REPORT OF
AERIALLY-DEPOSITED LEAD INVESTIGATION
SR-210 PEPPER AVENUE INTERCHANGE
SAN BERNARDINO COUNTY
CITY OF RIALTO, CALIFORNIA
EA#44394

Prepared for:

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GDC Project No. IE-219
July 23, 2012

GROUP DELTA CONSULTANTS

Geotechnical Engineering

Geology

Hydrogeology

Earthquake Engineering

Materials Testing & Inspection

Forensic Services

July 23, 2012

Civil Works Engineers, Inc.
3151 Airway Avenue, Suite T-1
Costa Mesa, CA 92626

Attention: Marie Marston

Subject: **Report of Aerially Deposited Lead Investigation**
State Route 210 Pepper Avenue Interchange
San Bernardino County
City of Rialto, California
Group Delta Project No. IE-219
EA#44394

Dear Marie:

Group Delta Consultants, Inc. (Group Delta) is pleased to submit this report of our Aerially-Deposited Lead (ADL) Investigation for State Route 210 (SR-210) Pepper Avenue Interchange, in the City of Rialto, San Bernardino County, California.

This report discusses the purpose and scope of work, execution of work, conclusions, and findings for the project alignment. This report is intended for the sole use of Civil Works Engineers, Inc. and its client and Caltrans only. Our services have been performed under mutually agreed-upon terms and conditions. If other parties wish to rely on this report, please have them contact us so that a mutual understanding and agreement of the terms and conditions for our services can be established prior to their use and reliance of this report and the information it contains.

We appreciate your selection of Group Delta for this project and look forward to assisting you further on this and other projects. If you have any questions, please do not hesitate to contact us.

Sincerely,
GROUP DELTA CONSULTANTS, INC.

Vesna Glisic Petrilla, P.E.
Project Engineer

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1.0 EXECUTIVE SUMMARY

Pursuant to Caltrans requirements and as described in our Work Plan dated March 21, 2012, reviewed and approved by Caltrans, Group Delta Consultants (Group Delta) has performed an Aerially-Deposited Lead (ADL) investigation at specified locations where project grading is proposed along the portion of a new road construction.

The project involves construction of a new State Route 210 (SR-210)/ Pepper Avenue interchange including construction of on-ramps and off-ramps, and construction of a portion of Pepper Avenue in the City of Rialto, San Bernardino County, California (Figures 1 and 2a,b). The lead project agencies are San Bernardino Associated Governments (SANBAG) in coordination with California Department of Transportation (Caltrans).

The objective of the investigation was to evaluate soil for the presence of ADL due to the historical use of leaded fuels by roadway traffic. The information obtained from the limited soil sampling-and laboratory testing is to inform Civil Works Engineers, Inc. (CWE) and its clients of potential health and safety issues for workers at the site during the project construction and to allow separation of non-hazardous soil from potentially hazardous soil and reduce disposal costs during construction.

Caltrans ADL guidance document, based on the California Department of Toxic Substances Control (DTSC) variances for reuse of soil impacted with ADL, was used as a guiding document. The testing frequency and methods satisfy Caltrans requirements dated June, 2007.

A total of 24 samples were collected from 8 project boring locations within the area of the future soil disturbance as identified in Table 1. Sample boring locations are shown in Figure 3. The samples were collected at depths of 0 to 0.5 feet, 1.0 to 2.0 feet, and 2.0 to 3.0 feet. Two (2) Quality Assurance/Quality Control (QA/QC) samples were also collected.

All twenty six (26) samples were analyzed for total lead and pH. Total lead concentrations ranged from non-detect to 132 mg/Kg and 32 mg/Kg recorded only in one sample and its QA/QC sample, respectively. Lead concentrations in the rest of the samples did not exceed 14.9 mg/Kg. Samples with highest concentrations of lead were tested for Soluble Threshold Concentration Level (STLC) using Waste Extraction Test methods with deionized water (WET-DI). One (1) sample with total lead concentration of 132 mg/Kg was analyzed for WET with citric acid. No samples were

tested for Toxicity Characteristic Leaching Procedure (TCLP) due to generally low concentrations of total lead, as it was not expected that the TCLP test would show any detectable values.

The total lead data were analyzed using the EPA ProUCL version 4.1.01 program for data analysis. The sample results for total lead were analyzed statistically. The data is normally and gamma distributed and the recommended 95% adjusted Student's-t Upper Confidence Limit (UCL) of 8.96 mg/Kg is calculated. Summary of the statistical calculations using full data set are summarized in Table 2. Caltrans ADL Soil Management Flow Chart is presented in Table 3.

The one sample with total lead concentration of 132 mg/Kg (HA-12-001 at 0.5 feet) was considered an outlier and was not included in the statistical analysis. WET citric result for this sample was 9.73mg/L. This is the only sample considered impacted with lead. Estimated impacted area is within a radius of 10 ft from HA-12-001.

Five (5) randomly selected samples were tested for pH, which includes two QA/QC samples. Soil pH ranges between 8.27 and 8.89.

The laboratory results are summarized in Table 1. Log of hand auger borings is presented in Appendix A and the report of laboratory analyses are presented in Appendix B.

Based on the test results following are our findings and recommendations:

- The upper 1 ft of soil located within a radius of 10 ft of boring HA-12-001 is considered California Hazardous Waste Caltrans soil type Z2, and should be disposed off-site by the contractor prior to start of the grading activities.

- The rest of the Site soil is non-hazardous and can be used without restrictions.

2.0 INTRODUCTION

2.1 Project Description

The San Bernardino Associated Governments (SANBAG), in coordination with the California Department of Transportation (Caltrans) and the City of Rialto, is proposing to construct the new interchange along State Route 210 (SR-210) at Pepper Avenue. Preliminary engineering for the project was previously completed, and final design was initiated under the SR-210 freeway extension project. In mid-2003, this interchange was removed from the SR-210 freeway extension project since the construction of Pepper Avenue to SR-210 (which is a separate local project by the City) was not completed. As part of the SR-210 freeway extension project, grading occurred and right-of- way was preserved for a future diamond configuration interchange at SR-210/Pepper Avenue. Pepper Avenue is currently being extended south of the project limits under a separate project led by City of Rialto. The City's extension project will extend Pepper Avenue from this point up to the south side of the existing SR-210 right-of-way, which is located approximately 680 feet south of SR-210 along the proposed Pepper Avenue alignment.

The purpose of the proposed SR-210/Pepper Avenue Interchange project is to:

- provide improved regional connectivity to the local transportation network;
- provide improved connectivity between SR-210 and Interstate 10 (I-10); and
- provide interchange improvements that are consistent with existing local planning documents.

For the proposed project, a Build Alternative and a No-Build Alternative are being considered.

2.1.1 Build Alternative

The proposed Build Alternative would construct a new tight diamond interchange along SR-210 at Pepper Avenue. The project would provide a freeway access ramp at the four quadrants of the interchange. The eastbound and westbound off-ramps would widen from one lane where the ramps diverge from SR-210 to two lanes at the intersection with Pepper Avenue where a left turn lane and a dedicated right turn lane would be provided. The eastbound and westbound on-ramps would each include two lanes at the intersection with Pepper Avenue and would taper to one lane prior to merging onto SR-210.

At the ramp intersections with Pepper Avenue, traffic signals would be installed. A traffic signal would also be installed at the Pepper Avenue/Highland Avenue intersection.

Pepper Avenue would be constructed from Highland Avenue to just south of the intersection of Pepper Avenue and the eastbound ramps; a distance of approximately

850 feet. This portion of Pepper Avenue would consist of two 12-foot through lanes in each direction with an 8-foot shoulder, curb and gutter, a 6.5-foot parkway, and a 5-foot side walk on both sides of the roadway (i.e., northbound and southbound), except under the bridge where we will have no parkway. A dedicated 12-foot left turn lane from northbound Pepper Avenue to the westbound on-ramp and from southbound Pepper Avenue to the eastbound on-ramp would also be constructed. The south end of the interchange project would taper to match the Pepper Avenue Extension that is currently being undertaken by the City.

Utilities would be adjusted or relocated, as needed, to accommodate the new interchange. Best Management Practice (BMP) features that would include modifications to the existing, or the installation of new, water quality control features, would also be included as part of the project. To the fullest extent practicable, BMPs would be designed to convey both stormwater quantity flows and peak flows.

The proposed project improvements are shown on Figures 2a, b.

2.1.2 No-Build Alternative

Under the No-Build Alternative, no interchange would be constructed along SR-210 at Pepper Avenue. This alternative, however, does not preclude the construction of future improvements.

2.2 ADL INVESTIGATION OBJECTIVES

The objective of the investigation is to evaluate soil for the presence of ADL in unpaved areas along the roadway. Highland Avenue has been used as a road since 1901 or earlier. It is assumed that ADL impact, if any, will be limited to the near-surface of the unpaved areas.

The information obtained from the limited soil sampling-and laboratory testing is to inform CWE of potential health and safety issues for workers at the site during the project construction or landscaping activities and to allow separation of non-hazardous soil from potentially hazardous soil and reduce disposal costs during construction.

Caltrans standard approach to managing ADL impacted soils utilizes the California Department of Toxic Substances Control (DTSC) variance. Variance allows for soil with lead levels that trigger California Hazardous Waste criteria to be re-used within Caltrans projects under the conditions of the variance. The provisions of this variance are considered when making the recommendations in this report. A DTSC ADL impacted soils management flow chart based on the DTSC variance is presented in Table 3.

2.3 SCOPE OF WORK

GDC's scope of work consisted of pre-field activities, limited soil sampling, statistical analysis and report preparation.

2.3.1 Pre-Field Activities

Pre-field activities consisted of following:

- Preparation of a work plan and review our in-house Health and Safety Plan for the proposed activities. The work plan was reviewed and approved by Caltrans on March 21, 2012 prior to start of the work. The Health and Safety Plan included guidelines for the use of personal protective equipment for GDC employees during the field activities where such use may be required.

- Obtaining the site encroachment permit on March 13, 2012.

- Marking the boring locations and contacting Underground Service Alert (USA) to notify utility companies of the field activities. GDC was provided with USA Ticket Numbers for the investigation area.

2.3.2 Limited Sampling

Twenty four (24) soil samples were collected from 8 boring locations (HA-12-001 to HA-12-008) on May 24, 2012 in accordance with Caltrans Aerially Deposited Lead Guidance (June 2007). Two (2) duplicate samples were collected as part of the Quality Assurance /Quality Control (QA/QC) program. Pepper Avenue is unpaved except for the about 60 ft of asphalt paved section located west of and connecting to Highland Avenue. The borings are located within the approximately 20 ft wide zone to the east, west and south of the paved portion of Pepper Avenue; these areas are cleared of vegetation. No borings were placed in the far eastern area of the Pepper Avenue widening, as it was covered with tall grass and bushes, and was inaccessible.

A 4-ft tall, 4-ft wide and over 20 feet long pile of soil mixed with construction debris is placed at the entrance of future Pepper Avenue along East Highland Avenue, preventing vehicular traffic into the future area for Pepper Avenue extension. Based on the information provided to us by the Caltrans encroachment permit inspector Ray Behbahani, The City of Rialto placed this pile of soil to prevent illegal dumping along the Pepper Avenue alignment. No ADL sampling could be performed within the first 5 ft of Highland Avenue due to the presence of the stockpile.

Boring locations were located using a measuring wheel and distances were noted relative to Highland Avenue or existing landmarks near the road. The measured boring locations are shown in Figure 3.

Soil samples were collected at depths of 0 to 0.5 feet, 1.0 to 2.0 feet, and 2.0 to 3.0 feet below ground surface (bgs) within the zone of the future soil disturbance. The borings were backfilled with soil cuttings generated during the drilling and sampling activities.

2.3.3 Laboratory Analyses

GDC submitted samples to a State of California Department of Health Services certified hazardous waste testing laboratory, American Environmental Testing Laboratory, Inc. (AETL) of Burbank, California for analysis. Analytical tests to support reuse under a DTSC variance and to support disposal of excess material were performed in accordance with Caltrans Aerially Deposited Lead Guidance (2007) as described below:

- Total Lead: All twenty four (24) samples and two (2) QA/QC samples were analyzed for total lead using United States Environmental Protection Agency (USEPA) Method 6010B.

- One (1) sample was tested for WET-Citric test.

- Seven (7) samples were tested for WET-DI test.

- pH: Five (5) randomly selected samples (including QA/QC samples) were analyzed for pH using USEPA Method 9045.

Generally, analytical testing suite required to support reuse of soil under the DTSC variance requires that all soil samples be tested for total lead. Any soil sample exceeding 50 mg/Kg of total lead should be analyzed for Soluble Threshold Limit Concentration (STLC) by California Waste Extraction Test (Cal-WET) using citric acid. Samples exceeding 5 mg/L by WET-citrate or 1,000 mg/Kg of total lead should be tested for Toxicity Characteristic Leaching Procedure (TCLP). If testing shows that DTSC variance is applicable, and soil pH is less than 5, soil can be used as fill only under paved portion of the project.

No samples were tested for Toxicity Characteristic Leaching Procedure (TCLP) due to generally low concentrations of total lead and non-detect WET-DI concentrations. It was not expected that the TCLP test would show any detectable values, therefore it was not performed.

2.3.4 Report Preparation

This report summarizing the field activities and laboratory results was prepared in accordance with work scope requirements.

2.3.5 Previous Site Investigations

GDC is not aware of information concerning other environmental site investigations performed in the area or its vicinity. So, the results of this investigation are the basis for the recommendations made in this report.

3.0 INVESTIGATIVE METHODS

3.1 SITE CONDITIONS

The soils encountered at the site are native soils consisting primarily of silty sands with gravel and cobbles. The groundwater table was not encountered in any of the borings.

3.2 FIELD METHODS

The field methods used by GDC to complete this work were consistent with the requirements of Caltrans for soil investigation. The field procedures are described below.

3.2.1 Procedures for Soil Sampling

Sampling procedure was as follows:

- Boring was advanced to the first sampling depth using a hand-held 3-inch diameter stainless steel auger;
- A sample was collected at the specified depth by rotating the hand auger until sample entered the tube, than transferred the sample from the tube of the hand-auger directly into a sealable 4-ounce glass jar;
- The sampling equipment was cleaned and rinsed after each sample was collected, and between boring locations by washing with a solution of Tri Sodium Phosphate (TSP) substitute followed by deionized water rinses;
- Record samples on chain-of-custody forms to document their tracking and custody;
- Jar samples were placed on ice in an ice chest and delivered to the project state-certified chemical testing laboratory (AETL), under chain-of-custody documentation.

3.2.2 Procedures for Field Documentation of Sampling Activities

The following paragraphs describe procedures for proper sampling documentation.

1. Sampling procedures were documented in field notes that contain the following information:

- Sample collection procedures,
- Date and time of collection,
- Sample collection location,

- Sample identification number(s),
- Name of collector, and
- Any pertinent observations.

2. Samples were labeled with the following information:

- Sample number, boring number,
- Date and time sample was collected,
- Name of collector, and
- Sample preservatives (if required).

3. Handling of the samples was recorded on a chain-of-custody form that includes the following information:

- Site name;
- Signature of collector;
- Date and time of collection;
- Sample identification number;
- Number of containers in sample set;
- Description of sample and container;
- Sample preservation,
- Names and signatures of persons, and the companies or agencies they represent who are involved in the chain of possession;
- Inclusive dates and times of possession; and
- Analyses to be completed.

Log of hand auger boring is presented in Appendix A. Chain of custody documents are included with laboratory results in Appendix B.

4.0 LABORATORY TESTING

4.1 ANALYTICAL RESULTS

A summary of the analytical results is presented as Table 1. A complete copy of the laboratory reports and chain-of-custody documentation is presented in Appendix B.

4.2 TOTAL LEAD

A total of 24 test samples using the USEPA Method 6010B were analyzed for total lead. In addition to 24 samples, 2 samples were analyzed for total lead as duplicates. Total lead concentrations generally range from below the laboratory detection limit of 2.5 mg/kg to 14.9 mg/Kg. Two (2) out of twenty six (26) samples were non-detects. A decontamination rinsate water sample was also collected and it did not contain a reportable concentration of lead. A lead concentration of 132 mg/Kg was encountered in HA-12-001 sample at 0-0.5 feet (see Table 1). This sample was considered an outlier and was not used for statistical analysis.

The relative percent difference (RPD) for the duplicate sample collected from HA-12-007 at 2.0-3.0 feet is 3 percent which is within the quality requirements for the analysis (30 percent). However, the RDP for the sample collected at HA-12-001 at 0-0.5 feet is greater than 30 percent and this result was not deemed suitable for reliable use on the project. In addition, as this sample shows lead concentrations several times higher than the rest of the samples it was considered an outlier, and was excluded from the statistical analysis.

