identified streets where investments in safety will have the most impact in reducing severe injuries and traffic fatalities in the City[4]. These roads are collectively known as the High Injury Network (HIN). The HIN will be reviewed for potential engineering re-design as well as educational and enforcement campaigns.

The proposed Project is located at 2450 South Shenandoah Street in the Southeast Los Angeles Community Plan Area. The roadways adjacent to and in the vicinity of the Shenandoah Street ES campus that have been identified on the City's HIN are noted below:

[4] Vision Zero Los Angeles 2015-2025, August 2015.

- Cadillac Avenue between Corning Street and La Cienega Boulevard,
- Corning Street between Guthrie Avenue and Cadillac Avenue, and
- La Cienega Boulevard between Whitworth Drive to Venice Boulevard.

If a proposed project results in significant traffic impacts at intersections located along a designated HIN, LADOT's Vision Zero group will review those specific locations and immediate vicinity for potential safety enhancements that are consistent with the City's Vision Zero initiative.

Conclusions and Recommendations

The following recommendations are based on LLG's review of the current pick-up/drop-off activities associated with usage of the pick-up/drop-off loading zone on Shenandoah Street as it relates specifically to overall circulation patterns:

i. In accordance with Standard Condition Measures SC-PED-2 and SC-PED-4, it is recommended that the Shenandoah ES institute the Safety Valet Program of parent volunteers or assign individuals to help in the loading and unloading of students to/from personal vehicles at the future planned loading zone along Shenandoah Street. The Shenandoah Street loading zone shall be coned off, marking the appropriate area for guardians to drop-off/pick-up students without leaving the vehicle. The safety valet shall continue to direct traffic to pull up to the front of the loading zone before opening car doors for students. This has been observed to result in a more continuous traffic flow and efficient vehicle processing, which in turn reduces the potential for any vehicle queuing outside of the designated loading zone area. It is recommended that safety valets wear safety gear including reflective vests, hats and/or gloves at all times when performing traffic control operations at the campus. Also as part of the training for the safety valets, it should be reiterated that they be on time and present prior to the commencement of loading operations.

ii. It is recommended that a minimum of two (2) safety valet volunteers/staff members be stationed at the Shenandoah Street loading zone. The safety valet volunteer/s will be present primarily for the oversight of drop-off/pick-up activities at the designated loading zone and not to assist with any pedestrian crossings. In doing so, the safety valet volunteers/staff would be able to identify the student name within ample time to allow for student assembly and pick-up prior to the guardian's arrival at the designated pick-up location. It is recognized that improving the processing of pick-up operations would also help relieve congestion/queues observed at the Shenandoah

Street/Beverlywood Street intersection. The recommended circulation pattern is intended to facilitate a high processing rate for dropping-off and picking-up students (i.e., unload and load several vehicles at a time). Parents will be encouraged to have their student ready to exit and enter the vehicle quickly and safely.

iii. As posted along the east side of Shenandoah Street immediately north of 24th Street, Tow Away No Stopping (TANS) restrictions are required between 7:00 AM to 5:00 PM on school days, with the exception for school buses. It was observed during the morning and afternoon time periods and vehicles utilized this area to conduct pick-up/drop-off activities such that the school buses were not able to utilize this area. Further enforcement should be implemented such that vehicles observed to utilize this area within the specified hours would be towed/ticketed since any passenger vehicle/s parked/stopped would essentially block the buses from this loading zone and would essentially require the buses to mix with other passenger vehicles and utilize the passenger loading zone located south of 24th Street. Guidance on parking restrictions, vehicle enforcement, and school parking signage are provided in the School Traffic Safety Reference Guide REF-4492.1 as part of Standard Condition Measure SC-PED-4.

iv. Based on the pedestrian routes recommended for Shenandoah Street ES, as prepared in September 2016 (refer to ***Attachment B***), a crossing guard is expected to be stationed and present at the Halm Avenue/Cadillac Avenue intersection. One crossing guard was observed at this location during the conduct of the field review. The School should encourage that guardians and students follow the circulation pattern and utilize the loading zone for those who choose to conduct drop-off/pick-up activities along the Shenandoah Street frontage. Guardians who choose to park along the west side of Shenandoah Street or other residential streets in the area and walk their child(ren) to the gates on the east side of Shenandoah Street should be informed by the School that they must accompany the child(ren) and cross within the designated crosswalk at the Shenandoah Street/24th Street intersection. School-related pedestrians will be directed to the campus by crossing at designated crosswalks at intersections (i.e., at Shenandoah Street/Cadillac Avenue and Shenandoah Street/24th Street). Standard Condition Measure SC-PED-2 identifies the OEHS Traffic and Pedestrian Safety Program which includes measures (i.e., sidewalks, crossing guards, crosswalks, warning signs, etc.) to ensure separation between pedestrians and vehicles along pedestrian routes.

v. School-operated buses which transport students to and/or from Shenandoah ES, shall load and unload students along the east side of Shenandoah Street north of 24th Street so as to not overlap with the future primary usage of the Shenandoah Street loading zone by passenger vehicles located south of 24th Street. As part of the School Design Guide identified as Standard Condition Measures SC-PED-5 and SC-T-2, student drop-off and pick-up loading, bus loading areas, and parking areas shall be separated. The School Design Guide also contains specifications related to parking space requirements, general parking guidelines, and vehicular access and pedestrian safety.

vi. It was observed that School-operated buses approaching Shenandoah ES from the south circulated to campus by heading northbound on Reynier Avenue before attempting a left-turn maneuver from Reynier Avenue to westbound Beverlywood Street. The school buses would then proceed westerly on Beverlywood Street and conduct a right-turn maneuver at Shenandoah Street in order to approach the loading zone. Due to vehicles parked along the north side of Beverlywood Street between Shenandoah Street and Reynier Avenue, the buses could not complete the turn in one maneuver and were observed to back up to complete the turn. Given the existing street widths and speed humps installed on Reynier Avenue south of Beverlywood Street and the narrow street widths with the absence of curb and gutter on Shenandoah Street south of Beverlywood Street, it is recommended that school-buses approaching the Shenandoah ES campus from the south utilize Bedford Street to complete the left-turn maneuver onto Beverlywood Street.

Recommendations on General Campus Traffic Procedures

It is also recommended that the student drop-off/pick-up operations be included in the School policies for parent/guardian distribution at the beginning of each school year during the student enrollment period. The School's policy would include general traffic procedures for the campus, a summary of the drop-off and pick-up procedures, reminders on School policies for off-campus traffic circulation and parking, as well as provisions for being a good neighbor to local residents living near the School campus. These School policies are communicated to faculty, staff, students and parents/guardians at the beginning of the school year and are reinforced throughout the school year in the School's newsletter that is distributed throughout the School community, as well as to every resident located within a 500-foot radius of the campus.

It is also recommended that a School official (i.e., the School Principal or Principal's designee) along with their respective contact information, including telephone number, continue to be published in the School's newsletter as well as posted on the

School's website so that if the community has questions or comments regarding school-related traffic and parking issues, there is one clearly identified contact person. This School official would be referred to as the School's traffic and parking ombudsman and would be responsible for proactively addressing questions, comments and complaints from the School community and local residents. It is expected that the School's traffic and parking ombudsman would be very familiar with all policies and procedures regarding traffic and parking operations at the campus, as well as any special events planned to be held at the campus.

Please feel free to call us at 626.796.2322 with any questions and comments.

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MAP SOURCE: RAND MCNALLY & COMPANY

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★ PROJECT SITE

● STUDY INTERSECTION

FIGURE 1
VICINITY MAP

LINSCOTT, LAW & GREENSPAN, engineers

SHENANDOAH STREET ELEMENTARY SCHOOL

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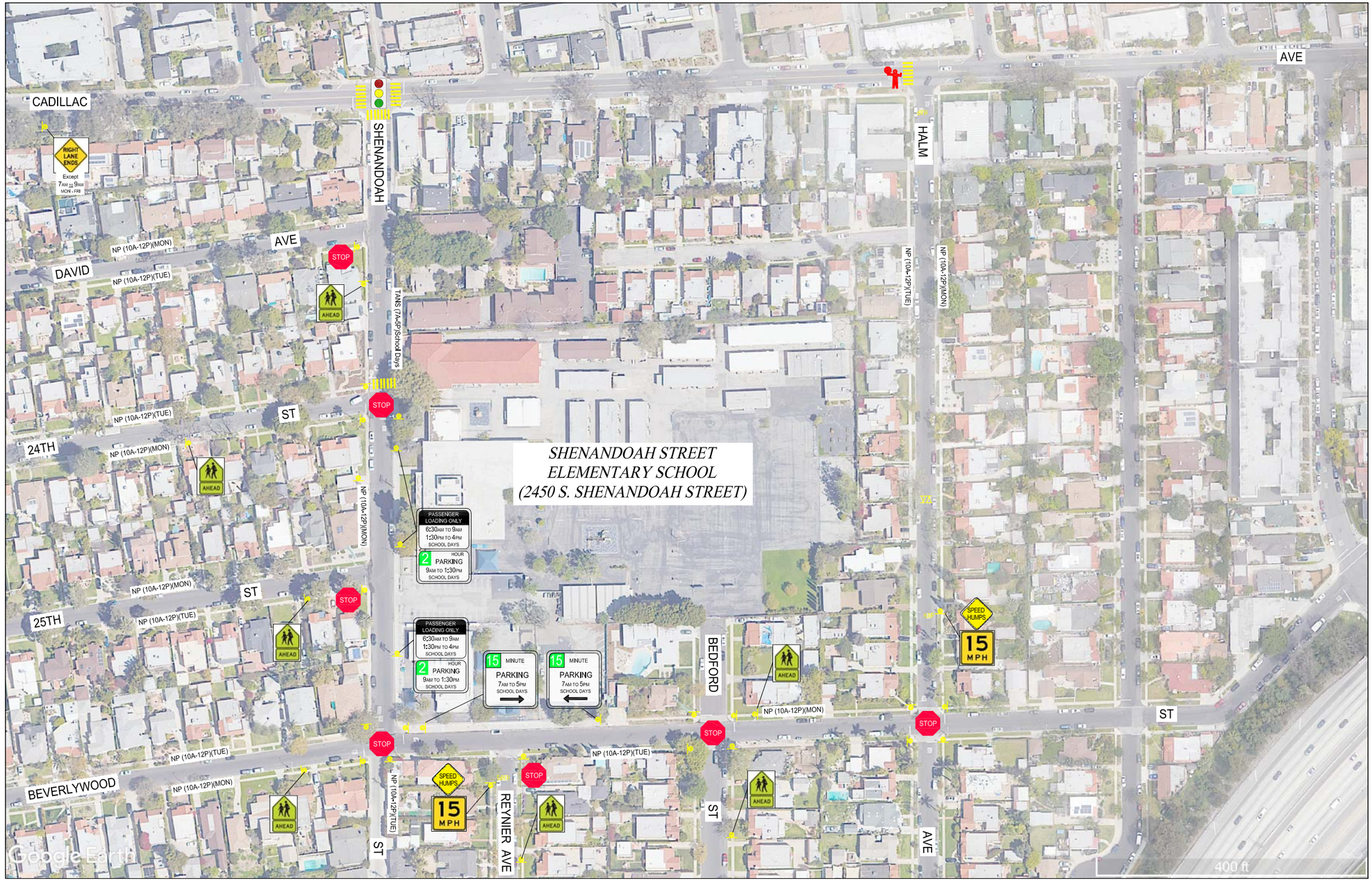

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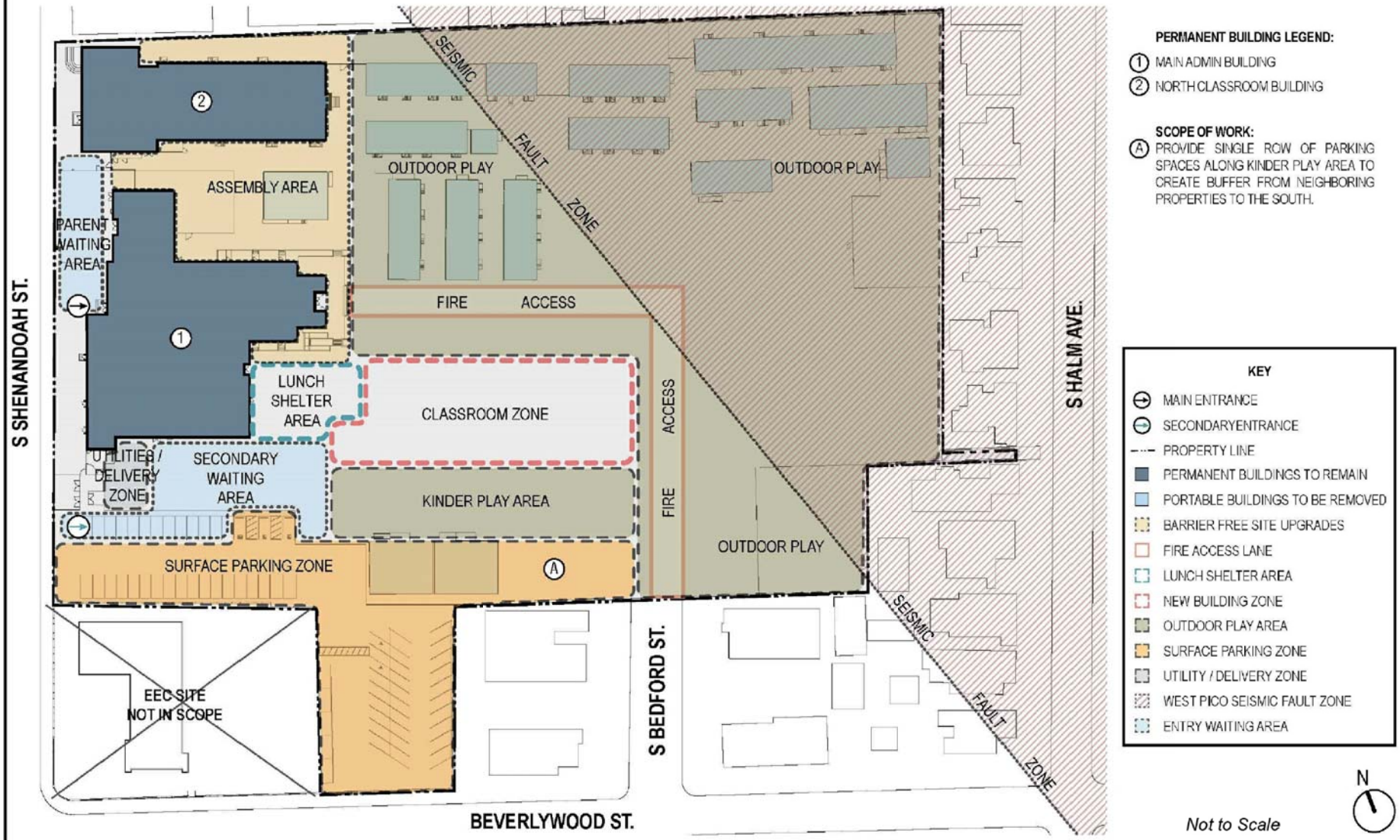
MAP SOURCE: GOOGLE EARTH

SIGN LOCATION

CROSSING GUARD

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 2
EXISTING CONDITIONS
STUDY AREA
SHENANDOAH STREET ELEMENTARY SCHOOL



SOURCE: CHAMBERS GROUP

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FIGURE 3
PROPOSED PROJECT SITE PLAN

