FILE

EL DORADO COUNTY

ENVIRONMENTAL MANAGEMENT DEPARTMENT

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M.S., REHS
Director

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Sampling and Analysis of Aerially Deposited Lead
Road Improvement Projects

Pleasant Valley Road (SR-49) at Patterson Drive Intersection Signalization
Milepost 10.6 to 10.9

El Dorado County, California

Prepared for
El Dorado County of Transportation

Prepared by
Robert Lauritzen
El Dorado County Environmental Management Department

September 12, 2011

PROFESSIONAL GEOLOGIST
ROBERT A. LAURITZEN
No. 7504
STATE OF CALIFORNIA

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1.0 INTRODUCTION

The following report presents the results for Aerially Deposited Lead (ADL) sampling and laboratory analyses in surface soils at the above referenced location. In addition, sampling and analysis of yellow center stripe paint for lead and chromium was also performed in compliance with Caltrans requirements. Results of this study will be used by the El Dorado County Department of Transportation (EDCDOT) for information regarding potential health and safety issues as well as proper waste disposal characterization for potential lead-impacted soils and/or lead and chromium impacted traffic stripe paint.

2.0 PROJECT DESCRIPTION AND PROPOSED IMPROVEMENTS

The project area consists of paved and unpaved shoulders of Pleasant Valley Road from Milepost 10.6 to 10.9 in El Dorado County, California. The purpose of this EDCDOT project is to widen and realign Pleasant Valley Road at the Patterson Drive intersection. The proposed improvements include the following: asphalt widening, asphalt overlay, curbs, gutters, sidewalks, storm drainage and grading along Pleasant Valley Road (SR-49) and Patterson Drive with a new signal proposed at the intersection. The project and location map are shown on Figure 1.

3.0 BACKGROUND

3.1 ADL Soils and Regulatory Hazardous Waste Determination

ADL testing which has been performed on an ongoing basis by the California Department of Transportation (Caltrans) has indicated that emissions of vehicles using leaded gasoline has resulted elevated lead deposits in soils along major highways and/or freeways.

Soils impacted with ADL are subject to regulatory criteria which define whether or not it is classified as a waste for disposal and handling purposes contained in California Code of Regulations (CCR), Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24. Federal classification of a waste under the Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Federal Code of Regulations (40 CFR), Section 261.

Potential metals-impacted soils (eg. lead) are classified as California hazardous waste when: 1) the total metal (lead or chromium) content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal (lead or chromium) concentration exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET-citrate) . Waste such as lead-impacted soils may have the potential to exceed the STLC when the TTLC value is 10 times the STLC value assuming 100 percent of the total metals are soluble (50 mg/kg). STLC analysis is required when this STLC value is exceeded in TTLC analysis. A waste may also be classified as RCRA hazardous when the soluble metal (lead or chromium) content exceeds Federal regulatory criteria based on the Toxicity

Characteristic Leaching Procedure (TCLP) laboratory analysis. TTLC and STLC WET-citrate threshold values are listed in Table 1. TCLP threshold values are the same as STLC threshold values. Recent changes in 2009 to Department of Toxic Substances Control (DTSC) waste classification and DTSC's determination of variance applicability for lead in soils allows the use of STLC WET-DI methodology which uses distilled water instead of a citrate buffer to leach lead from a soil sample. The threshold value for lead STLC WET-DI is 1.5 mg/L.

The scope of work for this project included STLC WET-citrate, but not TCLP analysis due to the elevated results of the TTLC (total lead) analysis. Material may also be classified as hazardous based on criteria other than chemical concentrations such as corrosivity and ignitibility; however lead concentrations are considered the most likely characteristic to determine whether or not disturbed soil in this project are hazardous or not.

DTSC considers soils classified as hazardous such as those potentially encountered on this project not necessarily a waste if they are left in-place. For example DTSC provides specific determinations that the movement of waste within an area of contamination does not constitute land disposal and therefore does not trigger hazardous waste disposal requirements. Potentially lead-impacted soil above hazardous waste threshold levels may be scarified in-place, moisture conditioned, and re-compacted during roadway improvement activities may not be considered a waste. Health and safety requirements should also be consulted prior to project initiation for proper handling and disposal requirement. Soil lead concentrations were below regulatory threshold values for this project with the exception of seven (7) total lead samples, which resulted in the reanalysis of all samples by STLC WET-citrate methods for soluble lead. None of the samples exceeded soluble lead threshold levels.

3.2 Lead and Chromium-based Paint Regulatory Waste Determination

Lead-based paint is defined by CCR Title 17, Division 1, Chapter 8, Section 35033 as any surface coating that contains an amount of lead equal to or in excess of, one milligram per square centimeter (1.0 mg/cm2) or more than half of one percent (0.5%) by weight. Deteriorated lead-based paint is defined by CCR Title 17, Division 1, Chapter 8, Section 35022 as a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from a component.

Elevated lead and chromium concentrations in traffic stripe paint require sampling and analysis to determine appropriate health and safety procedures as wells as proper removal and disposal practices. Air monitoring and/or respiratory protection may be required during the demolition of material coated with lead and/or chromium based paint. Regulatory guidance for construction workers in an environment where they may be exposed to lead are in CCR, Title 8, Section 1532.1 (Lead in Construction).

