



October 14, 2024

ADDENDUM NO. A

TO THE CONTRACT DOCUMENTS

FOR

JOE BACA MIDDLE SCHOOL - SOCCER FIELD IMPROVEMENTS

FOR THE

COLTON JOINT UNIFIED SCHOOL DISTRICT
777 W. VALLEY BLVD
COLTON CA. 92324

DSA #04-123755 FILE #36-H4 RCA Project No. 1-15-113

NOTICE TO BIDDERS

This Addendum forms a part of the Contract and modifies the original documents of DSA Approved on September 10, 2024. It is intended that all work affected by the following modifications shall conform with related provisions and general conditions of the contract of the original drawings and specifications. Modify the following items wherever appearing in any drawing or sections of the specifications. Acknowledge receipt of Addendum No. A in the space provided on the Bid Form. Failure to do so may subject bidder to disqualification.

GENERAL ITEMS

- | | |
|--------------|---|
| Item No. A.0 | Reference Geotechnical Report – attached for review |
| Item No. A.1 | Reference District Bidding Documents Section 00 01 01 – 1 Title Page |
| A.1.1 | Correct project No. to read “22-07” |
| Item No. A.2 | Reference District Bidding Documents Section 00 11 16 Notice to Bidders |
| A.2.1 | Revise Bid Schedule per table below: |
| | a) 1st Publication Friday, October 11, 2024 |
| | b) 2nd Publication Friday, October 18, 2024 |
| | c) Job Walk : Friday, October 25, 2024 @ 2PM |
| | d) RFI's and Prequalification Packages: October 30, 2024 |
| | e) BID Opening: November 13, 2024, 2PM |

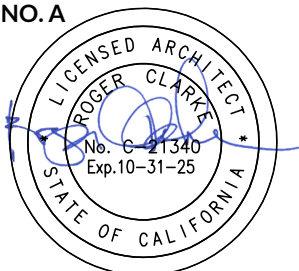
CHANGES TO SPECIFICATION – NA

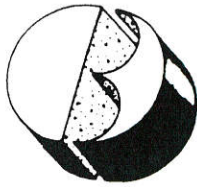
CHANGES TO THE DRAWINGS – N/A

ATTACHMENTS – Geotechnical Report, Bid Documents 00 01 01, NIB 00 11 16

END OF ADDENDUM NO. A

Roger Clarke, Principal
C-21340





John R. Byerly
I N C O R P O R A T E D

GEOTECHNICAL INVESTIGATION

JUNE 18, 2024

JOE BACA MIDDLE SCHOOL

SPORTS FIELD LIGHTING PROJECT AND FITNESS WALKING PATH

1640 S. LILAC AVENUE

BLOOMINGTON, CALIFORNIA

CLIENT:

COLTON JOINT UNIFIED SCHOOL DISTRICT

325 HERMOSA AVENUE, BUILDING #5

COLTON, CALIFORNIA 92324

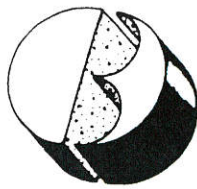
ATTENTION: DIANE MENDEZ, FACILITIES PROJECT MANAGER

DISTRIBUTION:
(1) CLIENT

RPT. NO.: 8402
FILE NO.: S-14697

GEOTECHNICAL ENGINEERS • TESTING AND INSPECTION

2257 South Lilac Ave., Bloomington, CA 92316-2903
Bloomington (909) 877-1324 Riverside (909) 783-1910 Fax (909) 877-5210



John R. Byerly

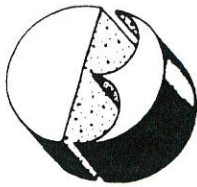
I N C O R P O R A T E D

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I N C O R P O R A T E D

Enclosures:

- (1) Plot Plan
- (2) Test Boring Logs
- (3) Maximum Density Determinations
- (4) Direct Shear Test Results
- (5) Seismic Settlement Analysis

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INTRODUCTION

During June of 2024, an investigation of the soil conditions underlying the planned improvements at the existing Joe Baca Middle School was conducted by this firm. The purpose of our investigation was to evaluate the surface and subsurface conditions at the site with respect to safe and economical foundation types, vertical and lateral bearing values, site preparation and liquefaction and seismic settlement potential. Included in the recommendations are the seismic design parameters as required by the 2022 edition of the California Building Code and ASCE Standard 7-16. Our geotechnical investigation, together with our conclusions and recommendations, is discussed in detail in the following report.

This report has been prepared for the exclusive use of the Colton Joint Unified School District and their design consultants for specific application to the project described herein. Should the project be modified, the conclusions and recommendations presented in this report should be reviewed by the geotechnical engineer. Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, express or implied.

PROJECT DESCRIPTION

We understand that planned improvements to the existing Joe Baca Middle School will consist of the installation of seven or nine sports field lighting poles around the perimeter of a turf area in the western portion of the property. Musco field lighting poles will be used and will have a height of either 60 feet or 80 feet. These poles utilize precast and prestressed pier footing elements. A pier diameter of 30 inches is preferred. It is anticipated that the light pole footings will have an embedment depth ranging from 10 feet to 16 feet. The light poles will exert relatively light foundation loads on the underlying soil. A fitness walking path with decomposed granite surfacing will be constructed adjacent to all the perimeters of the turf area except the east. New underground utility lines are also planned. Based on the site topography, minimal cuts and fills are proposed, and slopes and retaining walls are not planned. The site configuration is illustrated on Enclosure 1.

SITE CONDITIONS

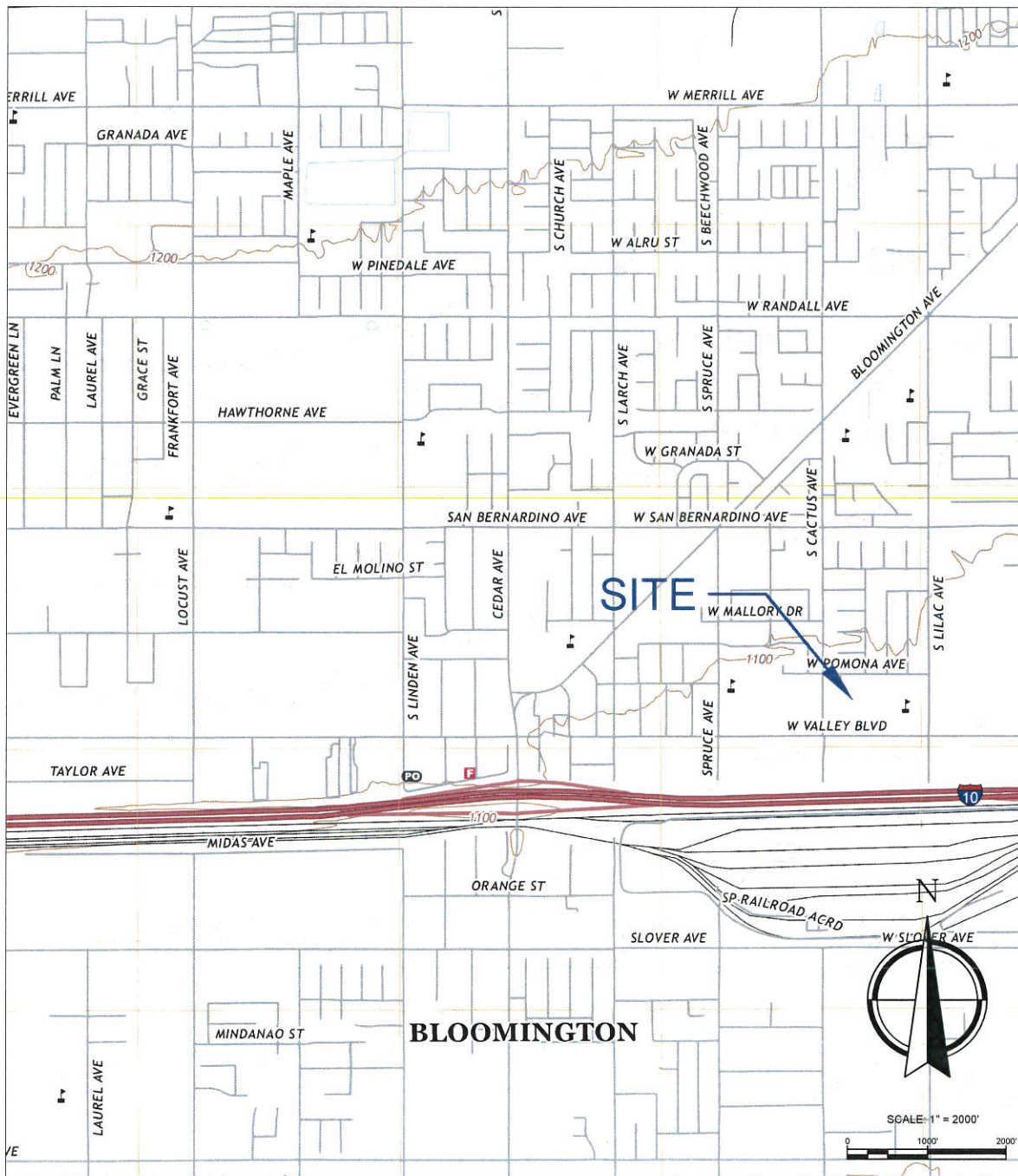
The existing Joe Baca Middle School is located on the northwest corner of West Valley Boulevard and South Lilac Avenue in the community of Bloomington. An Index Map showing the general vicinity of the site is presented on the following page. The coordinates of the site are latitude 34.0714° N and longitude -117.3825° W utilizing the North American Datum (NAD) from 1983. The property currently contains a middle school which consists of buildings, hardscape, landscape and playfield areas. Fences and gates are present on the property. The property to the north is occupied by single-family residences, and retail buildings are located to the east and south. The area topography is generally flat, sloping downward to the south at a gradient of less than 2 percent.

FIELD AND LABORATORY INVESTIGATION

The soils in the vicinity of the proposed light poles and walking path were explored by means of four test borings drilled with a limited-access track-mounted flight-auger to a maximum depth of 51.5 feet below the existing ground surface. The soils encountered were examined and visually classified by one of our field engineers. A summary of the soil classifications appears as Enclosure 2. The exploration logs show subsurface conditions at the dates and locations indicated, and may not be representative of other locations and times. The stratification lines presented on the logs represent the approximate boundaries between soil types, and the transitions may be gradual. A hollow-stem auger with an outside diameter of 7.9 inches was utilized. The inside diameter of the auger was 4.3 inches.

Bulk and relatively undisturbed samples were obtained at selected levels within the explorations and returned to our laboratory for testing and evaluation. The driving energy or blow counts required to advance the sampler at each sample interval were also noted. Relatively undisturbed soil samples were recovered at various intervals in the borings with a California sampler. The California sampler was a 2.9-inch outside diameter, 2.5-inch inside diameter, split-barrel sampler lined with brass tubes. The sampler was 18 inches long. The sampler conformed to the requirements of ASTM D 3550. A 140-pound automatic trip hammer was lifted hydraulically and was dropped 30 inches for each blow. Standard penetration tests were performed as Boring 1 was advanced. Standard penetration testing was performed with a 2.0-inch outside diameter, 1.5-inch inside diameter, split-barrel sampler. The sampler was 18 inches long. The inside diameter of the sampler shoe was 1.4 inches. The sampler

INDEX MAP



SOURCE DOCUMENTS: USGS FONTANA QUADRANGLE, CALIFORNIA, 7.5 MINUTE SERIES, 2021

TOWNSHIP AND RANGE: SECTION 23, T1S, R5W

LATITUDE: 34.0714° N

LONGITUDE: 117.3825° W



was unlined. The sampler conformed to the requirements of ASTM D 1586. A 140-pound automatic trip hammer was lifted hydraulically and was dropped 30 inches for each blow. An efficiency value of 1.0 was assumed for the automatic trip hammer.