The descriptive statistics for the total lead analyses are presented in Table 2.

4.3 SOLUBLE THRESHOLD LIMIT CONCENTRATION (STLC) LEAD BY WET (CITRATE, DI)

One (1) sample (HA-12-001 sample at 0-0.5 feet) was analyzed for STLC by WET-Citric. The result shows soluble lead concentration of 9.73 mg/L. Seven (7) samples were analyzed for STLC by WET-DI. No soluble lead results above the laboratory detection limits were reported for WET-DI.

4.4 TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)

None of the samples tested by the USEPA Method 6010B exceeded the limit of 1000 mg/Kg.

One (1) sample (HA-12-001 sample at 0-0.5 feet), with total lead concentration of 132 mg/Kg, was analyzed for STLC by WET-Citric. The result shows soluble lead

concentration of 9.73 mg/L. Based on our experience, although the STLC by citric was greater than 5mg/L, due to the relatively low total lead concentration it is unlikely that the TCLP test would show any detectable levels of lechate, and for this reason it was not performed.

4.5 PH RESULTS

A total of three (3) samples and two (2) QA/QC samples were analyzed for pH using USEPA Method 9045C. The analytical results ranged from 8.27 to 8.89 (see Table 1).

5.0 STATISTICAL DATA EVALUATION

The analytical results of the 24 soil samples collected from borings located along the project area were evaluated statistically. The statistical methods used are provided in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods found in chapter nine of SW-846, 3rd edition, USEPA, 1986 and in the Site Investigation (SI) protocols and ADL Guidance of Caltrans.

Statistical methods were applied to the total lead data set collected to evaluate if the total lead data is normally, lognormally or gamma distributed (by comparison of the mean and variance).

The total lead data were analyzed using the EPA ProUCL version 4.1.01 program for data analysis. Data for all lead analyses were used and where the total lead was reported to be not detected, it was assumed present at one-half the reporting limit. This assumption is consistent with EPA recommendations for these analyses. Data identified as outliers were removed from the sample results prior to conducting the statistical analyses. ProUCL reported the sample HA-12-001 (0 to 0.5 ft) as a potential outlier.

A summary of the Upper Confidence Limit (UCL) calculations using all of the methods of the program are presented in Table 2. The data appear to be gamma and normally distributed at 5% significance level. The 95% Student's-t UCL of 8.96 mg/kg is recommended to be used.

The histogram for total lead and the distribution plots are provided on Figures 4a through 4d.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The objective of the investigation was to evaluate soil for the presence of aerially-deposited lead due to the historical use of leaded fuels by freeway traffic in the unpaved surface soils of the project area. The information obtained from the limited soil sampling and laboratory testing is to inform the client of potential health and safety issues for workers at the site during project construction or landscaping activities and to allow the separation of non-hazardous soil from potentially hazardous soil and reduce disposal costs. Soil samples collected from the site were analyzed for total lead and pH.

Our findings and recommendations are as follows:

- The sample HA-12-001 (0 to 0.5 ft), with total lead concentration of 132 mg/Kg was considered an outlier, as the only sample with total lead result higher than 14.9 mg/Kg. For this reason, this sample result was not included in the statistical analysis. Wet-citric test result for this sample shows soluble lead level of 9.73mg/L. It is not expected that TCLP test would show values of leachate higher than 5mg/L, therefore this soil sample is not considered Resource Conservation and Recovery Act (RCRA) waste. However, according to the Caltrans ADL Soil Management Chart presented in Table 3, this soil is considered California Hazardous Waste. Soil below 1 ft at the HA-12-001 boring location is not impacted with lead. The closest boring HA-12-003 (See Figure 3) is located within 20 feet from HA-12-001 and shows low total lead values, as well as the rest of the borings performed for this analysis. Based on the distance to the nearby borings with no or low detectable lead levels, the area of influence is estimated to 1/2 the distance between the boring HA-12-001 and the nearest borings with low lead concentrations. Based on this, it is estimated that the upper 1 foot of soil located within a 10 ft radius of the HA-12-001 may be impacted with lead, and should be disposed off-site by the contractor as California Hazardous Waste prior to start of grading. Assuming the 300 ft2 impacted area and soil unit weight of 120 pcf, the estimated cost of soil disposal is $3,600. Optionally, additional field investigation can be preformed to closer delineate the area of impacted soil, however it is not deemed cost effective.

- The rest of the Site soil is non-hazardous and may be used without restrictions.

7.0 QUALIFICATIONS{TC "10.0 QUALIFICATIONS"}

The findings and opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at substantially later dates. The opinions included herein are based on information obtained during the study and our experience. If additional information becomes available which might impact our environmental findings, we request the opportunity to review the information, reassess the potential concerns, and modify our opinions, if warranted.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar conditions, by reputable environmental consultants practicing in this or similar localities. No other warranty, expressed or implied, is made regarding the professional information in this report.

8.0 REFERENCES

Caltrans, "ADL Lead Testing Guidance", June 2007.

ProUCL 4.1.01 (2011), *Statistical Software for Environmental Applications For Data Sets with and without Nondetect Observations*, National Exposure Research Lab, EPA, Las Vegas, Nevada, 2011.

TABLES

Table 1
Laboratory Test Results

Sampling Location [1]	Sample Depth (feet bgs)	Total Lead (mg/Kg) [2,3]	STLC (WET DI) (mg/L)	STLC (WET Citric) (mg/L)	TCLP (mg/L)	pH	Notes
HA-12-001	0-0.5	132	ND<0.05	9.73	Not Needed	8.27	
	0.0.5	33.2		-		8.46	QA/QC Duplicate Sample
	1.0-2.0	8.98	ND<0.05	-		-	
	2.0-3.0	13.1	-	-		-	
HA-12-002	0.0.5	5.96	-	-		-	
	1.0-2.0	5.44	-	-		-	
	2.0-3.0	13.2	-	-		-	
HA-12-003	0.0.5	7.94	-	-		-	
	1.0-2.0	9.21	ND<0.05	-		8.75	
	2.0-3.0	6.75	-	-		-	
HA-12-004	0.0.5	4.78J	-	-		-	
	1.0-2.0	2.91J	-	-		-	
	2.0-3.0	5.29	-	-		-	
HA-12-005	0.0.5	13.6	ND<0.05	-		-	
	1.0-2.0	ND<2.5	-	-		-	
	2.0-3.0	ND<2.5	-	-		-	
HA-12-006	0.0.5	13.5	ND<0.05	-		-	
	1.0-2.0	5.96	-	-		-	
	2.0-3.0	5.52	-	-		-	
HA-12-007	0.0.5	7.20	-	-		-	
	1.0-2.0	14.9	ND<0.05	-		-	
	2.0-3.0	3.68J	-	-		8.89	
	2.0-3.0	3.57J	-	-		8.88	QA/QC Duplicate Sample
HA-12-008	0.0.5	7.67	-	-		-	
	1.0-2.0	10.3	ND<0.05	-		-	
	2.0-3.0	4.76J	-	-		-	
Rinseate	-	ND<2.5	-	-	-	-	Hand Auger Rinseate Sample

Notes:

(1) Hand Auger Boring Locations are Presented in Figure 2

(2) "ND<X" = Constituents Not Detected at or above the method detection limit (MDL) "X"

(3) "J" indicates analyte was detected, however, analyte concentration is an estimated value which is between the method detection limit (MDL) and the practical quantitation limit (PQL).

Table 2
General UCL Statistics for Full Data Sets

User Selected Options	
From File	N:\Projects_IE\200\IE-219 SR-210 Pepper Geo-Enviro, Rialto\ADL\Analysis\Analysis.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operatio	2000

All

General Statistics			
Number of Valid Observations	23	Number of Distinct Observations	21

Raw Statistics		Log-transformed Statistics	
Minimum	1.25	Minimum of Log Data	0.223
Maximum	14.9	Maximum of Log Data	2.701
Mean	7.528	Mean of log Data	1.843
Geometric Mean	6.315	SD of log Data	0.673
Median	6.75		
SD	4.001		
Std. Error of Mean	0.834		
Coefficient of Variation	0.531		
Skewness	0.383		

Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.961	95% H-UCL	10.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.94
95% Adjusted-CLT UCL (Chen-1995)	8.972	97.5% Chebyshev (MVUE) UCL	15.16
95% Modified-t UCL (Johnson-1978)	8.972	99% Chebyshev (MVUE) UCL	19.5

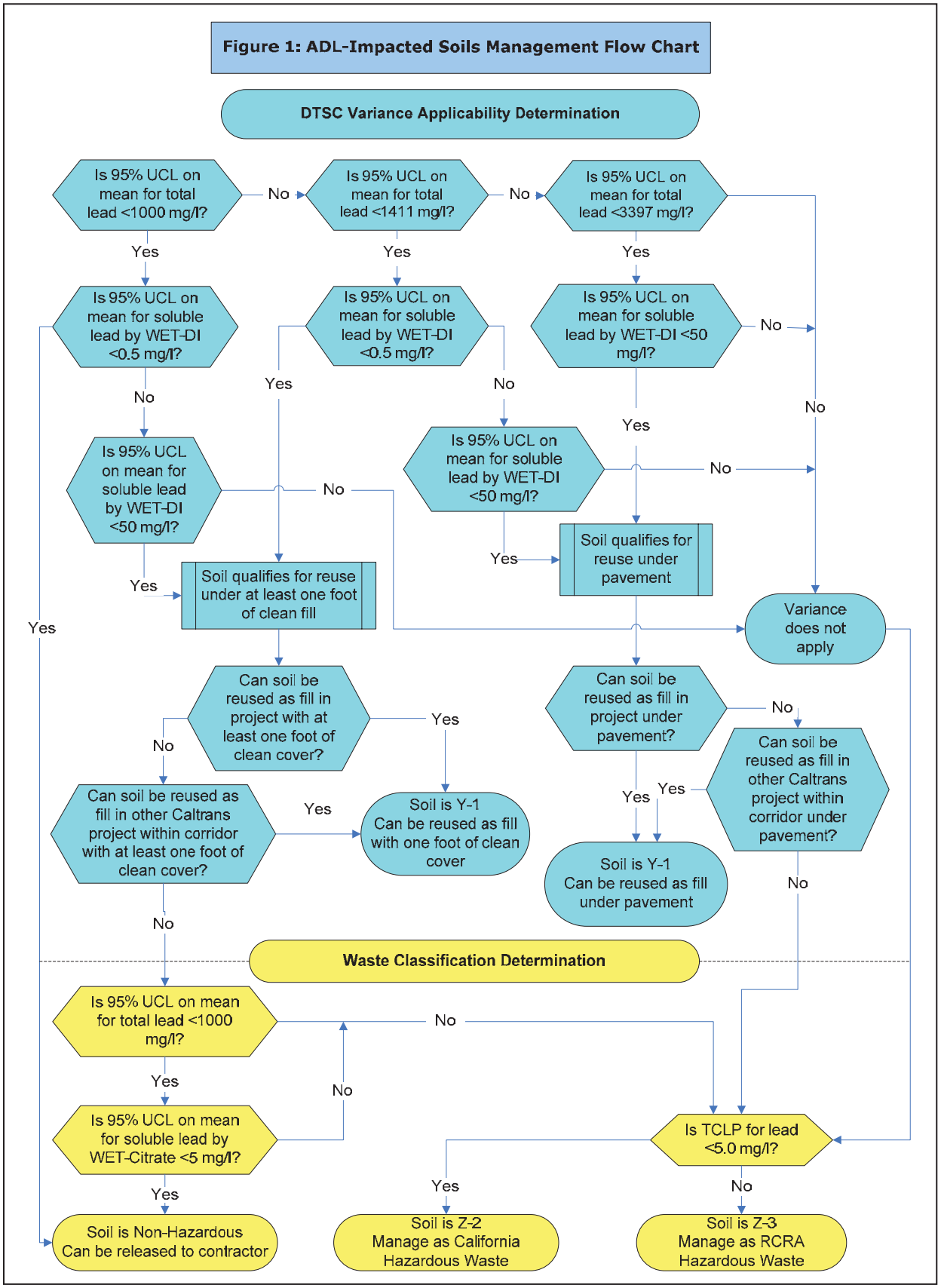
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.639	Data appear Normal at 5% Significance Level	
Theta Star	2.853		
MLE of Mean	7.528		
MLE of Standard Deviation	4.634		
nu star	121.4		
Approximate Chi Square Value (.05)	96.95	Nonparametric Statistics	
Adjusted Level of Significance	0.0389	95% CLT UCL	8.9
Adjusted Chi Square Value	95.37	95% Jackknife UCL	8.961
		95% Standard Bootstrap UCL	8.862
Anderson-Darling Test Statistic	0.4	95% Bootstrap-t UCL	9.162
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	8.975
Kolmogorov-Smirnov Test Statistic	0.121	95% Percentile Bootstrap UCL	8.837
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	8.978
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.16
		97.5% Chebyshev(Mean, Sd) UCL	12.74
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.83
95% Approximate Gamma UCL (Use when n >= 40	9.426		
95% Adjusted Gamma UCL (Use when n < 40)	9.583		

Potential UCL to Use		Use 95% Student's-t UCL	8.961

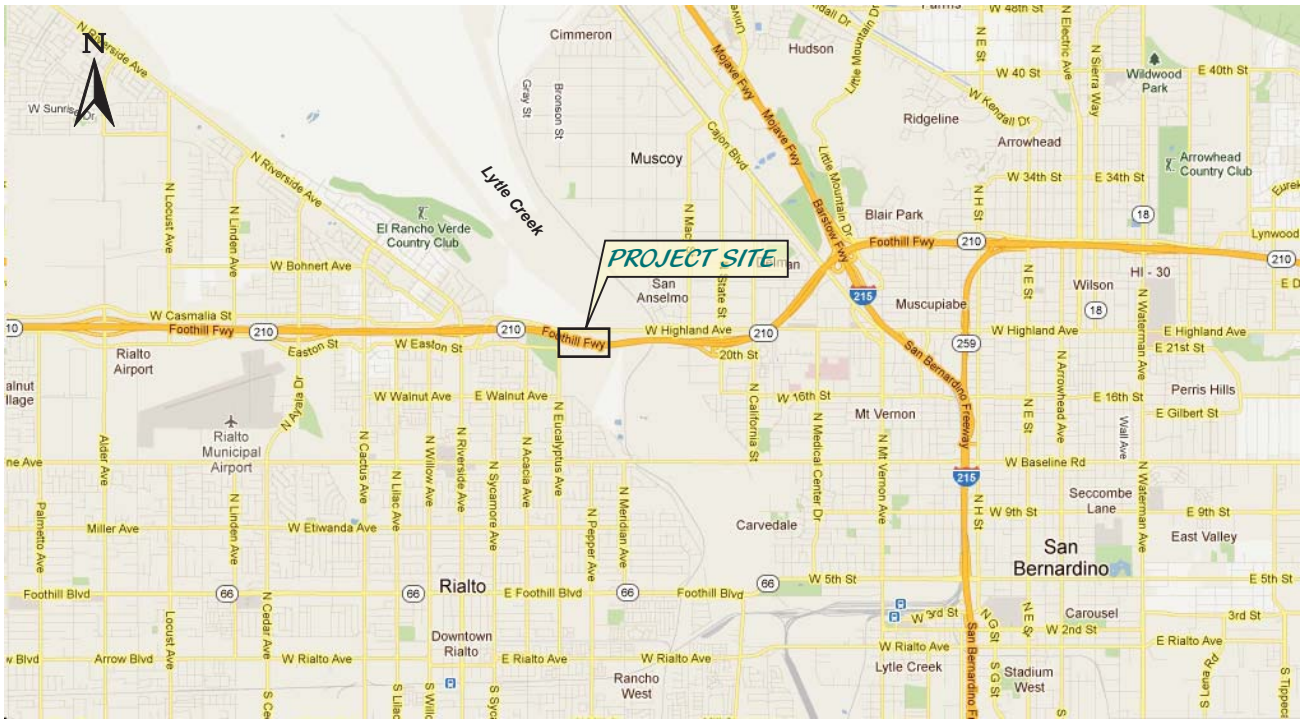
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user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

