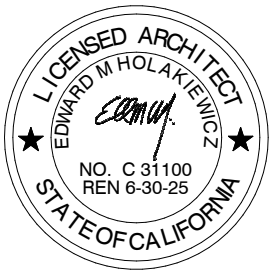
ADDENDUM TO BID DOCUMENTS

SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT
F25-01 Paakuma K-8 Sports Lighting Project

PROCUREMENT AND CONTRACTING REQUIREMENTS

ADDENDUM NO. 1
07 February 2025

NOTE: All CONTRACT DOCUMENTS REMAIN UNCHANGED EXCEPT SECTIONS OR PARTS ADDED TO, REVISED, DELETED OR CLARIFIED BY THIS ADDENDUM.



EDWARD M. HOLAKIEWICZ | AIA, Architect

CHANGES TO BID PROPOSAL

Specifications:

None

Changes to Drawings

Item 1.1: Electrical Sheet E-002 is hereby issued.
Item 1.2: Electrical Sheet E-101 is hereby issued.

Supplemental Documents:

Item 1.1: RFI Log and responses are hereby issued.
Item 1.2: Job Walk signing sheet is hereby issued.
Item 1.3: Electrical Room Photos are hereby issued.
Item 1.4: Geotechnical Evaluation dated July 10, 2024, is hereby issued.

Attachments

Sheet E-002
Sheet E-101
RFI Log
Job Walk Sign-in Sheet
Electrical Room Photos:

- Electrical Room 1
- Electrical Room 2

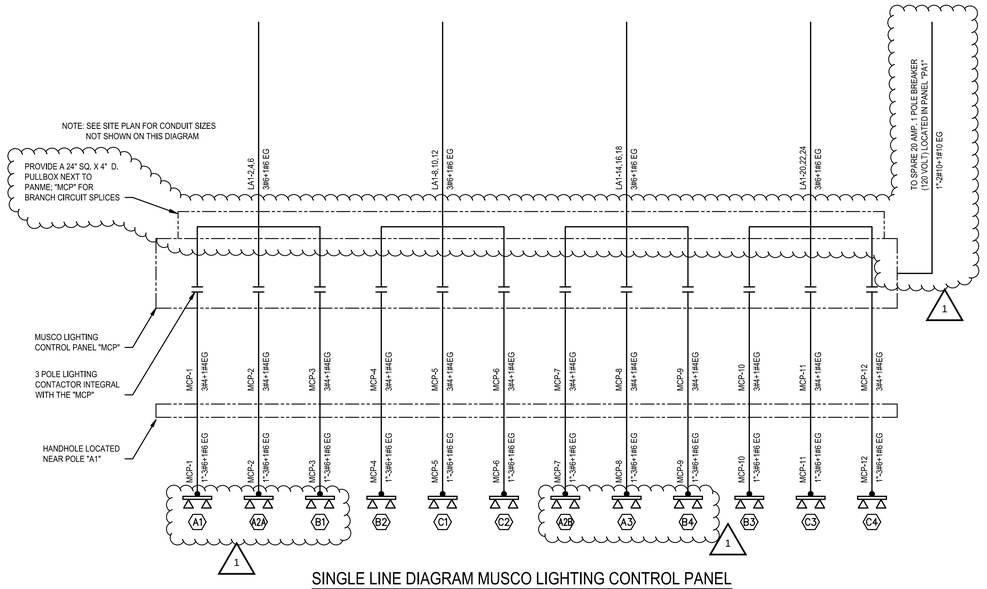
- Panel A1 Sect 3 PV load
- Panel LA1 Sect 1 Lighting
- Panel LA1 Sect 2 Hvac
- Panel PA1
- Panel PA2
- Panel PA3

Geotechnical Evaluation

END OF ADDENDUM NO. 1

SPORTS LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	MANUFACTURER AND CATALOG NUMBER	EQUIVALENT MANUFACTURER SUBJECT TO APPROVAL OF SHOP DRAWINGS	HEADS PER POLE			FIXTURE		DRIVER TYPE	FIXTURE MOUNTING HEIGHT	DESCRIPTION
			QTY.	TYPE	COLOR TEMP.	INPUT VOLTS	TOTAL INPUT WATTS			
A1	MUSCO LIGHTING	OR APPROVED EQUAL	(1)@900W (2)@550W (1)@575W	LED	LED	480	3466	LED	POLE (3)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
A2	MUSCO LIGHTING	OR APPROVED EQUAL	(2)@900W (4)@550W (2)@575W	LED	LED	480	6932	LED	POLE (6)@60' (3)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
A3	MUSCO LIGHTING	OR APPROVED EQUAL	(1)@900W (2)@550W (1)@575W	LED	LED	480	3466	LED	POLE (3)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
B1 B2	MUSCO LIGHTING	OR APPROVED EQUAL	(1)@550W (3)@900W (1)@575W	LED	LED	480	3750	LED	POLE (4)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
B3 B4	MUSCO LIGHTING	OR APPROVED EQUAL	(1)@550W (3)@900W (1)@575W	LED	LED	480	3750	LED	POLE (4)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
C1 C2	MUSCO LIGHTING	OR APPROVED EQUAL	(3)@900W (1)@575W	LED	LED	480	3210	LED	POLE (3)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.
C3 C4	MUSCO LIGHTING	OR APPROVED EQUAL	(3)@900W (1)@575W	LED	LED	480	3210	LED	POLE (3)@60' (1)@16'	LED, FACTORY AIMED AND ASSEMBLED SPORTS LIGHTING FIXTURES MOUNTED ON A 60' TALL GALVANIZED STEEL POLE WITH PRE-CAST CONCRETE BASE. COMPLETE SYSTEM INCLUDES CONTROLLER, WIRE HARNESS, REMOTE ELECTRICAL COMPONENT ENCLOSURE AND 25 YEAR WARRANTY.



SINGLE LINE DIAGRAM MUSCO LIGHTING CONTROL PANEL

NO SCALE

PANEL ID: LA1 EXISTING

LOCATION:	ELECTRICAL ROOM
MAIN:	350A/3P M.C.B.
BUS AMPS	400
MOUNTING:	SURFACE
AIC RATING	14K

FEEDER/SYSTEM

FED FROM:	MSB
FEEDER OCP	350 AMPS
SYSTEM:	480 /277V, 3-PH, 4W

LOAD TYPES

blank or NON: NON-CONTINUOUS
LCL: LONG-CONTINUOUS
REC: DEMANDABLE RECEPT'S
KIT: KITCHEN PNL: SUB-FED PNL
UNIT: RESID. UNIT MTR: MOTOR

CKT	DESCRIPTION	LOAD TYPE	BKR	LOAD (VA) PH. A	LOAD (VA) PH.B	LOAD (VA) PH.C	BKR	LOAD TYPE	DESCRIPTION	CKT
1	EXISTING LIGHITNG	LCL	20/1	870 **2992**			30/		**POLES A1, A2A, B1 NOTE 1**	2
3	EXISTING LIGHITNG	LCL	20/1		1201 **2992**		/			4
5	EXISTING LIGHITNG	LCL	20/1			1077 **2992**	/3		---	6
7	EXISTING LIGHITNG	LCL	20/1	1906 **3469**			30/		**POLES B2, C1, C2 NOTE 1**	8
9	EXISTING LIGHITNG	LCL	20/1		1343 **3469**		/		---	10
11	EXISTING LIGHITNG	LCL	20/1			407 **3469**	/3		---	12
13	EXISTING LIGHITNG	LCL	20/1	420 **3469**			30/		**POLES A2B, A3, B4 NOTE 1**	14
15	SPARE	LCL	20/1		0 **3469**		/		---	16
17	SPARE	LCL	20/1			0 **3469**	/3		---	18
19	BUSSED SPACE			0 **2992**			30/		**POLES B3, C3, C4 NOTE 1**	20
21	BUSSED SPACE				0 **2992**		/		---	22
23	BUSSED SPACE					0 **2992**	/3		---	24
25	BUSSED SPACE								BUSSED SPACE	26
27	BUSSED SPACE								BUSSED SPACE	28
29	BUSSED SPACE								BUSSED SPACE	30

	CONNECTED VA	DEMAND VA	PH A	PH B	PH C	
GEN'L LOAD:	38766	38766	16118	15466	14408	CONNECTED LOAD PER PHASE
LONG CONTIN.:	7224	9030		45990		TOTAL CONNECTED LOAD (VA)
GEN'L RECEPT:	0	0		55		AMPS OF TOTAL CONNECTED LOAD
MOTOR LOAD:	0	+25% OF LARGEST		47796		TOTAL DEMAND VA (BALANCED)
KITCHEN LOAD:	0	0		61		HIGH PHASE AMPS/L.C.L

PANEL NOTES:

1. PROVIDE NEW 30 AMP, 3 POLE (SQUARE D) BREAKER TO MATCH EXISTING, IN EXISTING BUSSED SPACE. (REMOVE EXISTING BREAKERS WHERE NEEDED)

ARCHITECTS
MOSHER DREW
1775 HANCOCK STREET SUITE 150
SAN DIEGO, CALIFORNIA 92110
TELEPHONE (619) 223-2400
FAX NO. (619) 223-3017

REGISTERED PROFESSIONAL ENGINEER
DALE M. FRANCINA
No.11533
exp.6/30/26
ELECTRICAL
STATE OF CALIFORNIA

ARCHITECT / CONSULTANT STAMP

TURPIN & RATTAN
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LA MESA, CA 91941-5221
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Email: info@turpinrattan.com

TRI PROJECT # 24019.500

CONSULTANT LOGO

SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT

DSA

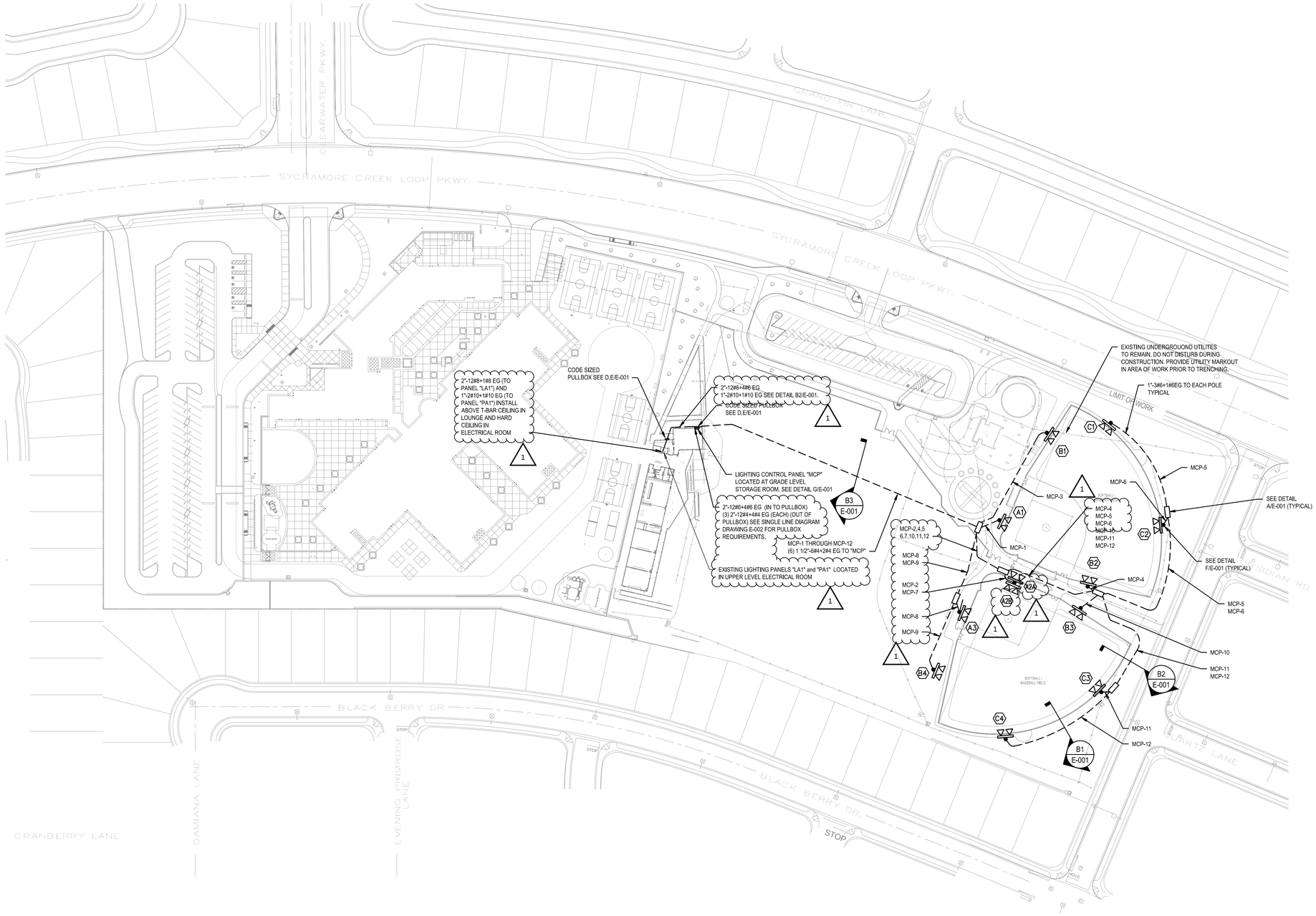
CONSTRUCTION DOCUMENTS

SBCUSD SPORTS LIGHTING
PAAKUMÁ K-8 SCHOOL
17825 SYCAMORE CREEK LOOP PARKWAY
SAN BERNARDINO, CA 92405

Project Number	:	24200.00
Date	:	09/30/2024
Drawn By	:	GK
Checked By	:	DF
Revisions	:	
1		February 07, 2025

FIXTURE SCHEDULE SINGLE LINE DIAGRAM AND PANEL SCHEDULE

E-002



SITE PLAN - LIGHTING

SCALE: 1"=60'

0 30' 60' 120' 180'

1" = 60'

NORTH

DSA

ARCHITECTS
MOSHER DREW

1775 HANCOCK STREET SUITE 150
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TREI PROJECT # 24019.500

SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT

CONSTRUCTION DOCUMENTS

SBCUSD SPORTS LIGHTING
PAAKUMÁ K-8 SCHOOL
17825 SYCAMORE CREEK LOOP PARKWAY
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1		February 07, 2025

SITE PLAN - LIGHTING

E-101

ARCHITECTS
MOSHER DREW

PAAKUMA K-8 BID# F25-01 PRE- BID REQUEST FOR INFORMATION LOG

RFI #	Reference	Question	Contractor	Responsible Party	Response	Date	
1	Temporry Facilities01 50 00 - 1.22B	Temporary Facilities section 01 50 00 1.22 B, Calls for a field office to be supplied. With the short duration and small scale please clarify if the Field office will be a requirement. If required can the restroom facilities within the trailer be eliminated.	RIS Electrical Contractor	Mosher Drew	Field office with restroom facilities is require	2/4/2025	
2	Pictures of Electric room,	At the time of the job walk, access to the electric room and storage room was not available. It was suggested we request picture for the areas in question. Please provide pictures for the interior of the Electric room, the interior of the storage room, a whole picture of panel LA1, and a picture of the name tag for panel LA1.	RIS Electrical Contractor	Mosher Drew/SBCUS District	Photos will be issued with addendum #01	2/4/2025	
3	Covid Vaccine	Under special conditions 00 71 00 -9-C it states that employees will be required to be vaccinated or be subject to testing. Please clarify if this section 00 71 00 - 9 -C, covid vaccine and or covid testing will be required for this project.	RIS Electrical Contractor	Mosher Drew/SBCUS District	Proof of vaccination will be require.	2/4/2025	
4	Soils Report	Will the soils report be provided? The soil condition in this area is very rocky.	Rancho Pacific Electric	Mosher Drew	Soils report will be issued with addendum #01	2/3/2025	
5	Engeneers Estimate	Is there an engineer's estimate for the value of this project?	Christianbelle Electric	Mosher Drew	NO	1/31/2025	
6	Estimate, Sign in Sheet	1. Is there an engineer estimate? 2. Please provide the sign in sheet of the job walk attendees 3.Provide geotechincal investigation report 4. Are there any temporary power requirements	ACE Electric	Mosher Drew	1.No 2. Will be issued with Addendum #01. 3. Will be issued with Addendum #01. 4. Contractor is responsible to provide construction power	1/30/2025	
7	Attendees List	May I get a list of the attendees to the pre-bid meeting that took place yesterday?	Construction Connect	Mosher Drew	Will be issued with Addendum #01.	1/30/2025	

SIGN-IN SHEET

SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT
Making Hope Happen

JOB WALK SIGN-IN SHEET
F25-01 Paakuma K8 - Sports Lighting
Paakuma' K-8 School
17875 Sycamore Creek Loop Pkwy,
San Bernardino, CA 92407
January 29, 2025 @ 10:00am
Non - Mandatory

NAME	COMPANY	PHONE	E-MAIL
Ryan Denman	SBCUSD	909-388-6100	Ryan.Denman__ndua@sbcusd.k12.ca.us
Sean MacDowell	SBCUSD	909-388-6100	Sean.MacDowell@sbcusd.k12.ca.us
Alahe Aldo GERARDO MACALPIN	Mosher Drew	760 427 8500	alahea@mosherdrew.com
Gerardo Macalpin	Mosher Drew		GerardoM@mosherdrew.com
GARY KRAUT	TURPIN + RATTAN ENG	619 851-0568	garyk@treisd.com
Rick Robledo	Southern Contract.	619-520-6277	RRobledo@Southerncontracting.com
KYLE Mitchell	MILLER CON.	909 494 1009	MARK@MILLERCON.COM
Doug Munsey	Rancho Pacific Electric	909 476 1022	DOUGM@RPEINC.NET
MIKE HIGGINS	MASCO LIGHTING	714-614-0863	MIKE.HIGGINS@MASCO.COM
Isaiah Valencia	Plyco Corp	(951) 727-8200	IZZY@PLYCOCORP.COM
Kurt de Steuben	FEC ELECTRIC INC	909 793 0965	Kurt@Fec-electric.com

Please contact facilities_contracts@sbcusd.k12.ca.us for general questions.