Included in our laboratory testing were moisture/density determinations on all undisturbed samples. Optimum moisture content/maximum dry density relationships were established for typical soil types so that the relative compaction of the subsoils could be computed. Direct shear testing was conducted on selected samples to determine their strength parameters. The moisture/density data are presented on the boring logs, Enclosure 2. The maximum density and direct shear test results appear on Enclosures 3 and 4, respectively. Chemical testing, comprised of pH, soluble sulfate, chloride, redox potential and resistivity testing was also performed. The chemical test results are presented in the "Chemical Test Results" section of this report.

SOIL CONDITIONS

The soils encountered in our test borings consisted of loose to very dense sands and silty sands with varying amounts of gravel. Neither undocumented fill, bedrock or ground water was encountered in our explorations. The near-surface soils encountered in our test borings are granular and non-plastic, and are considered to have a very low expansion potential in accordance with ASTM D 4829.

LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction is a phenomenon that occurs when a soil undergoes a transformation from a solid state to a liquefied condition due to the effects of increased pore-water pressure. Loose saturated soils with particle sizes in the medium sand to silt range are particularly susceptible to liquefaction when subjected to seismic ground shaking. Affected soils lose all strength during liquefaction, and foundation failure can occur.

Free ground water was not encountered in our test borings. Based on a review of water well data from the State of California, the closest water well (State Well No. 01S05W22M003S) to the site is located approximately 4,200 feet to the west-southwest. The measured ground water in this well was at a depth of 257 feet below grade in October of 2006. For the purpose of this evaluation,

we have assumed an historic high ground water table of 250 feet below the ground surface. Due to the great depth to ground water, we conclude that the potential for liquefaction is low.

It is anticipated that major earthquake ground shaking will occur during the lifetime of the proposed development from the seismically active San Jacinto fault located approximately 3.8 miles northeast of the site. This fault would create the most significant earthshaking event. Based on an earthquake magnitude of 7.8, a peak horizontal ground acceleration of 0.739g is assigned to the site. To evaluate the potential for liquefaction and seismically induced settlement of the subsoils, the soils were analyzed for relative density. The most effective measurement of relative density of sands with respect to liquefaction potential is standard penetration resistance.

Using the information presented in Table 3 of Page 73 of the publication by Idriss and Boulanger (Soil Liquefaction During Earthquakes, Idriss and Boulanger, MNO-12, 2008) an analysis was conducted to determine the sampler correction factor C_s . The SPT sampler is machined to fit liners, therefore a correction factor of 1.0 may not be appropriate. Throughout the test boring, a calculation was performed to determine the average $(N_1)_{60}$ value from which C_s was subsequently determined. An average C_s value of 1.3 was calculated and used in the analysis.

The standard penetration data provided input for the LiquefyPro Version 4.3 program for liquefaction and seismically induced settlement potential. As indicated in Special Publication 117A (Revised) Release, "Guidelines for Evaluating and Mitigating Seismic Hazards in California, March 2009," a safety factor of 1.3 was used in this analysis.

The results of this evaluation are shown on Enclosure 5 and reveal a potential for 2.30 inches of seismic-induced settlement. The total settlement will occur over a large area and will not affect local buried utilities. This is an acceptable value for lighting poles..It is our opinion that neither liquefaction nor seismic settlement need be a consideration in the design of the light pole foundations.

CONCLUSIONS

The Musco lighting poles will be supported by prestressed precast piers that will potentially extend to a maximum depth of 16 feet. Due to the presence of relatively cohesionless soils, caving of excavation sidewalls may occur during construction. The use of casing may be required during construction. Detailed recommendations are presented below for light pole foundation design and for site preparation for the proposed walking path and underground utility installation.

RECOMMENDATIONS

FOUNDATION DESIGN FOR LIGHT STANDARDS

Musco field lighting poles will utilize precast and prestressed pier footing elements. It is our understanding that a pier diameter of 30 inches is anticipated. For pier embedment depths of 10 feet and 16 feet, average skin friction values of 180 pounds per square foot and 280 pounds per square foot, respectively, should be assumed. These values may be increased by one-third for wind or seismic loading. Lateral load capacity of the pier footings may be computed using any accepted pole footing formula. An allowable lateral earth pressure of 250 pounds per square foot per foot of depth is recommended. The lateral earth pressure should not exceed a maximum of 3,000 pounds per square foot.

SEISMIC DESIGN PARAMETERS

The 2022 California Building Code and ASCE Standard 7-16 coefficients and factors are provided in the following table:

<i>Factor or Coefficient</i>	<i>Value</i>
Latitude	34.0714° N
Longitude	-117.3825° W
S_s	1.748g
S_1	0.684g
F_a	1.2
F_v	1.7
S_{DS}	1.398g
S_{D1}	0.775g
S_{MS}	2.098g
S_{M1}	1.163g
PGA	0.739g
T_L	12 seconds
Site Class	D

CAVING POTENTIAL

Since some of the near-surface soils are relatively cohesionless, caving of the pier sidewalls may occur during the footing excavation process. It may be prudent to have casing available should sidewall caving occur.

WALKING PATH

Below the proposed walking path, prior to placement of the decomposed granite surfacing, a representative of this firm should observe the exposed soils prior to processing. Undocumented fill may be left in place as long as it contains less than 2 percent organics. Artificial fill with a relatively heavy organic content should be removed. Upon approval of the exposed soils, the soils should be scarified to a minimum depth of 12 inches below existing grade or 12 inches below proposed finished grade, whichever is deeper. Finished grade is defined as the elevation of the top of the subgrade. The scarified soils should be moistened to within 2 percent of the optimum moisture content and densified to a minimum relative compaction of 90 percent (ASTM D 1557). Decomposed granite surfacing should have a minimum thickness of 4 inches and should be placed over compacted subgrade.

Excavated soils and engineered fill should be placed in 8-inch or less lifts, moisture conditioned to within two percent of the optimum moisture content, and densified to a minimum relative compaction of 90 percent (ASTM D 1557). Granite surfacing should be moisture conditioned to within two percent of the optimum moisture content and densified to a minimum relative compaction of 90 percent (ASTM D 1557).

UTILITY TRENCH BACKFILL

If free of significant organic matter, the on-site soil is suitable for utility trench backfill. Utility trench backfill should be moisture conditioned to within two percent of the optimum moisture content and densified to a minimum relative compaction of 90 percent (ASTM D 1557).

CHEMICAL TEST RESULTS

The chemical test results from a sample taken from Boring 1 between the ground surface and a depth of 5 feet are shown on the following table:

Analysis	Result	Units
Saturated Resistivity	3750	ohm-cm
Chloride	ND (Not Detected)	ppm
Sulfate	40	ppm
pH	8.8	pH units
Redox Potential	220	mV

The chemical test results from a sample taken from Boring 2 between the ground surface and a depth of 4 feet are shown on the following table:

Analysis	Result	Units
Saturated Resistivity	2450	ohm-cm
Chloride	ND (Not Detected)	ppm
Sulfate	160	ppm
pH	8.5	pH units
Redox Potential	210	mV

The soil tested exhibited a relatively low soluble sulfate content; therefore, sulfate-resistant concrete will not be required for this project. The results of the pH testing in both borings indicate that the soils may be corrosive to buried ferrous-metal pipes. If buried ferrous metal pipes are to be utilized, recommendations for protection of buried ferrous metal should be provided by a corrosion engineer.

FOUNDATION AND GRADING PLAN REVIEW

The project foundation and grading plans should be reviewed by the geotechnical engineer. Additional recommendations may be required at that time.

CONSTRUCTION OBSERVATIONS

All earthwork operations and the drilling of the pier footing excavations for the light poles should be monitored by a representative of the geotechnical engineer. Observation of the pier footing installation will verify correlation of soil conditions encountered with those noted during the soils investigation, and verify embedment depths and widths.

The conclusions and recommendations presented in this report are based upon the field and laboratory investigation described herein and represent our best engineering judgment. Should conditions be encountered in the field that appear different from those described in this report, we should be contacted immediately in order that appropriate recommendations might be prepared.

Respectfully submitted,

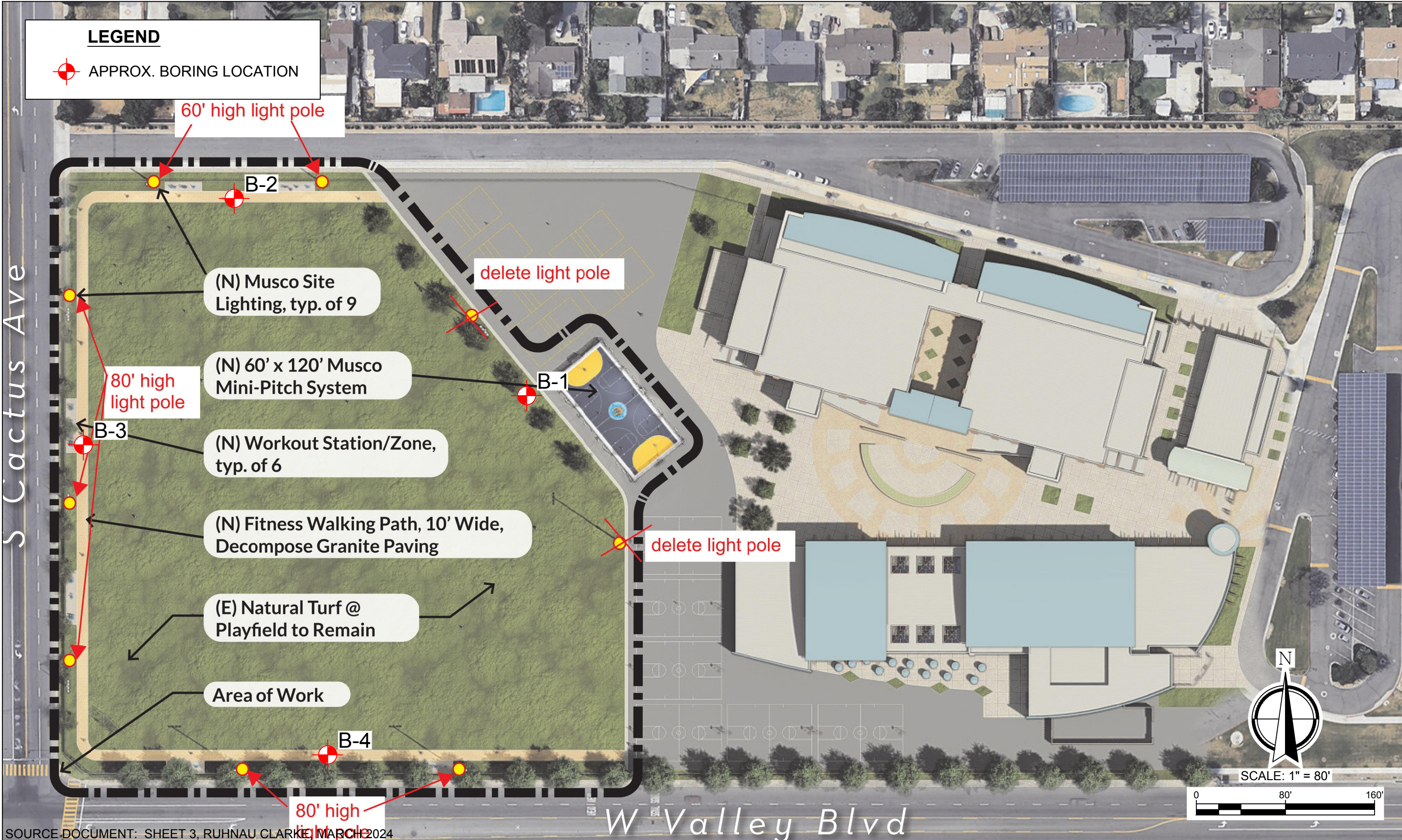
JOHN R. BYERLY, INC.