TABLE 3:
CALTRANS ADL SOIL MANAGEMENT FLOW CHART

June 2007

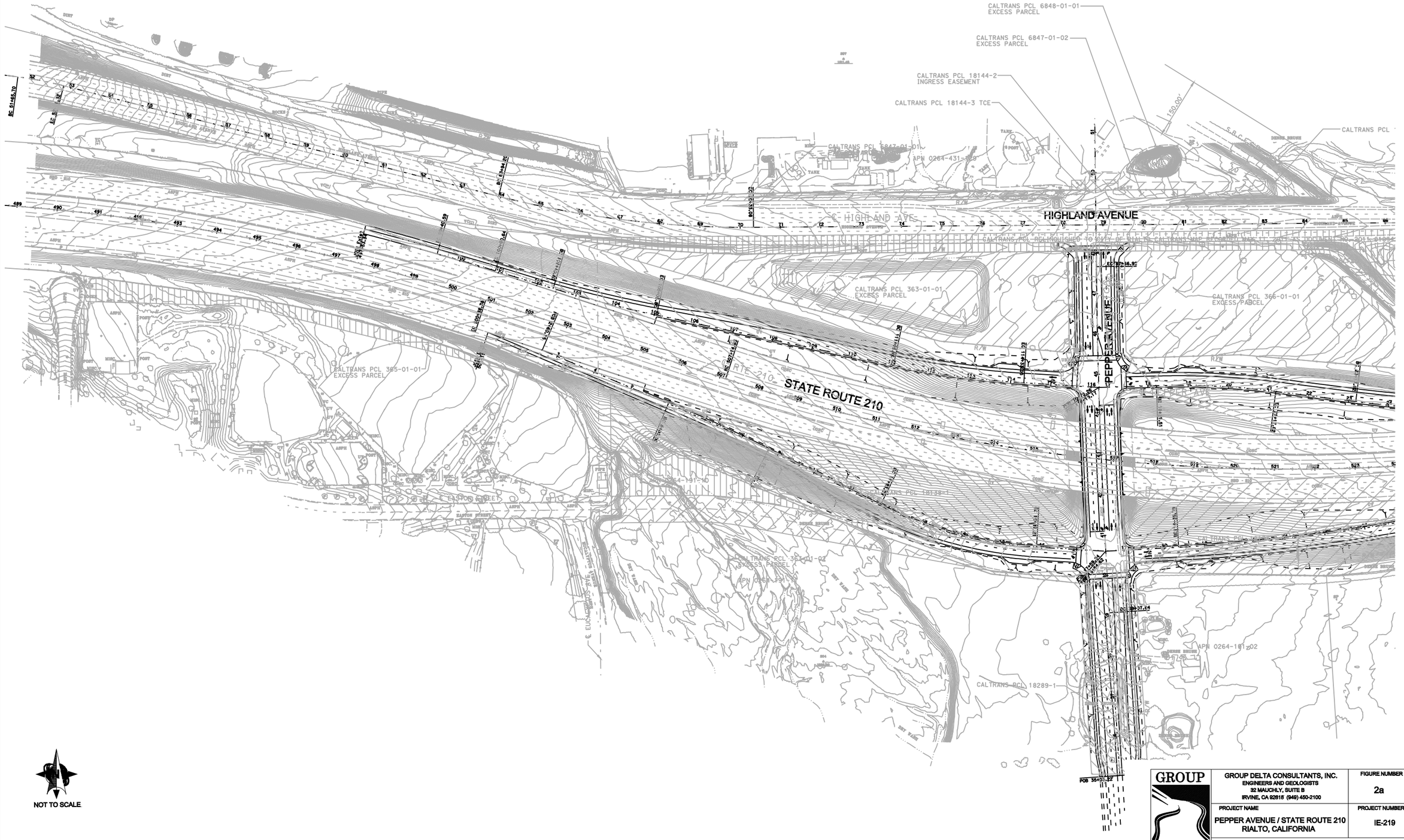


FIGURES



The base maps/photos are from Google Maps

GROUP DELTA CONSULTANTS	**GROUP DELTA CONSULTANTS, INC.** ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE, CA 92618 (949) 450-2100	FIGURE NUMBER **1**
	PROJECT NAME SR210/PEPPER AVENUE RIALTO, CALIFORNIA	PROJECT NUMBER IE-219
	VICINITY MAP	



NOT TO SCALE

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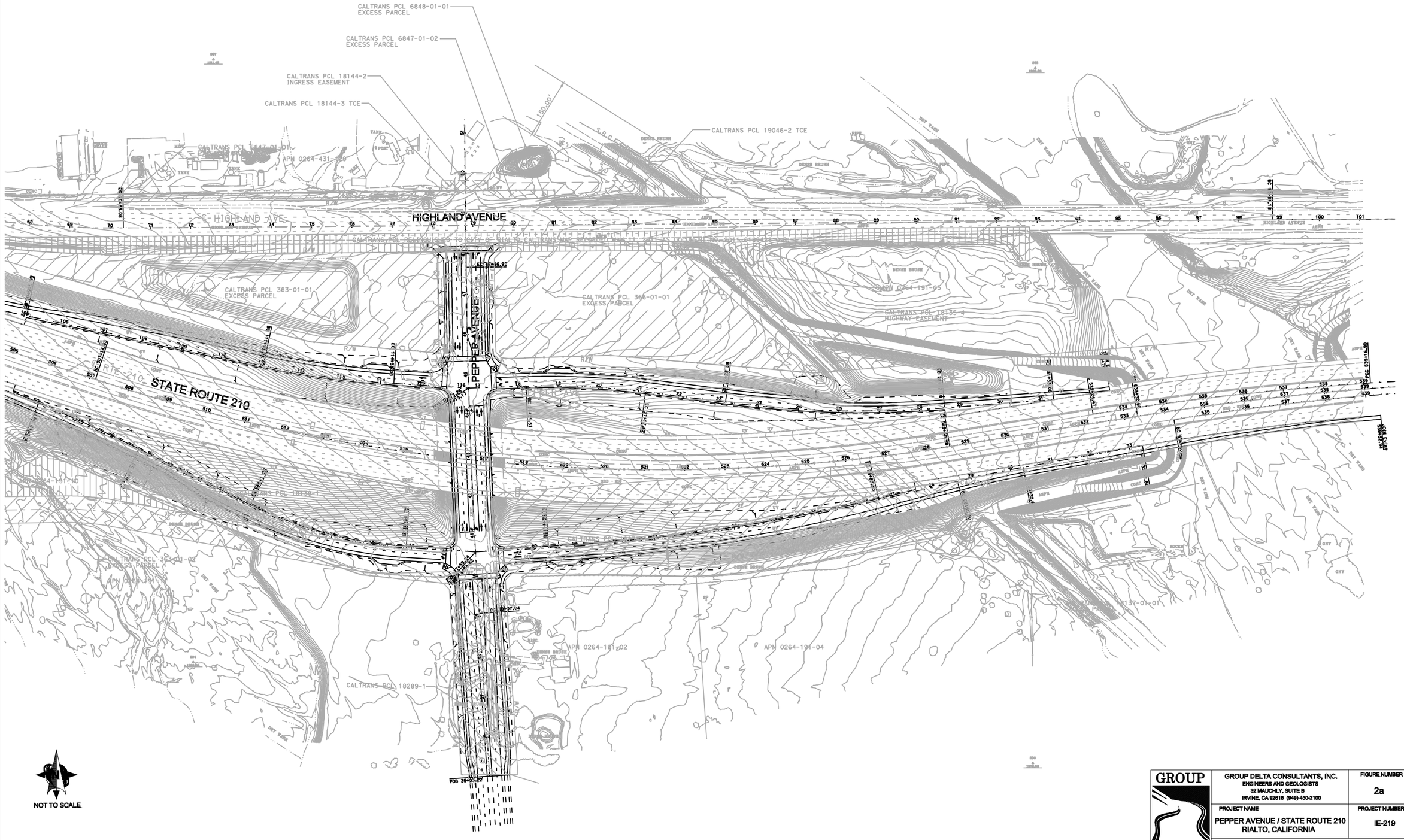
IRVINE, CA 92618 (949) 450-2100

FIGURE NUMBER
2a

PROJECT NAME
PEPPER AVENUE / STATE ROUTE 210
RIALTO, CALIFORNIA

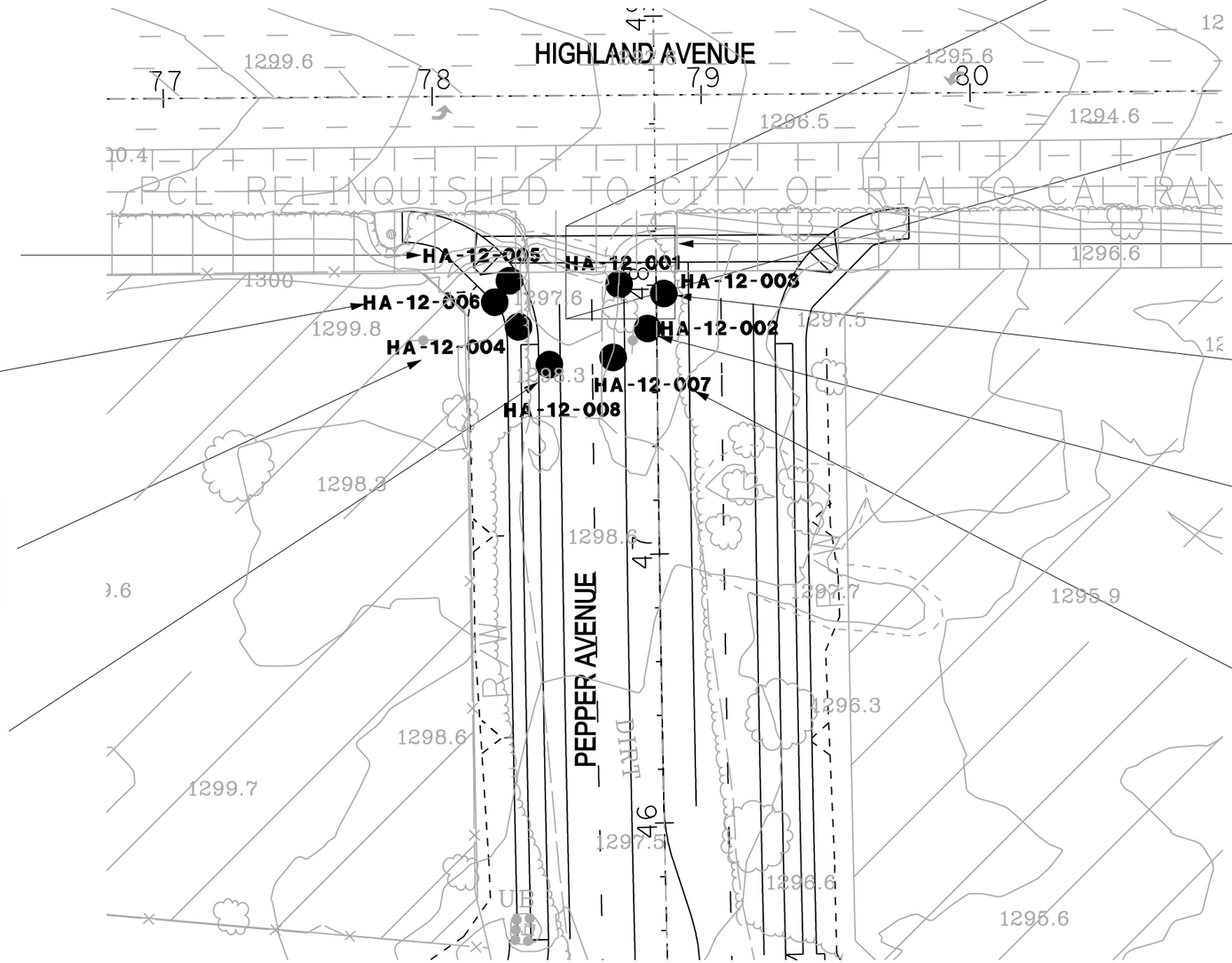
PROJECT NUMBER
IE-219

SITE IMPROVEMENTS PLAN



NOT TO SCALE

GROUP DELTA CONSULTANTS	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE, CA 92618 (949) 450-2100	FIGURE NUMBER 2a
	PROJECT NAME PEPPER AVENUE / STATE ROUTE 210 RIALTO, CALIFORNIA	PROJECT NUMBER IE-219
	SITE IMPROVEMENTS PLAN	



HA-12-005

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	13.6
1 - 2	ND<2.5
2 - 3	ND<2.5

HA-12-006

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	13.5
1 - 2	5.96
2 - 3	5.52

HA-12-004

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	4.78J
1 - 2	2.91J
2 - 3	5.29

HA-12-008

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	7.67
1 - 2	10.3
2 - 3	4.76J

HA-12-001

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	132
1 - 2	8.98
2 - 3	13.1

HA-12-003

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	7.94
1 - 2	9.21
2 - 3	6.75

HA-12-002

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	5.96
1 - 2	5.44
2 - 3	13.2

HA-12-007

DEPTH (ft)	TOTAL LEAD (mg/Kg)
0 - 5	7.20
1 - 2	14.9
2 - 3	3.68J

NOT TO SCALE

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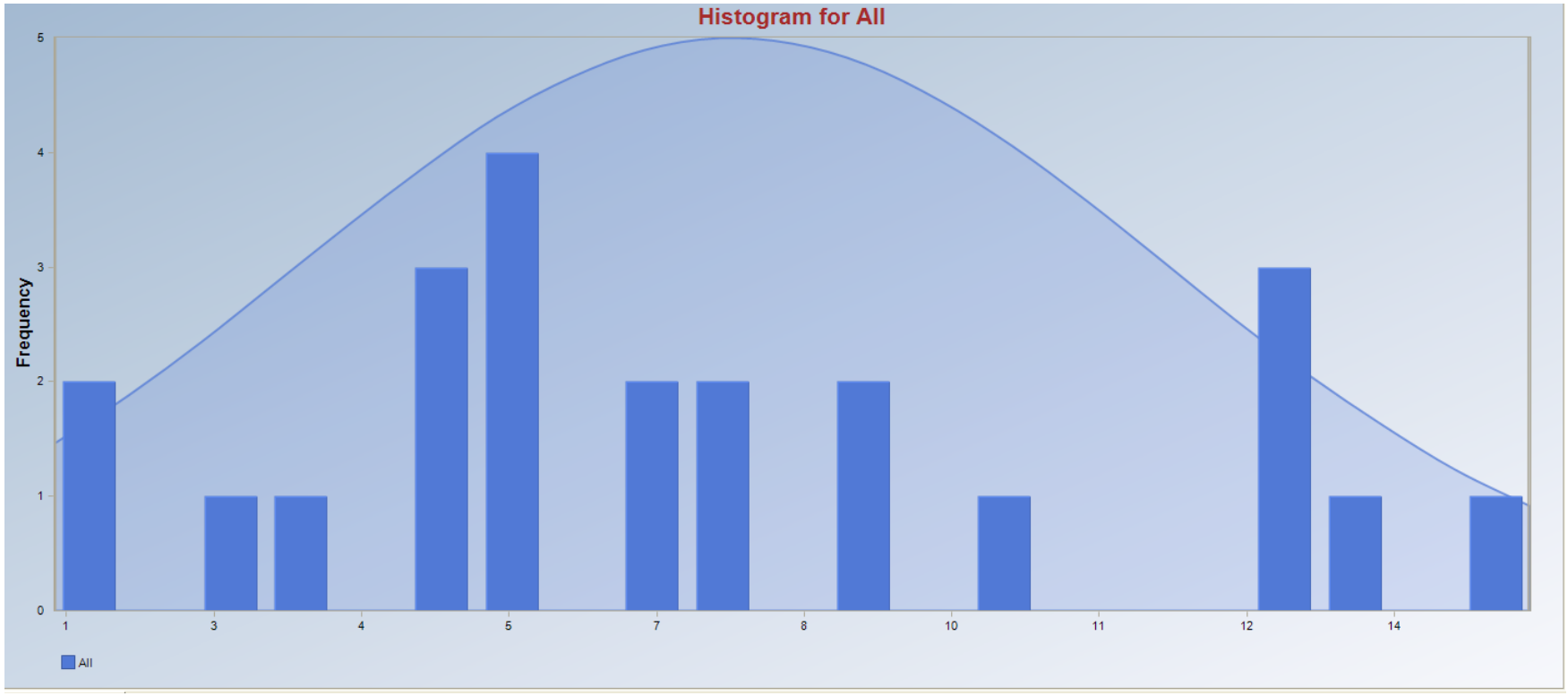
IRVINE, CA 92618 (949) 450-2100