4.0 METHODS

A total of eighteen (18) surface soil samples were collected at seven (7) locations along the unpaved shoulders of Pleasant Valley Road at the Patterson Drive intersection where planned road construction activity will disturb surface soils (Figure 1). A hand auger, shovel and other digging implements were used to collect representative soil samples which were placed in pre-cleaned laboratory glass jars. Samples were collected from depths of 1.0 foot and 2.0 feet. At each location one sample was collected from surface grade to one-foot below grade. In addition, two duplicate soil samples DUP-1 (S1-1.0) and DUP-2 (S2-1.0) were collected and analyzed. All samples were transported in a chilled cooler under chain of custody procedures to California Laboratory Services (CLS) for analysis. Soil samples were analyzed for Total Lead according to EPA Method 6010B. If necessary, laboratory results with a lead concentration of 50 mg/kg or higher were analyzed according to STLC California WET (citrate) methodology to determine the concentration of soluble lead for waste disposal purposes. Selected soil samples were also analyzed for soil pH using EPA Method 9045C.

A paint chip sample (Stripe-1) was collected from the yellow center stripe of the project. A paint stripe sample was analyzed for Total Lead and Total Chromium by EPA Method 6010B. The total chromium was performed using EPA Method 6010 and indicated a concentration of 9.4 mg/kg. Hexavalent chromium analysis was performed using EPA Method 7199 which indicated the concentration below laboratory method reporting limits of <10 mg/kg.

5.0 RESULTS

Total Lead Analyses

Initial laboratory results for total lead concentrations in soil ranged from 130 mg/kg in sample S7-1.0 to 11.0 mg/kg in sample S2-2.0. Seven (7) samples including S1-1.0 (81 mg/kg), S3-2.0 (77 mg/kg), S4-1.0 (70 mg/kg), S4-2.0 (120 mg/kg), S5-1.0 (81 mg/kg), S7-1.0 (130 mg/kg), DUP-1 (76 mg/kg; S1-1.0), exceeded the regulatory threshold level for lead (10 times the STLC WET or 50 mg/kg total lead). Therefore all samples were reanalyzed by STLC California WET methodology to determine the concentration of soluble lead for waste disposal purposes. Laboratory results are summarized in Table 1.

STLC Analyses

Laboratory results for the 18 soil samples indicated a soluble lead concentration which ranged from None Detected (ND, <0.25) mg/L in seven samples to 4.1 mg/L in sample S4-2.0. None of the samples exceeded the STLC threshold concentration of 5.0 mg/L. Laboratory results are summarized in Table 1.

Center Stripe Analyses

Paint sample Stripe-1 contained total lead and hexavalent chromium concentrations that are not considered hazardous waste under state of California Hazardous Waste classification system.

Soil pH Analyses

Soil pH results ranged from 5.46 to 7.34 which were within the upper and lower limits for pH levels that would not be considered a hazardous waste based on pH. A summary of laboratory results is presented in Table 1 and analytical laboratory reports are attached. Soil pH results would not cause the soil to be classified as a RCRA hazardous waste and is greater than the DTSC lower limit for soil pH of 5.0.

Statistical Analysis using ProUCL

Statistical analysis of total lead concentrations was performed for this study because seven (7) of the samples exceeded the TTLC threshold of 50 mg/kg. The EPA statistical program ProUCL was used to provide summary statistics for the total lead results. The program's best fit statistical analysis resulted in a 95% Bootstrap UCL of 60.24 (mean of 46.11) for total lead concentrations. The UCL total lead value of 60.24 mg/kg is well below the 1,000 mg/kg threshold for total lead. ProUCL's best fit statistical analysis using 95% Approximate Gamma UCL indicated a UCL of 4.689 mg/L (mean of 1.482) for STLC-WET data. The UCL lead value of 4.689 mg/L is below the 5.0 mg/L threshold for STLC-WET analysis and indicates that the material can be treated as non-hazardous waste.

6.0 CONCLUSIONS AND RECOMMENDATIONS

ADL Soil Anaylsis

Total lead concentrations were below regulatory threshold limits for twelve (12) of the 18 samples. Six (6) samples analyzed for total lead exceeded the STLC WET (citrate) threshold of 50 mg/kg, therefore all samples were analyzed by STLC WET (citrate) analysis. None of the samples analyzed for lead by STLC WET methodology had a lead concentration above the SLTC WET threshold of 5.0 mg/L.

A ProUCL statistical analysis of total lead samples resulted in a calculated a 95% UCL of 60.24 mg/kg based on a mean of 46.11 mg/kg which is below the TTLC or total lead threshold of 1,000 mg/kg. A ProUCL statistical analysis of lead samples analyzed by STLC WET methods resulted in a calculated a 95% UCL of 4.689 mg/L based on a mean of 1.482 mg/L which is below the lead by STLC WET method of 5.0 mg/L. Statistical analyses indicates the neither the TTLC or STLC WET thresholds are likely to be exceeded based on a 95% Confidence Level; therefore, surface soils for this project would not be classified as hazardous waste.

This project is located in the Sierra foothills which is an area known to contain naturally occurring lead bearing minerals and the most likely explanation for elevated lead concentrations in some of the samples collected.

Center Stripe Analysis for Lead and Chromium

Laboratory analytical results indicate that centerline paint striping contain did not have hazardous levels of lead and chrome, which indicates that removal and disposal of this material should not be regarded as a hazardous waste.