✓ John R. Byerly, Geotechnical Engineer
President

JRB:GSF:st

Enclosures: (1) Plot Plan
(2) Test Boring Logs
(3) Maximum Density Determinations
(4) Direct Shear Test Results
(5) Seismic Settlement Analysis



SOURCE DOCUMENT: SHEET 3, RUHNAU CLARK, MARCH 2024

B-1

Boring Date: 6/4/24

Surface Elevation:

Drilling Method: Limited-Access Track Rig

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0							SM	Brown silty fine to medium sand with a trace of gravel, moist, and loose
	8	106	7.9	---			SM	Brown silty fine to coarse sand with gravel, damp, and loose
	12	113	6.9	84				
5								
	12	111	4.0	83				-becoming medium dense at 6 feet
							SP	Light brown fine to coarse sand with gravel, damp, and medium dense
10								
	29	114	3.9	86			SM	Light brown silty fine sand, damp, and medium dense
	27							
15								
	28	112	3.8	86				
	20						SP	Light gray-brown fine to coarse sand with gravel, dry, and dense
20								
	46	118	1.6	90				
	30							
25								
	50/7"	---	2.6	---				-becoming very dense at 25 feet
	55							
30								
	50/10"	120	5.1	92				-becoming dense and damp at 30 feet
	46							
35								

LOG OF BORING



John R. Byerly, Inc.

**Joe Baca Middle School
Bloomington, California**

Enclosure 2, Page 1
Rpt. No.: 8402
File No.: S-14697

B-1

Boring Date: 6/4/24

Surface Elevation:

Drilling Method: Limited-Access Track Rig

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table	
35	64						-becoming very dense at 35 feet
40	34						-becoming dense at 40 feet
45	35						SM Gray-brown silty fine to coarse sand with gravel, damp, and dense
50	51						SP Gray-brown fine to coarse sand with gravel, damp, and very dense
55							Total Depth at 51.5 Feet No Free Ground Water Encountered
60							
65							
70							

LOG OF BORING



John R. Byerly, Inc.

**Joe Baca Middle School
Bloomington, California**

Enclosure 2, Page 2
Rpt. No.: 8402
File No.: S-14697

B-2

Boring Date: 6/4/24

Surface Elevation:

Drilling Method: Limited-Access Track Rig

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECTS-14697 (Rpt. No. 8402).log Date: 6/18/2024

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0								
	26	112	10.7	---		GWT not encountered	SM	Gray-brown silty fine to medium sand with a trace of gravel, moist, and medium dense
	37	119	5.5	89			SM	Brown silty fine to coarse sand with a trace of gravel, damp, and medium dense
5	15	116	5.9	87				
	33	117	3.0	89			SP	Light brown fine to coarse sand with gravel, damp, and medium dense
10	25	116	3.3	88				
15	47	118	14.1	91			SM	Gray-brown silty fine sand, wet, and dense
							SP	Light gray-brown fine to coarse sand with gravel, dry, and medium dense
20	37	114	2.4	87				
25	50/11"	118	2.3	90				-becoming dense at 25 feet
30								
35								

Total Depth at 26.4 Feet
No Free Ground Water Encountered

LOG OF BORING



John R. Byerly, Inc.

**Joe Baca Middle School
Bloomington, California**

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Rpt. No.: 8402
File No.: S-14697

B-3

Boring Date: 6/4/24

Surface Elevation:

Drilling Method: Limited-Access Track Rig

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Superlog4\PROJECTS-14697 (Rpt. No. 8402).log Date: 6/18/2024

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0								
	30	115	7.5	---			SM	Gray-brown silty fine to medium sand with a trace of gravel, moist, and medium dense
	30	117	5.8	87			SM	Gray-brown silty fine to coarse sand with gravel, damp, and medium dense
5	15	115	4.7	86				
	22	114	2.4	86			SP	Light brown fine to coarse sand with gravel, dry to damp, and medium dense
10	25	116	3.2	88				
15	29	113	8.5	87			SM	Gray-brown silty fine sand, moist, and medium dense
20	14	---	6.3	---			SM	Gray-brown silty fine to medium sand with a trace of gravel, damp, and medium dense
25	25	116	14.9	---				-becoming wet at 25 feet
30								
35								

LOG OF BORING



John R. Byerly, Inc.

**Joe Baca Middle School
Bloomington, California**

Enclosure 2, Page 4
Rpt. No.: 8402
File No.: S-14697

Total Depth at 26.5 Feet
No Free Ground Water Encountered

B-4

Boring Date: 6/4/24

Surface Elevation:

Drilling Method: Limited-Access Track Rig

Depth	Std. Pen. "N" Value	Blows/Ft.	Dry Density (PCF)	Moisture Content (%)	Rel. Compaction (%)	Water Table		
0								
	15	114	4.8	---			SM	Gray-brown silty fine to medium sand with gravel, damp, and medium dense
	11	112	7.2	84			SM	Brown silty fine to coarse sand with gravel, damp, and loose
5	14	112	6.3	84				
	10	111	5.8	83				
10	36	113	2.7	86			SP	Light brown fine to coarse sand with gravel, dry, and medium dense
15	12	106	25.1	82			SM	Gray-brown silty fine sand, wet, and loose
20	50/11"	119	2.4	91			SP	Light gray-brown fine to coarse sand with gravel, dry to damp, and dense
25	50/10"	118	3.5	90				
30								
35								

Total Depth at 26.3 Feet
No Free Ground Water Encountered

LOG OF BORING

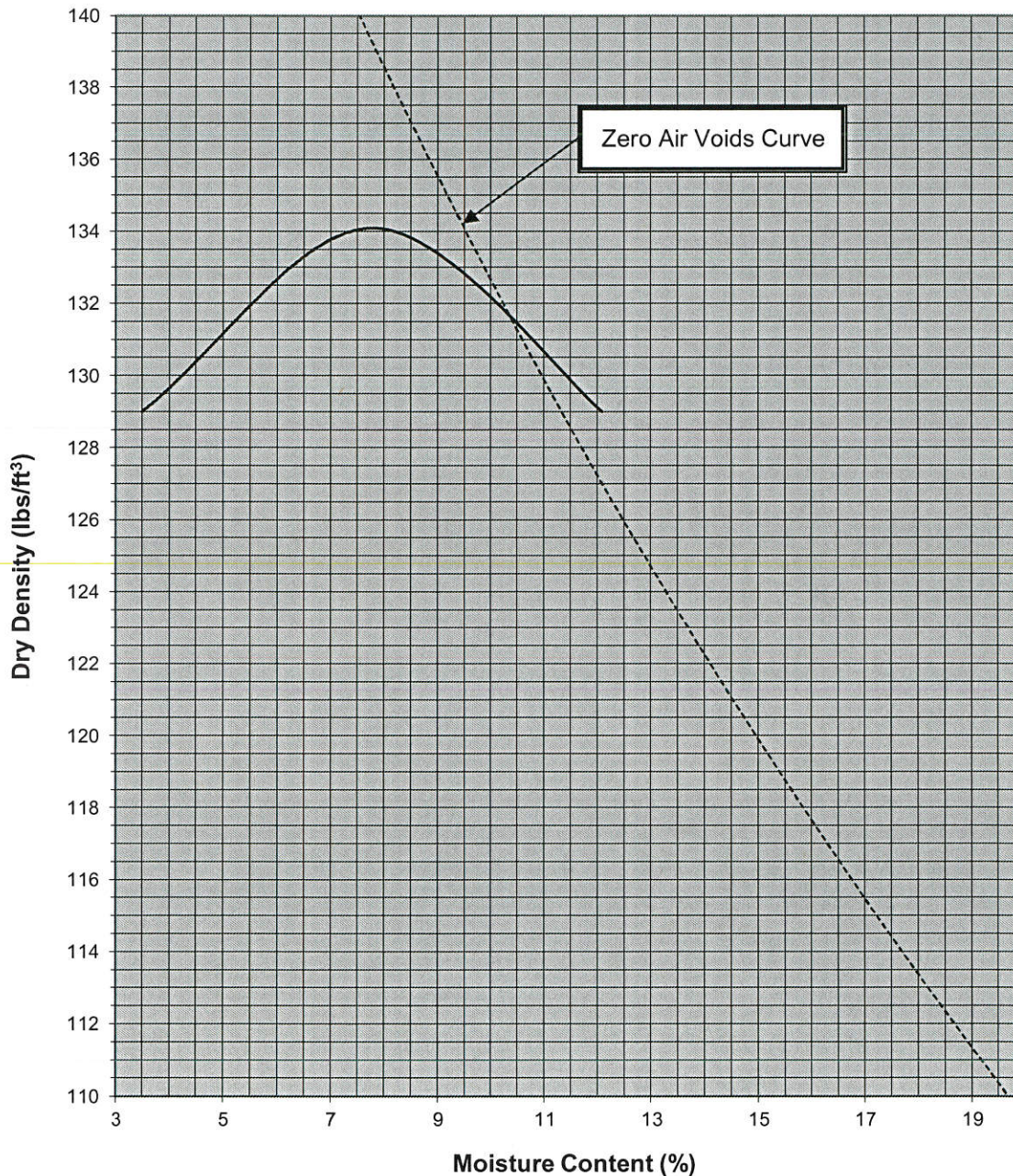


John R. Byerly, Inc.

**Joe Baca Middle School
Bloomington, California**

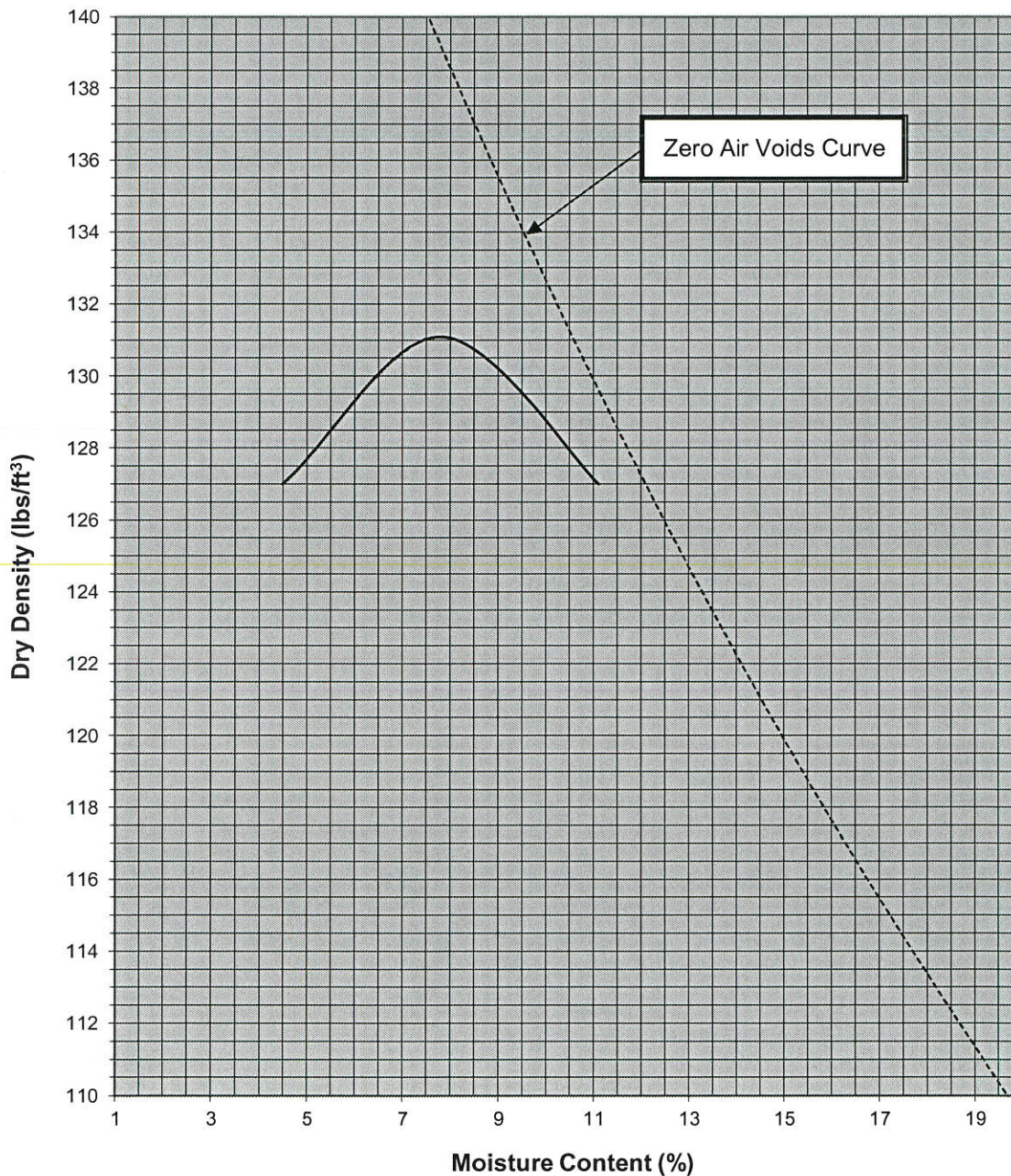
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Rpt. No.: 8402
File No.: S-14697