FIGURE NUMBER 3

PROJECT NAME
PEPPER AVENUE / STATE ROUTE 210
RIALTO, CALIFORNIA

PROJECT NUMBER IE-219

BORING LOCATION PLAN

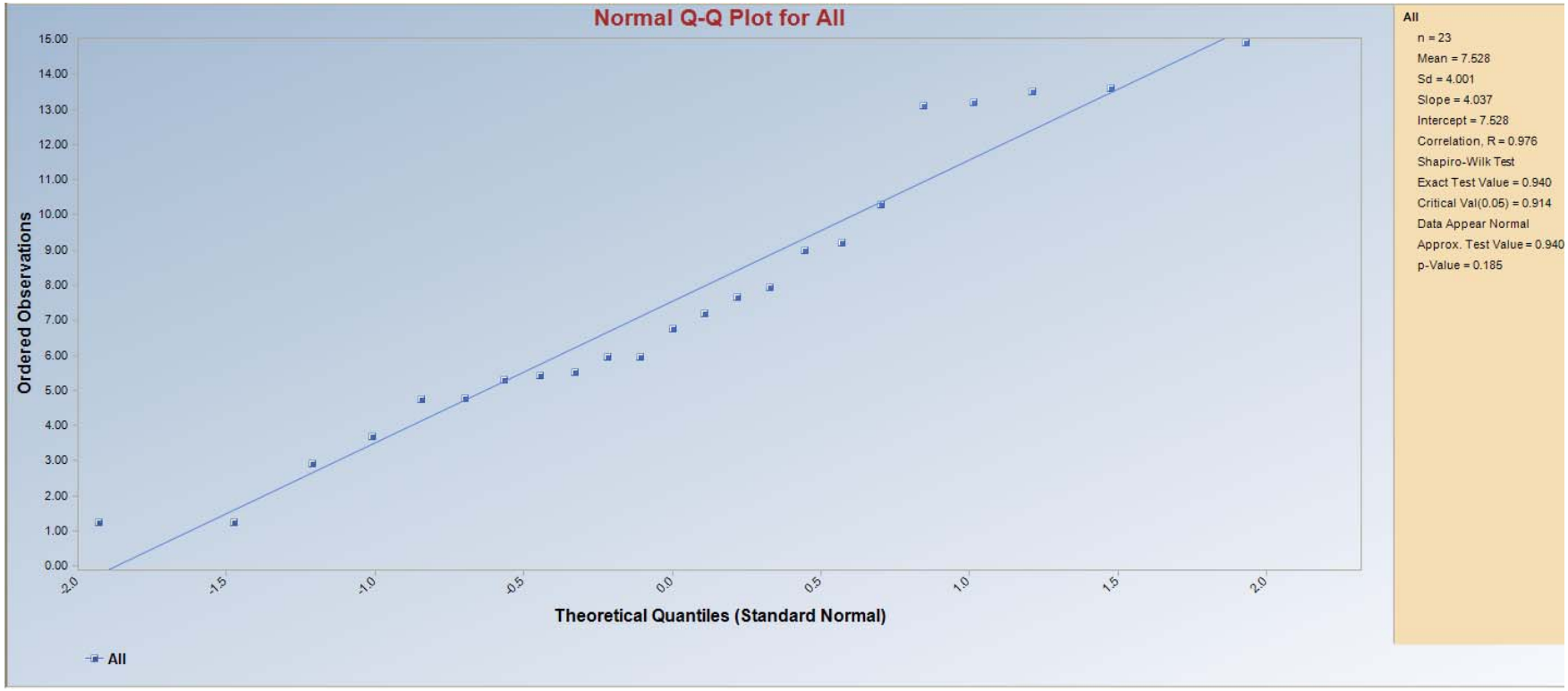


Note: This plot was created using the EPA ProUCL program Version 4.1.01

GDC Project Number IE-219

SR-210/Pepper Avenue Project
Total Lead Histogram Plot

Figure 4a

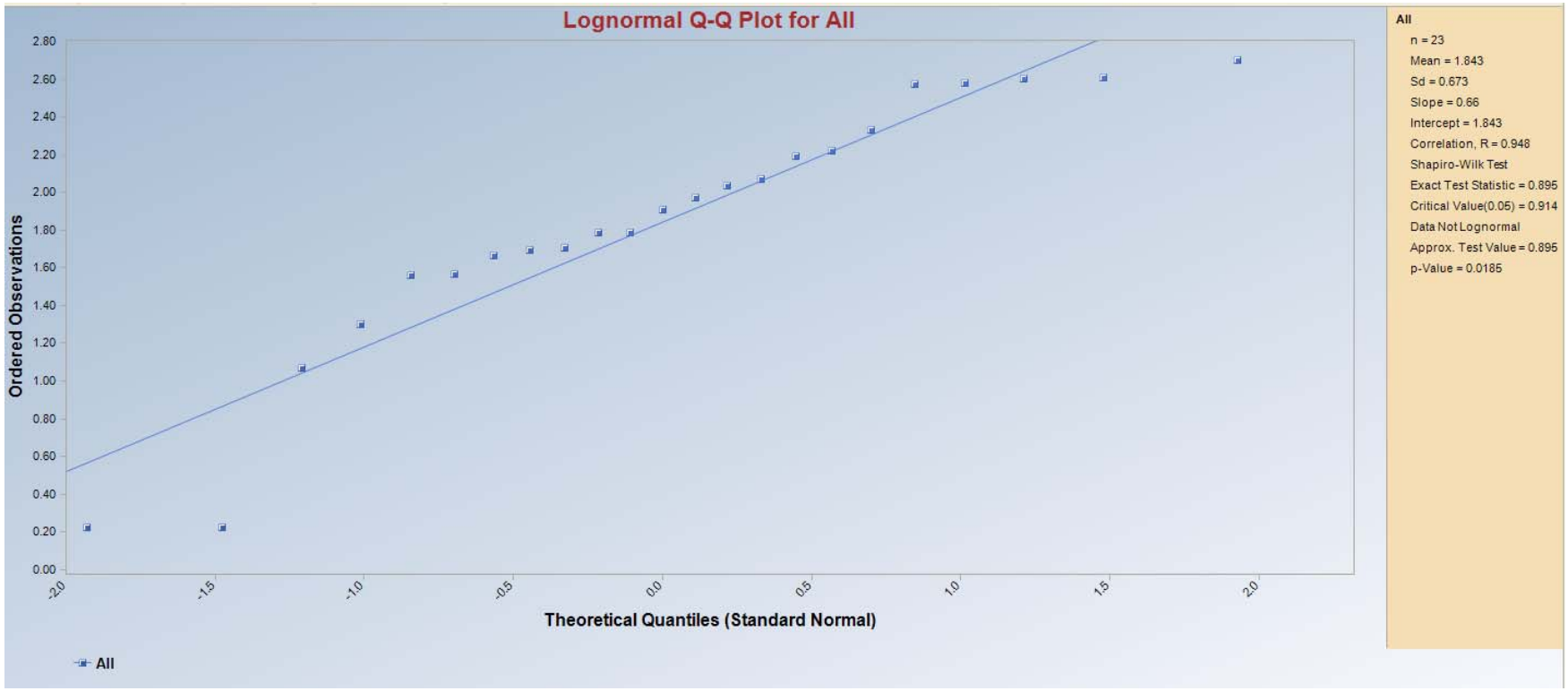


Note: This plot was created using the EPA ProUCL program Version 4.1.01

GDC Project Number IE-219

SR-210/Pepper Avenue Project
Total Lead Normal Distribution Plot

Figure 4b

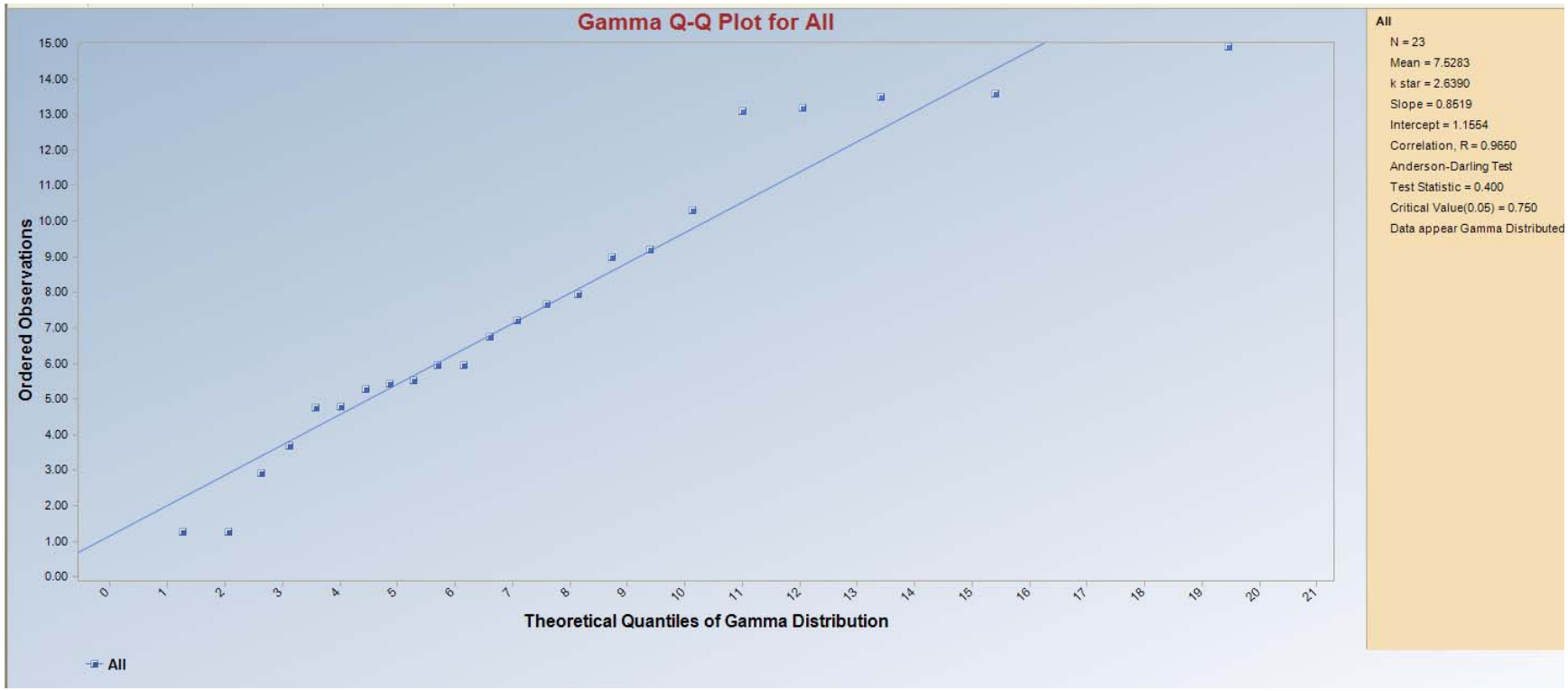


Note: This plot was created using the EPA ProUCL program Version 4.1.01

GDC Project Number IE-219

SR-210/Pepper Avenue Project
Total Lead Logonormal Distribution Plot

Figure 4c



Note: This plot was created using the EPA ProUCL program Version 4.1.01

GDC Project Number IE-219

SR-210/Pepper Avenue Project
Total Lead Gamma Distribution Plot

Figure 4d

APPENDIX A
Log of Hand Auger Borings

KEY FOR SOIL CLASSIFICATION

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE-GRAINED SOILS (< 50% fines content)	GRAVEL (% GRAVEL > % SAND)	CLEAN GRAVEL (Less than 5% fines)	GW	Well-graded gravel, gravel with sand, little or no fines
			GP	Poorly-graded gravel, gravel with sand, little or no fines
		"DIRTY" GRAVEL (More than 12% fines)	GM	Silty gravel, silty gravel with sand, silty or non-plastic fines
			GC	Clayey gravel, clayey gravel with sand, clayey or plastic fines
	SAND (% SAND ≥ % GRAVEL)	CLEAN SAND (Less than 5% fines)	SW	Well-graded sand, sand with gravel, little or no fines
			SP	Poorly-graded sand, sand with gravel, little or no fines
		"DIRTY" SAND (More than 12% fines)	SM	Silty sand, silty sand with gravel, silty or non-plastic fines
			SC	Clayey sand, clayey sand with gravel, clayey or plastic fines
FINE-GRAINED SOILS (> 50% fines content)	SILTS AND CLAYS (Liquid Limit less than 50)		ML	Inorganic silt, sandy silt, gravelly silt, or clayey silt with low plasticity
			CL	Inorganic clay of low to medium plasticity, sandy clay, gravelly clay, silty clay, Lean Clay
			OL	Low to medium plasticity Silt or Clay with significant organic content (vegetative matter)
	SILTS AND CLAYS (Liquid Limit 50 or more)		MH	Inorganic elastic silt, sandy silt, gravelly silt, or clayey silt of medium to high plasticity
			CH	Inorganic clay of high plasticity, Fat Clay
			OH	Medium to high plasticity Silt or Clay with significant organic content (vegetative matter)
HIGHLY ORGANIC SOILS			PT	Peat or other highly organic soils

Note: Dual symbols are used for coarse grained soils with 5 to 12% fines (ex: SP-SM), and for soils with Atterberg Limits falling in the CL-ML band in the Plasticity Chart
Borderline classifications between groups may be indicated by two symbols separated by a slash (ex: CL/CH, SW/GW).

CONSISTENCY CLASSIFICATION

COARSE GRAINED SOILS		FINE GRAINED SOILS		
Blowcount SPT[1] (CAL)[2]	Consistency	Blowcount[3] SPT[1] (CAL)[2]	Consistency	Undrained Shear Strength[3], S_u (ksf)
		<2 (<3)	Very Soft	< 0.25
0-4 (0-6)	Very Loose	2-4 (3-6)	Soft	0.25 -0.50
5-9 (7-14)	Loose	5-8 (7-12)	Medium Stiff	0.50 - 1.0
10-29 (15-44)	Med. Dense	9-15 (13-22)	Stiff	1.0 - 2.0
30-49 (45-74)	Dense	16-30 (23-45)	Very Stiff	2.0 - 4.0
≥50 (≥75)	Very Dense	>30 (>45)	Hard	>4.0

MOISTURE CLASSIFICATION

DRY - Absence of moisture, dusty, dry to the touch
MOIST- Damp but no visible water
WET- Visible free water, usually soil is below water table

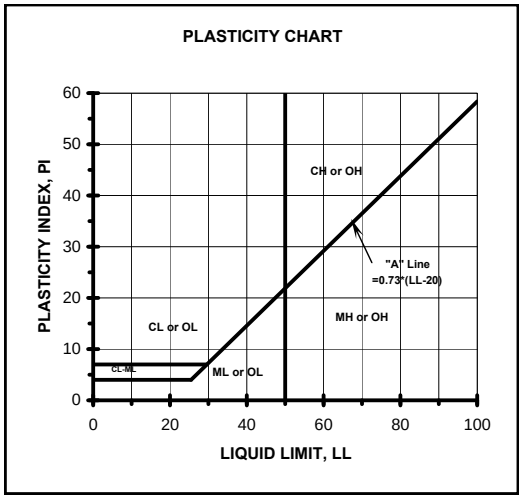
CONSISTENCY NOTES:

1. Number of blows of a 60% efficiency 140-lb. hammer falling 30-inches to drive a 2-inch O.D. (1.375-inch I.D.) **SPT Sampler** the final 12-inches of driving
2. Number of blows of a 140-lb. hammer falling 30-inches to drive a 3-inch O.D. (2.42-inch I.D.) **California Ring Sampler** the final 12-inches of driving.
3. Undrained shear strength of cohesive soils predicted from field blowcounts is generally unreliable. Where possible, consistency should be based on S_u data from pocket penetrometer, torvane, or laboratory testing.