Soil pH Analysis

Soil pH results were within the upper and lower limits such that soils at the project would not be considered a hazardous waste based on pH

Table 1

Summary of Analytical Results

El Dorado County Department of Transportation
Pleasant Valley at Patterson Improvement Project
MP 10.6 to 10.9

Sample	Date	Depth (ft)	Total Lead (mg/kg)	STLC WET (mg/L)	STLC DI (mg/L)	Total Chromium (mg/kg)	Chromium VI (mg/kg)	pH
S1-1.0	8/3/2011	1.0	81	3.0	---	---	---	6.86
S2-1.0	8/3/2011	1.0	18	0.54	---	---	---	6.50
S2-2.0	8/3/2011	2.0	11	ND	---	---	---	---
S3-1.0	8/3/2011	1.0	22	1.4	---	---	---	7.04
S3-2.0	8/3/2011	2.0	77	3.4	---	---	---	---
S4-1.0	8/3/2011	1.0	70	4.1	---	---	---	7.34
S4-2.0	8/3/2011	2.0	120	4.0	---	---	---	---
S5-1.0	8/3/2011	1.0	81	2.3	---	---	---	7.10
S5-2.0	8/3/2011	2.0	35	0.96	---	---	---	---
S6-1.0	8/3/2011	1.0	30	0.52	---	---	---	6.94
S6-2.0	8/3/2011	2.0	33	ND	---	---	---	---
S7-1.0	8/3/2011	1.0	130	2.6	---	---	---	7.29
S7-2.0	8/3/2011	2.0	34	0.81	---	---	---	---
S8-1.0	8/3/2011	1.0	19	0.54	---	---	---	6.71
S9-1.0	8/3/2011	1.0	17	0.51	---	---	---	---
S10-1.0	8/3/2011	1.0	16	ND	---	---	---	5.70
S10-2.0	8/3/2011	2.0	13	ND	---	---	---	---
S11-1.0	8/3/2011	1.0	23	1.0	---	---	---	5.46
DUP-1	8/3/2011	---	76	---	---	---	---	---
DUP-2	8/3/2011	---	16	---		---	---	---
Stripe-1	8/3/2011	paint	110	---	---	40	33	---
TTLC Limit			1,000	---	---	2500	500	---
STLC WET Limit			5.0	5.0	---	5.0	5.0	---
STLC DI Limit			---	---	1.5	---	---	---
CHHSL			320	---	---	---	37	---

Notes:

TTLC = Total Threshold Limit Concentration (40 CCR, Section 261)

CHHSL = California Human Health Screening Level (Cal EPA) - commercial/industrial levels (2009)

STLC-WET = Soluable Threshold Limit Concentration by California WET (citrate buffer)

exceeds 10 times STLC regulatory threshold of 5.0 mg/kg.