NAME	COMPANY	PHONE	E-MAIL
Bryan Bayardo	RIS Electrical	951 653 2611	bryanb@riselec.com
Jesse Rosales	Champion Electric	951 276 9819	estimating@championelec.com
Bobbi Dalke	Dalke & Sons	951-274-9880	David Cadalkeandsons.com
ANNA BRITTON	ARCHITECTS MOSHER DREW	909-747-7161	ANNAB@MOSHERDREW.COM

facilities_contracts@sbcusd.k12.ca.

ELECTRICAL ROOM 1

ELECTRICAL ROOM 2

PANEL A1 SECT 3 PV load

PANEL LA1 SECT 1 LIGHTING

PANEL LA2 SECT 1 Hvac

PANEL PA1

PANEL PA2

PANEL PA3


Panel PA3
CIRCUIT DIRECTORY
PA3
WARNING
ADVERTENCIA
AVERTISSEMENT

Geotechnical Evaluation

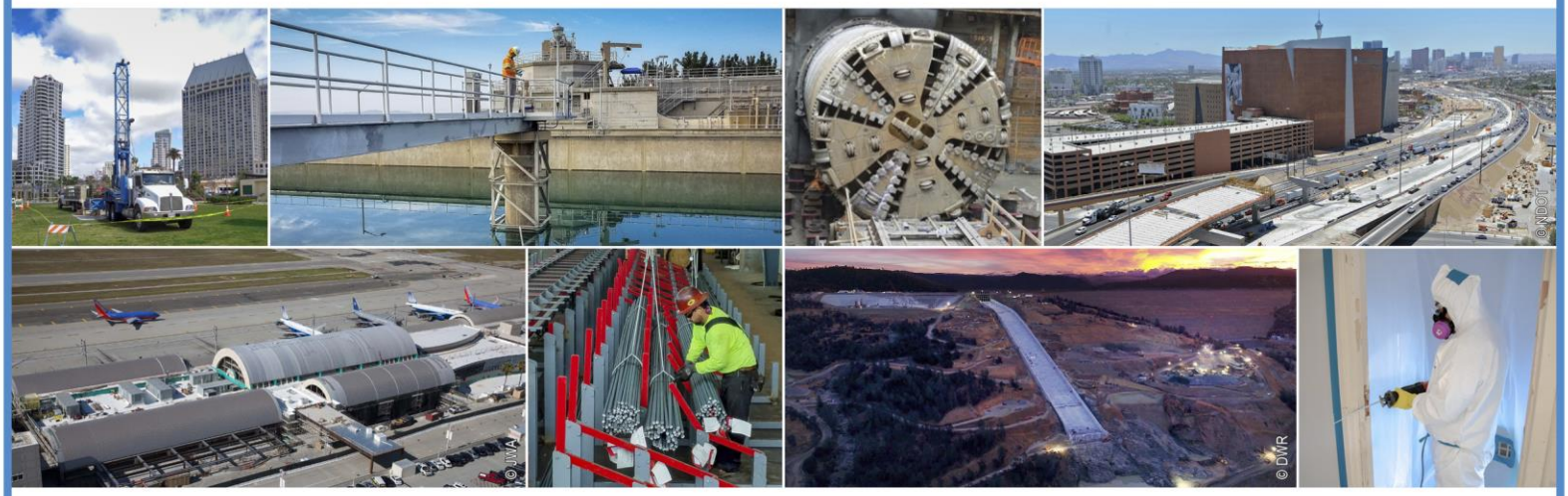
Sports Field Lighting Project
Paakuma K-8 Soccer and Little League Fields
17825 Sycamore Creek Loop Parkway

San Bernardino, California

Architects Mosher Drew

1775 Hancock Street, Suite 150 | San Diego, California 92110

July 10, 2024 | Project No. 212647001



Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

35+ YEARS

Geotechnical Evaluation
Sports Field Lighting Project
Paakuma K-8 Soccer and Little League Fields
17825 Sycamore Creek Loop Parkway
San Bernardino, California

Ms. Alahe Aldo
Architects Mosher Drew
1775 Hancock Street, Suite 150 | San Diego, California 92110

July 10, 2024 | Project No. 212647001

Spencer Marcinek, PE, GE
Senior Engineer

Ronald Hallum, PG, CEG
Principal Geologist

Soumitra Guha, PhD, PE, GE
Principal Engineer

SCM/RDH/SG/lva

CONTENTS

TABLE

FIGURES

APPENDICES

1 INTRODUCTION

In accordance with your request, we have performed a geotechnical evaluation for the Paakuma K-8 Soccer and Little League Fields Sports Field Lighting Project located at 17825 Sycamore Creek Parkway in San Bernardino, California (Figure 1). Our services included evaluation of the subsurface conditions at the site and preparation of geotechnical recommendations for the design and construction of the new light poles. This report presents our geotechnical findings, conclusions, and recommendations for the project.

2 SCOPE OF SERVICES

Our scope of services included the following:

- Project coordination, planning, and scheduling of the subsurface exploration.
- Review of readily available background material, including published geologic maps, fault and seismic hazards maps, groundwater data, topographic maps, stereoscopic aerial photographs, and project-related plans provided by the client.
- Well permit acquisition from the County of San Bernardino.
- A field reconnaissance to observe and document the existing site conditions at the practice field and to mark the boring locations for utility clearance by Underground Service Alert and district personnel.
- Subsurface exploration consisting of the drilling, sampling, and logging of six small-diameter borings to depths ranging from approximately 4.5 to 40.8 feet below the ground surface. The borings were logged by a representative of our firm, and bulk and relatively undisturbed soil samples were collected at selected depths for laboratory testing.
- Laboratory testing of representative soil samples to evaluate in-situ moisture content and dry density, gradation, percentage of particles finer than the No. 200 sieve, direct shear strength, and soil corrosivity.
- Compilation and geotechnical engineering analyses of data obtained from our background review, subsurface exploration, and laboratory testing.
- Preparation of this report presenting our findings, conclusions, and recommendations pertaining to the geotechnical aspects of the design and construction of the proposed improvements.

3 SITE DESCRIPTION AND PROPOSED CONSTRUCTION

The project site is located adjacent to the east side of the campus of the Paakuma K-8 School in San Bernardino, California (Figure 1). Two baseball fields are present on the east side of the project area and two soccer fields are present on the west side of the project area. The site is bounded by Paakuma K-8 School to the west, Sycamore Creek Loop Parkway and residential properties to the north, Clove Way and residential properties to the east, and residential properties

and Blackberry Drive to the south. Existing improvements within the park consist of an asphalt concrete parking lot, concrete pathways, a playground, landscaping, and fencing.

The project area is relatively flat and slopes gently downward to the east, with elevations ranging from approximately 1,887 to 1,898 feet above the mean sea level (MSL) (Google Earth, 2024). Relatively shallow descending slopes are located on the northeast and east sides of the site that descend to a low elevation of approximately 1,881 feet above MSL to Sycamore Creek Loop Parkway and Clove Way. Based on our review of aerial photographs dating back to 1938 (Historical Aerials, 2024), intermittent grading at the site commenced between 2005 and 2009 and was completed by approximately 2015. Fill slopes were constructed in order to create a level pad for the baseball fields. The site latitude and longitude are approximately 34.1879 degrees north and -117.4144 degrees west, respectively (Google Earth, 2024).

The proposed improvements include the installation of eleven new sports lighting towers (light poles), designed by Musco Lighting, to be located around the perimeter of the existing baseball fields. The project previously consisted of eighteen new light poles; however, some of the light poles around the soccer fields were removed from this phase of the project. The light poles around the soccer fields may be installed as part of a subsequent project. The proposed locations of the light poles are shown on Figure 2. Some of the light poles located along the east side of the project area will be situated at the crest of descending fill slopes. The project also involves the construction of electrical conduits and wiring related to the proposed light poles.