CLASSIFICATION CRITERIA BASED ON LABORATORY TESTS

Grain Size Classification

CLAY AND SILT	SAND			GRAVEL		COBBLES	BOULDERS
	Fine	Medium	Coarse	Fine	Coarse		
US Std Sieve →	No. 200	No. 40	No. 10	No. 4	3/4"	3"	12"
Grain Size (mm) →	0.075	0.425	2	4.75	19.1	76.2	304.8



Classification of earth materials shown on the logs is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

Granular Soil Gradation Parameters

Coefficient of Uniformity: $C_u = D_{60} / D_{10}$

Coefficient of Curvature: $C_C = (D_{30})^2 / (D_{10} \times D_{60})$

D_{10}= 10% of the soil is finer than this diameter

D_{30}= 30% of the soil is finer than this diameter

D_{60}= 60% of the soil is finer than this diameter

Group Symbol	Gradation or Plasticity Requirement
SW	C_u>6 and C_c between 1 and 3
GW	C_u>4 and C_c between 1 and 3
GP or SP	Clean gravel or sand not meeting requirement for GW or SW
GM or SM	Plots below "A" Line on Plasticity Chart or PI < 4
GC or SC	Plots above "A" Line on Plasticity Chart and PI > 7

Metric Unit Conversion: 1" = 25.4 mm, 1.0 ksf = 47.88 kPa

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
SR-210 Pepper Avenue Improvements ADL	IE-219	**HA-12-001**

SITE LOCATION	START	FINISH	SHEET NO.
Rialto, CA	5/24/2012	5/24/2012	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
N/A	Hand Auger	K.Garcia	V. Petrilla

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Hand Auger	3	3	1298	▼ / *na*

SAMPLING METHOD: 4 oz. glass jar

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		X	HA-1A/1B									Silty SAND (SM) with gravel and cobbles.
		X	HA-2									
		X	HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-2

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
SR-210 Pepper Avenue Improvements ADL	IE-219	**HA-12-002**

SITE LOCATION	START	FINISH	SHEET NO.
Rialto, CA	5/24/2012	5/24/2012	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
N/A	Hand Auger	K.Garcia	V. Petrilla

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Hand Auger	3	3	1298	▼ / *na*

SAMPLING METHOD: 4 oz. glass jar

NOTES:

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		X	HA-1									Silty SAND (SM) with gravel and cobbles.
		X	HA-2									
		X	HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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Irvine, CA 92618

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FIGURE A-3

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-003**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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Irvine, CA 92618

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FIGURE A-4

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-004**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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Irvine, CA 92618

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FIGURE A-5

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-005**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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FIGURE A-6

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-006**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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FIGURE A-7

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-007**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3A/HA-3B									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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FIGURE A-8

LOG OF TEST BORING

PROJECT NAME SR-210 Pepper Avenue Improvements ADL		**PROJECT NUMBER** IE-219	**BORING** **HA-12-008**
SITE LOCATION Rialto, CA	**START** 5/24/2012	**FINISH** 5/24/2012	**SHEET NO.** 1 of 1
DRILLING COMPANY N/A	**DRILLING METHOD** Hand Auger	**LOGGED BY** K.Garcia	**CHECKED BY** V. Petrilla
DRILLING EQUIPMENT Hand Auger	**BORING DIA. (in)** 3	**TOTAL DEPTH (ft)** 3	**GROUND ELEV (ft)** 1298
SAMPLING METHOD 4 oz. glass jar			**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ / *na*
			NOTES

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	DRY DENSITY (pcf)	MOISTURE (%)	PID (ppm)	% PASSING #200	ATTERBERG LIMITS LL:PI	POCKET PEN (tsf)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			HA-1									Silty SAND (SM) with gravel and cobbles.
			HA-2									
			HA-3									
	1295											Boring terminated at 3 ft. bgs Groundwater not encountered Backfilled with soil cuttings.
5												
	1290											

GDC_LOG_BORING_1A IE-219 ADL.GPJ GDCLOG.GDT 6/20/12

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32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS 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 THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-9

APPENDIX B
Laboratory Data Reports

American Environmental Testing Laboratory Inc.
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Ordered By

Group Delta Consultants
32 Mauchly Suite B
Irvine, CA 92618-

Telephone: (949)450-2100
Attention: Vesna Glisic

Number of Pages	**15**
Date Received	**05/24/2012**
Date Reported	**06/05/2012**

Job Number	Order Date	Client
65918	05/24/2012	GROUP

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

Enclosed please find results of analyses of 1 water and 26 soil samples which were analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

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CHAIN OF CUSTODY RECORD

№ 72374

AETL JOB No. 65918

Page 1 of 2

COMPANY: Group Delta Consultants
PROJECT MANAGER: V. Glisic
COMPANY ADDRESS: 32 Mauchly, St B, Irvine CA 92618
PHONE: 949 450 2100
FAX: 949 450 2108
PROJECT NAME: SR-210 / Pepper Interchange
PROJECT #: IE-219
SITE NAME AND ADDRESS:
PO #:

	SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	ANALYSIS REQUESTED	TEST INSTRUCTIONS & COMMENTS
1	HA-12-001 -	HA-1A	5/24/12	8:40	Soil	4oz glass	None		65918-01
2	HA-12-001 -	HA-1B		8:41					65918-02 OA/QC Duplicate
3	HA-12-001 -	HA-2		9:01					65918-03
4	HA-12-001	HA-3		9:15					65918-04
5	HA-12-005	HA-1		9:30					65918-05
6	HA-12-005	HA-2		9:32					65918-06
7	HA-12-005	HA-3		9:40					65918-07
8	HA-12-003	HA-1		9:50					65918-08
9	HA-12-003	HA-2		10:05					65918-09
10	HA-12-003	HA-3		10:30					65918-10
11	HA-12-006	HA-1		10:50					65918-11
12	HA-12-006	HA-2		10:56					65918-12
13	HA-12-006	HA-3		11:15					65918-13
14	HA-12-004	HA-1		11:25					65918-14
15	HA-12-004	HA-2		11:40					65918-15

ANALYSIS REQUESTED: 8010/7000 Lead; 8270 SVOCs

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	15	PROPERLY COOLED Y / N / NA	
CUSTODY SEALS Y / N / NA		SAMPLES INTACT Y / N / NA	
RECEIVED IN GOOD COND. Y / N		SAMPLES ACCEPTED Y / N	

TURN AROUND TIME

☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

	1.	2.	3.
RELINQUISHED BY SAMPLER:	Signature:	Signature:	Signature:
	Printed Name: Kevin Garcia	Printed Name:	Printed Name:
	Date: 5/24/12 Time: 2:40 PM	Date: Time:	Date: 5/24/12 Time: 1750
RECEIVED BY:	Signature:	Signature:	Signature:
	Printed Name:	Printed Name:	Printed Name:
	Date: 5/24/12 Time: 1440	Date: Time:	Date: 5/24/12 Time: 1750
RECEIVED BY LABORATORY:			AETL

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

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CHAIN OF CUSTODY RECORD

№ 72375

AETL JOB No. 65918

Page 2 of 2

COMPANY: Group Delta Consultants — PROJECT MANAGER: V. Glisic

COMPANY ADDRESS: 32 Mauchly, St B, Irvine, CA 92618 — PHONE: 949 450-2100 — FAX: 949 450 2108

PROJECT NAME: SR 210 / Pepper Interchange — PROJECT #: IE-219

SITE NAME AND ADDRESS: — PO #:

#	SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	6010B / [illegible] 7000		9045A pH	ANALYSIS REQUESTED	TEST INSTRUCTIONS & COMMENTS
1	HA-12-004	HA-3	5/24/12	11:55	Soil	4 oz glass	None	✓				65918.16
2	HA-12-002	HA-1		12:10				✓				65918.17
3	HA-12-002	HA-2		12:16				✓				65918.18
4	HA-12-002	HA-3		12:22				✓				65918.19
5	HA-12-007	HA-1		12:50				✓		✓ KG		65918.20
6	HA-12-007	HA-2		1:09				✓		✓ KG		65918.21
7	HA-12-007	HA-3A		1:17				✓		✓		65918.22
8	HA-12-007	HA-3B		1:18				✓		✓	65918.23	QA/QC Duplicate
9	HA-12-008	HA-1		1:23				✓				65918.24
10	HA-12-008	HA-2		1:30				✓				65918.25
11	HA-12-008	HA-3		1:40				✓				65918.26
12	Rinsate		5/24/12	2:37	H2O	1 L Amberglass	None	✓				65918.27
13												
14												
15												

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	12	PROPERLY COOLED	Y / N / NA
CUSTODY SEALS Y / N / NA		SAMPLES INTACT	Y / N / NA
RECEIVED IN GOOD COND. Y / N		SAMPLES ACCEPTED	Y / N

TURN AROUND TIME: ☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

RELINQUISHED BY SAMPLER: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature]	Signature:	Signature: [signature]
Printed Name: Kevin Garcia	Printed Name:	Printed Name: [signature]
Date: 5/24/12 Time: 2:40	Date: Time:	Date: 5-24-12 Time: 1750

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY LABORATORY: AETL 3.
Signature: [signature]	Signature:	Signature:
Printed Name: [signature]	Printed Name:	Printed Name: [signature]
Date: 5/24/12 Time: 1440	Date: Time:	Date: 5/24-12 Time: 1750

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

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Telephone: (949)450-2100
Attention: Vesna Glisic

Project ID: IE-219
Date Received 05/24/2012
Date Reported 06/05/2012

Job Number	Order Date	Client
65918	05/24/2012	GROUP

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

AETL received 27 samples with the following specification on 05/24/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
65918.01	HA-12-001-HA-1A	05/24/2012	Soil	1
65918.02	HA-12-001-HA-1B	05/24/2012	Soil	1
65918.03	HA-12-001-HA-2	05/24/2012	Soil	1
65918.04	HA-12-001-HA-3	05/24/2012	Soil	1
65918.05	HA-12-005-HA-1	05/24/2012	Soil	1
65918.06	HA-12-005-HA-2	05/24/2012	Soil	1
65918.07	HA-12-005-HA-3	05/24/2012	Soil	1
65918.08	HA-12-003-HA-1	05/24/2012	Soil	1
65918.09	HA-12-003-HA-2	05/24/2012	Soil	1
65918.10	HA-12-003-HA-3	05/24/2012	Soil	1
65918.11	HA-12-006-HA-1	05/24/2012	Soil	1
65918.12	HA-12-006-HA-2	05/24/2012	Soil	1
65918.13	HA-12-006-HA-3	05/24/2012	Soil	1
65918.14	HA-12-004-HA-1	05/24/2012	Soil	1
65918.15	HA-12-004-HA-2	05/24/2012	Soil	1
65918.16	HA-12-004-HA-3	05/24/2012	Soil	1
65918.17	HA-12-002-HA-1	05/24/2012	Soil	1
65918.18	HA-12-002-HA-2	05/24/2012	Soil	1
65918.19	HA-12-002-HA-3	05/24/2012	Soil	1
65918.20	HA-12-007-HA-1	05/24/2012	Soil	1
65918.21	HA-12-007-HA-2	05/24/2012	Soil	1
65918.22	HA-12-007-HA-3A	05/24/2012	Soil	1
65918.23	HA-12-007-HA-3B	05/24/2012	Soil	1

Continued

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Project ID: IE-219
Date Received 05/24/2012
Date Reported 06/05/2012

Job Number	Order Date	Client
65918	05/24/2012	GROUP

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
65918.24	HA-12-008-HA-1	05/24/2012	Soil	1
65918.25	HA-12-008-HA-2	05/24/2012	Soil	1
65918.26	HA-12-008-HA-3	05/24/2012	Soil	1
65918.27	Rinsate	05/24/2012	Aqueous	1

The samples were analyzed as specified on the enclosed chain of custody. Analytical non-conformances have been noted on the report.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

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ANALYTICAL RESULTS

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Page: **2**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531012C1

Our Lab I.D.			Method Blank	65918.01	65918.02	65918.03	65918.04
Client Sample I.D.				HA-12-001-HA-1A	HA-12-001-HA-1B	HA-12-001-HA-2	HA-12-001-HA-3
Date Sampled				05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/31/2012	05/31/2012	05/31/2012	05/31/2012	05/31/2012
Preparation Method			3050B	3050B	3050B	3050B	3050B
Date Analyzed			06/01/2012	06/01/2012	06/01/2012	06/01/2012	06/01/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead	2.5	5.0	ND	132	33.2	8.98	13.1

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Page: **3**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531012C1

Our Lab I.D.			65918.05	65918.06	65918.07	65918.08	65918.09
Client Sample I.D.			HA-12-005-H A-1	HA-12-005-H A-2	HA-12-005-H A-3	HA-12-003-H A-1	HA-12-003-H A-2
Date Sampled			05/24/2012	05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/31/2012	05/31/2012	05/31/2012	05/31/2012	05/31/2012
Preparation Method			3050B	3050B	3050B	3050B	3050B
Date Analyzed			06/01/2012	06/01/2012	06/01/2012	06/01/2012	06/01/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead	2.5	5.0	13.6	ND	ND	7.94	9.21

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Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531012C1

Our Lab I.D.			65918.10	65918.11	65918.12	65918.13	65918.14
Client Sample I.D.			HA-12-003-HA-3	HA-12-006-HA-1	HA-12-006-HA-2	HA-12-006-HA-3	HA-12-004-HA-1
Date Sampled			05/24/2012	05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/31/2012	05/31/2012	05/31/2012	05/31/2012	05/31/2012
Preparation Method			3050B	3050B	3050B	3050B	3050B
Date Analyzed			06/01/2012	06/01/2012	06/01/2012	06/01/2012	06/01/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead	2.5	5.0	6.75	13.5	5.96	5.52	4.78J

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Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531012C1

Our Lab I.D.			**65918.15**				
Client Sample I.D.			HA-12-004-HA-2				
Date Sampled			05/24/2012				
Date Prepared			05/31/2012				
Preparation Method			3050B				
Date Analyzed			06/01/2012				
Matrix			Soil				
Units			mg/Kg				
Dilution Factor			1				
Analytes	**MDL**	**PQL**	**Results**				
Lead	2.5	5.0	2.91J				

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Page: 6

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531122C2

Our Lab I.D.			Method Blank	65918.16	65918.17	65918.18	65918.19
Client Sample I.D.				HA-12-004-HA-3	HA-12-002-HA-1	HA-12-002-HA-2	HA-12-002-HA-3
Date Sampled				05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/31/2012	05/31/2012	05/31/2012	05/31/2012	05/31/2012
Preparation Method			3050B	3050B	3050B	3050B	3050B
Date Analyzed			06/01/2012	06/01/2012	06/01/2012	06/01/2012	06/01/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead	2.5	5.0	ND	5.29	5.96	5.44	13.2

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Page: **7**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531122C2

Our Lab I.D.			65918.20	65918.21	65918.22	65918.23	65918.24
Client Sample I.D.			HA-12-007-HA-1	HA-12-007-HA-2	HA-12-007-HA-3A	HA-12-007-HA-3B	HA-12-008-HA-1
Date Sampled			05/24/2012	05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/31/2012	05/31/2012	05/31/2012	05/31/2012	05/31/2012
Preparation Method			3050B	3050B	3050B	3050B	3050B
Date Analyzed			06/01/2012	06/01/2012	06/01/2012	06/01/2012	06/01/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead	2.5	5.0	7.20	14.9	3.68J	3.57J	7.67

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Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531122C2

Our Lab I.D.			65918.25	65918.26			
Client Sample I.D.			HA-12-008-HA-2	HA-12-008-HA-3			
Date Sampled			05/24/2012	05/24/2012			
Date Prepared			05/31/2012	05/31/2012			
Preparation Method			3050B	3050B			
Date Analyzed			06/01/2012	06/01/2012			
Matrix			Soil	Soil			
Units			mg/Kg	mg/Kg			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Lead	2.5	5.0	10.3	4.76J			

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Page: 9

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: 9045C, Soil and Waste pH

QC Batch No: 053012-1

Our Lab I.D.			Method Blank	65918.01	65918.02	65918.09	65918.22
Client Sample I.D.				HA-12-001-HA-1A	HA-12-001-HA-1B	HA-12-003-HA-2	HA-12-007-HA-3A
Date Sampled				05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			05/30/2012	05/30/2012	05/30/2012	05/30/2012	05/30/2012
Preparation Method			9045C	9045C	9045C	9045C	9045C
Date Analyzed			05/30/2012	05/30/2012	05/30/2012	05/30/2012	05/30/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			pH unit	pH unit	pH unit	pH unit	pH unit
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
pH	1.00	1.00	NA	8.27	8.46	8.75	8.89

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Attn: Vesna Glisic
Page: **10**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: 9045C, Soil and Waste pH

QC Batch No: 053012-1

Our Lab I.D.			65918.23				
Client Sample I.D.			HA-12-007-HA-3B				
Date Sampled			05/24/2012				
Date Prepared			05/30/2012				
Preparation Method			9045C				
Date Analyzed			05/30/2012				
Matrix			Soil				
Units			pH unit				
Dilution Factor			1				
Analytes	**MDL**	**PQL**	**Results**				
pH	1.00	1.00	8.88				

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ANALYTICAL RESULTS

Ordered By

Group Delta Consultants
32 Mauchly
Suite B
Irvine, CA 92618-

Telephone: (949)450-2100
Attn: Vesna Glisic
Page: **11**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: 6010B.LEAD, Lead, ICP

QC Batch No: 0530122C1

Our Lab I.D.			Method Blank	**65918.27**			
Client Sample I.D.				Rinsate			
Date Sampled				05/24/2012			
Date Prepared			05/30/2012	05/30/2012			
Preparation Method			3005A	3005A			
Date Analyzed			05/30/2012	05/30/2012			
Matrix			Aqueous	Aqueous			
Units			mg/L	mg/L			
Dilution Factor			1	1			
Analytes	**MDL**	**PQL**	**Results**	**Results**			
Lead	0.05	0.10	ND	ND			