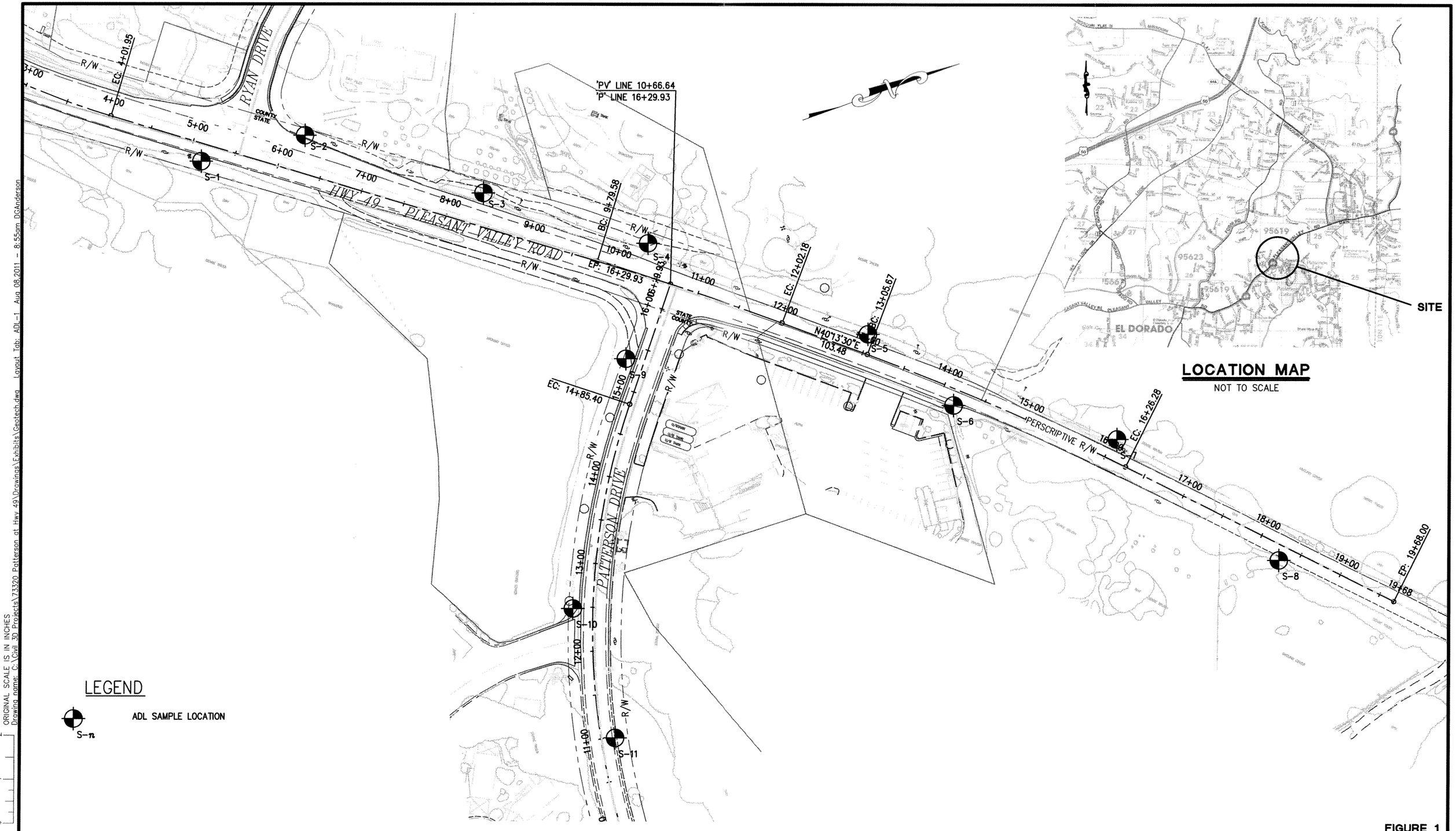
Dup-1 = CS-1-1.0

Dup-2 = CS-2-1.0

= exceeds STLC DI regulatory threshold of 1.5 mg/L.

STLC WET-DI = Soluable Threshold Limit Concentration by Ca WET (distilled H20)

ND = none detected, see lab report for method reporting limits



LEGEND

S-n ADL SAMPLE LOCATION

ORIGINAL SCALE IS IN INCHES
Drawing name: C:\Civil 3D Projects\73320 Patterson at Hwy 49\Drawings\Exhibits\Geotech.dwg Layout Tab: ADL-1 Aug 08,2011 - 8:55am DGAnderson

FOR REDUCED PLANS

PRELIMINARY

FIGURE 1
AERIALLY DEPOSITED LEAD SAMPLE LOCATIONS
SCALE : 1" = 50'

REVISION			
NUMBER	DATE	DESCRIPTION	BY

PREPARED UNDER THE SUPERVISION OF :

REGISTERED CIVIL ENGINEER

DATE:

DESIGNED: –	DRAWN: DGA
CHECKED: –	DATE: 8/08/11
ROAD NUMBER:	77

EL DORADO COUNTY
DEPARTMENT OF TRANSPORTATION

PLEASANT VALLEY ROAD AND PATTERSON DRIVE INTERSECTION IMPROVEMENTS

SHEET ADL-1
1 OF 1
W.O. No. 73320

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

August 10, 2011

CLS Work Order #: CUH0151
COC #:

Robert Lauritzen
El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project Name: Pleasant Valley @ Patterson - Soil Sampling

Enclosed are the results of analyses for samples received by the laboratory on 08/03/11 13:55. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

California Laboratory Services

08/10/11 12:39

El Dorado County Environmental	Project: Pleasant Valley @ Patterson - Soil Sampling	
2850 Fairlane Court, Building C	Project Number: DOT Soil Sampling	**CLS Work Order #: CUH0151**
Placerville, CA 95667	Project Manager: Robert Lauritzen	COC #:

3249 Fitzgerald Road, Rancho Cordova, CA
Phone: (916) 638-7301

CLS Laboratories

Lab Login#

CHAIN OF CUSTODY/ANALYSIS REQUEST FORM

Date: 8/3/11

CUH0151

Pleasant Valley@Patterson -Soil sampling

El Dorado County DOT
Report to: Robert Lauritzen
El Dorado County Environmental Management
2850 Fairlaine Court, Bldg C
Placerville, CA 95667
Office: (530)-621-5130
Fax: (530) 626-7130

Sample ID	Date	Time	Lab ID	Sample Matrix	# of Containers	Analysis Requested: Total Lead Method 6010	Total Chromium Method 6010	Soil pH by Method 9045	Chromium VI by Method 7199		Comments
						NP	NP				
S-1-1.0	8/3/2011	0905		soil	1	x		x			
S-2-1.0	8/3/2011	0915		soil	1	x		x			
S-2-2.0	8/3/2011	0920		soil	1	x					
S-3-1.0	8/3/2011	0925		soil	1	x		x			
S-3-2.0	8/3/2011	0930		soil	1	x					
S-4-1.0	8/3/2011	0935		soil	1	x		x			
S-4-2.0	8/3/2011	0940		soil	1	x					
S-5-1.0	8/3/2011	0945		soil	1	x		x			
S-5-2.0	8/3/2011	0950		soil	1	x					
S-6-1.0	8/3/2011	0955		soil	1	x		x			
S-6-2.0	8/3/2011	1000		soil	1	x					
S-7-1.0	8/3/2011	1005		soil	1	x		x			
S-7-2.0	8/3/2011	1010		soil	1	x					
S-8-1.0	8/3/2011	1015		soil	1	x		x			
S-9-1.0	8/3/2011	1025		soil	1	x		x			
S-10-1.0	8/3/2011	1035		soil	1	x		x			
S-10-2.0	8/3/2011	1040		soil	1	x					
S-11-1.0	8/3/2011	1045		soil	1	x		x			
DUP-1	8/3/2011	1055		soil	1	x					
DUP-2	8/3/2011	1100		soil	1	x					
Stripe-1	8/3/2011	1105		gasit	1	x	x		x		

Relinquished by:
Signature: Robert Lauritzen
Printed Name: R. Lauritzen
El Dorado County
Date/Time 8/3/11 1355

Recieved by:
Signature:
Printed Name:
Date/Time 8/3/11 1355

TAT Requirements
__x__ Standard (10 days) ___ I. Routine Report
___ II. Report(includes DUP,MS MSD, as required.