The Musco Lighting standard foundation consists of a round precast, prestressed concrete bottom pole section centered in a 30-inch-diameter pier excavation, plumbed and stabilized with concrete backfill in the annular space. The concrete bottom pole section extends 7 to 8 feet above grade and supports a galvanized steel pole utilizing a slip-lap connection. The Equipment Layout Plan (Musco Lighting, 2024) indicates that the light poles will have heights of up to approximately 60 feet.

4 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our subsurface evaluation at the site was conducted on May 16 and 17, 2024, and consisted of the drilling, logging, and sampling of six small diameter borings (B-1 through B-6). The borings were drilled using both truck-mounted and track-mounted drill rigs equipped with 8-inch-diameter augers to depths ranging from approximately 4.5 to 40.8 feet below the ground surface. The proposed depth of the borings was 40 feet. Refusal was encountered in borings B-2, B-3, and B-4 on very dense layers (cobbles and boulders) at depths of approximately 11.5, 4.5, and 7 feet below the ground surface, respectively. Multiple attempts with the drill rig were made at the boring

locations where refusal was encountered. Borings that encountered refusal are noted as such at the bottom of the boring log. The approximate locations of the borings are shown on Figure 2. The borings were logged by a representative from our firm and bulk and relatively undisturbed soil samples were obtained at selected depths for laboratory testing. Logs of the exploratory borings are presented in Appendix A.

Laboratory testing was performed to evaluate in-situ moisture content and dry density, percentage of particles finer than the No. 200 sieve, direct shear strength, and soil corrosivity. The results of the in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. The remaining laboratory tests are presented in Appendix B.

5 GEOLOGY AND SUBSURFACE CONDITIONS

5.1 Regional Geology

The project site is located at the base of the San Gabriel Mountains and the San Bernardino Mountains, along the southern edge of the Transverse Ranges Geomorphic Province (Norris and Webb, 1990). This geomorphic province encompasses an area that extends from Point Arguello and San Miguel Island on the west to the mountains of Joshua Tree National Monument on the east, where the province merges with the Mojave and Colorado deserts. The majority of this geomorphic province is characterized by east-west trending mountain ranges composed predominantly of Mesozoic and older age igneous and metamorphic rocks. The Transverse Ranges province has been very active, tectonically, during the late Tertiary and Quaternary time. Rapid rates of uplift along bounding faults have produced the current regional landscape of rugged highlands with eroded material accumulating in alluvial fans along the base of the mountains. The steep, southerly front of the San Bernardino Mountains has developed through movement along the San Andreas fault system which is located just to the northeast of the site.

Based on our review of geologic maps of the site, the site is mapped as being underlain by Holocene and late Pleistocene-age young alluvial fan deposits (Morton and Matti, 2001). The material is described as unconsolidated to moderately consolidated alluvial fans consisting of coarse-grained sand to boulders having slightly to moderately dissected surfaces. A regional geologic map is shown on Figure 3.

5.2 Site Geology

The materials encountered in our exploratory borings consisted of undocumented fill underlain by alluvium. The thickness of the undocumented fill encountered in borings B-1, B-5, and B-6 ranged from approximately 5 to 12.5 feet. Undocumented fill was encountered to the explored depths of

up to approximately 11.5 feet below the ground surface in borings B-2 through B-4 where early refusal was encountered. The undocumented fill consisted of moist, dense to very dense silty sand and silty gravel. Variable amounts of gravel, cobbles, and boulders were encountered in the undocumented fill. Alluvium was encountered beneath the undocumented fill to the explored depths of up to approximately 40.8 feet below the ground surface. The alluvium consisted of dry to moist, dense to very dense silty sand, well-graded gravel with silt and sand, and silty gravel. Variable amounts of gravel, cobbles, and boulders were encountered in the alluvium. Difficult drilling conditions were encountered in both the undocumented fill and alluvium. Refusal was encountered in borings B-2, B-3, and B-4 at depths of approximately 11.5, 4.5, and 7 feet below the ground surface, respectively. More detailed descriptions of the subsurface materials encountered during our exploration are presented on the boring logs in Appendix A.

6 GROUNDWATER

Groundwater was not encountered in our borings to the explored depths of up to approximately 40.8 feet below the ground surface. Regional maps indicate that the historical high groundwater level at the site is approximately 30 feet below the ground surface (Matti and Carson, 1991). The depth to groundwater in six nearby monitoring wells located within a two-mile radius from the site indicates that groundwater depths ranged from approximately 54 to 103 feet below the ground surface after 2008 (State of California, Department of Water Resources, 2024). Groundwater levels are subject to variation due to seasonal rainfall, irrigation, groundwater pumping, subsurface stratigraphy, topography, and other factors which may not have been evident at the time of our evaluation.

7 FAULTING AND SEISMICITY

The site is in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered significant during the design life of the project. Figure 4 shows the approximate site location relative to the major faults in the region. The site is not located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone) (California Geological Survey [CGS], 2018). The nearest mapped active fault to the site is the San Jacinto fault located approximately 0.08 miles northeast of the site (United States Geological Survey [USGS], 2008).

The principal seismic hazards evaluated at the subject site are surface fault rupture, ground motion, liquefaction, and seismically-induced landslides. A brief description of these hazards and the potential for their occurrences on-site are discussed in the following sections.

7.1 Surface Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project site. Therefore, the probability of damage from surface fault rupture is considered to be low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

7.2 Ground Motion

Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project area has a high potential for experiencing strong ground motion. The 2022 California Building Code (CBC) specifies that the risk-targeted maximum considered earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. Based on our review of CGS's shear wave velocity map, the average shear wave velocity in the upper 30 meters (100 feet) of the subsurface profile (V_{S30}) at the site is estimated to be approximately 352 meters per second (1,155 feet per second) (CGS, 2015). In accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) Publication 7-16 (2016) for the Minimum Design Loads and Associated Criteria for Building and Other Structures, the site classification is Site Class D (stiff soil).

In accordance with ASCE 7-16, the mapped MCE_R ground motion response accelerations were determined using the 2024 Applied Technology Council seismic design tool (web-based). The MCE_R ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits. Spectral response acceleration parameters, consistent with the 2022 CBC, are provided in Section 9.2 for the evaluation of seismic loads on buildings and other structures. We calculated the general spectral response acceleration parameters in accordance with Section 11.4 of ASCE 7-16 assuming that the exceptions in Section 11.4.8 of ASCE 7-16 will be applied to the project.

7.3 Liquefaction Evaluation

Liquefaction is the phenomenon in which loosely deposited, saturated granular soils (located below the water table) undergo rapid loss of shear strength due to development of excess pore pressure during strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to rapid rise in pore water pressure and it eventually causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Liquefaction is also known to occur in relatively fine-grained soils

(i.e., sandy silt and clayey silt) with a plasticity index of less than 7. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

Based on our review of the San Bernardino County Land Use Plan Geologic Hazard Overlays Map (2010), the project site is not located in a zone of suspected liquefaction susceptibility. Based on the historic high groundwater depth of approximately 30 feet below the ground surface and the presence of dense sand with scattered gravel, cobbles, and boulders at shallow depths, it is our opinion that liquefaction and liquefaction-related seismic hazards (e.g., dynamic settlement, ground subsidence, and/or lateral spreading) are not design considerations for the project.

7.4 Landslides

There are no mapped landslides on site and the site is not mapped in a generalized landslide susceptibility zone (County of San Bernardino, 2010). Based on this information, landsliding is not considered to be a potential hazard at the site.

8 CONCLUSIONS

Based on the results of our evaluation, it is our opinion that construction of the proposed improvements is feasible from a geotechnical perspective provided that the recommendations presented in this report are incorporated into the design and construction of the project. In general, the following conclusions were made:

- The site is generally underlain by undocumented fill and alluvium. The fill and alluvium generally consisted of dry to moist, dense to very dense silty sand, well-graded gravel with silt and sand, and silty gravel. Variable amounts of gravel, cobbles, and boulders were encountered in the fill and alluvium.
- Documentation regarding the placement and compaction of fill soils and original ground preparation is unknown. Due to the unknowns regarding the original ground preparation and the compaction of the existing fill soils, there is a potential for settlement of the fill under the new improvements particularly if exposed to excessive moisture.
- Excavations during site grading should be feasible with trenching and foundation drilling equipment in good working condition. Difficult excavation should be anticipated in gravel, cobbles, and boulders. Excavations may be subject to caving if materials with low cohesion or wet soils are encountered.
- On-site soils should be considered as Type C soils in accordance with the Occupational Safety and Health Administration (OSHA) soil classifications. Slope excavations or temporary shoring should be provided in accordance with the OSHA regulations. The granular soils encountered at the site have little cohesion and will be subject to caving.