LINSCOTT, LAW & GREENSPAN, engineers

SHENANDOAH STREET ELEMENTARY SCHOOL

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MAP SOURCE: GOOGLE EARTH

XX(XX) = AM(PM) PEAK HOUR VOLUMES

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LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 4
EXISTING TRAFFIC VOLUMES
SCHOOL AM AND PM PEAK HOURS
SHENANDOAH STREET ELEMENTARY SCHOOL



MAP SOURCE: GOOGLE EARTH

XX(XX) = AM(PM) PEAK HOUR PEDESTRIAN VOLUMES

NOT TO SCALE

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 5
EXISTING PEDESTRIAN TRAFFIC VOLUMES
SCHOOL AM AND PM PEAK HOURS

SHENANDOAH STREET ELEMENTARY SCHOOL

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MAP SOURCE: GOOGLE EARTH

INBOUND CIRCULATION

OUTBOUND CIRCULATION

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FIGURE 6
EXISTING SCHOOL INBOUND/OUTBOUND CIRCULATION PATTERNS

SHENANDOAH STREET ELEMENTARY SCHOOL

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Table 1
TRIP GENERATION USING 14 CUBIC-YARD CAPACITY TRUCKS [1]
PEAK CONSTRUCTION PHASE

LAND USE	DAILY TRIP ENDS [2] VOLUMES	AM PEAK HOUR VOLUMES [2] IN	AM PEAK HOUR VOLUMES [2] OUT	AM PEAK HOUR VOLUMES [2] TOTAL	PM PEAK HOUR VOLUMES [2] IN	PM PEAK HOUR VOLUMES [2] OUT	PM PEAK HOUR VOLUMES [2] TOTAL
Construction Trip Generation							
[A] Construction Workers [3]	88	0	0	0	0	22	22
[B] 14-cy Haul Truck Trips (unadjusted) [4]	82	6	6	12	6	6	12
[C] Delivery Truck Trips (unadjusted) [5]	24	2	2	4	2	2	4
[D] PCE Adjusted 14-cy Haul Truck Trips [6]	206	15	15	30	15	15	30
[E] PCE Adjusted Delivery Truck Trips [7]	48	4	4	8	4	4	8
Total Trips in PCEs with 14-CY Trucks ([A]+[D]+[E])	**342**	**19**	**19**	**38**	**19**	**41**	**60**
Existing Shenandoah Street ES Campus Trip Generation							
Elementary School [8] 675 students	1,276	244	208	452	55	60	115
Total Existing Campus Trip Generation	**1,276**	**244**	**208**	**452**	**55**	**60**	**115**

[1] Source: Based on the construction schedule matrix as provided by LAUSD, the following is assumed:
Haul trips expected to average 41 truck trips per day during the Site Preparation phase of peak export activities.
Hours of Truck Hauling Operations: Mondays to Fridays, 9:00 AM to 5:00 PM (8 hours of hauling per day are assumed)

[2] Trips are one-way traffic movements, entering or leaving.

[3] An average of 50 construction workers are expected to be on-site when students are present during the regular school year. Workers are assumed to arrive at the site prior to 7:00 AM and it is assumed that 50 percent (one-half) of the workers would depart during the PM peak hour of adjacent street traffic.
An average vehicle ridership factor of 1.135 passengers/vehicle was applied to determine the worker vehicle trips.
Daily construction worker trips = 50 workers/ (1.135 passengers/vehicle) = 44 inbound vehicle trips + 44 outbound vehicle trips = 88 total daily vehicle trips

[4] Daily truck trips to/from the receptor site/s were derived based on the following, using 14 cubic yard (cy) capacity per haul truck:
41 total truck loads per day = 41 inbound trips + 41 outbound trips = 82 total daily truck trips.
Peak Hour Truck Trips = 82 trips / 8 hours = 10 one-way truck trips per hour, rounded to 11 one-way truck trips per hour.
Thus, for analysis purposes 6 inbound truck trips + 6 outbound truck trips = 12 total truck trips per hour have been assumed.

[5] Peak delivery trips are expected during the Building Construction/Modernization sub-phase of construction activities, where 24 one-way delivery truck trips are expected during the peak day.
12 inbound delivery trucks + 12 outbound delivery trucks = 24 total daily delivery truck trips (assumed for peak delivery day)

[6] A passenger car equivalency (PCE) factor of 2.5 was employed for analysis purposes. This accounts for the assumption that a single 14 cubic yard capacity haul truck has the same overall affect on intersection traffic operations as 2.5 passenger cars.
Peak Hour Adjusted Truck Trips (in PCEs) = 15 inbound truck trips + 15 outbound truck trips = 30 total truck trips (in PCEs) have been assumed.

[7] A PCE factor of 2.0 was employed for delivery trucks, and the adjusted daily and peak hour delivery truck trips (in PCEs) are as follows:
Daily Adjusted Delivery Trips (in PCEs) = 24 inbound delivery trips + 24 outbound delivery trips = 48 total daily delivery trips.
Peak Hour Adjusted Delivery Trips (in PCEs) = 4 inbound delivery trips + 4 outbound delivery trips = 8 total delivery trips.

[8] Source: ITE "Trip Generation Manual", 10th Edition, 2017.
ITE Land Use Code 520 (Elementary School) trip generation average rates.
- Daily Trip Rate: 1.89 trips/student; 50% inbound/50% outbound
- AM Peak Hour Trip Rate: 0.67 trips/student; 54% inbound/46% outbound
- PM Peak Hour Trip Rate: 0.17 trips/student; 48% inbound/52% outbound

ATTACHMENT A

MANUAL INTERSECTION TRAFFIC COUNTS - SCHOOL AM AND PM PEAK HOURS

CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Vehicles

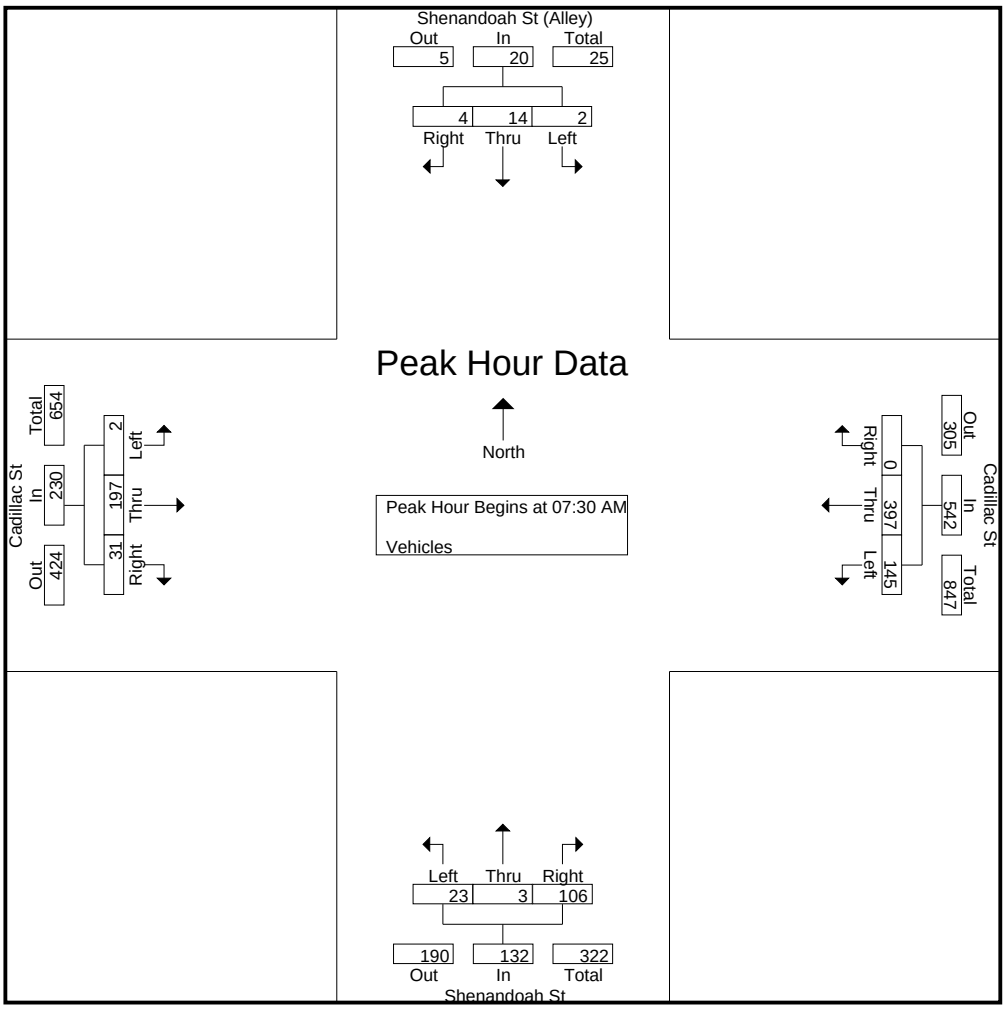
	Shenandoah St (Alley) Southbound			Cadillac St Westbound			Shenandoah St Northbound			Cadillac St Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	1	4	22	91	0	4	1	16	0	23	4	167
07:15 AM	1	3	3	26	83	0	1	1	5	1	27	5	156
07:30 AM	0	3	2	44	104	0	2	0	9	1	42	6	213
07:45 AM	1	7	1	42	87	0	6	0	34	1	45	11	235
Total	3	14	10	134	365	0	13	2	64	3	137	26	771
08:00 AM	0	3	0	34	106	0	11	2	44	0	53	8	261
08:15 AM	1	1	1	25	100	0	4	1	19	0	57	6	215
08:30 AM	0	2	0	15	127	0	3	1	11	0	46	5	210
08:45 AM	0	1	1	16	134	0	6	1	15	1	43	5	223
Total	1	7	2	90	467	0	24	5	89	1	199	24	909
01:30 PM	0	0	0	6	63	1	3	0	16	0	106	2	197
01:45 PM	0	2	0	11	62	0	2	0	17	1	114	0	209
Total	0	2	0	17	125	1	5	0	33	1	220	2	406
02:00 PM	2	0	1	17	46	1	4	0	16	1	105	6	199
02:15 PM	1	1	2	23	24	0	5	0	16	1	89	5	167
02:30 PM	1	0	0	16	51	0	5	1	32	0	86	4	196
02:45 PM	1	1	0	14	41	0	3	2	38	0	107	5	212
Total	5	2	3	70	162	1	17	3	102	2	387	20	774
03:00 PM	0	0	0	11	40	0	6	4	30	1	85	9	186
03:15 PM	0	0	0	25	25	0	6	3	22	1	69	11	162
Grand Total	9	25	15	347	1184	2	71	17	340	9	1097	92	3208
Apprch %	18.4	51	30.6	22.6	77.2	0.1	16.6	4	79.4	0.8	91.6	7.7	
Total %	0.3	0.8	0.5	10.8	36.9	0.1	2.2	0.5	10.6	0.3	34.2	2.9	

CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St (Alley) Southbound				Cadillac St Westbound				Shenandoah St Northbound				Cadillac St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	3	**2**	5	**44**	104	0	**148**	2	0	9	11	**1**	42	6	49	213
07:45 AM	**1**	**7**	1	**9**	42	87	0	129	6	0	34	40	1	45	**11**	57	235
08:00 AM	0	3	0	3	34	**106**	0	140	**11**	**2**	**44**	**57**	0	53	8	61	**261**
08:15 AM	1	1	1	3	25	100	0	125	4	1	19	24	0	**57**	6	**63**	215
Total Volume	2	14	4	20	145	397	0	542	23	3	106	132	2	197	31	230	924
% App. Total	10	70	20		26.8	73.2	0		17.4	2.3	80.3		0.9	85.7	13.5		
PHF	.500	.500	.500	.556	.824	.936	.000	.916	.523	.375	.602	.579	.500	.864	.705	.913	.885



CITY TRAFFIC COUNTERS

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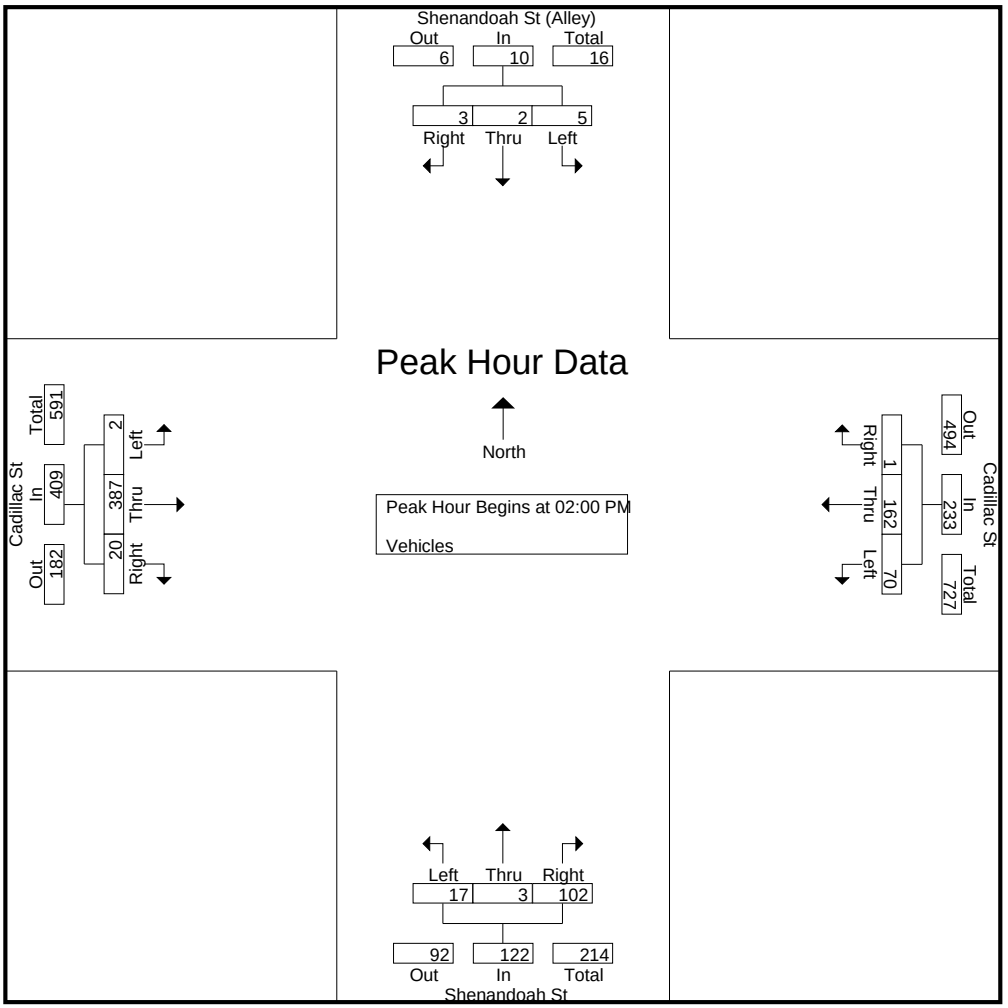
File Name : Shenandoah_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St (Alley) Southbound				Cadillac St Westbound				Shenandoah St Northbound				Cadillac St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:00 PM																	
02:00 PM	**2**	0	1	3	17	46	**1**	64	4	0	16	20	**1**	105	**6**	**112**	199
02:15 PM	1	**1**	**2**	**4**	**23**	24	0	47	**5**	0	16	21	1	89	5	95	167
02:30 PM	1	0	0	1	16	**51**	0	**67**	5	1	32	38	0	86	4	90	196
02:45 PM	1	1	0	2	14	41	0	55	3	**2**	**38**	**43**	0	**107**	5	112	**212**
Total Volume	5	2	3	10	70	162	1	233	17	3	102	122	2	387	20	409	774
% App. Total	50	20	30		30	69.5	0.4		13.9	2.5	83.6		0.5	94.6	4.9		
PHF	.625	.500	.375	.625	.761	.794	.250	.869	.850	.375	.671	.709	.500	.904	.833	.913	.913



CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

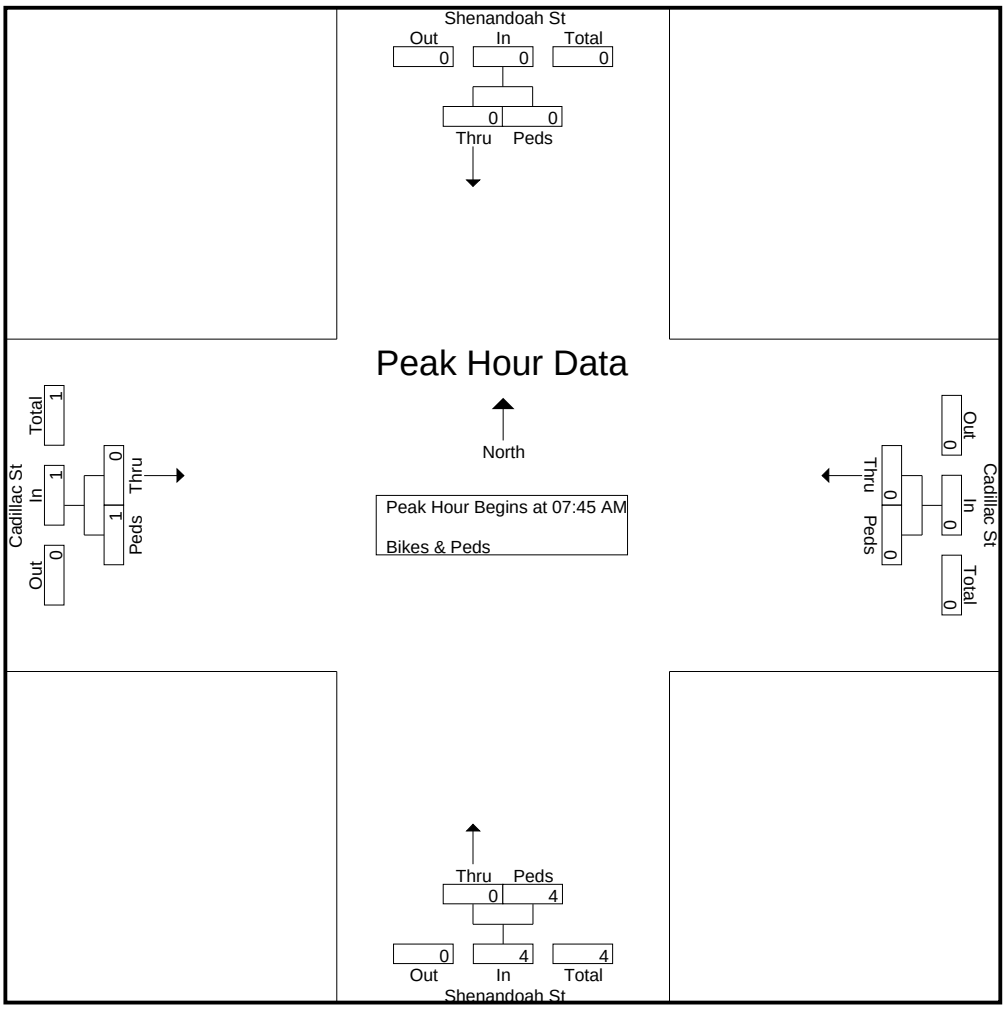
File Name : Shenandoah_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Bikes & Peds

	Shenandoah St Southbound		Cadillac St Westbound		Shenandoah St Northbound		Cadillac St Eastbound		
Start Time	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Int. Total
07:45 AM	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	1	0	0	1
08:00 AM	0	0	0	0	0	1	0	1	2
08:30 AM	0	0	0	0	0	2	0	0	2
08:45 AM	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	4	0	1	5
01:30 PM	0	0	0	0	0	1	0	1	2
01:45 PM	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	2	0	1	3
02:15 PM	0	0	0	0	0	1	0	0	1
02:30 PM	0	1	0	0	0	0	0	0	1
Total	0	1	0	0	0	1	0	0	2
03:15 PM	0	0	0	1	0	0	0	0	1
Grand Total	0	1	0	1	0	8	0	2	12
Apprch %	0	100	0	100	0	100	0	100	
Total %	0	8.3	0	8.3	0	66.7	0	16.7	

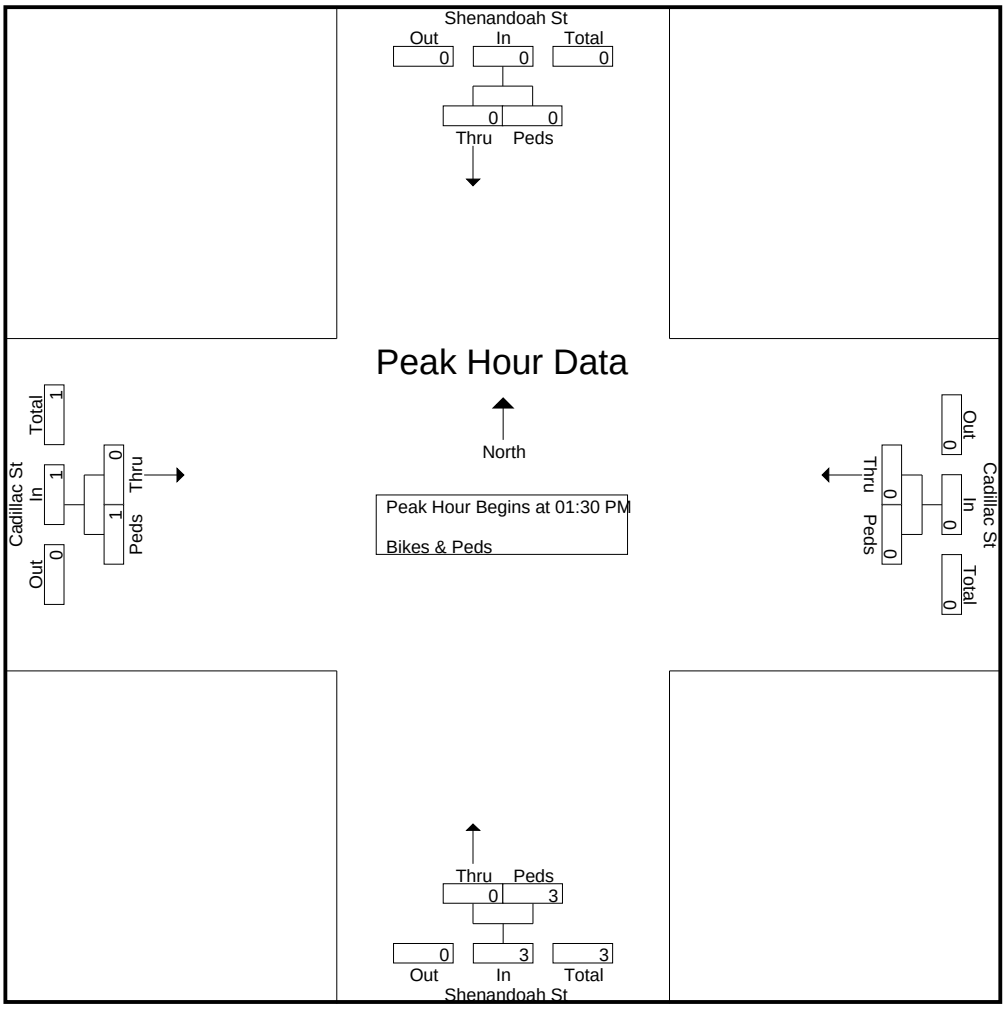
File Name : Shenandoah_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound			Cadillac St Westbound			Shenandoah St Northbound			Cadillac St Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	0	0	0	0	0	0	0	1	1	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	1	1	0	**1**	**1**	**2**
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	**2**	**2**	0	0	0	2
Total Volume	0	0	0	0	0	0	0	4	4	0	1	1	5
% App. Total	0	0		0	0		0	100		0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.500	.500	.000	.250	.250	.625



File Name : Shenandoah_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound			Cadillac St Westbound			Shenandoah St Northbound			Cadillac St Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:30 PM													
01:30 PM	0	0	0	0	0	0	0	**1**	**1**	0	**1**	**1**	**2**
01:45 PM	0	0	0	0	0	0	0	1	1	0	0	0	1
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	1	1	0	0	0	1
Total Volume	0	0	0	0	0	0	0	3	3	0	1	1	4
% App. Total	0	0		0	0		0	100		0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.750	.750	.000	.250	.250	.500



CITY TRAFFIC COUNTERS

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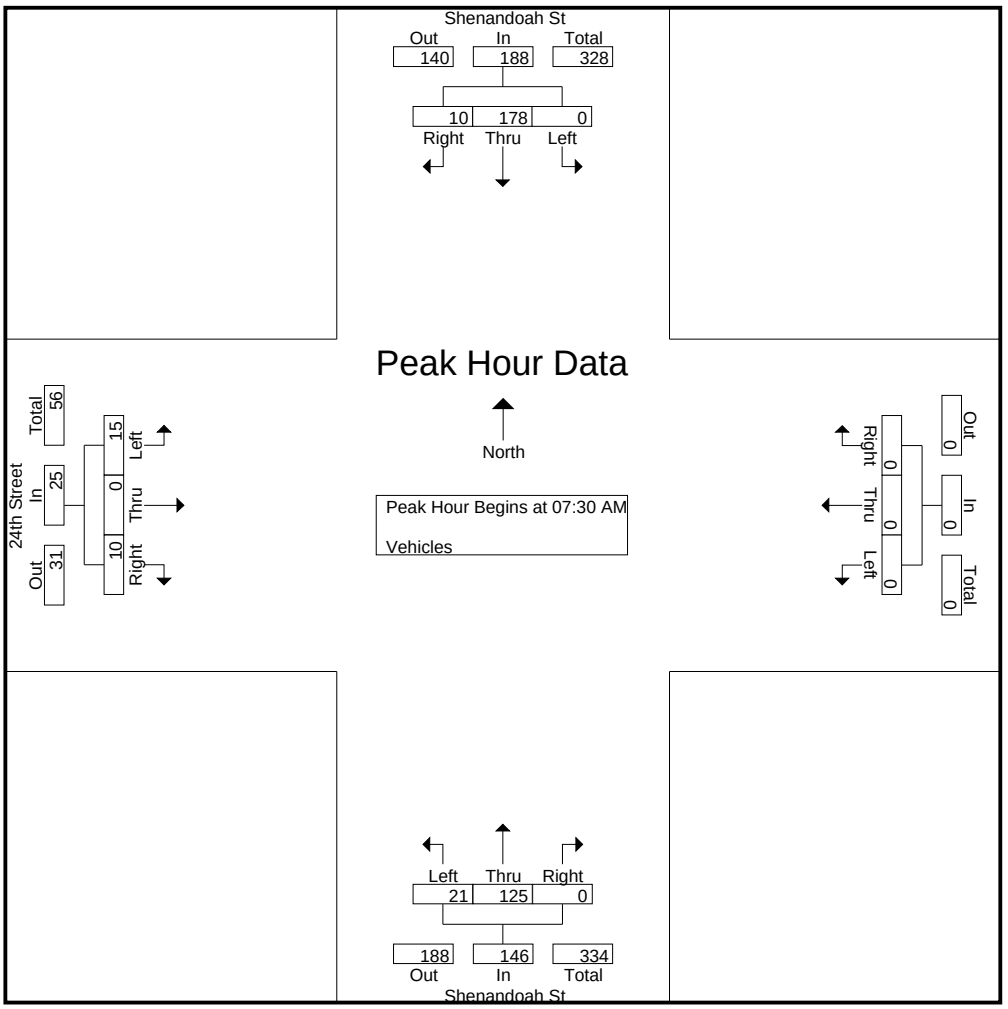
File Name : Shenandoah_24th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Vehicles

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			24th Street Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	21	4	0	0	0	0	15	0	3	0	0	43
07:15 AM	0	40	0	0	0	0	0	4	0	4	0	1	49
07:30 AM	0	48	1	0	0	0	1	11	0	1	0	2	64
07:45 AM	0	60	4	0	0	0	11	45	0	6	0	3	129
Total	0	169	9	0	0	0	12	75	0	14	0	6	285
08:00 AM	0	42	2	0	0	0	9	48	0	6	0	1	108
08:15 AM	0	28	3	0	0	0	0	21	0	2	0	4	58
08:30 AM	0	21	1	0	0	0	0	15	0	1	0	3	41
08:45 AM	0	16	5	0	0	0	1	17	0	1	0	1	41
Total	0	107	11	0	0	0	10	101	0	10	0	9	248
01:30 PM	0	7	1	0	0	0	1	11	0	1	0	0	21
01:45 PM	0	10	3	0	0	0	0	13	0	0	0	0	26
Total	0	17	4	0	0	0	1	24	0	1	0	0	47
02:00 PM	0	21	3	0	0	0	1	9	0	4	0	1	39
02:15 PM	0	18	5	0	0	0	2	19	0	4	0	1	49
02:30 PM	0	15	1	0	0	0	4	24	0	4	0	5	53
02:45 PM	0	21	1	0	0	0	2	47	0	4	0	1	76
Total	0	75	10	0	0	0	9	99	0	16	0	8	217
03:00 PM	0	20	0	0	0	0	0	30	0	3	0	0	53
03:15 PM	0	29	2	0	0	0	1	19	0	4	0	3	58
Grand Total	0	417	36	0	0	0	33	348	0	48	0	26	908
Apprch %	0	92.1	7.9	0	0	0	8.7	91.3	0	64.9	0	35.1	
Total %	0	45.9	4	0	0	0	3.6	38.3	0	5.3	0	2.9	

File Name : Shenandoah_24th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound				Westbound				Shenandoah St Northbound				24th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	48	1	49	0	0	0	0	1	11	0	12	1	0	2	3	64
07:45 AM	0	**60**	**4**	**64**	0	0	0	0	**11**	45	0	56	**6**	0	3	**9**	**129**
08:00 AM	0	42	2	44	0	0	0	0	9	**48**	0	**57**	6	0	1	7	108
08:15 AM	0	28	3	31	0	0	0	0	0	21	0	21	2	0	**4**	6	58
Total Volume	0	178	10	188	0	0	0	0	21	125	0	146	15	0	10	25	359
% App. Total	0	94.7	5.3		0	0	0		14.4	85.6	0		60	0	40		
PHF	.000	.742	.625	.734	.000	.000	.000	.000	.477	.651	.000	.640	.625	.000	.625	.694	.696