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Attn: Vesna Glisic
Page: **12**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: 6010B.LEAD, Lead, ICP

QC Batch No: 0530122C1; Dup or Spiked Sample: 65930.09; LCS: Clean Water; QC Prepared: 05/30/2012; QC Analyzed: 05/30/2012; Units: mg/L

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Lead	0.00	1.00	0.840	83.9	1.00	0.830	83.4	<1	80-120	<15

QC Batch No: 0530122C1; Dup or Spiked Sample: 65930.09; LCS: Clean Water; QC Prepared: 05/30/2012; QC Analyzed: 05/30/2012; Units: mg/L

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit						
Lead	1.00	0.910	91.0	80-120						

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Page: **13**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531012C1; Dup or Spiked Sample: 65918.02; LCS: Clean Sand; QC Prepared: 05/31/2012; QC Analyzed: 06/01/2012; Units: mg/Kg

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Lead	33.2	50.0	45.4 M	24.4	50.0	45.5 M	24.6	<1	80-120	<15

QC Batch No: 0531012C1; Dup or Spiked Sample: 65918.02; LCS: Clean Sand; QC Prepared: 05/31/2012; QC Analyzed: 06/01/2012; Units: mg/Kg

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Lead	50.0	46.0	92.0	50.0	45.8	91.6	<1	80-120	<15	

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Page: **14**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: (6010B.LEAD), Lead, ICP

QC Batch No: 0531122C2; Dup or Spiked Sample: 65918.23; LCS: Clean Sand; QC Prepared: 05/31/2012; QC Analyzed: 06/01/2012; Units: mg/Kg

Analytes	Sample Result	MS Concen	MS Recov	MS % REC	MS DUP Concen	MS DUP Recov	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit
Lead	3.57	50.0	76.6 M	146	50.0	78.1 M	149	2.03	80-120	<15

QC Batch No: 0531122C2; Dup or Spiked Sample: 65918.23; LCS: Clean Sand; QC Prepared: 05/31/2012; QC Analyzed: 06/01/2012; Units: mg/Kg

Analytes	LCS Concen	LCS Recov	LCS % REC	LCS DUP Concen	LCS DUP Recov	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit	
Lead	50.0	44.3	88.6	50.0	44.7	89.4	<1	80-120	<15	

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Attn: Vesna Glisic
Page: **15**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
65918	05/24/2012	GROUP

Method: 9045C, Soil and Waste pH

QC Batch No: 053012-1; Dup or Spiked Sample: 65918.01; LCS: Clean Sand; LCS Prepared: 05/30/2012; LCS Analyzed: 05/30/2012; Units: pH unit

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
pH	8.27	8.31	<1	<15	7.00	7.00	100	80-120		

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Data Qualifiers and Descriptors

Data Qualifier:

#:	Recovery is not within acceptable control limits.
*:	In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
B:	Analyte was present in the Method Blank.
D:	Result is from a diluted analysis.
E:	Result is beyond calibration limits and is estimated.
H:	Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
J:	Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
M:	Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
MCL:	Maximum Contaminant Level
NS:	No Standard Available
S6:	Surrogate recovery is outside control limits due to matrix interference.
S8:	The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
X:	Results represent LCS and LCSD data.

Definition:

%Limi:	Percent acceptable limits.
%REC:	Percent recovery.
Con.L:	Acceptable Control Limits
Conce:	Added concentration to the sample.
LCS:	Laboratory Control Sample
MDL:	Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.

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Data Qualifiers and Descriptors

MS:	Matrix Spike
MS DU:	Matrix Spike Duplicate
ND:	Analyte was not detected in the sample at or above MDL.
PQL:	Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.
Recov:	Recovered concentration in the sample.
RPD:	Relative Percent Difference

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Attention: Vesna Glisic

Number of Pages	**4**
Date Received	**05/24/2012**
Date Reported	**06/14/2012**

Job Number	Order Date	Client
66022	06/06/2012	GROUP

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

Enclosed please find results of analyses of 7 soil samples which were analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

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CHAIN OF CUSTODY RECORD

66022 ~~65918~~ Nº 72374

COMPANY: Group Delta Consultants | PROJECT MANAGER: V. Glisic
COMPANY ADDRESS: 32 Mauchly, St. B, Irvine, CA 92618 | PHONE: 949 450 2100 | FAX: 949 450 2108
PROJECT NAME: SR-210 / Pepper Interchange | PROJECT #: IE-219
SITE NAME AND ADDRESS: | PO #:
AETL JOB No.: ~~65918~~ | Page 1 of 2

	SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	ANALYSIS REQUESTED: 8260B/8010B Total	6010BS & 7471	STLC DI WET LEAD	TEST INSTRUCTIONS & COMMENTS
1	HA-12-001	HA-1A	5/24/12	8:40	Soil	4 oz glass	None			*	~~65918.01~~ 66022.01
2	HA-12-001	HA-1B		8:41							65918.02 QA/QC Duplicate
3	HA-12-001	HA-2		9:01					KM	*	~~65918.03~~ 66022.02
4	HA-12-001	HA-3		9:15					KM		65918.04
5	HA-12-005	HA-1		9:30						*	~~65918.05~~ 66022.03
6	HA12-005	HA-2		9:32							65918.06
7	HA-12-005	HA-3		9:40							65918.07
8	HA12-003	HA-1		9:50					KM	KG	65918.08
9	HA-12-003	HA-2		10:05						*	~~65918.09~~ 66022.04
10	HA-12-003	HA-3		10:30					KM	KG	65918.10
11	HA12-006	HA-1		10:50						*	~~65918.11~~ 66022.05
12	HA-12-006	HA-2		10:56							65918.12
13	HA-12-006	HA-3		11:15							65918.13
14	HA-12-004	HA-1		11:25							65918.14
15	HA-12-004	HA-2		11:40							65918.15

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	15	PROPERLY COOLED Y / N / NA	
CUSTODY SEALS Y / N / NA		SAMPLES INTACT Y / N / NA	
RECEIVED IN GOOD COND. Y / N		SAMPLES ACCEPTED Y / N	

TURN AROUND TIME

☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

	1.	2.	3.
RELINQUISHED BY:	SAMPLER:		
Signature:			
Printed Name:	Kevin Garcia		
Date:	5/24/12 Time: 3:40 PM	Date: Time:	Date: 5/24/12 Time: 1250
RECEIVED BY:	1.	2.	3.
Signature:			
Printed Name:			
Date:	5/24/12 Time: 1440	Date: Time:	RECEIVED BY LABORATORY: AETL Date: 5/24-12 Time: 1250

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

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CHAIN OF CUSTODY RECORD

№ 72375

AETL JOB No. 66022 ~~65918~~

COMPANY: Group Delta Consultants — PROJECT MANAGER: V. Glisic

COMPANY ADDRESS: 32 Mauchly, St. B, Irvine, CA 92618 — PHONE: 949 450-2100 — FAX: 949 450 2108

PROJECT NAME: SR 210 / Pepper Interchange — PROJECT #: IE-219

SITE NAME AND ADDRESS: — PO #:

#	SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.	6010B/7000 (test)	9045A pH		STLC DI WET LEAD		TEST INSTRUCTIONS & COMMENTS
													*-Added 6/6/12 Normal
1	HA-12-004	HA-3	5/24/12	11:55	Soil	4 oz glass	None	/					65918.16
2	HA-12-002	HA-1		12:10				/					65918.19
3	HA-12-002	HA-2		12:16				/					65918.18
4	HA-12-002	HA-3		12:23				/					65918.19
5	HA-12-007	HA-1		12:50				/	/	KG			65918.20
6	HA-12-007	HA-2		1:09				/	/	KG	*		~~65918.21~~ 66022.06
7	HA-12-007	HA-3A		1:17				/	/				65918.22
8	HA-12-007	HA-3B		1:18				/	/			65918.23	QA/QC Duplicate
9	HA-12-008	HA-1		1:23				/					65918.24
10	HA-12-008	HA-2		1:30				/			*		~~65918.25~~ 66022.07
11	HA-12-008	HA-3	↓	1:40	↓	↓	↓	/					65918.26
12	Rinsate		5/24/12	2:37	H2O	1L Amberglass	None	/					65918.27
13													
14													
15													

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	12	PROPERLY COOLED	(Y)/N/NA
CUSTODY SEALS Y/N/NA	(NA)	SAMPLES INTACT	(Y)/N/NA
RECEIVED IN GOOD COND.	(Y)/N	SAMPLES ACCEPTED	(Y)/N

TURN AROUND TIME

☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

	1.	2.	3.
RELINQUISHED BY	SAMPLER: Signature: [signature] Printed Name: Kevin Garcia Date: 5/24/12 Time: 2:40	Signature: Printed Name: Date: Time:	Signature: [signature] Printed Name: [signature] Date: 5/24/12 Time: 1750
RECEIVED BY	Signature: Printed Name: [signature] Date: 5/24/12 Time: 1440	Signature: Printed Name: Date: Time:	LABORATORY: AETL Signature: Printed Name: [signature] Date: 5/24/12 Time: 1750

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

Jim Lin

From: Vesna G. Petrilla [VesnaG@GroupDelta.com]
Sent: Wednesday, June 06, 2012 3:13 PM
To: 'Jim Lin'
Subject: RE: Summary & PDF results of analysis of samples from project "SR-210 / Pepper Interchange, CA"

Thanks, Jim.
Please run WET DI test on the following samples:

HA-12-001-HA-1A
HA-12-001-HA-2
HA-12-003-HA-2
HA-12-005-HA-1
HA-12-006-HA-1
HA-12-007-HA-2
HA-12-008-HA-2

Thank you

Vesna Glisic Petrilla, P.E., REA I
Project Engineer
Group Delta Consultants, Inc.

32 Mauchly Suite B
Irvine, CA 92618
Office phone (949) 450-2100
Cell phone (949) 244-1345
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From: Jim Lin [mailto:jiml@aetlab.com]
Sent: Tuesday, June 05, 2012 4:25 PM
To: Vesna G. Petrilla (Group Delta)
Cc: Shah Ghanbari (Group Delta)
Subject: Summary & PDF results of analysis of samples from project "SR-210 / Pepper Interchange, CA"

Dear Vesna,

Herewith please find Summary & PDF results of analysis of samples from project "SR-210 / Pepper Interchange, CA".

AETL Job No: 65918 (Original will be in the mail).

Thank you.

Should you have additional question, please feel free to contact us.

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Ordered By

Group Delta Consultants 32 Mauchly Suite B Irvine, CA 92618-

Project ID: IE-219 Date Received 05/24/2012 Date Reported 06/14/2012

Telephone: (949)450-2100
Attention: Vesna Glisic

Job Number	Order Date	Client
66022	06/06/2012	GROUP

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

AETL received 7 samples with the following specification on 06/06/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
66022.01	HA-12-001-HA-1A	05/24/2012	Soil	1
66022.02	HA-12-001-HA-2	05/24/2012	Soil	1
66022.03	HA-12-005-HA-1	05/24/2012	Soil	1
66022.04	HA-12-003-HA-2	05/24/2012	Soil	1
66022.05	HA-12-006-HA-1	05/24/2012	Soil	1
66022.06	HA-12-007-HA-2	05/24/2012	Soil	1
66022.07	HA-12-008-HA-2	05/24/2012	Soil	1

The samples were analyzed as specified on the enclosed chain of custody.
No analytical non-conformances were encountered.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

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ANALYTICAL RESULTS

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Attn: Vesna Glisic
Page: **2**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66022	05/24/2012	GROUP

Method: (6010B-STLC), DI Soluble Threshold Limit Concentration (DI-STLC) for Lead

QC Batch No: 0607122C2

Our Lab I.D.			Method Blank	66022.01	66022.02	66022.03	66022.04
Client Sample I.D.				HA-12-001-HA-1A	HA-12-001-HA-2	HA-12-005-HA-1	HA-12-003-HA-2
Date Sampled				05/24/2012	05/24/2012	05/24/2012	05/24/2012
Date Prepared			06/07/2012	06/07/2012	06/07/2012	06/07/2012	06/07/2012
Preparation Method			TITLE 22	TITLE 22	TITLE 22	TITLE 22	TITLE 22
Date Analyzed			06/12/2012	06/12/2012	06/12/2012	06/12/2012	06/12/2012
Matrix			Soil	Soil	Soil	Soil	Soil
Units			mg/L	mg/L	mg/L	mg/L	mg/L
Dilution Factor			1	1	1	1	1
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	**Results**
Lead (STLC-DI)	0.05	0.10	ND	ND	ND	ND	ND

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ANALYTICAL RESULTS

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Page: **3**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66022	05/24/2012	GROUP

Method: (6010B-STLC), DI Soluble Threshold Limit Concentration (DI-STLC) for Lead

QC Batch No: 0607122C2

Our Lab I.D.			66022.05	66022.06	66022.07		
Client Sample I.D.			HA-12-006-H A-1	HA-12-007-H A-2	HA-12-008-H A-2		
Date Sampled			05/24/2012	05/24/2012	05/24/2012		
Date Prepared			06/07/2012	06/07/2012	06/07/2012		
Preparation Method			TITLE 22	TITLE 22	TITLE 22		
Date Analyzed			06/12/2012	06/12/2012	06/12/2012		
Matrix			Soil	Soil	Soil		
Units			mg/L	mg/L	mg/L		
Dilution Factor			1	1	1		
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**		
Lead (STLC-DI)	0.05	0.10	ND	ND	ND		

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QUALITY CONTROL RESULTS

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Page: **4**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66022	05/24/2012	GROUP

Method: (6010B-STLC), DI Soluble Threshold Limit Concentration (DI-STLC) for Lead

QC Batch No: 0607122C2; Dup or Spiked Sample: 66022.01; LCS: Clean Sand; LCS Prepared: 06/07/2012; LCS Analyzed: 06/12/2012; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Lead (STLC-DI)	ND	ND	<1	<20	1.00	0.860	86.1	80-120		

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Data Qualifiers and Descriptors

Data Qualifier:

#:	Recovery is not within acceptable control limits.
*:	In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
B:	Analyte was present in the Method Blank.
D:	Result is from a diluted analysis.
E:	Result is beyond calibration limits and is estimated.
H:	Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
J:	Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
M:	Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
MCL:	Maximum Contaminant Level
NS:	No Standard Available
S6:	Surrogate recovery is outside control limits due to matrix interference.
S8:	The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
X:	Results represent LCS and LCSD data.

Definition:

%Limi:	Percent acceptable limits.
%REC:	Percent recovery.
Con.L:	Acceptable Control Limits
Conce:	Added concentration to the sample.
LCS:	Laboratory Control Sample
MDL:	Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.

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Ordered By

Group Delta Consultants
32 Mauchly Suite B
Irvine, CA 92618-

Telephone: (949)450-2100
Attention: Vesna Glisic

Number of Pages	**4**
Date Received	**06/25/2012**
Date Reported	**06/27/2012**

Job Number	Order Date	Client
66210	06/25/2012	GROUP

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

Enclosed please find results of analyses of 1 soil sample which was analyzed as specified on the attached chain of custody. If there are any questions, please do not hesitate to call.

Checked By: _____ Approved By: C. Razmara

Cyrus Razmara, Ph.D.
Laboratory Director

66210

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CHAIN OF CUSTODY RECORD

66022
65918

№ 72374

Page 1 of 2

COMPANY: Group Delta Consultants — PROJECT MANAGER: V. Glisic
COMPANY ADDRESS: 32 Mauchly, St. B, Irvine, CA 92618 — PHONE 949 450 2100 FAX 949 450 2108
PROJECT NAME: SR-210 / Pepper Interchange — PROJECT #: IE-219
SITE NAME AND ADDRESS — PO #

AETL JOB No.