- The on-site soils should be suitable for use as compacted fill provided that they are free of trash, debris, roots, vegetation, deleterious materials, and cobbles or hard lumps of material in excess of 4 inches in diameter.

- The site is not located within a State of California Earthquake Fault Zone (Alquist-Priolo Special Studies Zone). Based on our review of published geologic maps and aerial photographs, there are no known active faults that underlie the site. The potential for surface fault rupture at the site is considered to be low.

- The mapped maximum considered earthquake geometric mean (MCE_G) peak ground acceleration adjusted for site effects (PGA_M) for the project site was calculated as 1.071g.

- The site is not located in a zone of suspected liquefaction susceptibility or in a generalized landslide susceptibility zone (County of San Bernardino, 2010).

- Our limited laboratory test results indicate that the on-site soils can be classified as non-corrosive based on the California Department of Transportation (Caltrans, 2021) corrosion guidelines.

9 RECOMMENDATIONS

The following sections present our geotechnical recommendations for the project based on our field exploration, laboratory test results, and engineering analyses. The proposed construction should also be performed in accordance with the requirements of the applicable governing agencies.

9.1 Earthwork

We anticipate that earthwork for the project will consist of drilling for the proposed light pole foundations and trenching for electrical conduits. Earthwork operations should be performed in accordance with the requirements of the applicable governing agencies and the recommendations presented in the following sections of this report.

9.1.1 Pre-Construction Conference

We recommend that the project plans be submitted to Ninyo & Moore for review to evaluate conformance to the geotechnical recommendations provided in this report. We further recommend that a pre-construction conference be held in order to discuss the recommendations presented in this report. The owner and/or their representative, the governing agencies' representatives, the civil engineer, Ninyo & Moore, and the contractor should be in attendance to discuss the work plan, project schedule, and earthwork requirements.

9.1.2 Site Clearing and Preparation

Prior to performing excavations or other earthwork, the proposed area of improvements should be cleared of surface obstructions, debris, pavement, abandoned utilities, and other deleterious materials. Existing utilities within the project limits should be re-routed or protected from damage by construction activities. Materials generated from the clearing operations should be removed from the project site and disposed of at a legal dumpsite.

9.1.3 Excavation Characteristics

Based on our field exploration, we anticipate that excavations at the site may be accomplished with conventional foundation drilling and trenching equipment in good working condition. Difficult excavation should be anticipated in very dense gravel, cobbles, and boulders. Excavations may be subject to caving if materials with low cohesion or wet soils are encountered. Oversize material greater than approximately 4 inches is not considered suitable for use as backfill. In the event that oversize material, including cobbles, boulders, and/or construction debris is encountered during excavation operations, the oversize material should be disposed of off-site.

9.1.4 Temporary Trench Excavations

Electrical trenches on the order of 4 feet deep or less are anticipated for the light pole installations. Based on our borings, these relatively shallow trenches are anticipated to expose fill soils. Temporary near-vertical excavations not exceeding a depth of approximately 4 feet should be feasible where existing structures that may surcharge the excavations are not present. However, excavations that expose materials with low cohesion or wet soils may be subject to caving. In particular, bedding materials for existing pipelines, if encountered, may be prone to caving. Excavations deeper than 4 feet should be laid back to slope inclinations of approximately 1.5:1 (horizontal to vertical) or flatter. Excavations that are unstable should be laid back to slope inclinations of approximately 2:1 (horizontal to vertical) or flatter. Where excavations cannot be laid back, shoring may be appropriate. Excavations should be performed in accordance with the OSHA regulations. The on-site soils should be considered as Type C soils in accordance with the OSHA guidelines. Recommendations for temporary shoring can be provided, if requested.

9.1.5 Fill Material

In general, the on-site soils should be suitable for reuse as trench backfill provided that they are free of trash, debris, roots, vegetation, deleterious materials, and contamination. Fill should generally be free of rocks or lumps of material in excess of 4 inches in diameter. Rocks

or hard lumps larger than approximately 4 inches in diameter should be broken into smaller pieces or should be removed from the site. On-site soils used as fill will involve moisture-conditioning to achieve appropriate moisture content for compaction.

Imported fill materials, if used, should consist of clean, non-expansive, granular material, which conforms to the "Greenbook" for structure backfill. Non-expansive can be defined as soil having an expansion index (EI) of 20 or less in accordance with ASTM International (ASTM) test method D 4829. The imported materials should also meet the Caltrans (2021) criteria for non-corrosive soils (i.e., soils having a minimum resistivity greater than 1,500 ohm-centimeters [cm], a chloride concentration less than 500 parts per million [ppm], a sulfate concentration of less than 0.15 percent [1,500 ppm], and a pH value greater than 5.5). Import materials for use as fill should be evaluated by the geotechnical consultant prior to importing. The contractor should be responsible for the uniformity of import material brought to the site.

9.1.6 Fill Placement and Compaction

Fill soils should be compacted in horizontal lifts to a relative compaction of 90 percent as evaluated by ASTM D 1557. Fill soils should be placed at or slightly above the laboratory optimum moisture content as evaluated by ASTM D 1557. The optimum lift thickness of fill will depend on the type of compaction equipment used but generally should not exceed 8 inches in loose thickness. Placement and compaction of the fill soils should be in general accordance with specifications of the recent edition of the "Greenbook" (Standard Specifications for Public Works).

9.1.7 Electrical Conduit Bedding

We recommend that new electrical conduits be supported on 6 inches or more of granular bedding material such as sand with a sand equivalent (SE) value of 20 or more. Bedding material should be placed and compacted around the conduits, and 12 inches or more above the top of the conduits in accordance with the current "Greenbook." Special care should be taken to not allow voids beneath and around the conduits. Bedding material and compaction requirements should be in accordance with the recommendations of this report, the project specifications, and applicable requirements of the appropriate agencies.

9.1.8 Modulus of Soil Reaction

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed on the sides of buried flexible pipelines for the purpose of evaluating lateral deflection caused by the weight of the backfill above the pipe. We recommend that a modulus of soil reaction of

1,000 pounds per square inch be used for design, provided that granular bedding material is placed adjacent to the pipe, as recommended in this report.

9.2 Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with the CBC (2022) guidelines and adjusted MCE_R spectral response acceleration parameters (ATC, 2024).

Table 1 – 2022 California Building Code Seismic Design Criteria

Site Coefficients and Spectral Response Acceleration Parameters	Values
Site Class	D
Site Coefficient, Fa	1.0
Site Coefficient, Fv	1.7
Mapped Spectral Response Acceleration at 0.2-second Period, S_s	2.310g
Mapped Spectral Response Acceleration at 1.0-second Period, S_1	0.924g
Spectral Response Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	2.310g
Spectral Response Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	1.571g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	1.540g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	1.047g
Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration, PGA_M	1.071g

9.3 Pier Foundations

As noted previously, we anticipate that the drilled pier foundations for Musco lighting will have a diameter of 30 inches or more. We recommend that the poles be embedded to a depth of 8 feet or greater into dense fill or alluvium. For drilled piers with an embedment depth of 8 feet or more in dense fill or alluvium, we recommend an allowable axial side friction of 160 pounds per square foot (psf) in compression under static loading conditions starting at a depth of 2 feet below the finished grade at the light pole locations. No end bearing is allowed in evaluating the design capacity of drilled piers. The actual depth of piers should be evaluated by the light pole designer. Allowable axial capacity in tension (uplift) may be considered to be equivalent to 60 percent of the allowable axial capacity in compression for the drilled piers. Allowable axial capacities are based on a factor of safety of 2.0. The allowable axial capacities in compression and tension may be increased by one-third when considering loads of short duration such as wind or seismic forces. If the measures outlined in this report are implemented effectively, the total settlement of the piers are anticipated to be about 0.5 inch or less, provided that the drilled pier bearing materials are not significantly disturbed during construction.

Lateral resistance against the sides of the piers can be estimated considering a passive resistance of 500 psf per foot of depth up to a value of 5,000 psf acting on the pier. The

recommended lateral bearing resistance value includes an arching factor of 2.0. The lateral capacity is based on the assumption that the isolated poles are not adversely affected by a 0.5-inch deflection at the ground surface due to short term lateral loading. The piers should have a spacing of 3D or more, where D is the diameter of the pier. The pier capacities are based on the assumption that the adjoining ground surface will be horizontal for a distance of 10 feet or more.

The setback guidelines presented in Section 1808.7 of the CBC (2022) for structure footings situated near the top of a descending slope will be applicable for the light poles constructed on or adjacent to descending slopes on site. The bottom of the drilled piers shall have a horizontal setback of H/3 or more from the nearest slope face, where H is the height of the slope. The drilled piers may need to be deepened in order to meet the CBC (2022) setback guidelines.