CITY TRAFFIC COUNTERS

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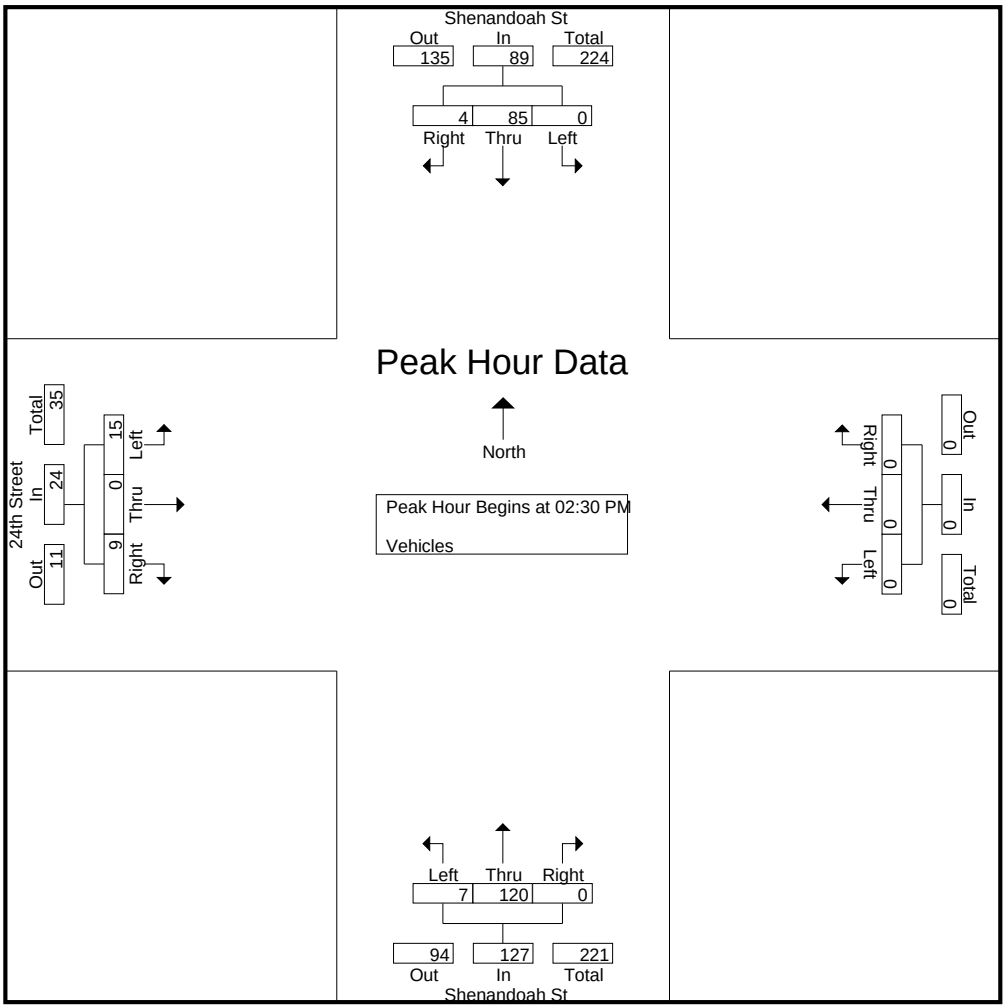
File Name : Shenandoah_24th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound				Westbound				Shenandoah St Northbound				24th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	0	15	1	16	0	0	0	0	**4**	24	0	28	**4**	0	**5**	**9**	53
02:45 PM	0	21	1	22	0	0	0	0	2	**47**	0	**49**	4	0	1	5	**76**
03:00 PM	0	20	0	20	0	0	0	0	0	30	0	30	3	0	0	3	53
03:15 PM	0	**29**	**2**	**31**	0	0	0	0	1	19	0	20	4	0	3	7	58
Total Volume	0	85	4	89	0	0	0	0	7	120	0	127	15	0	9	24	240
% App. Total	0	95.5	4.5		0	0	0		5.5	94.5	0		62.5	0	37.5		
PHF	.000	.733	.500	.718	.000	.000	.000	.000	.438	.638	.000	.648	.938	.000	.450	.667	.789



CITY TRAFFIC COUNTERS

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File Name : Shenandoah_24th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

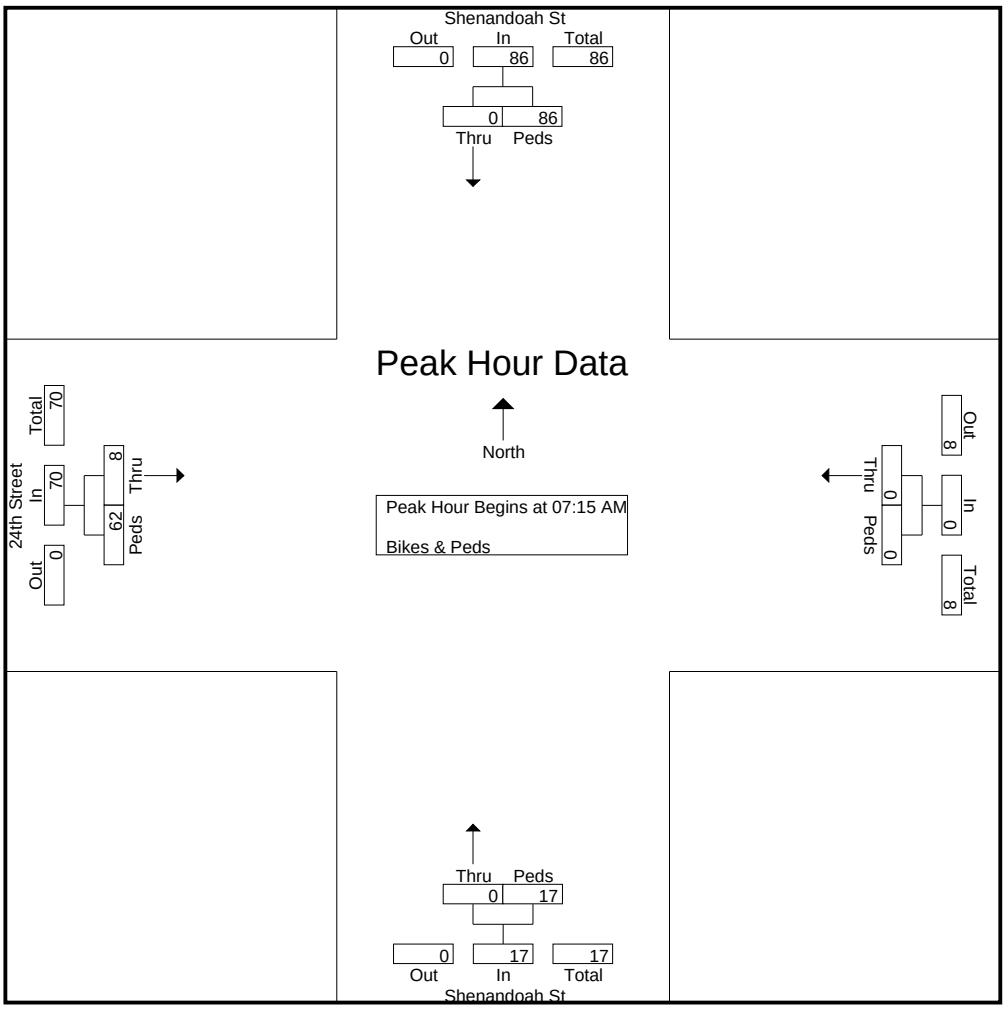
Groups Printed- Bikes & Peds

	Shenandoah St Southbound		Westbound		Shenandoah St Northbound		24th Street Eastbound		
Start Time	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Int. Total
07:00 AM	0	10	0	0	0	1	3	3	17
07:15 AM	0	4	0	0	0	0	2	6	12
07:30 AM	0	8	0	0	0	0	2	22	32
07:45 AM	0	44	0	0	0	13	2	22	81
Total	0	66	0	0	0	14	9	53	142
08:00 AM	0	30	0	0	0	4	2	12	48
08:15 AM	0	0	0	0	0	5	1	5	11
08:30 AM	0	4	0	0	0	10	3	3	20
08:45 AM	0	1	0	0	0	1	4	7	13
Total	0	35	0	0	0	20	10	27	92
01:30 PM	0	0	0	0	0	0	1	0	1
01:45 PM	0	0	0	0	0	0	0	2	2
Total	0	0	0	0	0	0	1	2	3
02:00 PM	0	8	0	0	0	3	1	4	16
02:15 PM	0	32	0	0	0	9	0	6	47
02:30 PM	0	52	0	0	0	3	1	0	56
02:45 PM	0	1	0	0	0	0	1	0	2
Total	0	93	0	0	0	15	3	10	121
03:00 PM	0	0	0	0	0	0	0	2	2
03:15 PM	0	1	0	0	0	1	0	11	13
Grand Total	0	195	0	0	0	50	23	105	373
Apprch %	0	100	0	0	0	100	18	82	
Total %	0	52.3	0	0	0	13.4	6.2	28.2	

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Shenandoah_24th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			24th Street Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	4	4	0	0	0	0	0	0	**2**	6	8	12
07:30 AM	0	8	8	0	0	0	0	0	0	2	**22**	**24**	32
07:45 AM	0	**44**	**44**	0	0	0	0	**13**	**13**	2	22	24	**81**
08:00 AM	0	30	30	0	0	0	0	4	4	2	12	14	48
Total Volume	0	86	86	0	0	0	0	17	17	8	62	70	173
% App. Total	0	100		0	0		0	100		11.4	88.6		
PHF	.000	.489	.489	.000	.000	.000	.000	.327	.327	1.00	.705	.729	.534



CITY TRAFFIC COUNTERS

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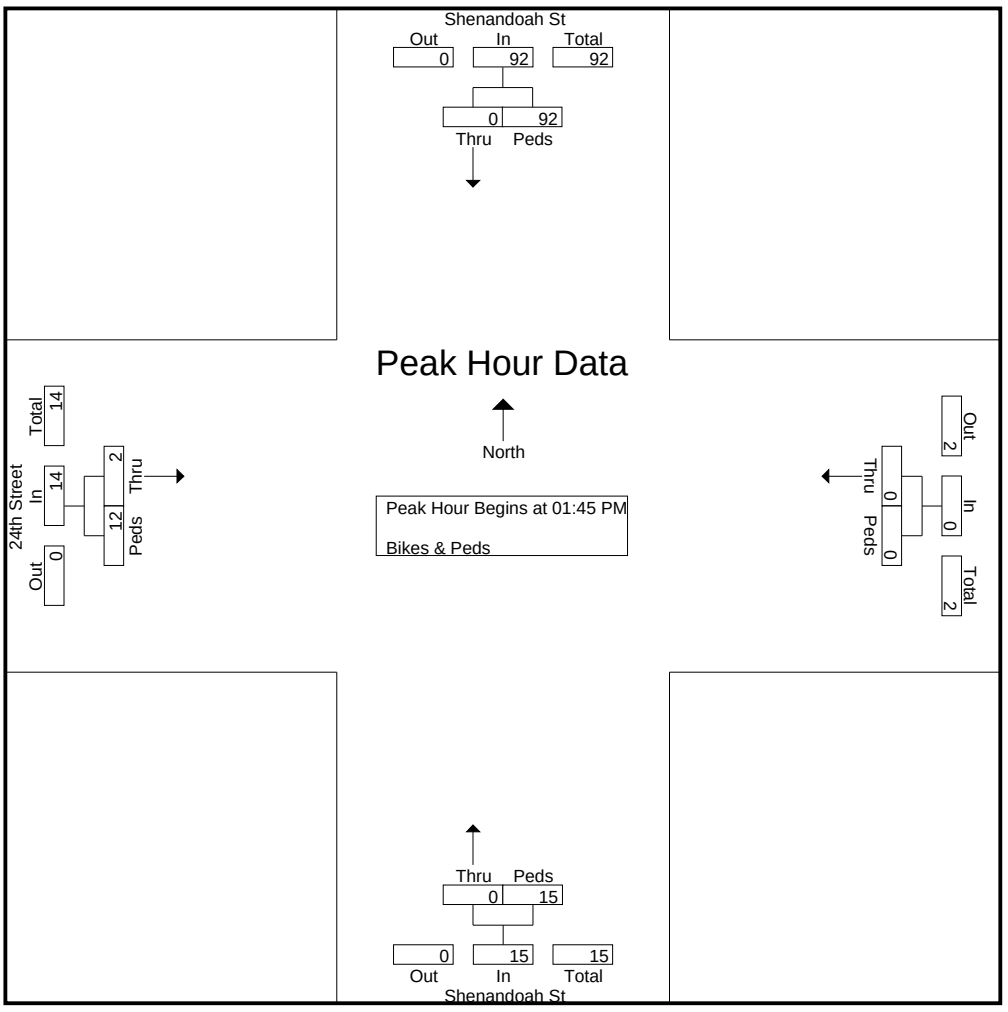
File Name : Shenandoah_24th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			24th Street Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:45 PM													
01:45 PM	0	0	0	0	0	0	0	0	0	0	2	2	2
02:00 PM	0	8	8	0	0	0	0	3	3	**1**	4	5	16
02:15 PM	0	32	32	0	0	0	0	**9**	**9**	0	**6**	**6**	47
02:30 PM	0	**52**	**52**	0	0	0	0	3	3	1	0	1	**56**
Total Volume	0	92	92	0	0	0	0	15	15	2	12	14	121
% App. Total	0	100		0	0		0	100		14.3	85.7		
PHF	.000	.442	.442	.000	.000	.000	.000	.417	.417	.500	.500	.583	.540



CITY TRAFFIC COUNTERS

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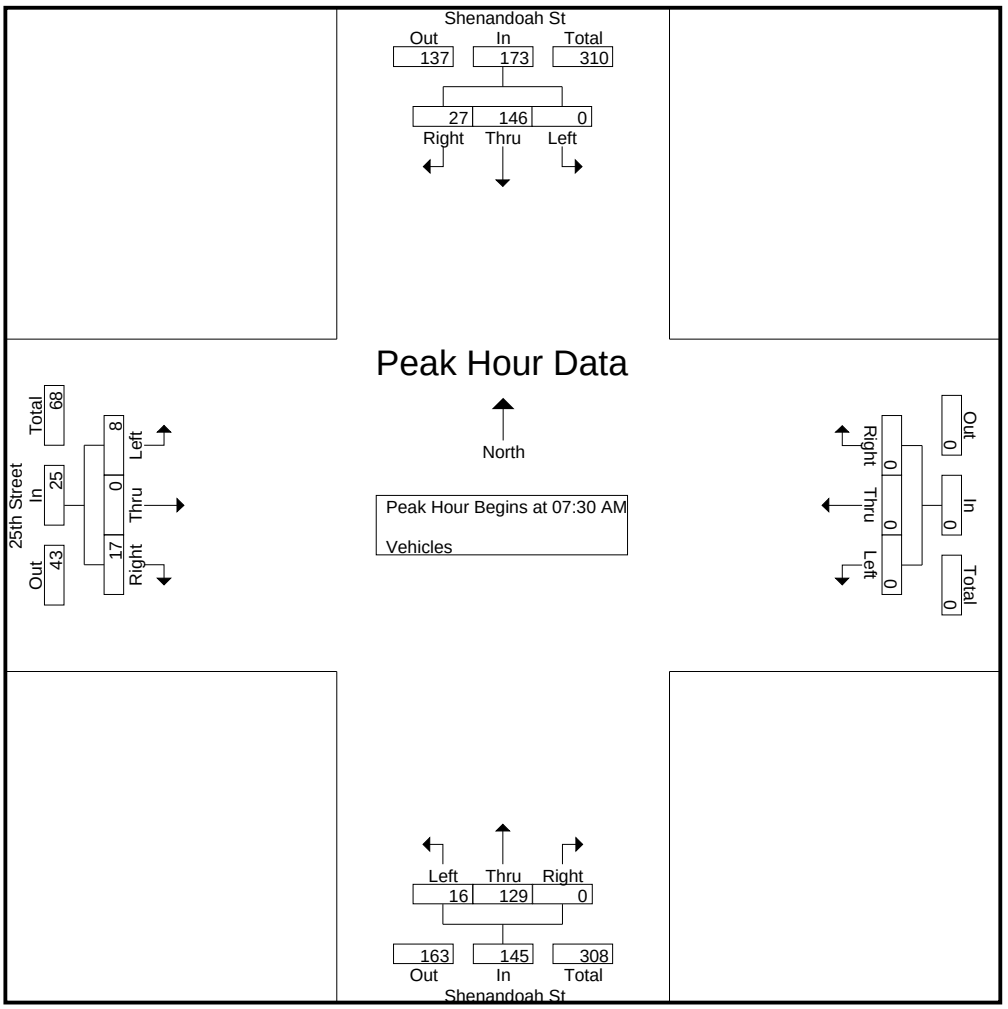
File Name : Shenandoah_25th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Vehicles