Moisture/Density Relationship ASTM D1557 (Method A)



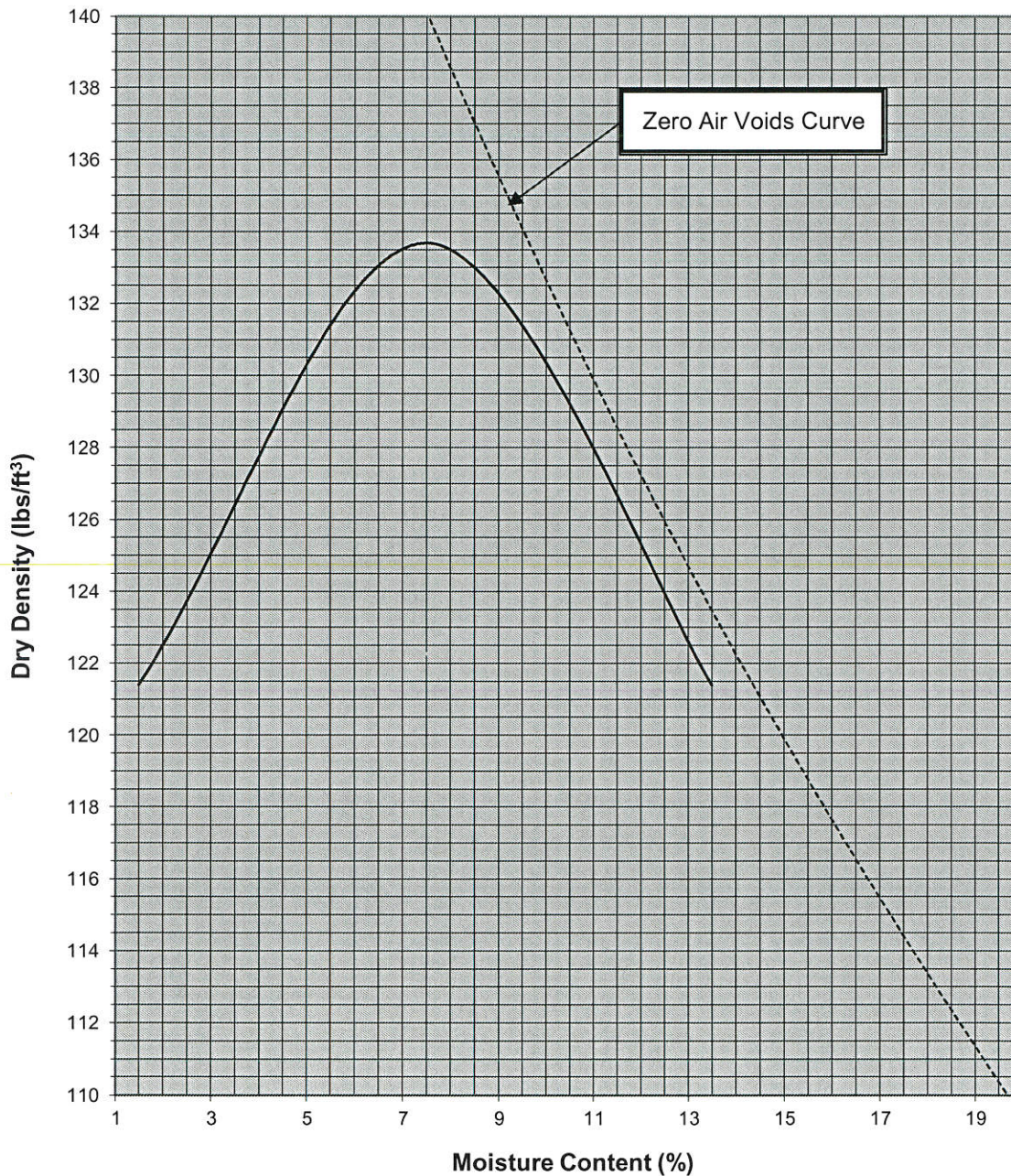
Boring No.	B-1
Depth (ft.)	3.5
Optimum Moisture (%)	7.8
Maximum Dry Density (pcf)	134.1
Soil Classification	Brown silty fine to coarse sand with gravel (SM)

**Moisture/Density Relationship
ASTM D1557 (Method A)**



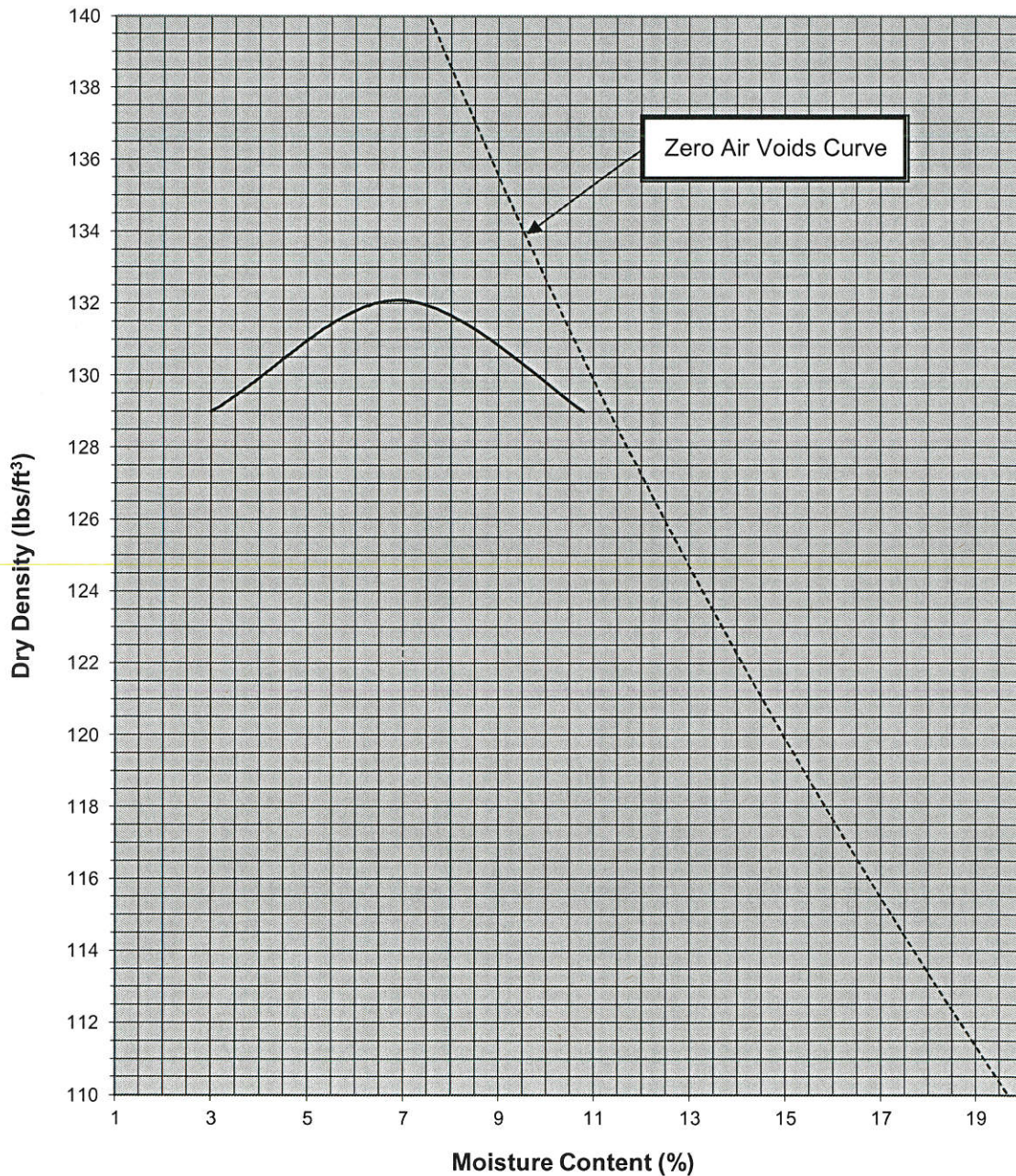
Boring No.	B-1
Depth (ft.)	20.5
Optimum Moisture (%)	7.8
Maximum Dry Density (pcf)	131.1
Soil Classification	Light gray-brown fine to coarse sand with gravel (SP)

**Moisture/Density Relationship
ASTM D1557 (Method A)**



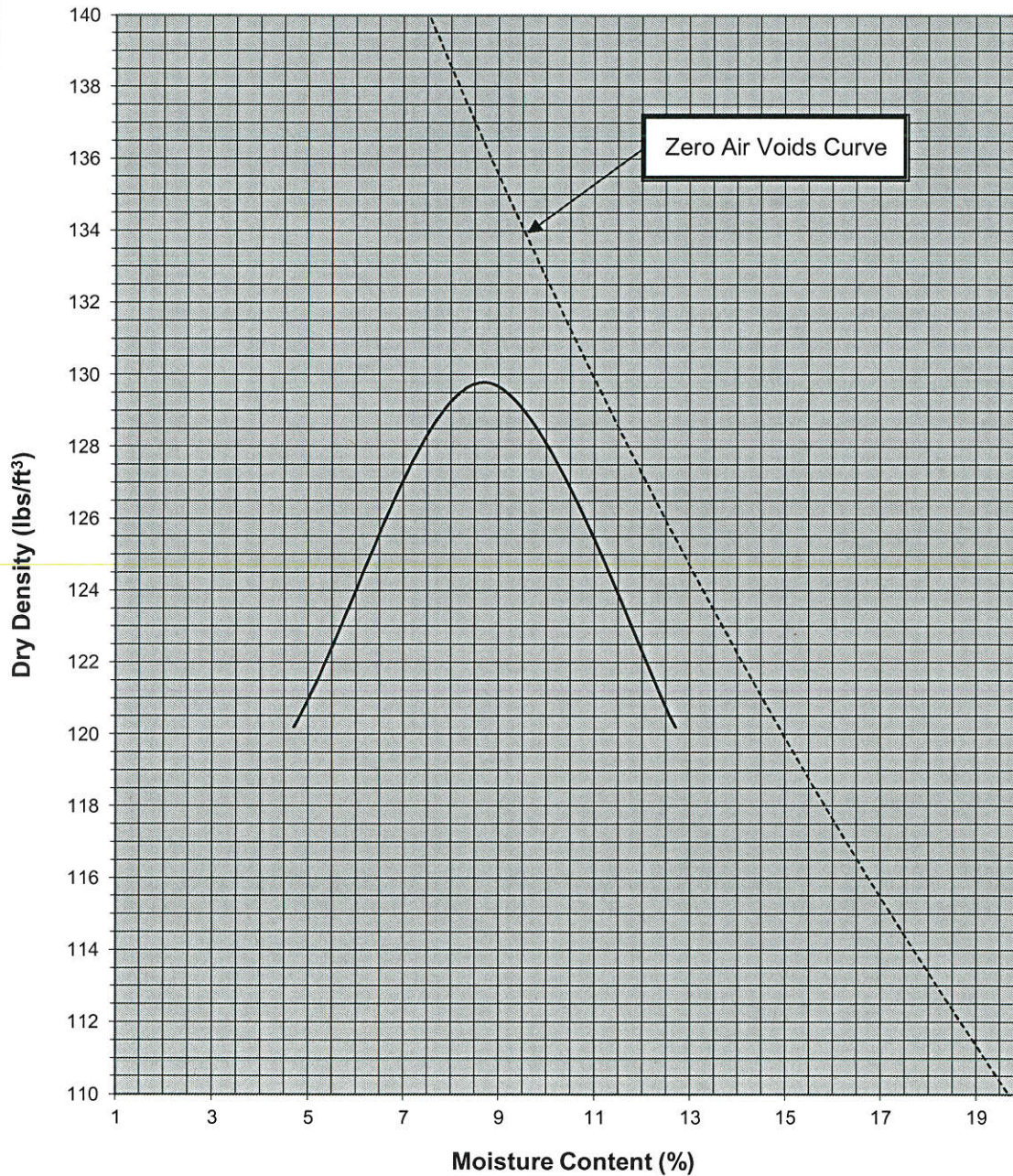
Boring No.	B-2
Depth (ft.)	3.5
Optimum Moisture (%)	7.5
Maximum Dry Density (pcf)	133.7
Soil Classification	Brown silty fine to coarse sand with a trace of gravel (SM)