Invoice:Greg Stanton, EDCEM
Address: 2850 Fairlane Ct., Bldg C, Placerville, CA, 95667
El Dorado County DOT - soil sampling

Additional Info: Hexavalent Chromium by EPA Method 7199/ No EDD required

08/10/11 12:39

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-1-1.0 (CUH0151-01) Soil	**Sampled: 08/03/11 09:05**	**Received: 08/03/11 13:55**							
pH	**6.86**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-2-1.0 (CUH0151-02) Soil	**Sampled: 08/03/11 09:15**	**Received: 08/03/11 13:55**							
pH	**6.50**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-3-1.0 (CUH0151-04) Soil	**Sampled: 08/03/11 09:25**	**Received: 08/03/11 13:55**							
pH	**7.04**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-4-1.0 (CUH0151-06) Soil	**Sampled: 08/03/11 09:35**	**Received: 08/03/11 13:55**							
pH	**7.34**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-5-1.0 (CUH0151-08) Soil	**Sampled: 08/03/11 09:45**	**Received: 08/03/11 13:55**							
pH	**7.10**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-6-1.0 (CUH0151-10) Soil	**Sampled: 08/03/11 09:55**	**Received: 08/03/11 13:55**							
pH	**6.94**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-7-1.0 (CUH0151-12) Soil	**Sampled: 08/03/11 10:05**	**Received: 08/03/11 13:55**							
pH	**7.29**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-8-1.0 (CUH0151-14) Soil	**Sampled: 08/03/11 10:15**	**Received: 08/03/11 13:55**							
pH	**6.71**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-9-1.0 (CUH0151-15) Soil	**Sampled: 08/03/11 10:25**	**Received: 08/03/11 13:55**							
pH	**5.70**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	

08/10/11 12:39

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-10-1.0 (CUH0151-16) Soil Sampled: 08/03/11 10:35 Received: 08/03/11 13:55									
pH	**5.46**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
S-11-1.0 (CUH0151-18) Soil Sampled: 08/03/11 10:45 Received: 08/03/11 13:55									
pH	**5.28**	1.00	pH Units	1	CU05541	08/04/11	08/04/11	EPA 9045C	
Stripe-1 (CUH0151-21) Paint chip Sampled: 08/03/11 11:05 Received: 08/03/11 13:55									
Hexavalent Chromium	**33**	10	µg/kg	1	CU05615	08/08/11	08/08/11	EPA 7199	

08/10/11 12:39

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling
Project Manager: Robert Lauritzen

CLS Work Order #: CUH0151
COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-1-1.0 (CUH0151-01) Soil	**Sampled: 08/03/11 09:05**	**Received: 08/03/11 13:55**							
Lead	**81**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-2-1.0 (CUH0151-02) Soil	**Sampled: 08/03/11 09:15**	**Received: 08/03/11 13:55**							
Lead	**18**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-2-2.0 (CUH0151-03) Soil	**Sampled: 08/03/11 09:20**	**Received: 08/03/11 13:55**							
Lead	**11**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-3-1.0 (CUH0151-04) Soil	**Sampled: 08/03/11 09:25**	**Received: 08/03/11 13:55**							
Lead	**22**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-3-2.0 (CUH0151-05) Soil	**Sampled: 08/03/11 09:30**	**Received: 08/03/11 13:55**							
Lead	**77**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-4-1.0 (CUH0151-06) Soil	**Sampled: 08/03/11 09:35**	**Received: 08/03/11 13:55**							
Lead	**70**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-4-2.0 (CUH0151-07) Soil	Sampled: 08/03/11 09:40	Received: 08/03/11 13:55							
Lead	**120**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-5-1.0 (CUH0151-08) Soil	Sampled: 08/03/11 09:45	Received: 08/03/11 13:55							
Lead	**81**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-5-2.0 (CUH0151-09) Soil	Sampled: 08/03/11 09:50	Received: 08/03/11 13:55							
Lead	35	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	