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			25th Street Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	18	3	0	0	0	0	14	0	1	0	4	40
07:15 AM	0	34	3	0	0	0	0	3	0	0	0	2	42
07:30 AM	0	40	2	0	0	0	3	18	0	1	0	4	68
07:45 AM	0	48	10	0	0	0	3	54	0	3	0	5	123
Total	0	140	18	0	0	0	6	89	0	5	0	15	273
08:00 AM	0	36	6	0	0	0	4	40	0	1	0	6	93
08:15 AM	0	22	9	0	0	0	6	17	0	3	0	2	59
08:30 AM	0	15	5	0	0	0	5	6	0	1	0	7	39
08:45 AM	0	12	3	0	0	0	1	13	0	1	0	1	31
Total	0	85	23	0	0	0	16	76	0	6	0	16	222
01:30 PM	0	9	2	0	0	0	0	13	0	1	0	2	27
01:45 PM	0	9	1	0	0	0	0	11	0	1	0	7	29
Total	0	18	3	0	0	0	0	24	0	2	0	9	56
02:00 PM	0	13	2	0	0	0	1	6	0	0	0	5	27
02:15 PM	0	16	2	0	0	0	3	15	0	4	0	3	43
02:30 PM	0	28	0	0	0	0	3	16	0	4	0	13	64
02:45 PM	0	23	0	0	0	0	1	36	0	5	0	5	70
Total	0	80	4	0	0	0	8	73	0	13	0	26	204
03:00 PM	0	20	0	0	0	0	2	18	0	4	0	8	52
03:15 PM	0	37	1	0	0	0	1	18	0	4	0	1	62
Grand Total	0	380	49	0	0	0	33	298	0	34	0	75	869
Apprch %	0	88.6	11.4	0	0	0	10	90	0	31.2	0	68.8	
Total %	0	43.7	5.6	0	0	0	3.8	34.3	0	3.9	0	8.6	

File Name : Shenandoah_25th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound				Westbound				Shenandoah St Northbound				25th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	40	2	42	0	0	0	0	3	18	0	21	1	0	4	5	68
07:45 AM	0	**48**	**10**	**58**	0	0	0	0	3	**54**	0	**57**	**3**	0	5	**8**	**123**
08:00 AM	0	36	6	42	0	0	0	0	4	40	0	44	1	0	**6**	7	93
08:15 AM	0	22	9	31	0	0	0	0	**6**	17	0	23	3	0	2	5	59
Total Volume	0	146	27	173	0	0	0	0	16	129	0	145	8	0	17	25	343
% App. Total	0	84.4	15.6		0	0	0		11	89	0		32	0	68		
PHF	.000	.760	.675	.746	.000	.000	.000	.000	.667	.597	.000	.636	.667	.000	.708	.781	.697



CITY TRAFFIC COUNTERS

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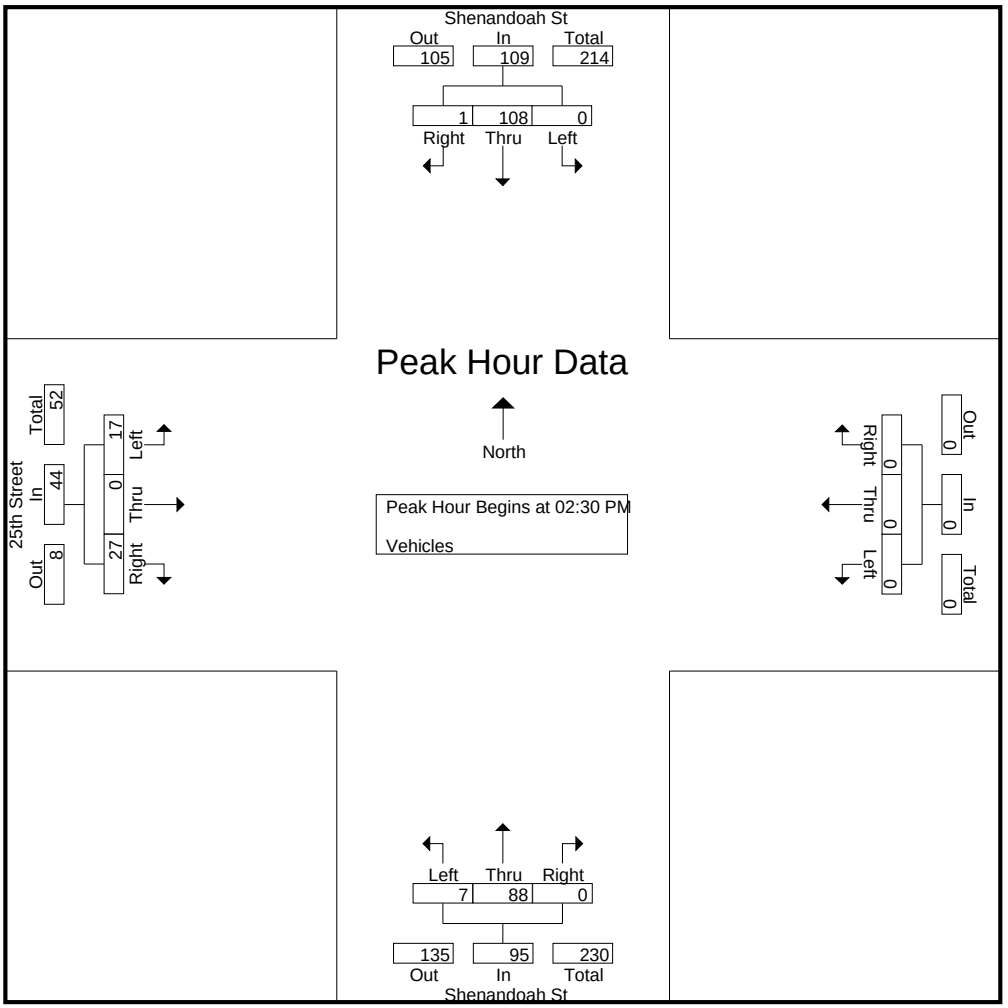
File Name : Shenandoah_25th
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound				Westbound				Shenandoah St Northbound				25th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	0	28	0	28	0	0	0	0	**3**	16	0	19	4	0	**13**	**17**	64
02:45 PM	0	23	0	23	0	0	0	0	1	**36**	0	**37**	**5**	0	5	10	**70**
03:00 PM	0	20	0	20	0	0	0	0	2	18	0	20	4	0	8	12	52
03:15 PM	0	**37**	**1**	**38**	0	0	0	0	1	18	0	19	4	0	1	5	62
Total Volume	0	108	1	109	0	0	0	0	7	88	0	95	17	0	27	44	248
% App. Total	0	99.1	0.9		0	0	0		7.4	92.6	0		38.6	0	61.4		
PHF	.000	.730	.250	.717	.000	.000	.000	.000	.583	.611	.000	.642	.850	.000	.519	.647	.886



CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_25th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

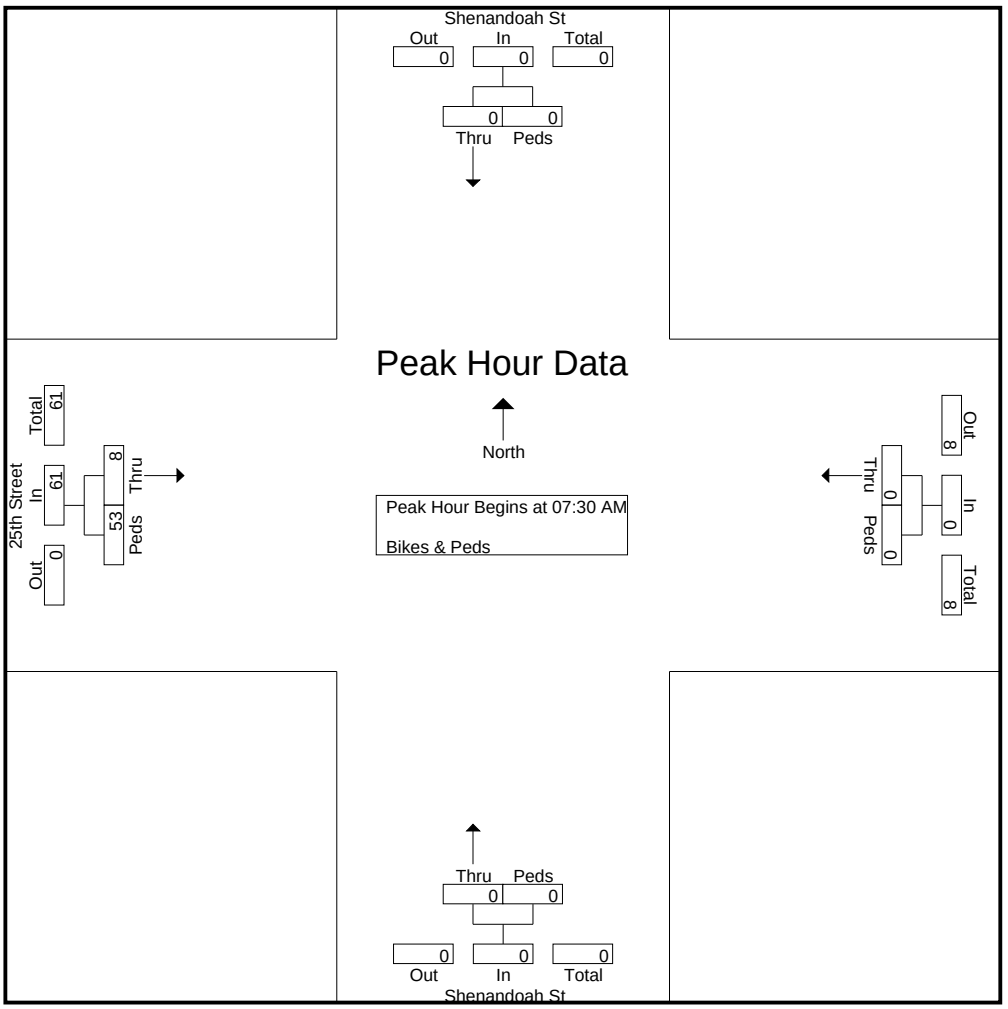
Groups Printed- Bikes & Peds

	Shenandoah St Southbound		Westbound		Shenandoah St Northbound		25th Street Eastbound		
Start Time	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	3	5	8
07:15 AM	0	0	0	0	0	0	2	4	6
07:30 AM	0	0	0	0	0	0	1	21	22
07:45 AM	0	0	0	0	0	0	2	13	15
Total	0	0	0	0	0	0	8	43	51
08:00 AM	0	0	0	0	0	0	4	10	14
08:15 AM	0	0	0	0	0	0	1	9	10
08:30 AM	0	0	0	0	0	0	5	3	8
08:45 AM	0	0	0	0	0	0	4	5	9
Total	0	0	0	0	0	0	14	27	41
01:30 PM	0	0	0	0	0	0	1	1	2
01:45 PM	0	0	0	0	0	0	0	4	4
Total	0	0	0	0	0	0	1	5	6
02:00 PM	0	0	0	0	0	0	1	2	3
02:15 PM	0	0	0	0	0	0	1	6	7
02:30 PM	0	0	0	0	0	0	1	8	9
02:45 PM	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	4	16	20
03:00 PM	0	0	0	0	0	0	0	1	1
03:15 PM	0	0	0	0	0	0	1	8	9
Grand Total	0	0	0	0	0	0	28	100	128
Apprch %	0	0	0	0	0	0	21.9	78.1	
Total %	0	0	0	0	0	0	21.9	78.1	

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Shenandoah_25th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			25th Street Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	0	0	0	0	0	0	0	0	1	**21**	**22**	**22**
07:45 AM	0	0	0	0	0	0	0	0	0	2	13	15	15
08:00 AM	0	0	0	0	0	0	0	0	0	**4**	10	14	14
08:15 AM	0	0	0	0	0	0	0	0	0	1	9	10	10
Total Volume	0	0	0	0	0	0	0	0	0	8	53	61	61
% App. Total	0	0		0	0		0	0		13.1	86.9		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.631	.693	.693

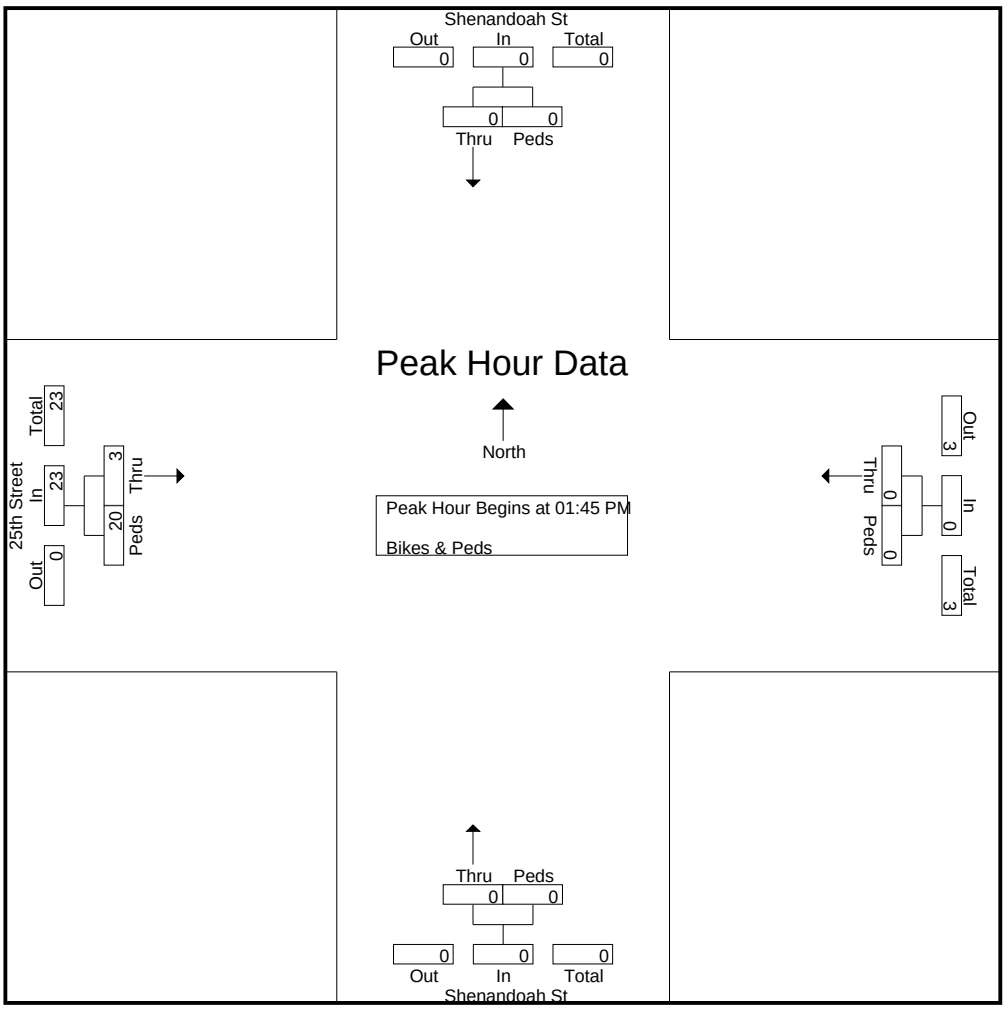


CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_25th_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound			Westbound			Shenandoah St Northbound			25th Street Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:45 PM													
01:45 PM	0	0	0	0	0	0	0	0	0	0	4	4	4
02:00 PM	0	0	0	0	0	0	0	0	0	**1**	2	3	3
02:15 PM	0	0	0	0	0	0	0	0	0	1	6	7	7
02:30 PM	0	0	0	0	0	0	0	0	0	1	**8**	**9**	**9**
Total Volume	0	0	0	0	0	0	0	0	0	3	20	23	23
% App. Total	0	0		0	0		0	0		13	87		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.625	.639	.639