SAMPLE ID	LAB ID	DATE	TIME	MATRIX	CONTAINER NUMBER/SIZE	PRES.
1 HA-12-001	HA-1A	5/24/12	8:40	Soil	4 oz glass	None
7 HA-12-001	HA-1B		8:41			
2 HA-12-001	HA-2		9:10			
4 HA-12-001	HA-3		9:15			
6 HA-12-005	HA-1		9:30			
5 HA-12-005	HA-2		9:32			
7 HA-12-005	HA-3		9:40			
8 HA-12-003	HA-1		9:50			
9 HA-12-003	HA-2		10:05			
10 HA-12-003	HA-3		10:30			
11 HA-12-006	HA-1		10:50			
12 HA-12-006	HA-2		10:56			
13 HA-12-006	HA-3		11:15			
K HA-12-004	HA-1		11:25			
15 HA-12-004	HA-2		11:40			

ANALYSIS REQUESTED

6010B/7000 Lead	pH 9045A	STLC DI WET Cr+6 Pb	STLC WET Cr+6 Pb				
		*	⊛		66210	9	
				65918.02			
KM	KM	*					
KM	KM						
		*					
KM	KG						
		*					
KM	KG						
		*					

TEST INSTRUCTIONS & COMMENTS:
*Added 6/6/12 Normal
⊛Added 6/25/12 Normal

65918.01 66022.01
QA/QC Duplicate
65918.03 66022.02
65918.04
65918.05 66022.03
65918.06
65918.07
65918.08
65918.09 66022.04
65918.10
65918.11 66022.05
65918.12
65918.13
65918.14
65918.15

SAMPLE RECEIPT - TO BE FILLED BY LABORATORY

TOTAL NUMBER OF CONTAINERS	15	PROPERLY COOLED Y / N / NA	
CUSTODY SEALS Y / N / NA		SAMPLES INTACT Y / N / NA	
RECEIVED IN GOOD COND. Y / N		SAMPLES ACCEPTED Y / N	

TURN AROUND TIME

☒ NORMAL ☐ RUSH ☐ SAME DAY ☐ NEXT DAY ☐ 2 DAYS ☐ 3 DAYS

RELINQUISHED BY SAMPLER: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature:	Signature:	Signature:
Printed Name: Kevin Garcia	Printed Name:	Printed Name:
Date: 5/24/12 Time: 2:40 PM	Date: Time:	Date: 5/24/12 Time: 1750
RECEIVED BY: 1.	**RECEIVED BY:** 2.	RECEIVED BY LABORATORY: AETL 3.
Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name: Kevin Garcia
Date: 5/24/12 Time: 1440	Date: Time:	Date: 5/24-12 Time: 1750

DISTRIBUTION: WHITE - Laboratory, CANARY - Laboratory, PINK - Project/Account Manager, YELLOW - Sampler/Originator

Jim Lin

From: Vesna G. Petrilla [VesnaG@GroupDelta.com]
Sent: Friday, June 22, 2012 5:49 PM
To: 'Jim Lin'
Subject: SR210 Pepper Avenue Additional Test

Jim,
Please test the following sample for WET citrate:
HA-12-001, sample HA-1A from 0-0.5 ft.

Project: SR210 Pepper
Project Number: IE-219

Thank you

Vesna Glisic Petrilla, P.E., REA I
Project Engineer
Group Delta Consultants, Inc.

32 Mauchly Suite B
Irvine, CA 92618
Office phone (949) 450-2100
Cell phone (949) 244-1345
Fax (949) 450-2108

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Ordered By

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32 Mauchly Suite B
Irvine, CA 92618-

Project ID: IE-219
Date Received 06/25/2012
Date Reported 06/27/2012

Telephone: (949)450-2100
Attention: Vesna Glisic

Job Number	Order Date	Client
66210	06/25/2012	GROUP

CERTIFICATE OF ANALYSIS
CASE NARRATIVE

AETL received 1 samples with the following specification on 06/25/2012.

Lab ID	Sample ID	Sample Date	Matrix	QTY of Containers
66210.01	HA-12-001-HA-1A	05/24/2012	Soil	1

The samples were analyzed as specified on the enclosed chain of custody.
No analytical non-conformances were encountered.

Checked By: _____ Approved By: C. Razmara _____

Cyrus Razmara, Ph.D.
Laboratory Director

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ANALYTICAL RESULTS

Ordered By

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32 Mauchly
Suite B
Irvine, CA 92618-

Telephone: (949)450-2100
Attn: Vesna Glisic
Page: **2**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66210	06/25/2012	GROUP

Method: (6010B-STLC), Soluble Threshold Limit Concentration (STLC)

QC Batch No: 0625122C3

Our Lab I.D.			Method Blank				
Client Sample I.D.							
Date Sampled							
Date Prepared			06/25/2012				
Preparation Method			TITLE 22				
Date Analyzed			06/27/2012				
Matrix			Soil				
Units			mg/L				
Dilution Factor			1				
Analytes	**MDL**	**PQL**	**Results**				
Lead (STLC)	0.05	0.10	ND				

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ANALYTICAL RESULTS

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Attn: Vesna Glisic
Page: **3**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66210	06/25/2012	GROUP

Method: (6010B-STLC), Soluble Threshold Limit Concentration (STLC)

QC Batch No: 0625122C3

Our Lab I.D.			66210.01				
Client Sample I.D.			HA-12-001-HA-1A				
Date Sampled			05/24/2012				
Date Prepared			06/25/2012				
Preparation Method			TITLE 22				
Date Analyzed			06/27/2012				
Matrix			Soil				
Units			mg/L				
Dilution Factor			10				
Analytes	**MDL**	**PQL**	**Results**				
Lead (STLC)	0.50	1.00	9.73				

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QUALITY CONTROL RESULTS

Ordered By

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Irvine, CA 92618-

Telephone: (949)450-2100
Attn: Vesna Glisic
Page: **4**

Project ID: IE-219
Project Name: SR-210/Pepper Interchange

AETL Job Number	Submitted	Client
66210	06/25/2012	GROUP

Method: (6010B-STLC), Soluble Threshold Limit Concentration (STLC)

QC Batch No: 0625122C3; Dup or Spiked Sample: 66210.01; LCS: Clean Sand; LCS Prepared: 06/25/2012; LCS Analyzed: 06/27/2012; Units: mg/L

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit	LCS Concen	LCS Recov	LCS % REC	LCS/LCSD % Limit		
Lead (STLC)	9.73	8.62	12.1	<20	1.00	0.868	86.8	80-120		

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Data Qualifiers and Descriptors

Data Qualifier:

#:	Recovery is not within acceptable control limits.
*:	In the QC section, sample results have been taken directly from the ICP reading. No preparation factor has been applied.
B:	Analyte was present in the Method Blank.
D:	Result is from a diluted analysis.
E:	Result is beyond calibration limits and is estimated.
H:	Analysis was performed over the allowed holding time due to circumstances which were beyond laboratory control.
J:	Analyte was detected . However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
M:	Matrix spike recovery is outside control limits due to matrix interference. Laboratory Control Sample recovery was acceptable.
MCL:	Maximum Contaminant Level
NS:	No Standard Available
S6:	Surrogate recovery is outside control limits due to matrix interference.
S8:	The analysis of the sample required a dilution such that the surrogate concentration was diluted below the method acceptance criteria.
X:	Results represent LCS and LCSD data.

Definition:

%Limi:	Percent acceptable limits.
%REC:	Percent recovery.
Con.L:	Acceptable Control Limits
Conce:	Added concentration to the sample.
LCS:	Laboratory Control Sample
MDL:	Method Detection Limit is a statistically derived number which is specific for each instrument, each method, and each compound. It indicates a distinctively detectable quantity with 99% probability.

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Data Qualifiers and Descriptors

MS:	Matrix Spike
MS DU:	Matrix Spike Duplicate
ND:	Analyte was not detected in the sample at or above MDL.
PQL:	Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.
Recov:	Recovered concentration in the sample.
RPD:	Relative Percent Difference

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Data Qualifiers and Descriptors

MS:	Matrix Spike
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ND:	Analyte was not detected in the sample at or above MDL.
PQL:	Practical Quantitation Limit or ML (Minimum Level as per RWQCB) is the minimum concentration that can be quantified with more than 99% confidence. Taking into account all aspects of the entire analytical instrumentation and practice.
Recov:	Recovered concentration in the sample.
RPD:	Relative Percent Difference

APPENDIX C
Statistical Analysis

	0	1	2	3
	0-0.5'	1-2'	2-3'	All
1	5.96	8.98	13.1	5.96
2	7.94	5.44	13.2	7.94
3	4.78	9.21	6.75	4.78
4	13.6	2.91	5.29	13.6
5	13.5	1.25	1.25	13.5
6	7.2	5.96	5.52	7.2
7	7.67	14.9	3.68	7.67
8		10.3	4.76	8.98
9				5.44
10				9.21
11				2.91
12				1.25
13				5.96
14				14.9
15				10.3
16				13.1
17				13.2
18				6.75
19				5.29
20				1.25
21				5.52
22				3.68
23				4.76

	Outlier Tests for Selected Variables
User Selected Options	
From File	WorkSheet_b.wst
Full Precision	OFF
Test for Suspected Outliers with Dixon test	1
Test for Suspected Outliers with Rosner test	1

Dixon's Outlier Test for 0-0.5'

Number of data = 8

10% critical value: 0.479

5% critical value: 0.554

1% critical value: 0.683

1. Data Value 132 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.939

For 10% significance level, 132 is an outlier.

For 5% significance level, 132 is an outlier.

For 1% significance level, 132 is an outlier.

2. Data Value 4.78 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.134

For 10% significance level, 4.78 is not an outlier.

For 5% significance level, 4.78 is not an outlier.

For 1% significance level, 4.78 is not an outlier.

Dixon's Outlier Test for 1-2'

Number of data = 8

10% critical value: 0.479

5% critical value: 0.554

1% critical value: 0.683

1. Data Value 14.9 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.384

For 10% significance level, 14.9 is not an outlier.

For 5% significance level, 14.9 is not an outlier.

For 1% significance level, 14.9 is not an outlier.

2. Data Value 1.25 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.183

For 10% significance level, 1.25 is not an outlier.

For 5% significance level, 1.25 is not an outlier.

For 1% significance level, 1.25 is not an outlier.

Dixon's Outlier Test for 2-3'

Number of data = 8

10% critical value: 0.479

5% critical value: 0.554

1% critical value: 0.683

1. Data Value 13.2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.011

For 10% significance level, 13.2 is not an outlier.

For 5% significance level, 13.2 is not an outlier.

For 1% significance level, 13.2 is not an outlier.

2. Data Value 1.25 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.205

For 10% significance level, 1.25 is not an outlier.

For 5% significance level, 1.25 is not an outlier.

For 1% significance level, 1.25 is not an outlier.

General UCL Statistics for Full Data Sets

User Selected Options	
From File	WorkSheet_b.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

0-0.5'

General Statistics

Number of Valid Observations	7	Number of Distinct Observations	7

Raw Statistics		Log-transformed Statistics	
Minimum	4.78	Minimum of Log Data	1.564
Maximum	13.6	Maximum of Log Data	2.61
Mean	8.664	Mean of log Data	2.092
Geometric Mean	8.103	SD of log Data	0.391
Median	7.67		
SD	3.507		
Std. Error of Mean	1.326		
Coefficient of Variation	0.405		
Skewness	0.814		

Warning: A sample size of 'n' = 7 may not adequate enough to compute meaningful and reliable test statistics and estimates!

It is suggested to collect at least 8 to 10 observations using these statistical methods!

If possible compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warning: There are only 7 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set,

the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.803	Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	11.24	95% H-UCL	12.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	14.24
95% Adjusted-CLT UCL (Chen-1995)	11.28	97.5% Chebyshev (MVUE) UCL	16.66
95% Modified-t UCL (Johnson-1978)	11.31	99% Chebyshev (MVUE) UCL	21.42
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.454	Data appear Normal at 5% Significance Level	
Theta Star	1.945		
MLE of Mean	8.664		

MLE of Standard Deviation	4.106		
nu star	62.35		
Approximate Chi Square Value (.05)	45.19	Nonparametric Statistics	
Adjusted Level of Significance	0.0158	95% CLT UCL	10.84
Adjusted Chi Square Value	40.81	95% Jackknife UCL	11.24
		95% Standard Bootstrap UCL	10.67
Anderson-Darling Test Statistic	0.47	95% Bootstrap-t UCL	14.43
Anderson-Darling 5% Critical Value	0.709	95% Hall's Bootstrap UCL	33.65
Kolmogorov-Smirnov Test Statistic	0.26	95% Percentile Bootstrap UCL	10.7
Kolmogorov-Smirnov 5% Critical Value	0.312	95% BCA Bootstrap UCL	11.04
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.44
		97.5% Chebyshev(Mean, Sd) UCL	16.94
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.85
95% Approximate Gamma UCL (Use when n >= 40)	11.96		
95% Adjusted Gamma UCL (Use when n < 40)	13.24		
Potential UCL to Use		Use 95% Student's-t UCL	11.24

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.

1-2'

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics		Log-transformed Statistics	
Minimum	1.25	Minimum of Log Data	0.223
Maximum	14.9	Maximum of Log Data	2.701
Mean	7.369	Mean of log Data	1.777
Geometric Mean	5.914	SD of log Data	0.798
Median	7.47		
SD	4.381		
Std. Error of Mean	1.549		
Coefficient of Variation	0.594		
Skewness	0.306		

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	

95% Student's-t UCL	10.3	95% H-UCL	19.78
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	17.46
95% Adjusted-CLT UCL (Chen-1995)	10.1	97.5% Chebyshev (MVUE) UCL	21.66
95% Modified-t UCL (Johnson-1978)	10.33	99% Chebyshev (MVUE) UCL	29.92
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.601	Data appear Normal at 5% Significance Level	
Theta Star	4.604		
MLE of Mean	7.369		
MLE of Standard Deviation	5.824		
nu star	25.61		
Approximate Chi Square Value (.05)	15.08	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0195	95% CLT UCL	9.916
Adjusted Chi Square Value	13.08	95% Jackknife UCL	10.3
		95% Standard Bootstrap UCL	9.773
Anderson-Darling Test Statistic	0.275	95% Bootstrap-t UCL	10.62
Anderson-Darling 5% Critical Value	0.723	95% Hall's Bootstrap UCL	10.33
Kolmogorov-Smirnov Test Statistic	0.202	95% Percentile Bootstrap UCL	9.716
Kolmogorov-Smirnov 5% Critical Value	0.297	95% BCA Bootstrap UCL	9.848
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.12
		97.5% Chebyshev(Mean, Sd) UCL	17.04
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	22.78
95% Approximate Gamma UCL (Use when n >= 40)	12.51		
95% Adjusted Gamma UCL (Use when n < 40)	14.43		
Potential UCL to Use		Use 95% Student's-t UCL	10.3

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.

2-3'

General Statistics

Number of Valid Observations	8	Number of Distinct Observations	8

Raw Statistics		**Log-transformed Statistics**	
Minimum	1.25	Minimum of Log Data	0.223
Maximum	13.2	Maximum of Log Data	2.58
Mean	6.694	Mean of log Data	1.69
Geometric Mean	5.421	SD of log Data	0.75
Median	5.405		
SD	4.296		
Std. Error of Mean	1.519		
Coefficient of Variation	0.642		
Skewness	0.812		

Warning: There are only 8 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set,
the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.865	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	9.571	95% H-UCL	16.08
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	15
95% Adjusted-CLT UCL (Chen-1995)	9.658	97.5% Chebyshev (MVUE) UCL	18.5
95% Modified-t UCL (Johnson-1978)	9.644	99% Chebyshev (MVUE) UCL	25.39

Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.662	Data appear Normal at 5% Significance Level	
Theta Star	4.027		
MLE of Mean	6.694		
MLE of Standard Deviation	5.192		
nu star	26.59		
Approximate Chi Square Value (.05)	15.84	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0195	95% CLT UCL	9.192
Adjusted Chi Square Value	13.78	95% Jackknife UCL	9.571
		95% Standard Bootstrap UCL	9.089
Anderson-Darling Test Statistic	0.364	95% Bootstrap-t UCL	12.17
Anderson-Darling 5% Critical Value	0.723	95% Hall's Bootstrap UCL	32.38
Kolmogorov-Smirnov Test Statistic	0.169	95% Percentile Bootstrap UCL	9.135
Kolmogorov-Smirnov 5% Critical Value	0.297	95% BCA Bootstrap UCL	9.444
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	13.31
		97.5% Chebyshev(Mean, Sd) UCL	16.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	21.81
95% Approximate Gamma UCL (Use when n >= 40)	11.24		
95% Adjusted Gamma UCL (Use when n < 40)	12.92		
Potential UCL to Use		Use 95% Student's-t UCL	9.571

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.