**Moisture/Density Relationship
ASTM D1557 (Method A)**

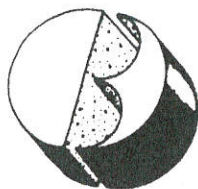


Boring No.	B-3
Depth (ft.)	7.5
Optimum Moisture (%)	6.9
Maximum Dry Density (pcf)	132.1
Soil Classification	Light brown fine to coarse sand with gravel (SP)

**Moisture/Density Relationship
ASTM D1557 (Method A)**



Boring No.	B-4
Depth (ft.)	15.5
Optimum Moisture (%)	8.7
Maximum Dry Density (pcf)	129.8
Soil Classification	Gray-brown silty fine sand (SM)



John R. Byerly

I N C O R P O R A T E D

DIRECT SHEAR TESTS

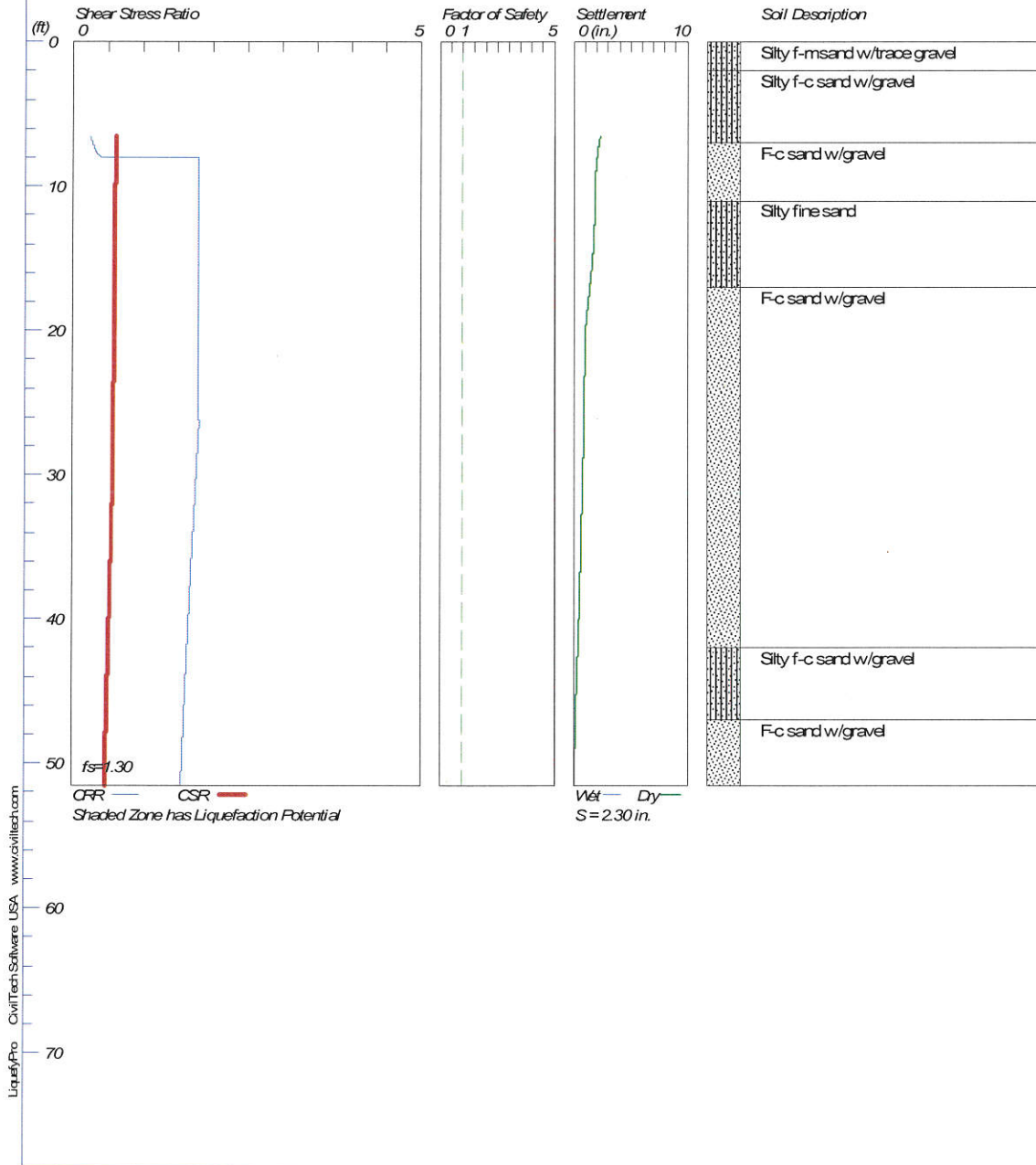
Test Boring No.	Depth of Sample (Ft.)	Angle of Internal Friction (°)	Cohesion (PSF)
B-3	7.5	32	10
B-4	7.5	30	80

LIQUEFACTION ANALYSIS

JOE BACA M.S. - PROPOSED FIELD LIGHTING AND FITNESS PATH

Hole No.=B-1 Water Depth=250.0 ft Surface Elev.=1087 feet AMSL

Magnitude=7.8
Acceleration=0.739g



John R. Byerly, Inc.

S-14697

S-14697.1.sum

LIQUEFACTION ANALYSIS CALCULATION SHEET

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Input File Name: P:\WORD PROCESSING\TerraServer\Liquefy4\S-14697.1.liq
Title: JOE BACA M.S. - PROPOSED FIELD LIGHTING AND FITNESS PATH
Subtitle: S-14697

Surface Elev.=1087 feet AMSL
Hole No.=B-1
Depth of Hole= 51.5 ft
Water Table during Earthquake= 250.0 ft
Water Table during In-Situ Testing= 250.0 ft
Max. Acceleration= 0.74 g
Earthquake Magnitude= 7.8
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1.15
Sampeling Method, Cs=1.3
SPT Fines Correction Method: Stark/Olson et al.*
Settlement Analysis Method: Ishihara / Yoshimine*
Fines Correction for Liquefaction: Stark/Olson et al.*
Fine Correction for Settlement: Post-Liq. Correction *
Average Input Data: Smooth*
* Recommended Options

Input Data:

Depth ft	SPT	Gamma pcf	Fines %
6.5	12.0	115.0	15.0
11.5	27.0	116.0	20.0
16.5	20.0	116.0	20.0
21.5	30.0	120.0	1.0
26.5	55.0	126.0	1.0
31.5	46.0	126.0	1.0
35.0	64.0	130.0	1.0
40.0	34.0	130.0	1.0
45.0	35.0	130.0	15.0
50.0	51.0	130.0	1.0

Output Results:

Settlement of saturated sands=0.00 in.
Settlement of dry sands=2.30 in.
Total settlement of saturated and dry sands=2.30 in.
Differential Settlement=1.151 to 1.520 in.

Depth ft	CRRm	CSRfs w/fs	F.S.	S_sat. in.	S_dry in.	S_all in.
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6.50	0.25	0.62	5.00	0.00	2.30	2.30
7.50	0.32	0.61	5.00	0.00	2.11	2.11
8.50	1.81	0.61	5.00	0.00	1.95	1.95
9.50	1.81	0.61	5.00	0.00	1.85	1.85
10.50	1.81	0.61	5.00	0.00	1.83	1.83
11.50	1.81	0.61	5.00	0.00	1.81	1.81
12.50	1.81	0.61	5.00	0.00	1.78	1.78
13.50	1.81	0.61	5.00	0.00	1.74	1.74
14.50	1.81	0.60	5.00	0.00	1.67	1.67
15.50	1.81	0.60	5.00	0.00	1.58	1.58
16.50	1.81	0.60	5.00	0.00	1.44	1.44
17.50	1.81	0.60	5.00	0.00	1.30	1.30
18.50	1.81	0.60	5.00	0.00	1.18	1.18
19.50	1.81	0.60	5.00	0.00	1.06	1.06
20.50	1.81	0.60	5.00	0.00	0.99	0.99
21.50	1.81	0.59	5.00	0.00	0.96	0.96
22.50	1.81	0.59	5.00	0.00	0.94	0.94
23.50	1.81	0.59	5.00	0.00	0.91	0.91
24.50	1.81	0.59	5.00	0.00	0.89	0.89
25.50	1.81	0.59	5.00	0.00	0.87	0.87
26.50	1.82	0.59	5.00	0.00	0.85	0.85
27.50	1.80	0.59	5.00	0.00	0.83	0.83
28.50	1.79	0.58	5.00	0.00	0.80	0.80
29.50	1.78	0.58	5.00	0.00	0.78	0.78
30.50	1.77	0.58	5.00	0.00	0.75	0.75
31.50	1.76	0.57	5.00	0.00	0.72	0.72
32.50	1.75	0.57	5.00	0.00	0.68	0.68
33.50	1.74	0.56	5.00	0.00	0.65	0.65
34.50	1.73	0.56	5.00	0.00	0.62	0.62
35.50	1.72	0.55	5.00	0.00	0.59	0.59
36.50	1.71	0.55	5.00	0.00	0.56	0.56
37.50	1.69	0.54	5.00	0.00	0.52	0.52
38.50	1.68	0.54	5.00	0.00	0.48	0.48
39.50	1.67	0.53	5.00	0.00	0.45	0.45
40.50	1.66	0.53	5.00	0.00	0.41	0.41
41.50	1.65	0.52	5.00	0.00	0.36	0.36
42.50	1.65	0.52	5.00	0.00	0.31	0.31
43.50	1.64	0.51	5.00	0.00	0.27	0.27
44.50	1.63	0.51	5.00	0.00	0.22	0.22
45.50	1.62	0.50	5.00	0.00	0.17	0.17
46.50	1.61	0.50	5.00	0.00	0.13	0.13
47.50	1.60	0.49	5.00	0.00	0.10	0.10
48.50	1.59	0.49	5.00	0.00	0.07	0.07
49.50	1.58	0.48	5.00	0.00	0.05	0.05
50.50	1.57	0.48	5.00	0.00	0.02	0.02
51.50	1.56	0.47	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight =
pcf, Settlement = in.