CITY TRAFFIC COUNTERS

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File Name : Shenandoah_Beverlywood
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Vehicles

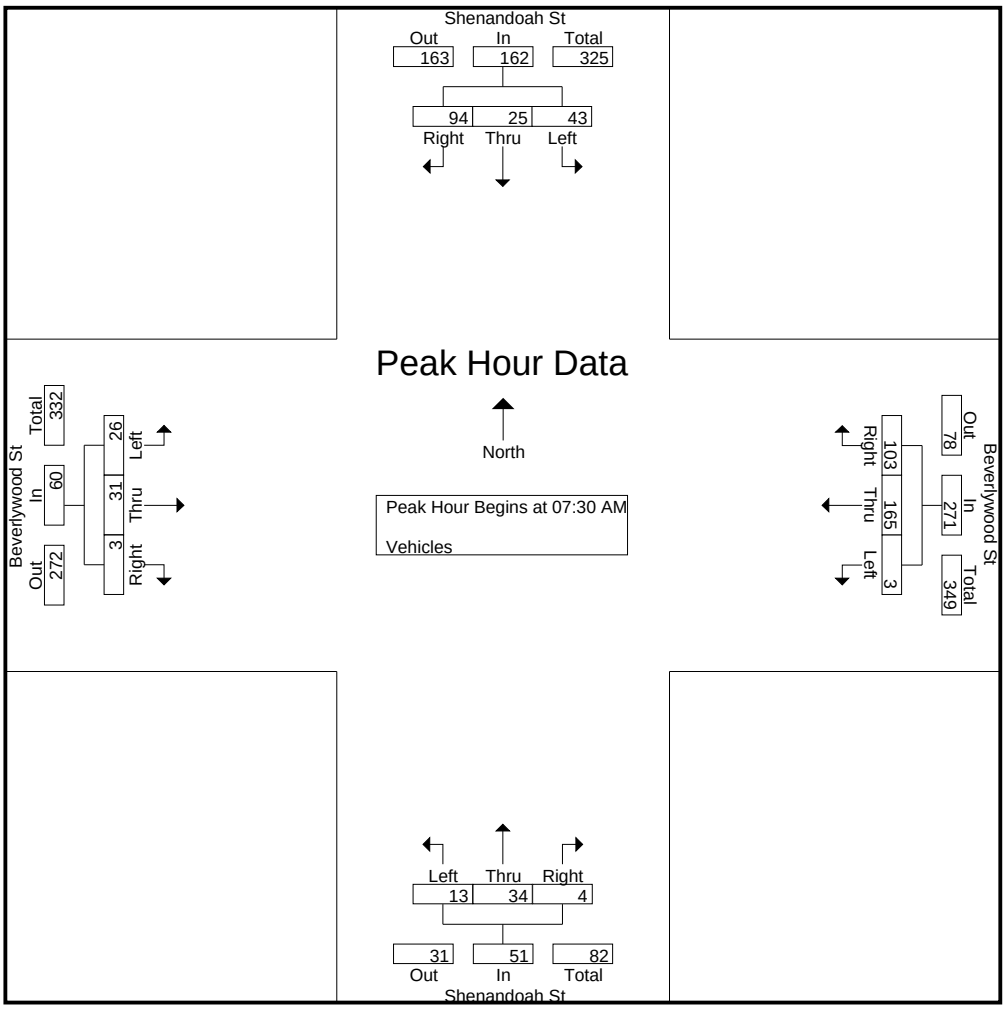
	Shenandoah St Southbound			Beverlywood St Westbound			Shenandoah St Northbound			Beverlywood St Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	7	2	13	0	22	10	2	2	0	2	7	0	67
07:15 AM	9	4	22	0	21	10	5	2	0	2	2	1	78
07:30 AM	10	4	36	1	49	21	6	8	1	3	2	0	141
07:45 AM	12	13	23	0	51	40	4	14	0	10	13	1	181
Total	38	23	94	1	143	81	17	26	1	17	24	2	467
08:00 AM	14	8	19	1	38	22	2	9	2	8	7	0	130
08:15 AM	7	0	16	1	27	20	1	3	1	5	9	2	92
08:30 AM	11	1	9	1	46	6	1	4	0	5	6	0	90
08:45 AM	7	4	7	0	42	7	1	1	1	2	2	0	74
Total	39	13	51	3	153	55	5	17	4	20	24	2	386
01:30 PM	6	2	2	1	7	7	0	3	1	2	3	0	34
01:45 PM	3	1	8	0	5	3	0	2	1	4	5	0	32
Total	9	3	10	1	12	10	0	5	2	6	8	0	66
02:00 PM	7	6	5	0	5	6	0	0	0	4	10	0	43
02:15 PM	12	4	6	0	4	16	0	8	0	4	6	1	61
02:30 PM	35	10	17	1	10	15	0	5	1	2	12	2	110
02:45 PM	15	7	10	0	4	11	0	9	0	16	10	0	82
Total	69	27	38	1	23	48	0	22	1	26	38	3	296
03:00 PM	11	4	13	0	8	5	1	9	0	10	21	1	83
03:15 PM	19	8	12	0	6	11	0	8	0	6	16	1	87
Grand Total	185	78	218	6	345	210	23	87	8	85	131	9	1385
Apprch %	38.5	16.2	45.3	1.1	61.5	37.4	19.5	73.7	6.8	37.8	58.2	4	
Total %	13.4	5.6	15.7	0.4	24.9	15.2	1.7	6.3	0.6	6.1	9.5	0.6	

CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_Beverlywood
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound				Beverlywood St Westbound				Shenandoah St Northbound				Beverlywood St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	10	4	**36**	**50**	**1**	49	21	71	**6**	8	1	15	3	2	0	5	141
07:45 AM	12	**13**	23	48	0	**51**	**40**	**91**	4	**14**	0	**18**	**10**	**13**	1	**24**	**181**
08:00 AM	**14**	8	19	41	1	38	22	61	2	9	**2**	13	8	7	0	15	130
08:15 AM	7	0	16	23	1	27	20	48	1	3	1	5	5	9	**2**	16	92
Total Volume	43	25	94	162	3	165	103	271	13	34	4	51	26	31	3	60	544
% App. Total	26.5	15.4	58		1.1	60.9	38		25.5	66.7	7.8		43.3	51.7	5		
PHF	.768	.481	.653	.810	.750	.809	.644	.745	.542	.607	.500	.708	.650	.596	.375	.625	.751

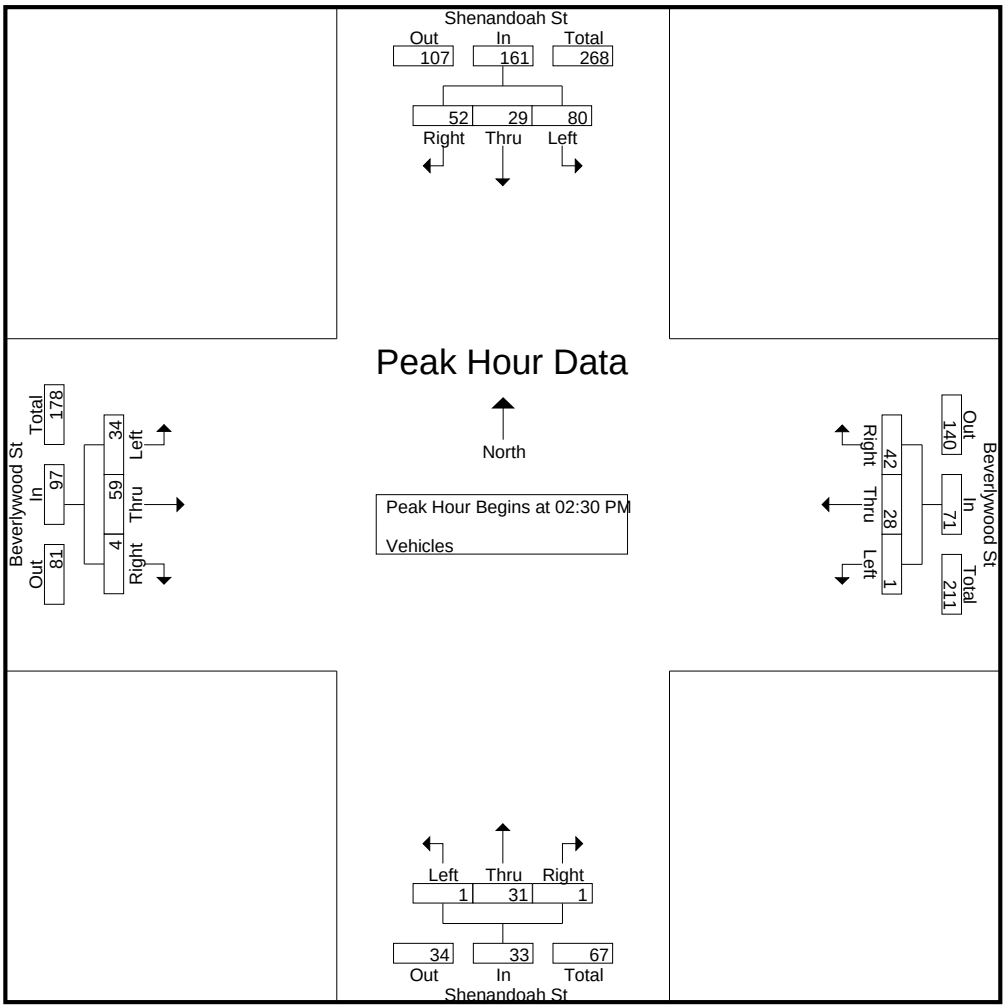


CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_Beverlywood
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound				Beverlywood St Westbound				Shenandoah St Northbound				Beverlywood St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	**35**	**10**	**17**	**62**	**1**	**10**	**15**	**26**	0	5	**1**	6	2	12	**2**	16	**110**
02:45 PM	15	7	10	32	0	4	11	15	0	**9**	0	9	**16**	10	0	26	82
03:00 PM	11	4	13	28	0	8	5	13	**1**	9	0	**10**	10	**21**	1	**32**	83
03:15 PM	19	8	12	39	0	6	11	17	0	8	0	8	6	16	1	23	87
Total Volume	80	29	52	161	1	28	42	71	1	31	1	33	34	59	4	97	362
% App. Total	49.7	18	32.3		1.4	39.4	59.2		3	93.9	3		35.1	60.8	4.1		
PHF	.571	.725	.765	.649	.250	.700	.700	.683	.250	.861	.250	.825	.531	.702	.500	.758	.823



CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

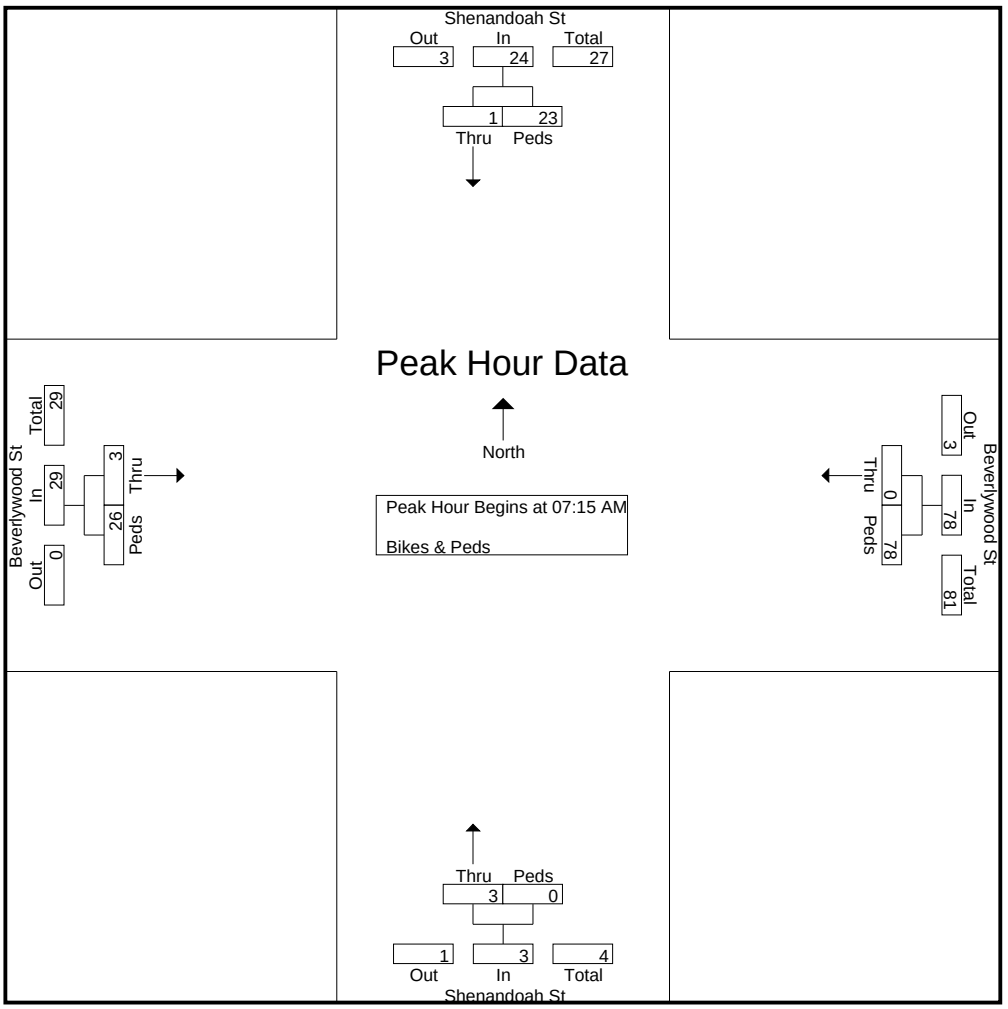
File Name : Shenandoah_Beverlywood_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Bikes & Peds

	Shenandoah St Southbound		Beverlywood St Westbound		Shenandoah St Northbound		Beverlywood St Eastbound		
Start Time	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Int. Total
07:00 AM	0	4	1	0	0	0	0	0	5
07:15 AM	0	5	0	4	0	0	1	2	12
07:30 AM	1	0	0	27	1	0	1	12	42
07:45 AM	0	13	0	34	1	0	1	6	55
Total	1	22	1	65	2	0	3	20	114
08:00 AM	0	5	0	13	1	0	0	6	25
08:15 AM	0	2	1	3	0	0	0	4	10
08:30 AM	0	1	0	1	0	2	0	0	4
08:45 AM	0	3	0	3	0	2	5	1	14
Total	0	11	1	20	1	4	5	11	53
01:30 PM	0	0	0	1	0	0	0	2	3
01:45 PM	0	5	0	1	0	0	0	2	8
Total	0	5	0	2	0	0	0	4	11
02:00 PM	0	0	0	6	0	0	1	1	8
02:15 PM	0	0	1	10	0	0	0	1	12
02:30 PM	1	5	0	25	0	0	0	3	34
02:45 PM	1	0	0	6	0	0	0	0	7
Total	2	5	1	47	0	0	1	5	61
03:00 PM	2	7	0	19	0	1	0	1	30
03:15 PM	0	17	1	59	0	8	0	3	88
Grand Total	5	67	4	212	3	13	9	44	357
Apprch %	6.9	93.1	1.9	98.1	18.8	81.2	17	83	
Total %	1.4	18.8	1.1	59.4	0.8	3.6	2.5	12.3	