El Dorado County Environmental	Project: Pleasant Valley @ Patterson - Soil Sampling	
2850 Fairlane Court, Building C	Project Number: DOT Soil Sampling	**CLS Work Order #: CUH0151**
Placerville, CA 95667	Project Manager: Robert Lauritzen	COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-6-1.0 (CUH0151-10) Soil Sampled: 08/03/11 09:55 Received: 08/03/11 13:55									
Lead	**30**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-6-2.0 (CUH0151-11) Soil Sampled: 08/03/11 10:00 Received: 08/03/11 13:55									
Lead	**33**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-7-1.0 (CUH0151-12) Soil Sampled: 08/03/11 10:05 Received: 08/03/11 13:55									
Lead	**130**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-7-2.0 (CUH0151-13) Soil Sampled: 08/03/11 10:10 Received: 08/03/11 13:55									
Lead	**34**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-8-1.0 (CUH0151-14) Soil Sampled: 08/03/11 10:15 Received: 08/03/11 13:55									
Lead	**19**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-9-1.0 (CUH0151-15) Soil Sampled: 08/03/11 10:25 Received: 08/03/11 13:55									
Lead	**17**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-10-1.0 (CUH0151-16) Soil Sampled: 08/03/11 10:35 Received: 08/03/11 13:55									
Lead	**16**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-10-2.0 (CUH0151-17) Soil Sampled: 08/03/11 10:40 Received: 08/03/11 13:55									
Lead	**13**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
S-11-1.0 (CUH0151-18) Soil Sampled: 08/03/11 10:45 Received: 08/03/11 13:55									
Lead	**23**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DUP-1 (CUH0151-19) Soil Sampled: 08/03/11 10:55 Received: 08/03/11 13:55									
Lead	**76**	2.5	mg/kg	1	CU05587	08/05/11	08/05/11	EPA 6010B	
DUP-2 (CUH0151-20) Soil Sampled: 08/03/11 11:00 Received: 08/03/11 13:55									
Lead	**16**	2.5	mg/kg	1	CU05524	08/04/11	08/08/11	EPA 6010B	
Stripe-1 (CUH0151-21) Paint chip Sampled: 08/03/11 11:05 Received: 08/03/11 13:55									
Chromium	**40**	10	mg/kg	10	CU05587	08/05/11	08/05/11	EPA 6010B	
Lead	**110**	25	"	"	"	"	"	"	

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Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CU05615 - General Prep										
Blank (CU05615-BLK1)				Prepared & Analyzed: 08/08/11						
Hexavalent Chromium	ND	10	µg/kg							
LCS (CU05615-BS1)				Prepared & Analyzed: 08/08/11						
Hexavalent Chromium	46.1	10	µg/kg	50.0		92	80-120			
LCS Dup (CU05615-BSD1)				Prepared & Analyzed: 08/08/11						
Hexavalent Chromium	45.9	10	µg/kg	50.0		92	80-120	0.3	20	
Matrix Spike (CU05615-MS1)		**Source: CUH0151-21**		Prepared & Analyzed: 08/08/11						
Hexavalent Chromium	95.2	10	µg/kg	50.0	33.0	124	75-125			
Matrix Spike Dup (CU05615-MSD1)		**Source: CUH0151-21**		Prepared & Analyzed: 08/08/11						
Hexavalent Chromium	97.4	10	µg/kg	50.0	33.0	129	75-125	2	25	QM-7

El Dorado County Environmental
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Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CU05524 - EPA 3050B										
Blank (CU05524-BLK1)				Prepared: 08/04/11 Analyzed: 08/05/11						
Lead	ND	2.5	mg/kg							
LCS (CU05524-BS1)				Prepared: 08/04/11 Analyzed: 08/05/11						
Lead	9.34	2.5	mg/kg	10.0		93	75-125			
LCS Dup (CU05524-BSD1)				Prepared: 08/04/11 Analyzed: 08/05/11						
Lead	9.45	2.5	mg/kg	10.0		94	75-125	1	25	
Matrix Spike (CU05524-MS1)	**Source: CUH0038-70**			Prepared: 08/04/11 Analyzed: 08/05/11						
Lead	101	2.5	mg/kg	10.0	95.7	58	75-125			QM-5
Matrix Spike Dup (CU05524-MSD1)	**Source: CUH0038-70**			Prepared: 08/04/11 Analyzed: 08/05/11						
Lead	106	2.5	mg/kg	10.0	95.7	104	75-125	4	30	
Batch CU05587 - EPA 3050B										
Blank (CU05587-BLK1)				Prepared & Analyzed: 08/05/11						
Lead	ND	2.5	mg/kg							
Chromium	ND	1.0	"							
LCS (CU05587-BS1)				Prepared & Analyzed: 08/05/11						
Lead	50.7	2.5	mg/kg	50.0		101	75-125			
Chromium	52.3	1.0	"	50.0		105	75-125			
LCS Dup (CU05587-BSD1)				Prepared & Analyzed: 08/05/11						
Lead	51.1	2.5	mg/kg	50.0		102	75-125	0.8	25	
Chromium	50.6	1.0	"	50.0		101	75-125	3	25	

El Dorado County Environmental
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Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0151**
Project Manager: Robert Lauritzen COC #:

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CU05587 - EPA 3050B										
Matrix Spike (CU05587-MS1)		**Source: CUH0151-01**		Prepared & Analyzed: 08/05/11						
Lead	127	2.5	mg/kg	50.0	81.1	91	75-125			
Chromium	114	1.0	"	50.0	67.7	93	75-125			
Matrix Spike Dup (CU05587-MSD1)		**Source: CUH0151-01**		Prepared & Analyzed: 08/05/11						
Lead	141	2.5	mg/kg	50.0	81.1	119	75-125	11	30	
Chromium	115	1.0	"	50.0	67.7	95	75-125	1	30	

El Dorado County Environmental	Project: Pleasant Valley @ Patterson - Soil Sampling	
2850 Fairlane Court, Building C	Project Number: DOT Soil Sampling	**CLS Work Order #: CUH0151**
Placerville, CA 95667	Project Manager: Robert Lauritzen	COC #:

Notes and Definitions

QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

August 17, 2011

CLS Work Order #: CUH0481
COC #:

Robert Lauritzen
El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project Name: Pleasant Valley @ Patterson - Soil Sampling

Enclosed are the results of analyses for samples received by the laboratory on 08/10/11 17:19. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