CRRm	cyclic resistance ratio from soils
CSRfs	cyclic stress ratio induced by a given earthquake (with user
request factor of safety)	
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
S_sat	Settlement from saturated sands
S_dry	Settlement from dry sands
S_all	Total settlement from saturated and dry sands
NoLiq	No-Liquefy Soils

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S-14697.1.cal

LIQUEFACTION ANALYSIS CALCULATION SHEET

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Input File Name: P:\WORD PROCESSING\TerraServer\Liquefy4\S-14697.1.liq
Title: JOE BACA M.S. - PROPOSED FIELD LIGHTING AND FITNESS PATH
Subtitle: S-14697

Input Data:

Surface Elev.=1087 feet AMSL
Hole No.=B-1
Depth of Hole=51.5 ft
Water Table during Earthquake= 250.0 ft
Water Table during In-Situ Testing= 250.0 ft
Max. Acceleration=0.74 g
Earthquake Magnitude=7.8
User defined factor of safty (applied to CSR) User fs=1.3
fs=user, Plot one CSR (fs=user)

Hammer Energy Ratio, Ce=1
Borehole Diameter, Cb=1.15
Sampeling Method, Cs=1.3
SPT Fines Correction Method: Stark/Olson et al.*
Settlement Analysis Method: Ishihara / Yoshimine*
Fines Correction for Liquefaction: Stark/Olson et al.*
Fine Correction for Settlement: Post-Liq. Correction *
Average Input Data: Smooth*
* Recommended Options

Depth ft	SPT	Gamma pcf	Fines %
6.5	12.0	115.0	15.0
11.5	27.0	116.0	20.0
16.5	20.0	116.0	20.0
21.5	30.0	120.0	1.0
26.5	55.0	126.0	1.0
31.5	46.0	126.0	1.0
35.0	64.0	130.0	1.0
40.0	34.0	130.0	1.0
45.0	35.0	130.0	15.0
50.0	51.0	130.0	1.0

Output Results: (Interval = 1.00 ft)

CSR Calculation:

Depth ft	gamma pcf	sigma tsf	gamma' pcf	sigma' tsf	rd	CSR	fs (user)	CSRfs w/fs
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S-14697.1.cal								
6.50	115.0	0.374	115.0	0.374	0.98	0.47	1.3	0.62
7.50	115.2	0.431	115.2	0.431	0.98	0.47	1.3	0.61
8.50	115.4	0.489	115.4	0.489	0.98	0.47	1.3	0.61
9.50	115.6	0.547	115.6	0.547	0.98	0.47	1.3	0.61
10.50	115.8	0.605	115.8	0.605	0.98	0.47	1.3	0.61
11.50	116.0	0.662	116.0	0.662	0.97	0.47	1.3	0.61
12.50	116.0	0.720	116.0	0.720	0.97	0.47	1.3	0.61
13.50	116.0	0.778	116.0	0.778	0.97	0.47	1.3	0.61
14.50	116.0	0.836	116.0	0.836	0.97	0.46	1.3	0.60
15.50	116.0	0.894	116.0	0.894	0.96	0.46	1.3	0.60
16.50	116.0	0.952	116.0	0.952	0.96	0.46	1.3	0.60
17.50	116.8	1.011	116.8	1.011	0.96	0.46	1.3	0.60
18.50	117.6	1.069	117.6	1.069	0.96	0.46	1.3	0.60
19.50	118.4	1.128	118.4	1.128	0.95	0.46	1.3	0.60
20.50	119.2	1.188	119.2	1.188	0.95	0.46	1.3	0.60
21.50	120.0	1.247	120.0	1.247	0.95	0.46	1.3	0.59
22.50	121.2	1.308	121.2	1.308	0.95	0.46	1.3	0.59
23.50	122.4	1.369	122.4	1.369	0.95	0.45	1.3	0.59
24.50	123.6	1.430	123.6	1.430	0.94	0.45	1.3	0.59
25.50	124.8	1.492	124.8	1.492	0.94	0.45	1.3	0.59
26.50	126.0	1.555	126.0	1.555	0.94	0.45	1.3	0.59
27.50	126.0	1.618	126.0	1.618	0.94	0.45	1.3	0.59
28.50	126.0	1.681	126.0	1.681	0.93	0.45	1.3	0.58
29.50	126.0	1.744	126.0	1.744	0.93	0.45	1.3	0.58
30.50	126.0	1.807	126.0	1.807	0.93	0.45	1.3	0.58
31.50	126.0	1.870	126.0	1.870	0.92	0.44	1.3	0.57
32.50	127.1	1.933	127.1	1.933	0.91	0.44	1.3	0.57
33.50	128.3	1.997	128.3	1.997	0.90	0.43	1.3	0.56
34.50	129.4	2.061	129.4	2.061	0.89	0.43	1.3	0.56
35.50	130.0	2.126	130.0	2.126	0.89	0.43	1.3	0.55
36.50	130.0	2.191	130.0	2.191	0.88	0.42	1.3	0.55
37.50	130.0	2.256	130.0	2.256	0.87	0.42	1.3	0.54
38.50	130.0	2.321	130.0	2.321	0.86	0.41	1.3	0.54
39.50	130.0	2.386	130.0	2.386	0.85	0.41	1.3	0.53
40.50	130.0	2.451	130.0	2.451	0.84	0.41	1.3	0.53
41.50	130.0	2.516	130.0	2.516	0.84	0.40	1.3	0.52
42.50	130.0	2.581	130.0	2.581	0.83	0.40	1.3	0.52
43.50	130.0	2.646	130.0	2.646	0.82	0.39	1.3	0.51
44.50	130.0	2.711	130.0	2.711	0.81	0.39	1.3	0.51
45.50	130.0	2.776	130.0	2.776	0.80	0.39	1.3	0.50
46.50	130.0	2.841	130.0	2.841	0.80	0.38	1.3	0.50
47.50	130.0	2.906	130.0	2.906	0.79	0.38	1.3	0.49
48.50	130.0	2.971	130.0	2.971	0.78	0.37	1.3	0.49
49.50	130.0	3.036	130.0	3.036	0.77	0.37	1.3	0.48
50.50	130.0	3.101	130.0	3.101	0.76	0.37	1.3	0.48
51.50	130.0	3.166	130.0	3.166	0.75	0.36	1.3	0.47

CSR is based on water table at 250.0 during earthquake

CRR Calculation from SPT or BPT data:									
(N1)60f	Depth CRR7.5 ft	SPT	Cebs	Cr	sigma'	Cn	(N1)60	Fines %	d(N1)60
—	6.50	12.00	1.49	0.75	0.374	1.64	22.01	15.0	2.40
24.41	0.27								
	7.50	15.00	1.49	0.75	0.431	1.52	25.61	16.0	2.64
28.25	0.35								
	8.50	18.00	1.49	0.85	0.489	1.43	32.71	17.0	2.88
35.59	2.00								
	9.50	21.00	1.49	0.85	0.547	1.35	36.09	18.0	3.12

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39.21	2.00								
	10.50	24.00	1.49	0.85	0.605	1.29	39.22	19.0	3.36
42.58	2.00								
	11.50	27.00	1.49	0.85	0.662	1.23	42.15	20.0	3.60
45.75	2.00								
	12.50	25.60	1.49	0.85	0.720	1.18	38.33	20.0	3.60
41.93	2.00								
	13.50	24.20	1.49	0.85	0.778	1.13	34.85	20.0	3.60
38.45	2.00								
	14.50	22.80	1.49	0.85	0.836	1.09	31.68	20.0	3.60
35.28	2.00								
	15.50	21.40	1.49	0.95	0.894	1.06	32.14	20.0	3.60
35.74	2.00								
	16.50	20.00	1.49	0.95	0.952	1.02	29.10	20.0	3.60
32.70	2.00								
	17.50	22.00	1.49	0.95	1.011	0.99	31.08	16.2	2.69
33.77	2.00								
	18.50	24.00	1.49	0.95	1.069	0.97	32.96	12.4	1.78
34.74	2.00								
	19.50	26.00	1.49	0.95	1.128	0.94	34.76	8.6	0.86
35.63	2.00								
	20.50	28.00	1.49	0.95	1.188	0.92	36.49	4.8	0.00
36.49	2.00								
	21.50	30.00	1.49	0.95	1.247	0.90	38.15	1.0	0.00
38.15	2.00								
	22.50	35.00	1.49	0.95	1.308	0.87	43.47	1.0	0.00
43.47	2.00								
	23.50	40.00	1.49	0.95	1.369	0.85	48.56	1.0	0.00
48.56	2.00								
	24.50	45.00	1.49	0.95	1.430	0.84	53.44	1.0	0.00
53.44	2.00								
	25.50	50.00	1.49	0.95	1.492	0.82	58.13	1.0	0.00
58.13	2.00								
	26.50	55.00	1.49	0.95	1.555	0.80	62.64	1.0	0.00
62.64	2.00								
	27.50	53.20	1.49	0.95	1.618	0.79	59.40	1.0	0.00
59.40	2.00								
	28.50	51.40	1.49	1.00	1.681	0.77	59.27	1.0	0.00
59.27	2.00								
	29.50	49.60	1.49	1.00	1.744	0.76	56.15	1.0	0.00
56.15	2.00								
	30.50	47.80	1.49	1.00	1.807	0.74	53.16	1.0	0.00
53.16	2.00								
	31.50	46.00	1.49	1.00	1.870	0.73	50.29	1.0	0.00
50.29	2.00								
	32.50	51.14	1.49	1.00	1.933	0.72	54.99	1.0	0.00
54.99	2.00								
	33.50	56.28	1.49	1.00	1.997	0.71	59.54	1.0	0.00
59.54	2.00								
	34.50	61.43	1.49	1.00	2.061	0.70	63.96	1.0	0.00
63.96	2.00								
	35.50	61.00	1.49	1.00	2.126	0.69	62.54	1.0	0.00
62.54	2.00								
	36.50	55.00	1.49	1.00	2.191	0.68	55.55	1.0	0.00
55.55	2.00								
	37.50	49.00	1.49	1.00	2.256	0.67	48.77	1.0	0.00
48.77	2.00								
	38.50	43.00	1.49	1.00	2.321	0.66	42.20	1.0	0.00
42.20	2.00								
	39.50	37.00	1.49	1.00	2.386	0.65	35.81	1.0	0.00
35.81	2.00								
	40.50	34.10	1.49	1.00	2.451	0.64	32.56	2.4	0.00
32.56	2.00								

				S-14697.1.cal					
32.37	41.50	34.30	1.49	1.00	2.516	0.63	32.33	5.2	0.05
	2.00								
	42.50	34.50	1.49	1.00	2.581	0.62	32.10	8.0	0.72
32.82	2.00								
	43.50	34.70	1.49	1.00	2.646	0.61	31.89	10.8	1.39
33.28	2.00								
	44.50	34.90	1.49	1.00	2.711	0.61	31.69	13.6	2.06
33.75	2.00								
	45.50	36.60	1.49	1.00	2.776	0.60	32.84	13.6	2.06
34.90	2.00								
	46.50	39.80	1.49	1.00	2.841	0.59	35.30	10.8	1.39
36.69	2.00								
	47.50	43.00	1.49	1.00	2.906	0.59	37.71	8.0	0.72
38.43	2.00								
	48.50	46.20	1.49	1.00	2.971	0.58	40.07	5.2	0.05
40.12	2.00								
	49.50	49.40	1.49	1.00	3.036	0.57	42.38	2.4	0.00
42.38	2.00								
	50.50	51.00	1.49	1.00	3.101	0.57	43.30	1.0	0.00
43.30	2.00								
	51.50	51.00	1.49	1.00	3.166	0.56	42.85	1.0	0.00
42.85	2.00								

CRR is based on water table at 250.0 during In-Situ Testing

Factor of Safety, - Earthquake Magnitude= 7.8:								
Depth ft	sigC' tsf	CRR7.5 tsf	Ksigma	CRRV	MSF	CRRm	CSRfs w/fs	F.S. CRRm/CSRfs
6.50	0.24	0.27	1.00	0.27	0.90	0.25	0.62	5.00
7.50	0.28	0.35	1.00	0.35	0.90	0.32	0.61	5.00
8.50	0.32	2.00	1.00	2.00	0.90	1.81	0.61	5.00
9.50	0.36	2.00	1.00	2.00	0.90	1.81	0.61	5.00
10.50	0.39	2.00	1.00	2.00	0.90	1.81	0.61	5.00
11.50	0.43	2.00	1.00	2.00	0.90	1.81	0.61	5.00
12.50	0.47	2.00	1.00	2.00	0.90	1.81	0.61	5.00
13.50	0.51	2.00	1.00	2.00	0.90	1.81	0.61	5.00
14.50	0.54	2.00	1.00	2.00	0.90	1.81	0.60	5.00
15.50	0.58	2.00	1.00	2.00	0.90	1.81	0.60	5.00
16.50	0.62	2.00	1.00	2.00	0.90	1.81	0.60	5.00
17.50	0.66	2.00	1.00	2.00	0.90	1.81	0.60	5.00
18.50	0.70	2.00	1.00	2.00	0.90	1.81	0.60	5.00
19.50	0.73	2.00	1.00	2.00	0.90	1.81	0.60	5.00
20.50	0.77	2.00	1.00	2.00	0.90	1.81	0.60	5.00
21.50	0.81	2.00	1.00	2.00	0.90	1.81	0.59	5.00
22.50	0.85	2.00	1.00	2.00	0.90	1.81	0.59	5.00
23.50	0.89	2.00	1.00	2.00	0.90	1.81	0.59	5.00
24.50	0.93	2.00	1.00	2.00	0.90	1.81	0.59	5.00
25.50	0.97	2.00	1.00	2.00	0.90	1.81	0.59	5.00
26.50	1.01	2.00	1.00	2.01	0.90	1.82	0.59	5.00
27.50	1.05	2.00	1.00	2.00	0.90	1.80	0.59	5.00
28.50	1.09	2.00	0.99	1.98	0.90	1.79	0.58	5.00
29.50	1.13	2.00	0.99	1.97	0.90	1.78	0.58	5.00
30.50	1.17	2.00	0.98	1.96	0.90	1.77	0.58	5.00
31.50	1.22	2.00	0.97	1.95	0.90	1.76	0.57	5.00
32.50	1.26	2.00	0.97	1.93	0.90	1.75	0.57	5.00
33.50	1.30	2.00	0.96	1.92	0.90	1.74	0.56	5.00
34.50	1.34	2.00	0.95	1.91	0.90	1.73	0.56	5.00
35.50	1.38	2.00	0.95	1.90	0.90	1.72	0.55	5.00
36.50	1.42	2.00	0.94	1.89	0.90	1.71	0.55	5.00
37.50	1.47	2.00	0.94	1.87	0.90	1.69	0.54	5.00