File Name : Shenandoah_Beverlywood_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Shenandoah St Southbound			Beverlywood St Westbound			Shenandoah St Northbound			Beverlywood St Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	5	5	0	4	4	0	0	0	**1**	2	3	12
07:30 AM	**1**	0	1	0	27	27	**1**	0	**1**	1	**12**	**13**	42
07:45 AM	0	**13**	**13**	0	**34**	**34**	1	0	1	1	6	7	**55**
08:00 AM	0	5	5	0	13	13	1	0	1	0	6	6	25
Total Volume	1	23	24	0	78	78	3	0	3	3	26	29	134
% App. Total	4.2	95.8		0	100		100	0		10.3	89.7		
PHF	.250	.442	.462	.000	.574	.574	.750	.000	.750	.750	.542	.558	.609

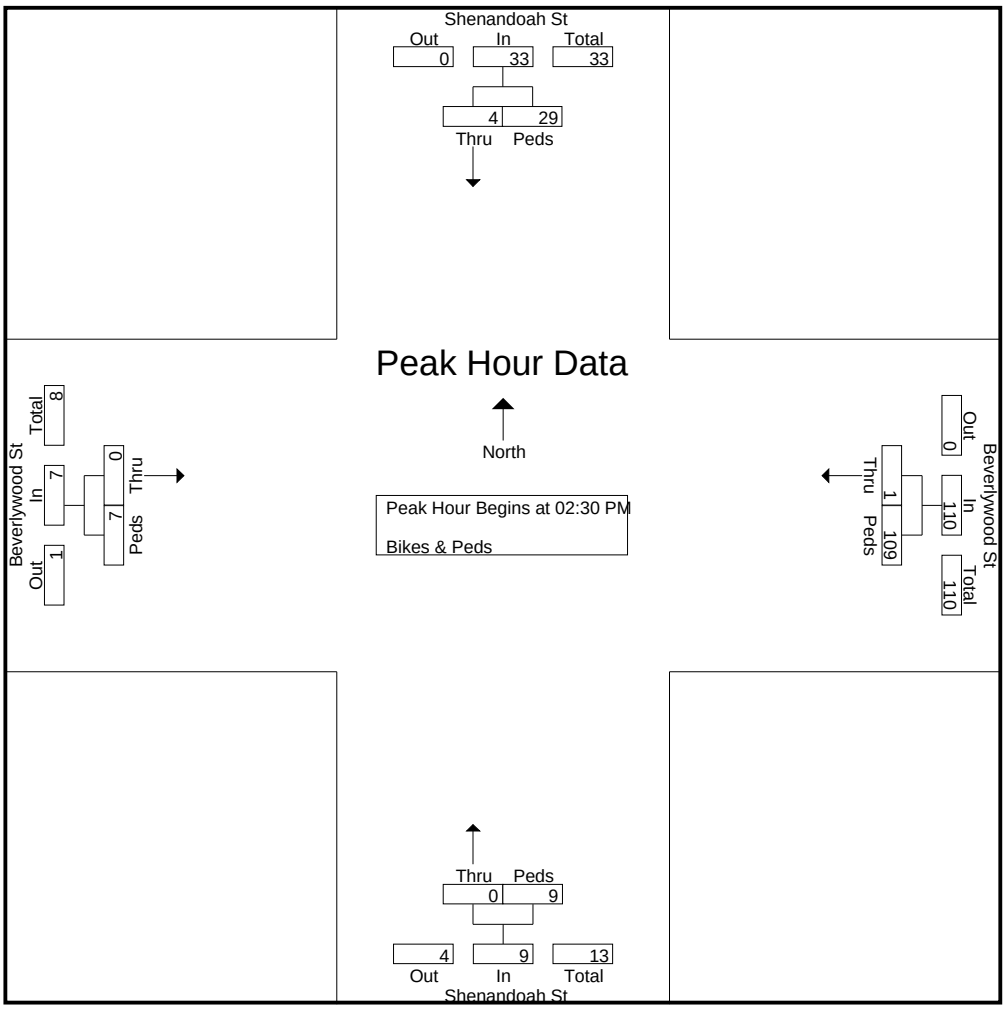


CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Shenandoah_Beverlywood_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Shenandoah St Southbound			Beverlywood St Westbound			Shenandoah St Northbound			Beverlywood St Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:30 PM													
02:30 PM	1	5	6	0	25	25	0	0	0	0	**3**	**3**	34
02:45 PM	1	0	1	0	6	6	0	0	0	0	0	0	7
03:00 PM	**2**	7	9	0	19	19	0	1	1	0	1	1	30
03:15 PM	0	**17**	**17**	**1**	**59**	**60**	0	**8**	**8**	0	3	3	**88**
Total Volume	4	29	33	1	109	110	0	9	9	0	7	7	159
% App. Total	12.1	87.9		0.9	99.1		0	100		0	100		
PHF	.500	.426	.485	.250	.462	.458	.000	.281	.281	.000	.583	.583	.452



CITY TRAFFIC COUNTERS

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File Name : Halm_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Vehicles

	Southbound			Cadillac Ave Westbound			Halm Ave Northbound			Cadillac Ave Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	3	110	0	0	0	10	0	36	0	159
07:15 AM	0	0	0	10	98	0	1	0	8	0	45	0	162
07:30 AM	0	0	0	11	95	0	5	0	13	0	58	1	183
07:45 AM	0	0	0	19	87	0	2	0	12	0	73	5	198
Total	0	0	0	43	390	0	8	0	43	0	212	6	702
08:00 AM	0	0	0	19	105	0	7	0	10	0	97	2	240
08:15 AM	0	0	0	16	96	0	14	0	13	0	59	1	199
08:30 AM	0	0	0	12	122	0	9	0	10	0	59	4	216
08:45 AM	0	0	0	15	128	0	5	0	7	0	69	0	224
Total	0	0	0	62	451	0	35	0	40	0	284	7	879
01:30 PM	0	0	0	2	70	0	1	0	8	0	112	1	194
01:45 PM	0	0	0	1	79	0	1	0	13	0	120	3	217
Total	0	0	0	3	149	0	2	0	21	0	232	4	411
02:00 PM	0	0	0	8	50	0	3	0	5	0	122	3	191
02:15 PM	0	0	0	6	38	0	0	0	11	0	90	2	147
02:30 PM	0	0	0	4	31	0	2	0	18	0	93	1	149
02:45 PM	0	0	0	15	38	0	2	0	19	0	85	1	160
Total	0	0	0	33	157	0	7	0	53	0	390	7	647
03:00 PM	0	0	0	6	40	0	3	0	16	0	70	4	139
03:15 PM	0	0	0	11	39	0	1	0	14	0	78	1	144
Grand Total	0	0	0	158	1226	0	56	0	187	0	1266	29	2922
Apprch %	0	0	0	11.4	88.6	0	23	0	77	0	97.8	2.2	
Total %	0	0	0	5.4	42	0	1.9	0	6.4	0	43.3	1	

CITY TRAFFIC COUNTERS

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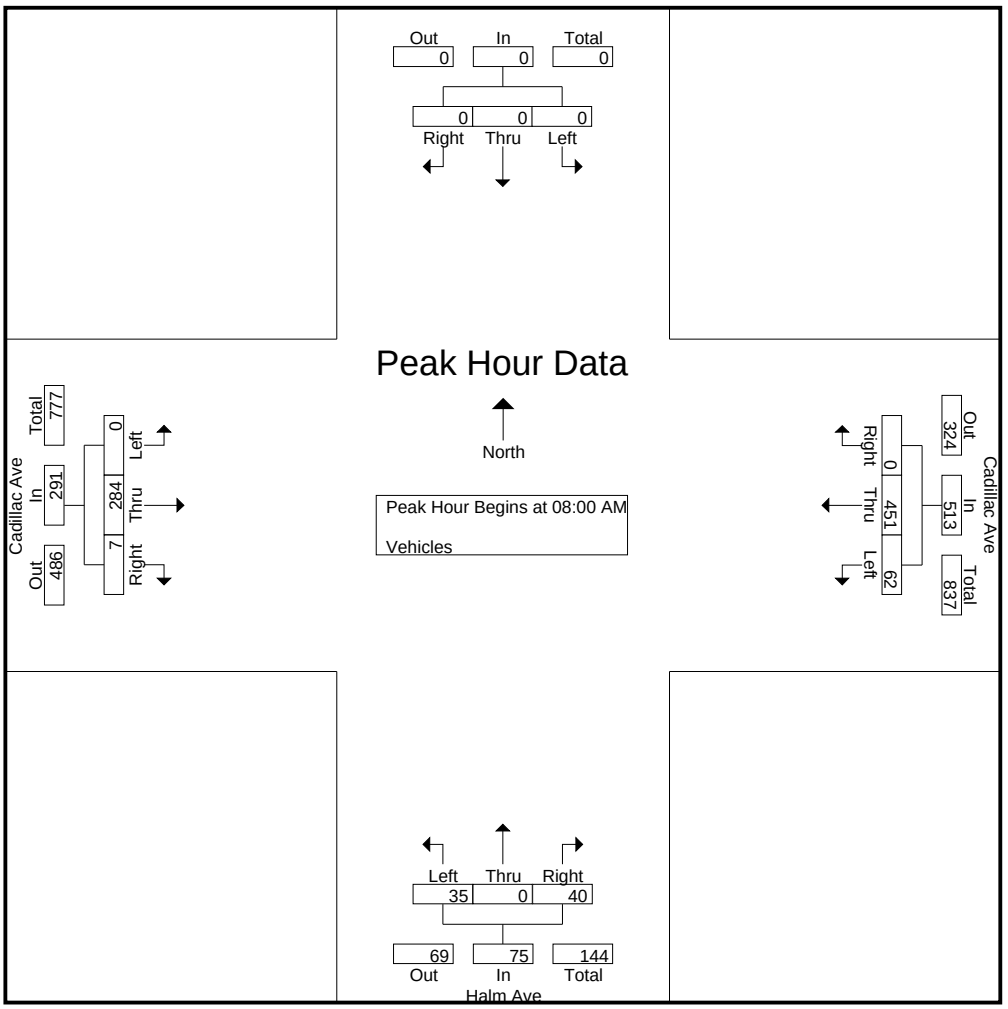
File Name : Halm_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Southbound				Cadillac Ave Westbound				Halm Ave Northbound				Cadillac Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	**19**	105	0	124	7	0	10	17	0	**97**	2	**99**	**240**
08:15 AM	0	0	0	0	16	96	0	112	**14**	0	**13**	**27**	0	59	1	60	199
08:30 AM	0	0	0	0	12	122	0	134	9	0	10	19	0	59	**4**	63	216
08:45 AM	0	0	0	0	15	**128**	0	**143**	5	0	7	12	0	69	0	69	224
Total Volume	0	0	0	0	62	451	0	513	35	0	40	75	0	284	7	291	879
% App. Total	0	0	0		12.1	87.9	0		46.7	0	53.3		0	97.6	2.4		
PHF	.000	.000	.000	.000	.816	.881	.000	.897	.625	.000	.769	.694	.000	.732	.438	.735	.916



CITY TRAFFIC COUNTERS

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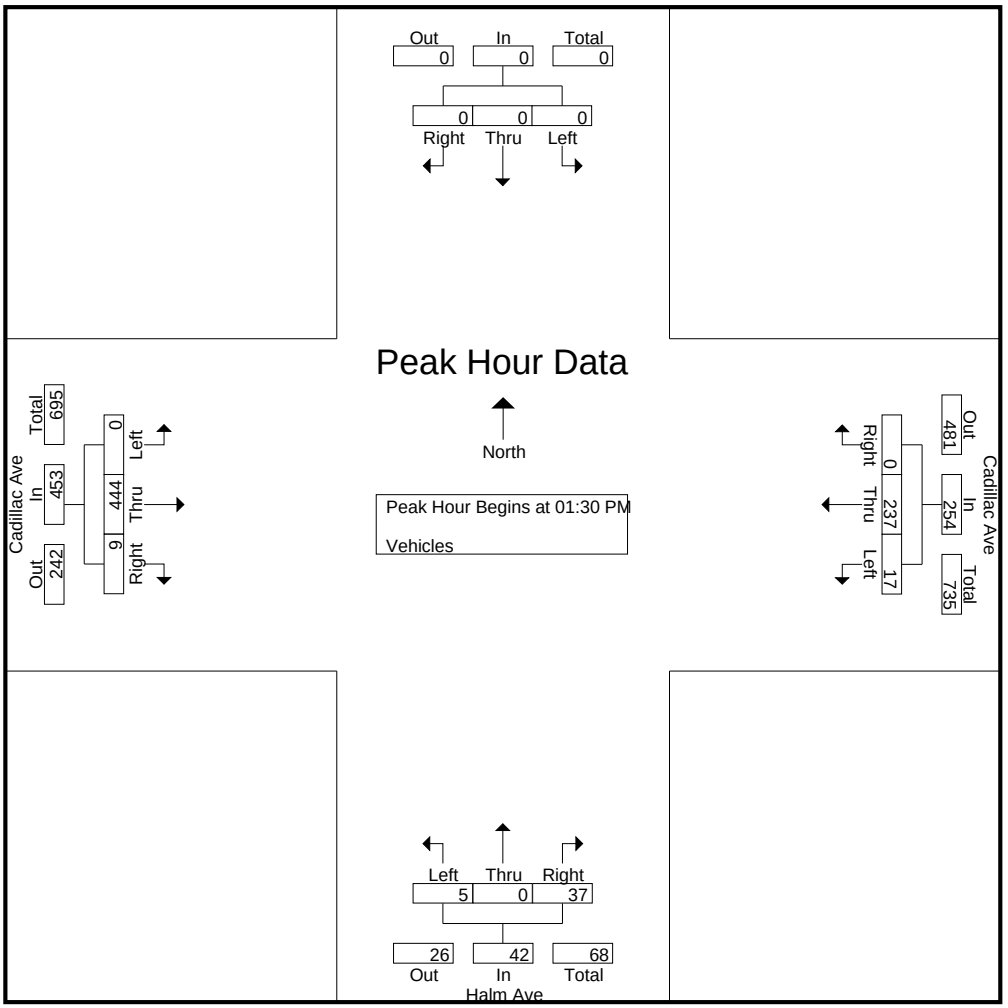
File Name : Halm_Cadillac
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Southbound				Cadillac Ave Westbound				Halm Ave Northbound				Cadillac Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	0	0	0	2	70	0	72	1	0	8	9	0	112	1	113	194
01:45 PM	0	0	0	0	1	**79**	0	**80**	1	0	**13**	**14**	0	120	**3**	123	**217**
02:00 PM	0	0	0	0	**8**	50	0	58	**3**	0	5	8	0	**122**	3	**125**	191
02:15 PM	0	0	0	0	6	38	0	44	0	0	11	11	0	90	2	92	147
Total Volume	0	0	0	0	17	237	0	254	5	0	37	42	0	444	9	453	749
% App. Total	0	0	0		6.7	93.3	0		11.9	0	88.1		0	98	2		
PHF	.000	.000	.000	.000	.531	.750	.000	.794	.417	.000	.712	.750	.000	.910	.750	.906	.863



CITY TRAFFIC COUNTERS

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File Name : Halm_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 1