08/17/11 16:09

El Dorado County Environmental	Project: Pleasant Valley @ Patterson - Soil Sampling	
2850 Fairlane Court, Building C	Project Number: DOT Soil Sampling	**CLS Work Order #: CUH0481**
Placerville, CA 95667	Project Manager: Robert Lauritzen	COC #:

CHANGE OF STATUS CUH0481

Work Order # CUH0481

Project Name: Pleasant Valley @ Patterson - Soil

Date Sample(s) Were Received: 8/3/11 **Original Date** 8/10/11

Robert Lauritzen (Client Contacted) of El Dorado County (Company) emailed called

On 8/10/11 (Date) at 1010 (Time)

... and requested the following:

Please analyze all samples except:
DUP-1 "CUH0481-19"
DUP-2 "CUH0481-20"
Strip-1 "CUH0481-21"
for lead by STLC-Wet

Turnaround time requested for additional work: 5 day

Natalie Meadows (Signature) 8/10/11 (Date)

Updated lab job database and file folder by:

Cc:

08/17/11 16:09

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0481**
Project Manager: Robert Lauritzen COC #:

STLC (WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-1-1.0 (CUH0481-01) Soil Sampled: 08/03/11 09:05 Received: 08/10/11 17:19									
Lead	**3.0**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-2-1.0 (CUH0481-02) Soil Sampled: 08/03/11 09:15 Received: 08/10/11 17:19									
Lead	**0.54**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-2-2.0 (CUH0481-03) Soil Sampled: 08/03/11 09:20 Received: 08/10/11 17:19									
Lead	ND	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-3-1.0 (CUH0481-04) Soil Sampled: 08/03/11 09:25 Received: 08/10/11 17:19									
Lead	**1.4**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-3-2.0 (CUH0481-05) Soil Sampled: 08/03/11 09:30 Received: 08/10/11 17:19									
Lead	**3.4**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-4-1.0 (CUH0481-06) Soil Sampled: 08/03/11 09:35 Received: 08/10/11 17:19									
Lead	**4.1**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-4-2.0 (CUH0481-07) Soil Sampled: 08/03/11 09:40 Received: 08/10/11 17:19									
Lead	**4.0**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-5-1.0 (CUH0481-08) Soil Sampled: 08/03/11 09:45 Received: 08/10/11 17:19									
Lead	2.3	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-5-2.0 (CUH0481-09) Soil Sampled: 08/03/11 09:50 Received: 08/10/11 17:19									
Lead	**0.96**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	

08/17/11 16:09

El Dorado County Environmental
2850 Fairlane Court, Building C
Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0481**
Project Manager: Robert Lauritzen COC #:

STLC (WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-6-1.0 (CUH0481-10) Soil Sampled: 08/03/11 09:55 Received: 08/10/11 17:19									
Lead	**0.52**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-6-2.0 (CUH0481-11) Soil Sampled: 08/03/11 10:00 Received: 08/10/11 17:19									
Lead	ND	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-7-1.0 (CUH0481-12) Soil Sampled: 08/03/11 10:05 Received: 08/10/11 17:19									
Lead	**2.6**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-7-2.0 (CUH0481-13) Soil Sampled: 08/03/11 10:10 Received: 08/10/11 17:19									
Lead	**0.81**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-8-1.0 (CUH0481-14) Soil Sampled: 08/03/11 10:15 Received: 08/10/11 17:19									
Lead	**0.54**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-9-1.0 (CUH0481-15) Soil Sampled: 08/03/11 10:25 Received: 08/10/11 17:19									
Lead	**0.51**	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-10-1.0 (CUH0481-16) Soil Sampled: 08/03/11 10:35 Received: 08/10/11 17:19									
Lead	ND	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-10-2.0 (CUH0481-17) Soil Sampled: 08/03/11 10:40 Received: 08/10/11 17:19									
Lead	ND	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	
S-11-1.0 (CUH0481-18) Soil Sampled: 08/03/11 10:45 Received: 08/10/11 17:19									
Lead	1.0	0.50	mg/L	1	CU05840	08/16/11	08/17/11	EPA 6010B	

El Dorado County Environmental
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Placerville, CA 95667

Project: Pleasant Valley @ Patterson - Soil Sampling
Project Number: DOT Soil Sampling **CLS Work Order #: CUH0481**
Project Manager: Robert Lauritzen COC #:

STLC (WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CU05840 - EPA 3010A										
Blank (CU05840-BLK1)				Prepared: 08/16/11		Analyzed: 08/17/11				
Lead	ND	0.50	mg/L							
LCS (CU05840-BS1)				Prepared: 08/16/11		Analyzed: 08/17/11				
Lead	10.4	0.50	mg/L	10.0		104	75-125			
LCS Dup (CU05840-BSD1)				Prepared: 08/16/11		Analyzed: 08/17/11				
Lead	10.7	0.50	mg/L	10.0		107	75-125	2	25	
Matrix Spike (CU05840-MS1)		**Source: CUH0481-01**		Prepared: 08/16/11		Analyzed: 08/17/11				
Lead	13.1	0.50	mg/L	10.0	2.98	101	75-125			
Matrix Spike Dup (CU05840-MSD1)		**Source: CUH0481-01**		Prepared: 08/16/11		Analyzed: 08/17/11				
Lead	12.8	0.50	mg/L	10.0	2.98	98	75-125	2	30	