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38.50	1.51	2.00	0.93	1.86	0.90	1.68	0.54	5.00
39.50	1.55	2.00	0.93	1.85	0.90	1.67	0.53	5.00
40.50	1.59	2.00	0.92	1.84	0.90	1.66	0.53	5.00
41.50	1.64	2.00	0.92	1.83	0.90	1.65	0.52	5.00
42.50	1.68	2.00	0.91	1.82	0.90	1.65	0.52	5.00
43.50	1.72	2.00	0.90	1.81	0.90	1.64	0.51	5.00
44.50	1.76	2.00	0.90	1.80	0.90	1.63	0.51	5.00
45.50	1.80	2.00	0.89	1.79	0.90	1.62	0.50	5.00
46.50	1.85	2.00	0.89	1.78	0.90	1.61	0.50	5.00
47.50	1.89	2.00	0.88	1.77	0.90	1.60	0.49	5.00
48.50	1.93	2.00	0.88	1.76	0.90	1.59	0.49	5.00
49.50	1.97	2.00	0.87	1.75	0.90	1.58	0.48	5.00
50.50	2.02	2.00	0.87	1.74	0.90	1.57	0.48	5.00
51.50	2.06	2.00	0.87	1.73	0.90	1.56	0.47	5.00

* F.S.<1: Liquefaction Potential Zone. (If above water table: F.S.=5)
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

CPT convert to SPT for Settlement Analysis:

Fines Correction for Settlement Analysis:

Depth ft	Ic	qc/N60	qc1 tsf	(N1)60	Fines %	d(N1)60	(N1)60s
6.50	-	-	-	22.01	15.0	1.37	23.38
7.50	-	-	-	25.61	16.0	1.46	27.07
8.50	-	-	-	32.71	17.0	1.54	34.25
9.50	-	-	-	36.09	18.0	1.62	37.72
10.50	-	-	-	39.22	19.0	1.71	40.93
11.50	-	-	-	42.15	20.0	1.79	43.94
12.50	-	-	-	38.33	20.0	1.79	40.11
13.50	-	-	-	34.85	20.0	1.79	36.64
14.50	-	-	-	31.68	20.0	1.79	33.47
15.50	-	-	-	32.14	20.0	1.79	33.92
16.50	-	-	-	29.10	20.0	1.79	30.89
17.50	-	-	-	31.08	16.2	1.47	32.55
18.50	-	-	-	32.96	12.4	1.15	34.11
19.50	-	-	-	34.76	8.6	0.81	35.57
20.50	-	-	-	36.49	4.8	0.46	36.95
21.50	-	-	-	38.15	1.0	0.10	38.25
22.50	-	-	-	43.47	1.0	0.10	43.57
23.50	-	-	-	48.56	1.0	0.10	48.66
24.50	-	-	-	53.44	1.0	0.10	53.54
25.50	-	-	-	58.13	1.0	0.10	58.23
26.50	-	-	-	62.64	1.0	0.10	62.74
27.50	-	-	-	59.40	1.0	0.10	59.50
28.50	-	-	-	59.27	1.0	0.10	59.37
29.50	-	-	-	56.15	1.0	0.10	56.25
30.50	-	-	-	53.16	1.0	0.10	53.26
31.50	-	-	-	50.29	1.0	0.10	50.39
32.50	-	-	-	54.99	1.0	0.10	55.09
33.50	-	-	-	59.54	1.0	0.10	59.64
34.50	-	-	-	63.96	1.0	0.10	64.06
35.50	-	-	-	62.54	1.0	0.10	62.64
36.50	-	-	-	55.55	1.0	0.10	55.64
37.50	-	-	-	48.77	1.0	0.10	48.87
38.50	-	-	-	42.20	1.0	0.10	42.29
39.50	-	-	-	35.81	1.0	0.10	35.91
40.50	-	-	-	32.56	2.4	0.23	32.79
41.50	-	-	-	32.33	5.2	0.50	32.82
42.50	-	-	-	32.10	8.0	0.75	32.86
43.50	-	-	-	31.89	10.8	1.01	32.90
44.50	-	-	-	31.69	13.6	1.25	32.94

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45.50	-	-	-	32.84	13.6	1.25	34.09
46.50	-	-	-	35.30	10.8	1.01	36.30
47.50	-	-	-	37.71	8.0	0.75	38.46
48.50	-	-	-	40.07	5.2	0.50	40.56
49.50	-	-	-	42.38	2.4	0.23	42.61
50.50	-	-	-	43.30	1.0	0.10	43.39
51.50	-	-	-	42.85	1.0	0.10	42.95

Settlement of Saturated Sands:

Settlement Analysis Method: Ishihara / Yoshimine*

Depth	CSRfs	F.S.	Fines	(N1)60s	Dr	ec	dsz	dsv	S
ft	w/fs		%		%	%	in.	in.	in.

Settlement of Saturated Sands=0.000 in.
dsz is per each segment: dz=0.05 ft
dsv is per each print interval: dv=1 ft
S is cumulated settlement at this depth

Settlement of Dry Sands:

ec	Depth	sigma'	sigC'	(N1)60s	CSRfs	Gmax	g*Ge/Gm	g_eff	ec7.5	Cec
%	dsz	dsv	S							
	ft	tsf	tsf		w/fs	tsf			%	
	in.	in.	in.							
	51.45	3.16	2.06	42.97	0.47	2243.2	6.7E-4	0.2799	0.0885	1.12
0.0990	1.2E-3	0.001	0.001							
	50.50	3.10	2.02	43.39	0.48	2228.4	6.6E-4	0.2774	0.0877	1.12
0.0981	1.2E-3	0.022	0.024							
	49.50	3.04	1.97	42.61	0.48	2191.7	6.7E-4	0.2826	0.0894	1.12
0.0999	1.2E-3	0.024	0.047							
	48.50	2.97	1.93	40.56	0.49	2132.8	6.8E-4	0.2969	0.0939	1.12
0.1050	1.3E-3	0.025	0.072							
	47.50	2.91	1.89	38.46	0.49	2072.3	6.9E-4	0.3131	0.1100	1.12
0.1230	1.5E-3	0.027	0.099							
	46.50	2.84	1.85	36.30	0.50	2010.0	7.0E-4	0.3317	0.1338	1.12
0.1496	1.8E-3	0.033	0.132							
	45.50	2.78	1.80	34.09	0.50	1945.6	7.2E-4	0.3533	0.1621	1.12
0.1812	2.2E-3	0.040	0.171							
	44.50	2.71	1.76	32.94	0.51	1900.9	7.2E-4	0.3646	0.1781	1.12
0.1991	2.4E-3	0.047	0.218							
	43.50	2.65	1.72	32.90	0.51	1877.1	7.2E-4	0.3625	0.1775	1.12
0.1985	2.4E-3	0.048	0.266							
	42.50	2.58	1.68	32.86	0.52	1853.2	7.2E-4	0.3600	0.1766	1.12
0.1975	2.4E-3	0.048	0.313							
	41.50	2.52	1.64	32.82	0.52	1829.1	7.2E-4	0.3569	0.1754	1.12
0.1962	2.4E-3	0.047	0.361							
	40.50	2.45	1.59	32.79	0.53	1804.8	7.2E-4	0.3533	0.1740	1.12
0.1945	2.3E-3	0.047	0.408							
	39.50	2.39	1.55	35.91	0.53	1835.3	6.9E-4	0.3169	0.1309	1.12
0.1464	1.8E-3	0.043	0.451							
	38.50	2.32	1.51	42.29	0.54	1911.5	6.5E-4	0.2644	0.0836	1.12
0.0935	1.1E-3	0.027	0.478							
	37.50	2.26	1.47	48.87	0.54	1977.5	6.2E-4	0.5285	0.1671	1.12
0.1869	2.2E-3	0.044	0.522							
	36.50	2.19	1.42	55.64	0.55	2034.9	5.9E-4	0.4211	0.1332	1.12
0.1489	1.8E-3	0.040	0.561							

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0.1225	35.50	2.13	1.38	62.64	0.55	2085.1	5.6E-4	0.3465	0.1096	1.12
	1.5E-3	0.032	0.594							
	34.50	2.06	1.34	64.06	0.56	2068.4	5.6E-4	0.3274	0.1035	1.12
0.1158	1.4E-3	0.028	0.621							
	33.50	2.00	1.30	59.64	0.56	1988.0	5.7E-4	0.3511	0.1110	1.12
0.1241	1.5E-3	0.029	0.650							
	32.50	1.93	1.26	55.09	0.57	1904.9	5.8E-4	0.3808	0.1204	1.12
0.1346	1.6E-3	0.031	0.681							
	31.50	1.87	1.22	50.39	0.57	1818.7	5.9E-4	0.4194	0.1326	1.12
0.1483	1.8E-3	0.034	0.715							
	30.50	1.81	1.17	53.26	0.58	1821.1	5.7E-4	0.3731	0.1180	1.12
0.1319	1.6E-3	0.033	0.749							
	29.50	1.74	1.13	56.25	0.58	1821.9	5.6E-4	0.3291	0.1041	1.12
0.1164	1.4E-3	0.030	0.778							
	28.50	1.68	1.09	59.37	0.58	1821.1	5.4E-4	0.2879	0.0910	1.12
0.1018	1.2E-3	0.026	0.804							
	27.50	1.62	1.05	59.50	0.59	1788.0	5.3E-4	0.2696	0.0852	1.12
0.0953	1.1E-3	0.023	0.828							
	26.50	1.55	1.01	62.74	0.59	1784.0	5.1E-4	0.2372	0.0750	1.12
0.0839	1.0E-3	0.021	0.849							
	25.50	1.49	0.97	58.23	0.59	1704.8	5.1E-4	0.2430	0.0769	1.12
0.0859	1.0E-3	0.020	0.870							
	24.50	1.43	0.93	53.54	0.59	1622.9	5.2E-4	0.2512	0.0794	1.12
0.0888	1.1E-3	0.021	0.891							
	23.50	1.37	0.89	48.66	0.59	1537.9	5.3E-4	0.2629	0.0831	1.12
0.0929	1.1E-3	0.022	0.912							
	22.50	1.31	0.85	43.57	0.59	1449.0	5.3E-4	0.2797	0.0884	1.12
0.0989	1.2E-3	0.023	0.935							
	21.50	1.25	0.81	38.25	0.59	1355.1	5.5E-4	0.3048	0.1087	1.12
0.1215	1.5E-3	0.025	0.961							
	20.50	1.19	0.77	36.95	0.60	1307.2	5.4E-4	0.2924	0.1134	1.12
0.1267	1.5E-3	0.030	0.991							
	19.50	1.13	0.73	35.57	0.60	1258.0	5.4E-4	1.0000	0.4215	1.12
0.4712	5.7E-3	0.067	1.058							
	18.50	1.07	0.70	34.11	0.60	1207.7	5.3E-4	1.0000	0.4582	1.12
0.5123	6.1E-3	0.118	1.176							
	17.50	1.01	0.66	32.55	0.60	1156.0	5.2E-4	1.0000	0.4987	1.12
0.5575	6.7E-3	0.129	1.304							
	16.50	0.95	0.62	30.89	0.60	1102.9	5.2E-4	1.0000	0.5437	1.12
0.6079	7.3E-3	0.140	1.444							
	15.50	0.89	0.58	33.92	0.60	1102.6	4.9E-4	0.8937	0.4138	1.12
0.4626	5.6E-3	0.132	1.577							
	14.50	0.84	0.54	33.47	0.60	1061.4	4.8E-4	0.7525	0.3572	1.12
0.3994	4.8E-3	0.094	1.670							
	13.50	0.78	0.51	36.64	0.61	1055.4	4.5E-4	0.5107	0.2018	1.12
0.2256	2.7E-3	0.072	1.743							
	12.50	0.72	0.47	40.11	0.61	1046.4	4.2E-4	0.3530	0.1116	1.12
0.1248	1.5E-3	0.040	1.783							
	11.50	0.66	0.43	43.94	0.61	1034.3	3.9E-4	0.2482	0.0785	1.12
0.0877	1.1E-3	0.025	1.808							
	10.50	0.60	0.39	40.93	0.61	964.9	3.8E-4	0.2261	0.0715	1.12
0.0799	9.6E-4	0.020	1.828							
	9.50	0.55	0.36	37.72	0.61	892.9	3.7E-4	0.2056	0.0759	1.12
0.0849	1.0E-3	0.019	1.847							
	8.50	0.49	0.32	34.25	0.61	817.8	3.7E-4	1.0000	0.4546	1.12
0.5083	6.1E-3	0.103	1.950							
	7.50	0.43	0.28	27.07	0.61	710.2	3.7E-4	1.0000	0.6604	1.12
0.7384	8.9E-3	0.157	2.107							
	6.50	0.37	0.24	23.38	0.62	629.6	3.7E-4	1.0000	0.8035	1.12
0.8984	1.1E-2	0.196	2.303							