9.3.1 Drilled Pier Construction Considerations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our exploratory borings, site observations, and experience with similar materials. The pier drilling contractor should mobilize equipment of sufficient size and operating capability to achieve the design embedment depth. The excavation technique chosen by the contractor should not adversely affect the quality or strength of the shaft side or end bearing materials. If refusal is encountered in these materials during actual installation, Ninyo & Moore should be notified to evaluate the subsurface condition to establish that true refusal has been met with adequate drilling equipment.

Groundwater is not expected to be encountered during drilling; however, seepage and perched water conditions could be encountered that could result in caving of the drilled holes. The contractor should be prepared to mitigate such conditions. A temporary casing may be used in the drill-hole to reduce water infiltration and caving potential. While placing concrete, the casing should be withdrawn gradually.

Concrete should be placed in the annular space between the precast, pre-stressed concrete bottom pole section and the drill-hole surface using the tremie method, as applicable. Concrete utilized in the drilled shaft should be a fluid mix with sufficient slump so that it will fill the voids between the pole and the drill-hole wall. The contractor should take care to reduce enlargement of the excavation near the top of the drilled shaft, which could result in mushrooming of the drilled shaft top.

The drill-hole should be cleaned prior to placement of the pole and concrete to fill the annular space. Care should be taken to check that the soils at the drilled shaft bottom have not been

disturbed. The successful advancement of the drill-hole will depend largely on the suitability of the drilling equipment and the skill of the operator. The drilled foundation contractor should try to reduce the time during which the excavation remains open. The contractor should schedule the sequence of operations so that the drill-hole excavation can be finished, the bottom pole section placed, and the concrete placed within the same work-day. Drilled shaft excavations should not be left open overnight. In case of delay in placing concrete within the drill-hole due to equipment breakdown or other unforeseen circumstances, temporary casing may be used to protect the integrity of the hole. While placing concrete, the casing should be withdrawn gradually.

The drilled shaft installation should be observed by the Geotechnical Engineer or a qualified representative to check that: 1) subsurface conditions are as anticipated from the borings, 2) the drilled shaft is constructed to the specified size and penetration and extends into dense fill or alluvium, 3) the drill-hole bottom is clean and competent, and 4) the drilled shaft is within allowable tolerance for plumbness. These items are fundamental to the installation and behavior of the pier foundations. Furthermore, we recommend the following for the installation of drilled shaft.

- The clear spacing between the precast, pre-stressed concrete bottom pole section and the drill-hole surface should be three times the maximum size of the coarse aggregate used in the concrete.
- Centralizers should be installed to keep the bottom pole section positioned per project specifications.
- If casing is used, a sufficient head of concrete that fills the casing should be used before pulling the casing.

9.4 Soil Corrosivity

Laboratory testing was performed on representative soil samples to evaluate pH, electrical resistivity, water-soluble chloride content, and water-soluble sulfate content. The soil pH and electrical resistivity tests were performed in general accordance with California Test Method (CT) 643. Chloride content testing was performed in general accordance with CT 422. Sulfate content testing was performed in general accordance with CT 417. The laboratory test results are presented in Appendix B.

The soil pH of the samples tested ranged from approximately 6.5 to 6.6 and the electrical resistivity ranged from approximately 2,114 to 20,871 ohm-centimeters. The chloride content of the samples ranged from approximately 65 to 70 ppm. The sulfate content of the samples ranged from approximately 0.001 to 0.003 percent by weight (i.e., 10 to 30 ppm). Based on the laboratory

test results and Caltrans (2021) criteria, the project site can be classified as a non-corrosive site, which is defined as having earth materials with less than 500 ppm chlorides, less than 0.15 percent sulfates (i.e., 1,500 ppm), a pH of 5.5 or more, or an electrical resistivity of more than 1,500 ohm-centimeters. If corrosion susceptible improvements are planned on site, we recommend that a corrosion engineer be consulted for further evaluation and recommendations.

9.5 Concrete Placement

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. Based on the CBC (2022), the potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight, moderate for water-soluble sulfate contents ranging from 0.10 to 0.20 percent by weight, severe for water-soluble sulfate contents ranging from 0.20 to 2.00 percent by weight, and very severe for water-soluble sulfate contents over 2.00 percent by weight. The soil samples tested for this evaluation, using CT 417, indicate a water-soluble sulfate content ranging from approximately 0.001 to 0.003 percent by weight (i.e., 10 to 30 ppm). Accordingly, the on-site soils are considered to have a negligible potential for sulfate attack. However, due to the potential variability of the on-site soils, consideration should be given to using Type II/V cement for the project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete for the proposed improvements be placed with a slump of 4 inches based on ASTM C 143. The slump should be checked periodically at the site prior to concrete placement. We further recommend that concrete cover over reinforcing steel for foundations be provided in accordance with CBC (2022). The structural engineer should be consulted for additional concrete specifications.

9.6 Drainage

Positive surface drainage is imperative for satisfactory site performance. Positive drainage should be provided and maintained to direct surface water away from foundations and off-site. Positive drainage is defined as a slope of 2 percent or more for a distance of 5 feet or more away from foundations and tops of slopes. Runoff should then be directed by the use of swales or pipes into a collective drainage system. Surface water should not be allowed to pond adjacent to foundations or pavement. Area drains for landscaped and paved areas are recommended.

9.7 Landscaping

Project landscaping should consist of drought tolerant plants. Landscape irrigation should be kept to a level just sufficient to maintain plant vigor. Overwatering should not be permitted.

10 CONSTRUCTION OBSERVATION

The recommendations provided in this report are based on our understanding of the proposed project and our evaluation of the data collected based on subsurface conditions observed in widely spaced exploratory borings. It is imperative that the geotechnical consultant checks the subsurface conditions during construction. We recommend that Ninyo & Moore review the project plans and specifications prior to construction. It should be noted that, upon review of these documents, some recommendations presented in this report may be revised or modified.

During construction, we recommend that the duties of the geotechnical consultant include, but not be limited to:

- Observing trench backfill placement and performing field tests to evaluate compaction.
- Evaluating existing excavated materials and/or imported materials prior to their use as fill (if used).
- Observing drill-hole excavations and cleaning prior to placement of the bottom pole section and concrete to fill the annular space.
- Performing material testing services including concrete compressive strength and steel tensile strength tests and inspections.

The recommendations provided in this report are based on the assumption that Ninyo & Moore will provide geotechnical observation and testing services during construction. In the event that the services of Ninyo & Moore are not utilized during construction, we request that the selected consultant provide the governing agency with a letter (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this report.

11 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be

encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project area. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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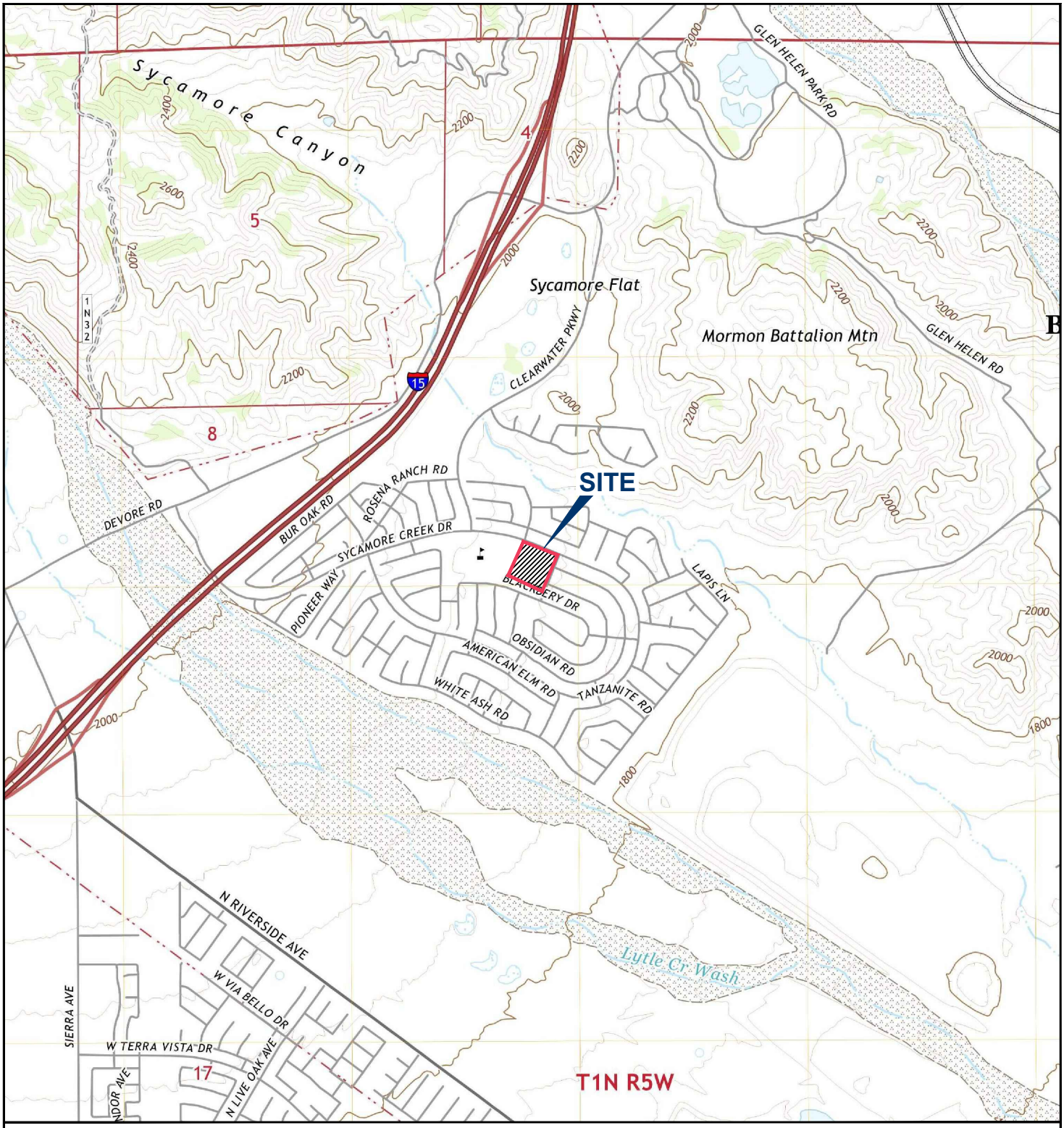
FIGURES