Groups Printed- Bikes & Peds

	Southbound		Cadillac Ave Westbound		Halm Ave Northbound		Cadillac Ave Eastbound		
Start Time	Bikes	Peds	Bikes	Peds	Bikes	Peds	Bikes	Peds	Int. Total
07:00 AM	0	0	0	1	0	0	0	1	2
07:15 AM	0	0	0	2	0	2	0	10	14
07:30 AM	0	0	0	0	0	0	0	22	22
07:45 AM	0	0	0	0	0	7	1	27	35
Total	0	0	0	3	0	9	1	60	73
08:00 AM	0	0	0	0	0	3	0	12	15
08:15 AM	0	0	0	0	0	0	0	4	4
08:30 AM	1	0	0	0	1	1	0	3	6
08:45 AM	1	0	0	1	0	0	1	2	5
Total	2	0	0	1	1	4	1	21	30
01:30 PM	0	1	0	0	0	0	0	2	3
01:45 PM	0	0	0	0	0	3	0	0	3
Total	0	1	0	0	0	3	0	2	6
02:00 PM	0	0	0	0	0	3	0	3	6
02:15 PM	0	0	0	0	0	0	0	17	17
02:30 PM	0	0	0	0	0	5	0	20	25
02:45 PM	0	0	0	0	0	0	0	4	4
Total	0	0	0	0	0	8	0	44	52
03:00 PM	0	0	0	0	0	2	0	6	8
03:15 PM	0	0	1	0	0	10	0	28	39
Grand Total	2	1	1	4	1	36	2	161	208
Apprch %	66.7	33.3	20	80	2.7	97.3	1.2	98.8	
Total %	1	0.5	0.5	1.9	0.5	17.3	1	77.4	

CITY TRAFFIC COUNTERS
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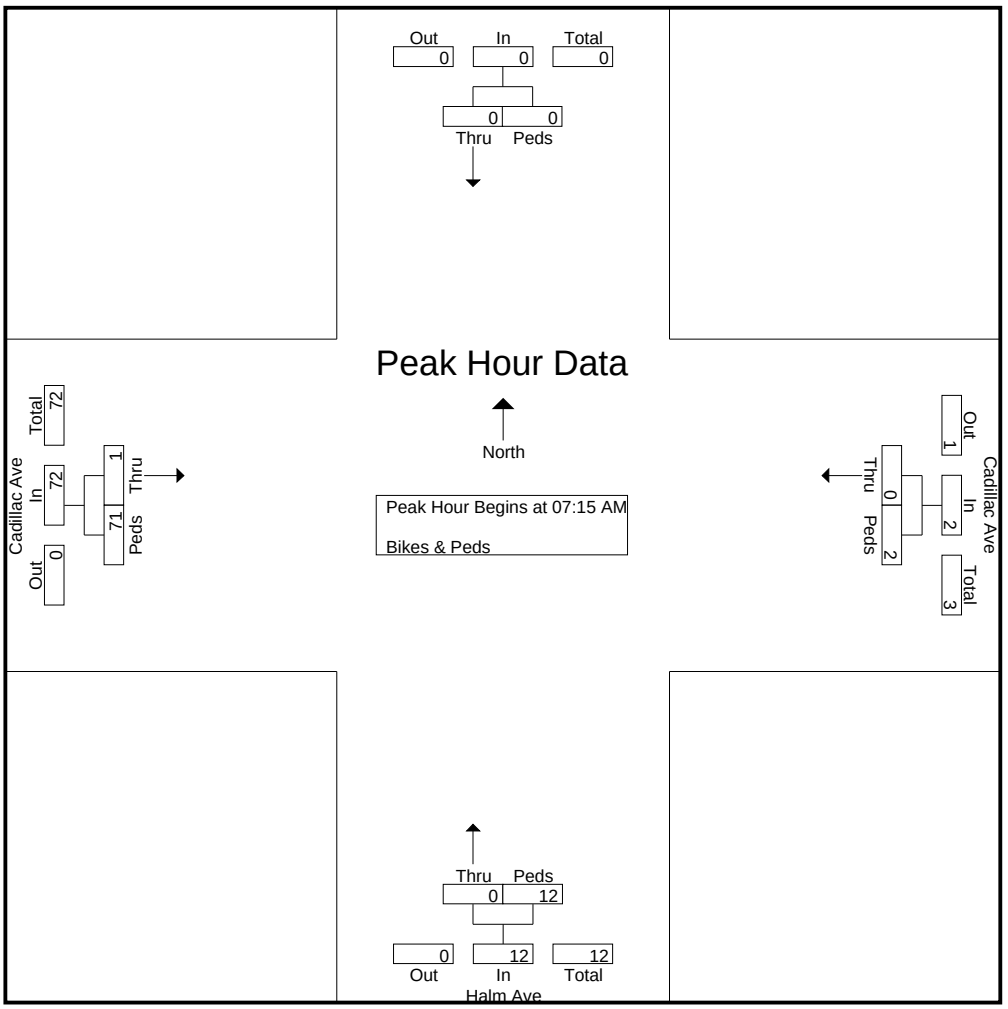
File Name : Halm_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 2

	Southbound			Cadillac Ave Westbound			Halm Ave Northbound			Cadillac Ave Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	0	0	0	**2**	**2**	0	2	2	0	10	10	14
07:30 AM	0	0	0	0	0	0	0	0	0	0	22	22	22
07:45 AM	0	0	0	0	0	0	0	**7**	**7**	**1**	**27**	**28**	**35**
08:00 AM	0	0	0	0	0	0	0	3	3	0	12	12	15
Total Volume	0	0	0	0	2	2	0	12	12	1	71	72	86
% App. Total	0	0		0	100		0	100		1.4	98.6		
PHF	.000	.000	.000	.000	.250	.250	.000	.429	.429	.250	.657	.643	.614



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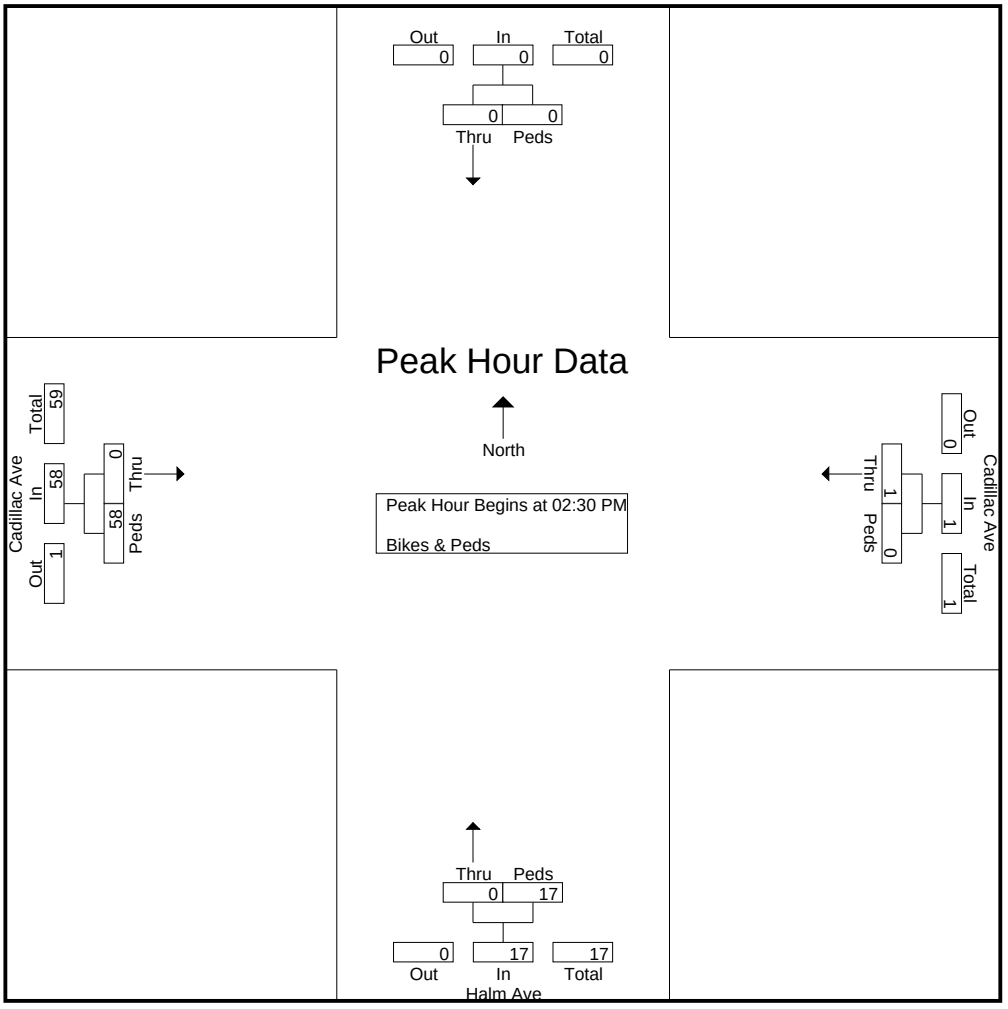
File Name : Halm_Cadillac_BP
Site Code : 00000000
Start Date : 4/3/2019
Page No : 3

	Southbound			Cadillac Ave Westbound			Halm Ave Northbound			Cadillac Ave Eastbound			
Start Time	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Bikes	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 03:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:30 PM													
02:30 PM	0	0	0	0	0	0	0	5	5	0	20	20	25
02:45 PM	0	0	0	0	0	0	0	0	0	0	4	4	4
03:00 PM	0	0	0	0	0	0	0	2	2	0	6	6	8
03:15 PM	0	0	0	**1**	0	**1**	0	**10**	**10**	0	**28**	**28**	**39**
Total Volume	0	0	0	1	0	1	0	17	17	0	58	58	76
% App. Total	0	0		100	0		0	100		0	100		
PHF	.000	.000	.000	.250	.000	.250	.000	.425	.425	.000	.518	.518	.487



ATTACHMENT B

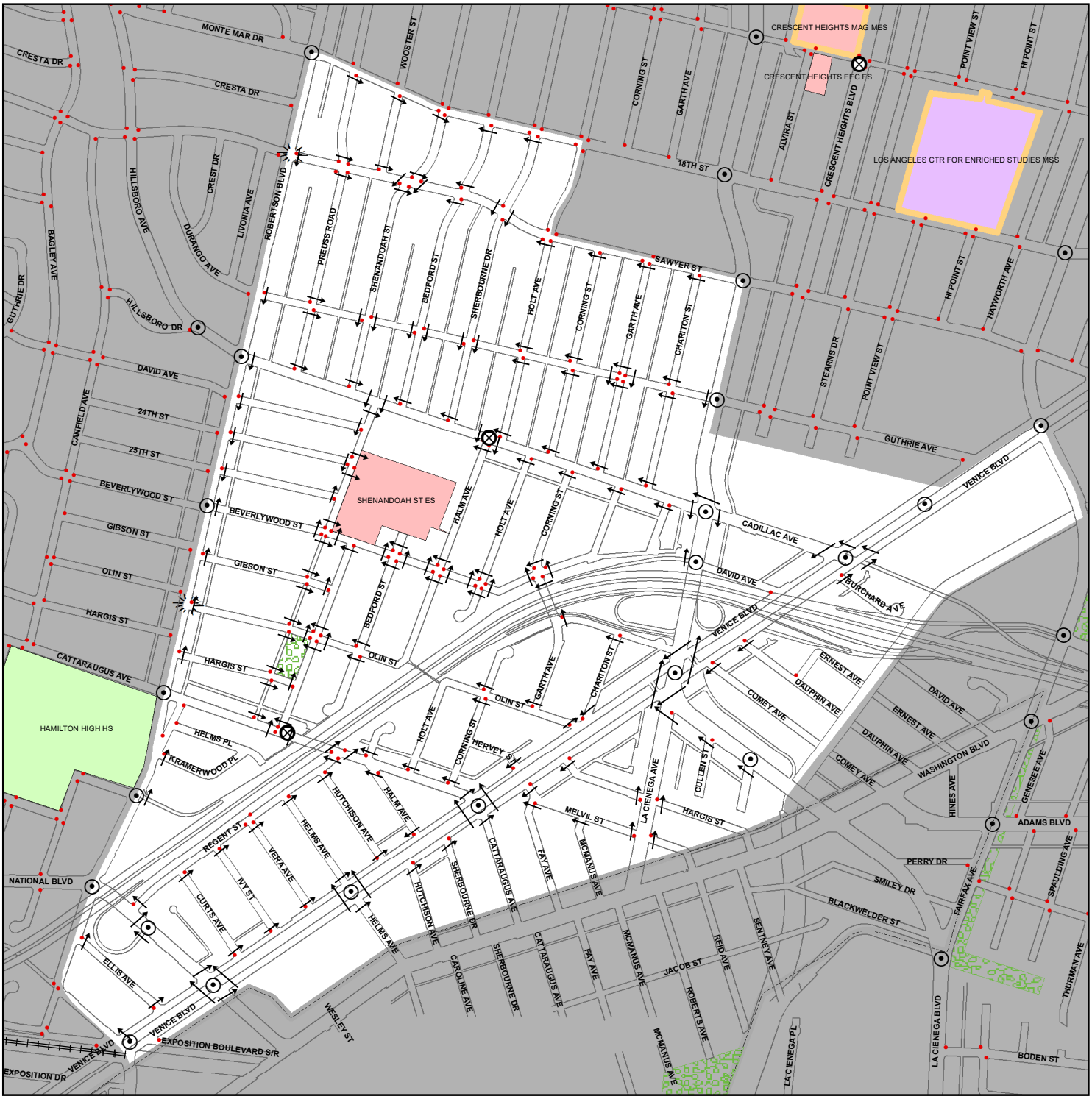
LADOT PEDESTRIAN ROUTES FOR SHENANDOAH STREET ELEMENTARY SCHOOL

CITY OF LOS ANGELES - DEPARTMENT OF TRANSPORTATION

LADOT
Moving LA Forward

September 2016

PEDESTRIAN ROUTES FOR SHENANDOAH STREET ELEMENTARY SCHOOL



Legend

- Recommended Crossing
- Stop Sign
- Traffic Signal
- Crossing Guard
- Flashing Warning Light
- Stairs or Walkway
- Pedestrian Bridge
- Pedestrian Tunnel
- Parks

N
W E
S

0 350 700
Feet

Parents:

This map shows the recommended crossings to be used from each block in your school attendance area. Following the arrows, select the best route from your home to the school and mark it with a colored pencil or crayon. This is the route your child should take. Instruct your child to use this route and to cross streets only at locations shown. You and your child should become familiar with the route by walking it together. Obey marked crosswalks, stop signs, traffic signals and other traffic controls. Crossing points have been located at these controls wherever possible, even though a longer walk may be necessary. Instruct your child to always look both ways before crossing the street. If no sidewalk exists, your child should walk facing traffic.

Estimados Padres:

Este mapa muestra los cruzados recomendados para los peatones de cada cuadra en la area de su escuela. Siguiendo las flechas en el mapa, selecione la ruta mas segura de su casa a la Escuela y marquelo con un lapis o tiza de color. Esta es la ruta que su hijo (a) debe de usar. Digale a su hijo (a) que use esta ruta y que cruce las calles solamente en los lugares indicados. Usted y su hijo (a) deberian de familiarizarce con esta ruta. Obedezcan los rotulos de peatones, de altos, semaforos y todos los señales de trafico. Puntos para cruzar estan localizados en areas controladas, aunque sea necesario de alargar el tiempo para cruzar. Instruye a su hijo (a) que siempre se fije de los dos lados antes de cruzar la calle. El estudiante debe de siempre caminar en la direccion opuesta del trafico si no existe una banqueta.