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Settlement of Dry Sands=2.303 in.
 dsz is per each segment: dz=0.05 ft
 dsv is per each print interval: dv=1 ft
 S is cumulated settlement at this depth

Total Settlement of Saturated and Dry Sands=2.303 in.
 Differential Settlement=1.151 to 1.520 in.

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight =
 pcf, Settlement = in.

SPT	Field data from Standard Penetration Test (SPT)
BPT	Field data from Becker Penetration Test (BPT)
qc	Field data from Cone Penetration Test (CPT)
fc	Friction from CPT testing
Gamma	Total unit weight of soil
Gamma'	Effective unit weight of soil
Fines	Fines content [%]
D50	Mean grain size
Dr	Relative Density
sigma	Total vertical stress [tsf]
sigma'	Effective vertical stress [tsf]
sigC'	Effective confining pressure [tsf]
rd	Stress reduction coefficient
CSR	Cyclic stress ratio induced by earthquake
fs	User request factor of safety, apply to CSR
w/fs	With user request factor of safety inside
CSRfs	CSR with User request factor of safety
CRR7.5	Cyclic resistance ratio (M=7.5)
Ksigma	Overburden stress correction factor for CRR7.5
CRRV	CRR after overburden stress correction, CRRV=CRR7.5 * Ksigma
MSF	Magnitude scaling factor for CRR (M=7.5)
CRRm	After magnitude scaling correction CRRm=CRRV * MSF
F.S.	Factor of Safety against liquefaction F.S.=CRRm/CSRfs
Cebs	Energy Ratio, Borehole Dia., and Sample Method Corrections
Cr	Rod Length Corrections
Cn	Overburden Pressure Correction
(N1)60	SPT after corrections, (N1)60=SPT * Cr * Cn * Cebs
d(N1)60	Fines correction of SPT
(N1)60f	(N1)60 after fines corrections, (N1)60f=(N1)60 + d(N1)60
Cq	Overburden stress correction factor
qc1	CPT after Overburden stress correction
dqc1	Fines correction of CPT
qc1f	CPT after Fines and Overburden correction, qc1f=qc1 + dqc1
qcln	CPT after normalization in Robertson's method
Kc	Fine correction factor in Robertson's Method
qc1f	CPT after Fines correction in Robertson's Method
Ic	Soil type index in Suzuki's and Robertson's Methods
(N1)60s	(N1)60 after settlement fines corrections
ec	Volumetric strain for saturated sands
ds	Settlement in each Segment dz
dz	Segment for calculation, dz=0.050 ft
Gmax	Shear Modulus at low strain
g_eff	gamma_eff, Effective shear Strain
g*Ge/Gm	gamma_eff * G_eff/G_max, Strain-modulus ratio
ec7.5	Volumetric Strain for magnitude=7.5
Cec	Magnitude correction factor for any magnitude
ec	Volumetric strain for dry sands, ec=Cec * ec7.5
NoLiq	No-Liquefy Soils

References:

NCEER Workshop on Evaluation of Liquefaction Resistance of Soils. Youd, T.L., and Idriss, I.M., eds., Technical Report NCEER 97-0022.

SP117. Southern California Earthquake Center. Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California. University of Southern California. March 1999.

BIDDING DOCUMENTS
FOR THE
COLTON JOINT UNIFIED SCHOOL DISTRICT
FOR
JOE BACA MIDDLE SCHOOL FIELD IMPROVEMENTS PROJECT
AT

JOE BACA MIDDLE SCHOOL
Location: 1640 S. Lilac Avenue, Bloomington, CA 92316

Project No. 22-07
DSA Application No. 04-123755
Bid No. 25-004FAC

Colton Joint Unified School District
325 Hermosa Avenue, Colton, CA 92324

October 4, 2024

*This project is being supported, in whole or in part, by federal award number SLFRP0154
awarded to San Bernardino County by the U.S. Department of Treasury.*

DOCUMENT 00 11 16

NOTICE TO BIDDERS / INVITATION TO BID

1. Notice is hereby given that the governing board ("Board") of the **Colton Joint Unified School District** ("District") will receive sealed bids to construct the following project:

Joe Baca Middle School Field Improvements Project ("Project" or "Contract")

This project is being supported, in whole or in part, by federal award number SLFRP0154 awarded to San Bernardino County by the U.S. Department of Treasury.

To bid on this Project, the Bidder is required to have been prequalified by the District. In addition, if the Project has electrical, mechanical, or plumbing components that will be performed by subcontractors performing under the following license classification(s), then each of those subcontractors that intend to bid as a first-tier subcontractor to a general contractor (prime contractor) are required to have been prequalified by the District: C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, and/or C-46. The Prequalification Questionnaire can be obtained by requesting a copy via email at facilities@cjsud.net or by downloading it from Mission Reprographics, www.missionreproplanroom.com. All prequalification questionnaires will be received until **2:00 p.m. October 30, 2024**, at the Facilities Department, located at **325 Hermosa Avenue, Building 5, Colton, California 92324**.

2. Contractors must submit sealed bids on or before **2:00p.m. November 13, 2024**, at the Facilities Department Office, located at **325 Hermosa Avenue, Building 5, Colton, California 92324**, at or after which time the District will open the bids and publicly read them aloud. Any claim by a Bidder of error in its bid must be made in compliance with Public Contract Code § 5100, et seq. Any bid that is submitted after this time shall be non-responsive and returned to the Bidder. The District is not responsible for Bids that are received after the deadline noted above.
3. The Project consists of:

Conversion of existing basketball court into a combo mini-soccer/basketball court, converting the perimeter of the playfield into a walking track, and addition of exterior field lighting.

4. All bids shall be on the form provided by the District. Each bid must conform and be responsive to all pertinent Contract Documents, including, but not limited to, the Instructions to Bidders.
5. To bid on this Project, the Bidder is required to possess one or more of the following State of California Contractor Licenses:

B – General Building Contractor License

The Bidder's license(s) must be active and in good standing at the time of the bid opening and must remain so throughout the term of the Contract.

6. As security for its Bid, each Bidder shall provide with its Bid form
 - a bid bond issued by an admitted surety insurer on the form provided by the District,
 - cash, or
 - a cashier's check or a certified check, drawn to the order of the **Colton Joint Unified School District**, in the amount of ten percent (10%) of the total bid price. This bid security shall be a guarantee that the Bidder shall, within seven (7) calendar days after the date of the Notice of Award, enter into a contract with the District for the performance of the services as stipulated in the bid.
7. As security for its Bid, each Bidder shall provide with its Bid form

- a bid bond issued by an admitted surety insurer on the form provided by the District,
 - cash, or
 - a cashier's check or a certified check, drawn to the order of the **Colton Joint Unified School District**, in the amount of ten percent (10%) of the total bid price. This bid security shall be a guarantee that the Bidder shall, within seven (7) calendar days after the date of the Notice of Award, enter into a contract with the District for the performance of the services as stipulated in the bid.
8. The successful Bidder may substitute securities for any monies withheld by the District to ensure performance under the Contract, in accordance with the provisions of Public Contract Code § 22300.
 9. The successful Bidder and its subcontractors shall pay all workers on the Project not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the Department of Industrial Relations, State of California, or United States Secretary of Labor, whichever is greater, for the type of work performed and the locality in which the work is to be performed within the boundaries of the District, pursuant to Labor Code § 1770 et seq and Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). Prevailing wage rates are on file with the District and are available to any interested party on request or at www.dir.ca.gov/oprl/statistics_and_databases.html and www.dol.gov/agencies/whd/government-contracts/prevailing-wage-resource-book/db-wage-determinations. Bidders and Bidders' subcontractors shall comply with the registration and qualification requirements pursuant to Labor Code §§ 1725.5 & 1771.1
 10. A mandatory pre-bid conference and site visit will be held on **October 25, 2024, at 2:00 p.m. at 1640 S. Lilac Avenue, Bloomington, California 92316**. All prospective Bidders are required to sign in at the Administration Building. The Site Visit is expected to take approximately one [1] hours. There will be a 5-minute grace period for contractors after the stated start time. Contractors arriving after grace period will not be allowed to sign-in and bids will be considered unresponsive. Job walk is mandatory for GC's., optional for subcontractors. Failure to attend or tardiness will render bid ineligible.
 11. Contract Documents are available on October 4, 2024, for review at the District Facilities Office. In addition, Contract Documents are available for review at the following builders' exchanges:

Bid documents are available from:

Mission Reprographics

2050 East La Cadena Drive, Suite L
Riverside, CA 92507
Phone: 951-686-8828
Email: missionreprographics@planroom.com
Website: www.missionreprographics.com

Construction Bidboard (Ebidboard)

11622 El Camino Real, #100
San Diego, CA 92130
Phone: 800-479-5314
Email: support@ebidboard.com
Website: www.ebidboard.com

Associated General Contractors of America

San Diego Chapter, Inc.
6212 Ferris Square San Diego, CA 92121
Phone: 858-558-7444
Email: Planroom@agcsd.org
Website: www.agcsd.org

Dodge Data & Analytics

830 Third Avenue, 6th Floor
New York, NY 10022
Phone: 877-784-9556
Email: support@construction.com
Website: www.construction.com

BidAmerica Online Planroom

41085 Elm Street Murrieta, CA 92562

Phone: 951-677-4819

Email: planroom@bidamerica.com

Website: www.BidAmerica.com

The District will furnish to each bidder, one (1) complementary download from Mission Reprographics. Hardcopies can be purchased directly from Mission Reprographics. No partial sets will be available.

12. The District's Board reserves the right to reject any and all bids and/or waive any irregularity in any bid received. If the District awards the Contract, the security of unsuccessful Bidder(s) shall be returned within sixty (60) days from the time the award is made. Unless otherwise required by law, no Bidder may withdraw its bid for ninety (90) days after the date of the bid opening.
13. The District shall award the Contract, if it awards it at all, to the lowest responsive responsible Bidder based on the base bid amount.

END OF DOCUMENT