All

General Statistics

Number of Valid Observations	23	Number of Distinct Observations	21

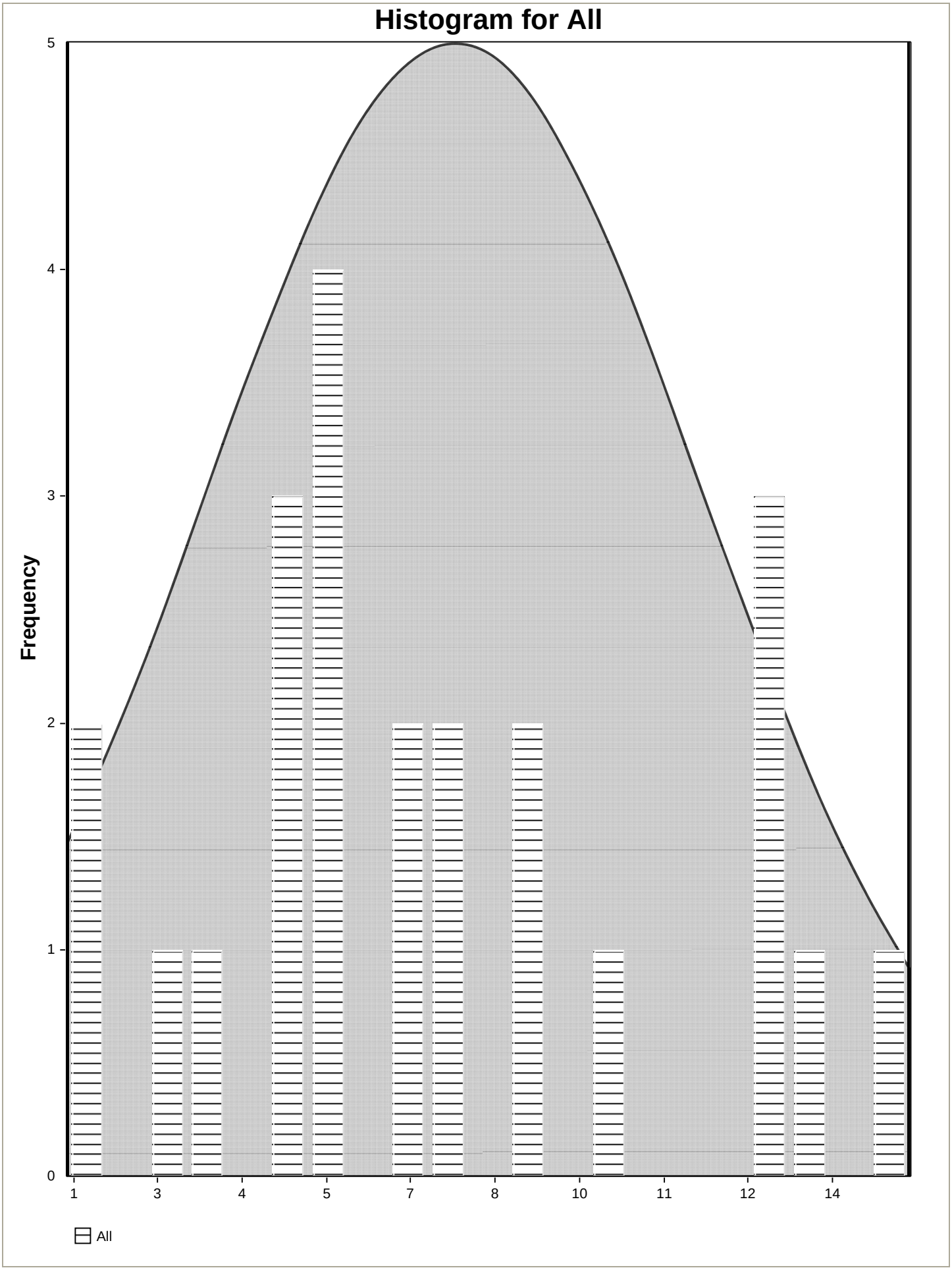
Raw Statistics		Log-transformed Statistics	
Minimum	1.25	Minimum of Log Data	0.223
Maximum	14.9	Maximum of Log Data	2.701
Mean	7.528	Mean of log Data	1.843
Geometric Mean	6.315	SD of log Data	0.673
Median	6.75		
SD	4.001		

Std. Error of Mean	0.834
Coefficient of Variation	0.531
Skewness	0.383

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical Value	0.914	Shapiro Wilk Critical Value	0.914
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	8.961	95% H-UCL	10.77
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.94
95% Adjusted-CLT UCL (Chen-1995)	8.972	97.5% Chebyshev (MVUE) UCL	15.16
95% Modified-t UCL (Johnson-1978)	8.972	99% Chebyshev (MVUE) UCL	19.5
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.639	Data appear Normal at 5% Significance Level	
Theta Star	2.853		
MLE of Mean	7.528		
MLE of Standard Deviation	4.634		
nu star	121.4		
Approximate Chi Square Value (.05)	96.95	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0389	95% CLT UCL	8.9
Adjusted Chi Square Value	95.37	95% Jackknife UCL	8.961
		95% Standard Bootstrap UCL	8.87
Anderson-Darling Test Statistic	0.4	95% Bootstrap-t UCL	9.072
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	8.999
Kolmogorov-Smirnov Test Statistic	0.121	95% Percentile Bootstrap UCL	8.894
Kolmogorov-Smirnov 5% Critical Value	0.183	95% BCA Bootstrap UCL	8.977
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.16
		97.5% Chebyshev(Mean, Sd) UCL	12.74
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.83
95% Approximate Gamma UCL (Use when n >= 40)	9.426		
95% Adjusted Gamma UCL (Use when n < 40)	9.583		
Potential UCL to Use		Use 95% Student's-t UCL	8.961

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.


Histogram for All
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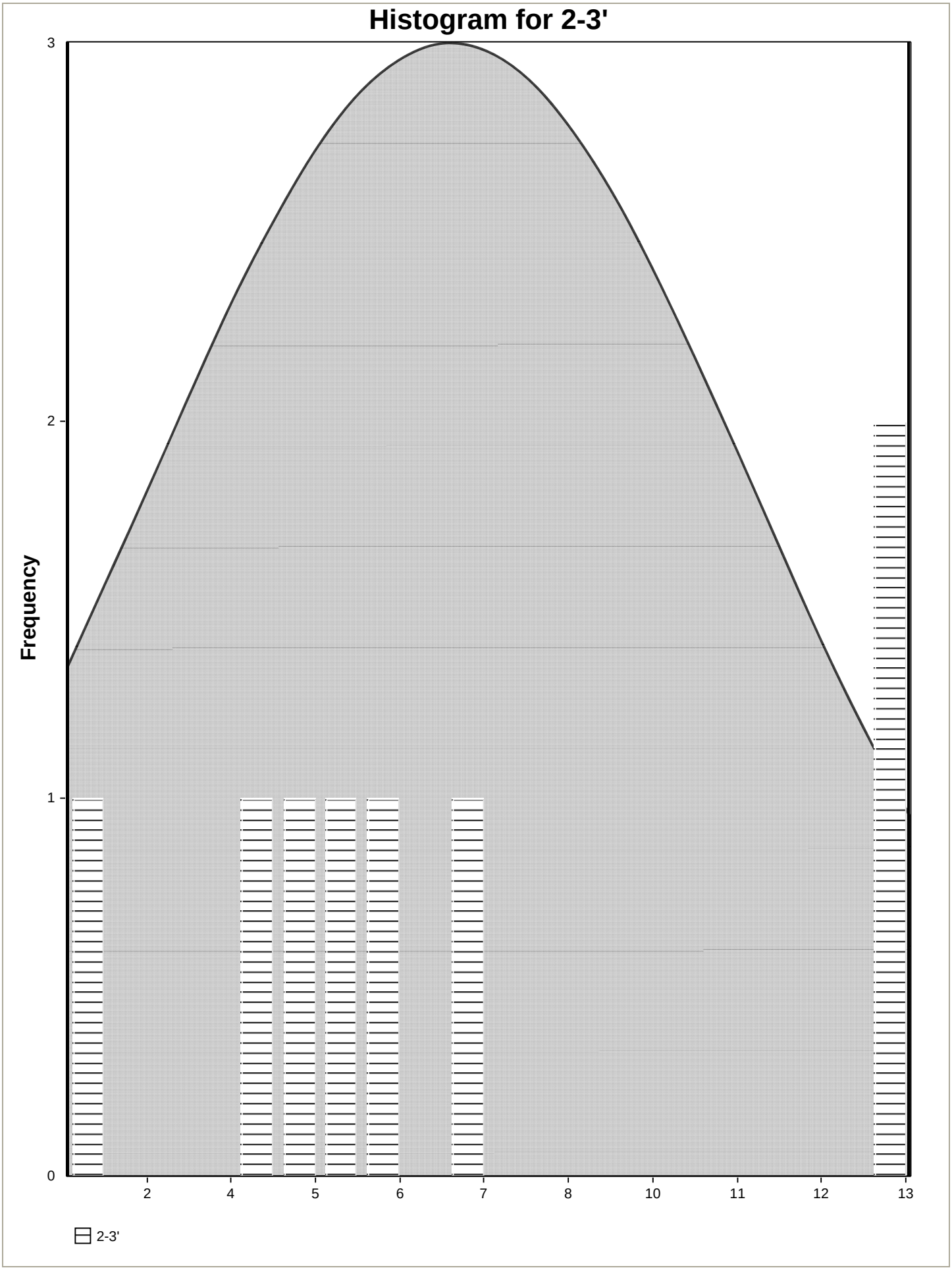
2
3
4
5
1
3
4
5
7
8
10
11
12
14
All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Frequency
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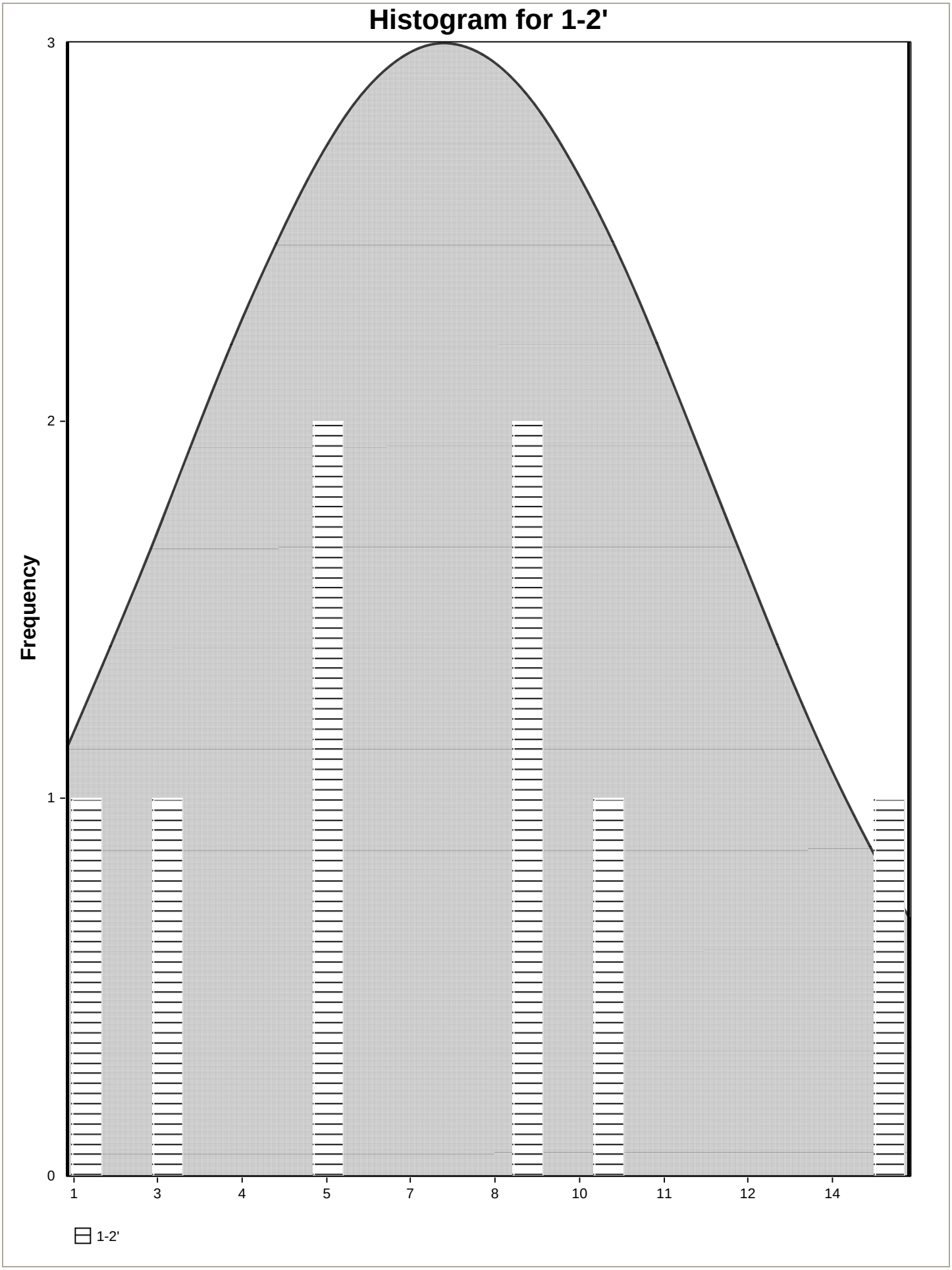
2
1
0
2
4
5
6
7
8
10
11
12
13
2-3'


Histogram for 1-2'
Frequency
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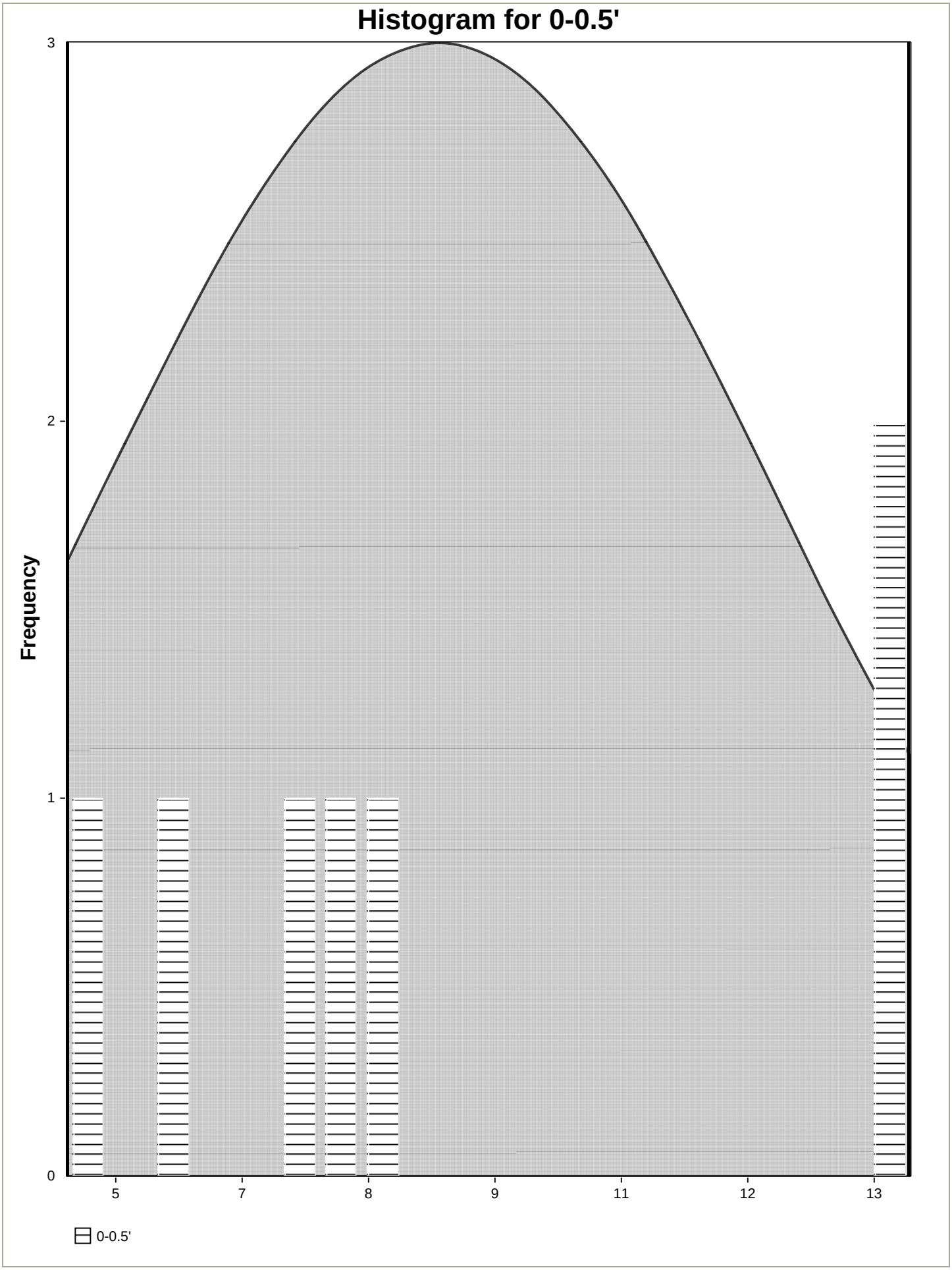
2
1
0
1
3
4
5
7
8
10
11
12
14
1-2'


Histogram for 0-0.5'
Frequency
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2
1
0
5
7
8
9
11
12
13
0-0.5'