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NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2021.

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FIGURE 1

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SITE LOCATION

PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY
SAN BERNARDINO, CALIFORNIA

212647001 I 7/24

Paakuma K8 Baseball

San Bernardino,CA

Equipment Layout

INCLUDES:
- Little League 1
- Little League 2

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

Equipment List For Areas Shown

	Pole			Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	ABOVE GRADE LEVEL	LUMINAIRE TYPE	QTY/POLE
2	A1 A3	60'	-	60'	TLC-LED-550	2
1	A2	60'	-	60' 15.5' 60' 60' 15.5'	TLC-LED-900 TLC-BT-575 TLC-LED-550 TLC-LED-900 TLC-BT-575	1 1 2/2* 1/1* 2
4	B1-B4	60'	-	60' 60' 15.5'	TLC-LED-550 TLC-LED-900 TLC-BT-575	1 3 1
4	C1-C4	60'	-	60' 15.5'	TLC-LED-900 TLC-BT-575	3 1
11	Totals					52

*This structure utilizes a back-to-back mounting configuration

Single Luminaire Amperage Draw Chart

Driver Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	380 (60)	480 (60)
TLC-BT-575	3.3	3.2	2.9	2.5	2.0	1.8	1.5
TLC-LED-550	3.2	3.0	2.8	2.4	1.9	1.8	1.4
TLC-LED-900	5.2	4.9	4.5	3.9	3.1	2.9	2.3

LEGEND

B-6 TD=40.8 — BORING; TD=TOTAL DEPTH IN FEET

REFERENCE: MUSCO LIGHTING, 2024.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

SCALE IN FEET 1 : 120

0' 120' 240'

ENGINEERED DESIGN By: C.Hensley • File #227430Cr1 • 13-May-24

Pole location(s) + dimensions are relative to 0,0 reference point(s)

FEET

0 200 400

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FIGURE 2

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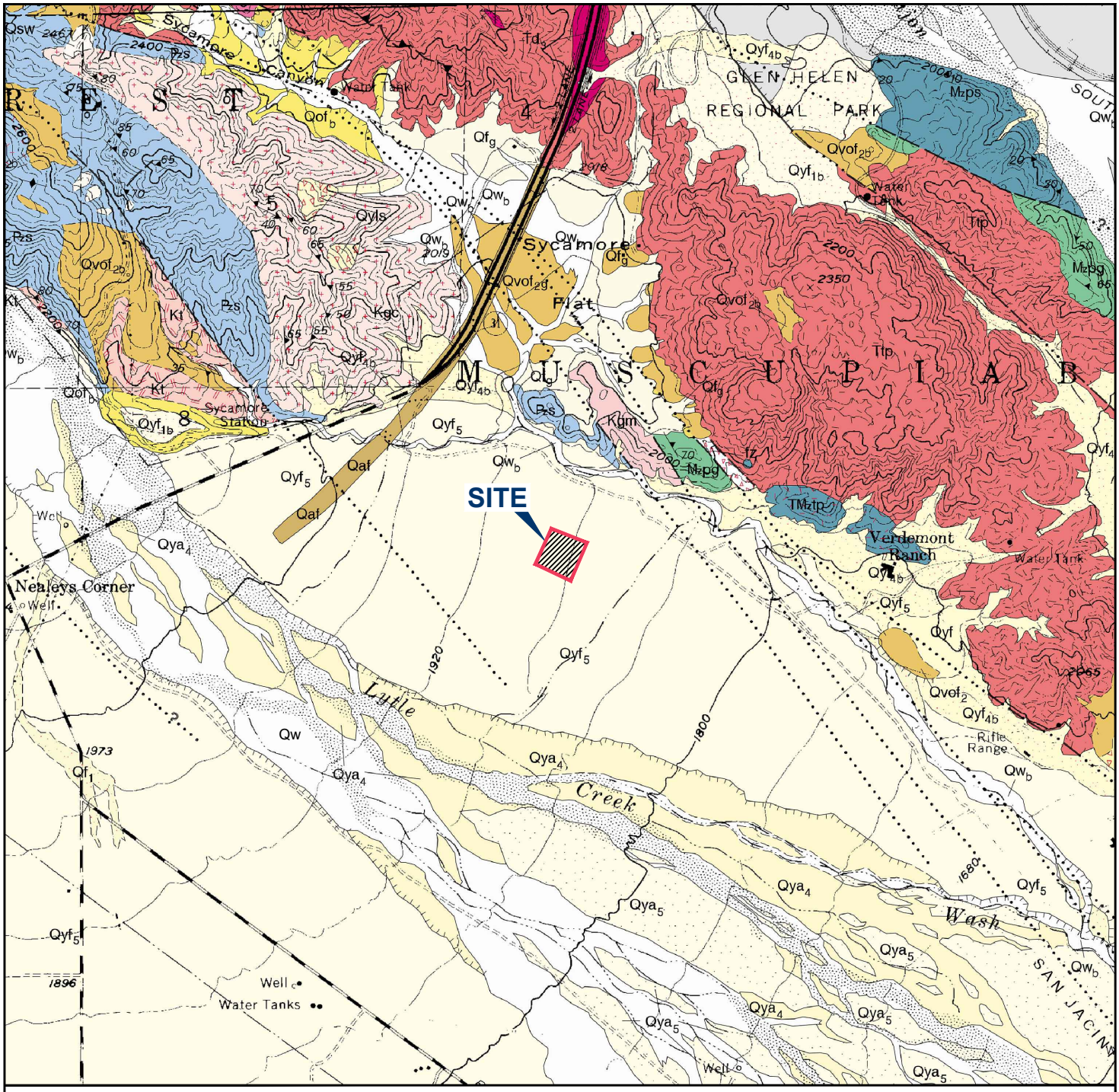
SITE PLAN AND BORING LOCATIONS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY
SAN BERNARDINO, CALIFORNIA

212647001 I 7/24



LEGEND

Qaf	ARTIFICIAL FILL	Ttp	GRANODIORITE OF TELEGRAPH PEAK
Qw	WASH DEPOSITS		GEOLOGIC CONTACT
Qyf	YOUNG ALLUVIAL-FAN DEPOSITS		FAULT
Qya	YOUNG ALLUVIAL-VALLEY DEPOSITS		

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: MORTON AND MATTI, 2001.