08/17/11 16:09

El Dorado County Environmental	Project: Pleasant Valley @ Patterson - Soil Sampling	
2850 Fairlane Court, Building C	Project Number: DOT Soil Sampling	**CLS Work Order #: CUH0481**
Placerville, CA 95667	Project Manager: Robert Lauritzen	COC #:

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

General UCL Statistics for Full Data Sets

STLC - WET data
PV @ Patterson

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	14
Number of Missing Values	1		

Raw Statistics		Log-transformed Statistics	
Minimum	0.25	Minimum of Log Data	-1.386
Maximum	4.1	Maximum of Log Data	1.411
Mean	1.482	Mean of log Data	-0.0618
Median	0.885	SD of log Data	1.019
SD	1.367		
Coefficient of Variation	0.922		
Skewness	0.903		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.82	Shapiro Wilk Test Statistic	0.902
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	2.043	95% H-UCL	3.052
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.283
95% Adjusted-CLT UCL (Chen-1995)	2.086	97.5% Chebyshev (MVUE) UCL	4.047
95% Modified-t UCL (Johnson-1978)	2.054	99% Chebyshev (MVUE) UCL	5.548

Gamma Distribution Test		Data Distribution
k star (bias corrected)	1.069	Data appear Gamma Distributed at 5% Significance Level
Theta Star	1.387	
MLE of Mean	1.482	
MLE of Standard Deviation	1.434	
nu star	38.48	
Approximate Chi Square Value (.05)	25.27	Nonparametric Statistics
Adjusted Level of Significance	0.0357	95% CLT UCL 2.012
Adjusted Chi Square Value	24.25	95% Jackknife UCL 2.043
		95% Standard Bootstrap UCL 1.993
Anderson-Darling Test Statistic	0.731	95% Bootstrap-t UCL 2.103
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL 2.009
Kolmogorov-Smirnov Test Statistic	0.184	95% Percentile Bootstrap UCL 2.011
Kolmogorov-Smirnov 5% Critical Value	0.208	95% BCA Bootstrap UCL 2.12
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 2.887
		97.5% Chebyshev(Mean, Sd) UCL 3.495
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 4.689

95% Approximate Gamma UCL	2.257
95% Adjusted Gamma UCL	2.352

Potential UCL to Use	Use 95% Approximate Gamma UCL 2.257 ✓

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Nonparametric UCL Statistics for Full Data Sets

Total Lead data
PVC Patterson

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

Number of Valid Observations	18
Number of Distinct Observations	17
Minimum	11
Maximum	130
Mean	46.11
Median	31.5
SD	37.48
Variance	1405
Coefficient of Variation	0.813
Skewness	1.146
Mean of log data	3.536
SD of log data	0.783

95% Useful UCLs

Student's-t UCL	61.48

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	63.19
95% Modified-t UCL (Johnson-1978)	61.88

Non-Parametric UCLs

95% CLT UCL	60.64
95% Jackknife UCL	61.48
95% Standard Bootstrap UCL	60.24
95% Bootstrap-t UCL	64.22
95% Hall's Bootstrap UCL	61.98
95% Percentile Bootstrap UCL	61.11
95% BCA Bootstrap UCL	62.06
95% Chebyshev(Mean, Sd) UCL	84.62
97.5% Chebyshev(Mean, Sd) UCL	101.3
99% Chebyshev(Mean, Sd) UCL	134

Data appear Lognormal (0.05)

May want to try Lognormal UCLs

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Number of Valid Observations	18	Number of Distinct Observations	17
Number of Missing Values	1		

Raw Statistics

Minimum	11
Maximum	130
Mean	46.11
Median	31.5
SD	37.48
Coefficient of Variation	0.813
Skewness	1.146

Log-transformed Statistics

Minimum of Log Data	2.398
Maximum of Log Data	4.868
Mean of log Data	3.536
SD of log Data	0.783

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.817
Shapiro Wilk Critical Value	0.897

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.897

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	61.48

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	63.19
95% Modified-t UCL (Johnson-1978)	61.88

Assuming Lognormal Distribution

95% H-UCL	72.78
95% Chebyshev (MVUE) UCL	85.2
97.5% Chebyshev (MVUE) UCL	102.3
99% Chebyshev (MVUE) UCL	135.9

Gamma Distribution Test

k star (bias corrected)	1.573
Theta Star	29.32
MLE of Mean	46.11
MLE of Standard Deviation	36.77
nu star	56.62
Approximate Chi Square Value (.05)	40.33
Adjusted Level of Significance	0.0357
Adjusted Chi Square Value	39.01
Anderson-Darling Test Statistic	0.799
Anderson-Darling 5% Critical Value	0.754
Kolmogorov-Smirnov Test Statistic	0.209
Kolmogorov-Smirnov 5% Critical Value	0.207

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Data Distribution

Data appear Lognormal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	60.64
95% Jackknife UCL	61.48
95% Standard Bootstrap UCL	60.56
95% Bootstrap-t UCL	65.79
95% Hall's Bootstrap UCL	61.72
95% Percentile Bootstrap UCL	60.89
95% BCA Bootstrap UCL	63.22
95% Chebyshev(Mean, Sd) UCL	84.62
97.5% Chebyshev(Mean, Sd) UCL	101.3
99% Chebyshev(Mean, Sd) UCL	134

95% Approximate Gamma UCL	64.74
95% Adjusted Gamma UCL	66.93

Potential UCL to Use	Use 95% H-UCL 72.78

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.