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FIGURE 3

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REGIONAL GEOLOGY

PAAKUMA SPORTS FIELD LIGHTING PROJECT
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SAN BERNARDINO, CALIFORNIA

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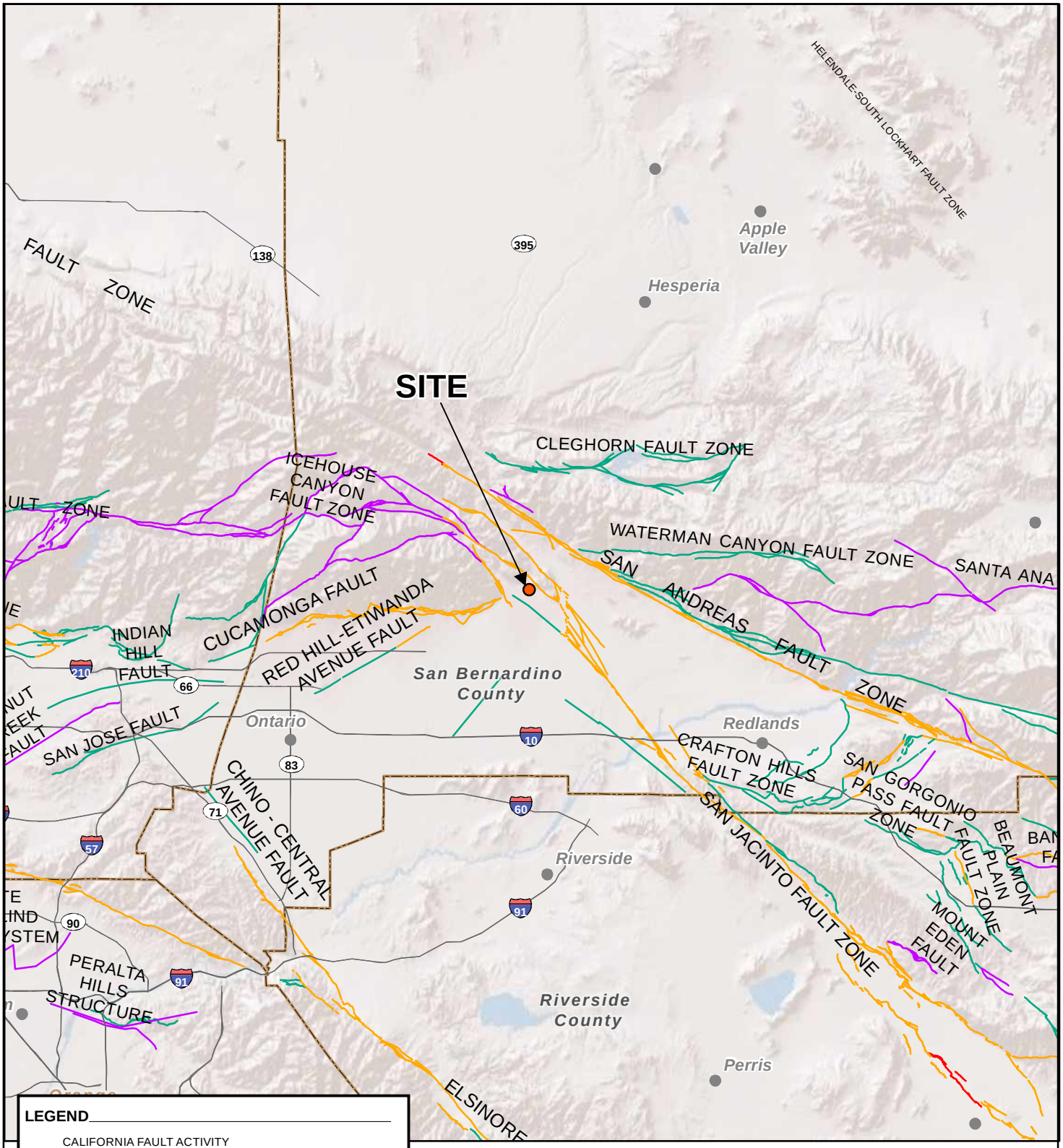

LEGEND

CALIFORNIA FAULT ACTIVITY

- HISTORICALLY ACTIVE
- HOLOCENE ACTIVE
- LATE QUATERNARY (POTENTIALLY ACTIVE)
- QUATERNARY (POTENTIALLY ACTIVE)
- STATE/COUNTY BOUNDARY

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

SOURCES: QUATERNARY FAULTS DATABASE - U.S. GEOLOGICAL SURVEY AND CALIFORNIA GEOLOGICAL SURVEY, QUATERNARY FAULT AND FOLD DATABASE FOR THE UNITED STATES, ACCESSED JUNE 20, 2024, AT: https://www.usgs.gov/programs/earthquake-hazards/faults, ESRI, 2023.

N

MILES

0 8 16

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FIGURE 4

FAULT LOCATIONS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples
Disturbed samples were obtained in the field using the following methods.

Bulk Samples
Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler
Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of $1^3/_8$ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples
Relatively undisturbed samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler
The sampler, with an external diameter of 3 inches, was lined with 1-inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sampler barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sampler barrel in the brass rings, sealed, and transported to the laboratory for testing.

DATE DRILLED 5/16/24 BORING NO. B-1

GROUND ELEVATION 1,897' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Reddish yellow, moist, dense, silty SAND; few to little gravel.
		60					Light brown. Very dense.
		50/6"	2.8	120.1		GW-GM	ALLUVIUM: Yellowish brown, moist, very dense, well-graded GRAVEL with silt and sand.
10		53					
20		50/1"					Difficult drilling conditions.
		50/4"					Few cobbles.
30		50/3"	0.3	124.4			Dry.
		95/10"				SM	Yellowish brown, moist, very dense, silty SAND; few gravel; few cobbles; difficut drilling conditions.
40						GM	Yellowish brown, moist, very dense, silty GRAVEL with sand.

FIGURE A- 1

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PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY, SAN BERNARDINO, CALIFORNIA

DATE DRILLED 5/16/24 BORING NO. B-1

GROUND ELEVATION 1,897' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		■	50/3"				GM	ALLUVIUM: (Continued) Yellowish brown, moist, very dense, silty GRAVEL with sand.
								Total Depth = 40.8 feet. Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/16/24.
50								Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
60								
70								
80								

DATE DRILLED 5/17/24 BORING NO. B-2

GROUND ELEVATION 1,892' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						GM	FILL: Brown, moist, dense, silty GRAVEL with sand; few cobbles; few organics.
							Yellowish brown.
		50/1"					Very dense.
							Difficult drilling conditions.
10		50/4"					Few boulders.
							Total Depth = 11.5 feet (Refusal). Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/17/24. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20							
30							
40							

DATE DRILLED 5/17/24 BORING NO. B-3

GROUND ELEVATION 1,889' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	FILL: Yellowish brown, moist, very dense, silty SAND with gravel; few cobbles; few organics. Brown; difficult drilling conditions. Few boulders.
								Total Depth = 4.5 feet (Refusal). Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/17/24. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
10								
20								
30								
40								

DATE DRILLED 5/17/24 BORING NO. B-4

GROUND ELEVATION 1,887' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						GM	FILL: Reddish brown, moist, very dense, silty GRAVEL with sand; few cobbles; few organics.
	N	50/1"					Brown; few boulders; difficult drilling conditions.
							Total Depth = 7.0 feet (Refusal). Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/17/24.
10							Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
20							
30							
40							

DATE DRILLED 5/16/24 BORING NO. B-5

GROUND ELEVATION 1,896' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Yellowish brown, moist, dense, silty SAND with gravel; few cobbles; few organics.
		21					
10		50/2"	4.9	112.5			Very dense; few cobbles; difficult drilling conditions.
						SM	ALLUVIUM: Brown to yellowish brown, moist, very dense, silty SAND with gravel; few cobbles; difficult drilling conditions.
		50/1"					
20		50/4"	3.2	129.5			Brown to grayish brown.
		50/6"					Few boulders.
30		50/1" 50/6"					Yellowish brown.
		50/1" 50/2"					
40							

FIGURE A- 6

DATE DRILLED 5/16/24 BORING NO. B-5

GROUND ELEVATION 1,896' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40			50/2"				SM	ALLUVIUM: (Continued) Yellowish brown, moist, very dense, silty SAND with gravel; few cobbles; difficult drilling conditions.
								Total Depth = 40.7 feet. Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/16/24.
50								Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
60								
70								
80								

DATE DRILLED 5/16/24 BORING NO. B-6

GROUND ELEVATION 1,892' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Yellowish brown, moist, dense, silty SAND; few gravel; few organics.
		22				SM	ALLUVIUM: Brown to yellowish brown, moist, dense, silty SAND; trace gravel; few organics.
10		50/4"	9.0	111.8			Very dense. Difficult drilling conditions.
		50/6"					Few cobbles; few boulders.
20		50/3"	3.9	123.0			Silty sand with gravel.
		50/1"					
30		50/3"	4.2	120.5			
		50/6"					Light brown.
40							

FIGURE A- 8

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PAAKUMA SPORTS FIELD LIGHTING PROJECT
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DATE DRILLED 5/16/24 BORING NO. B-6

GROUND ELEVATION 1,892' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Hollow-Stem Auger (Baja Exploration)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY ARB LOGGED BY ARB REVIEWED BY SCM/SG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		■	50/3"				SM	ALLUVIUM: (Continued) Light brown, moist, very dense, silty SAND with gravel; few cobbles; difficult drilling conditions.
								Total Depth = 40.8 feet. Groundwater not encountered during drilling. Backfilled with cement-bentonite grout on 5/16/24.
50								Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
60								
70								
80								

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in adherence to the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests
The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

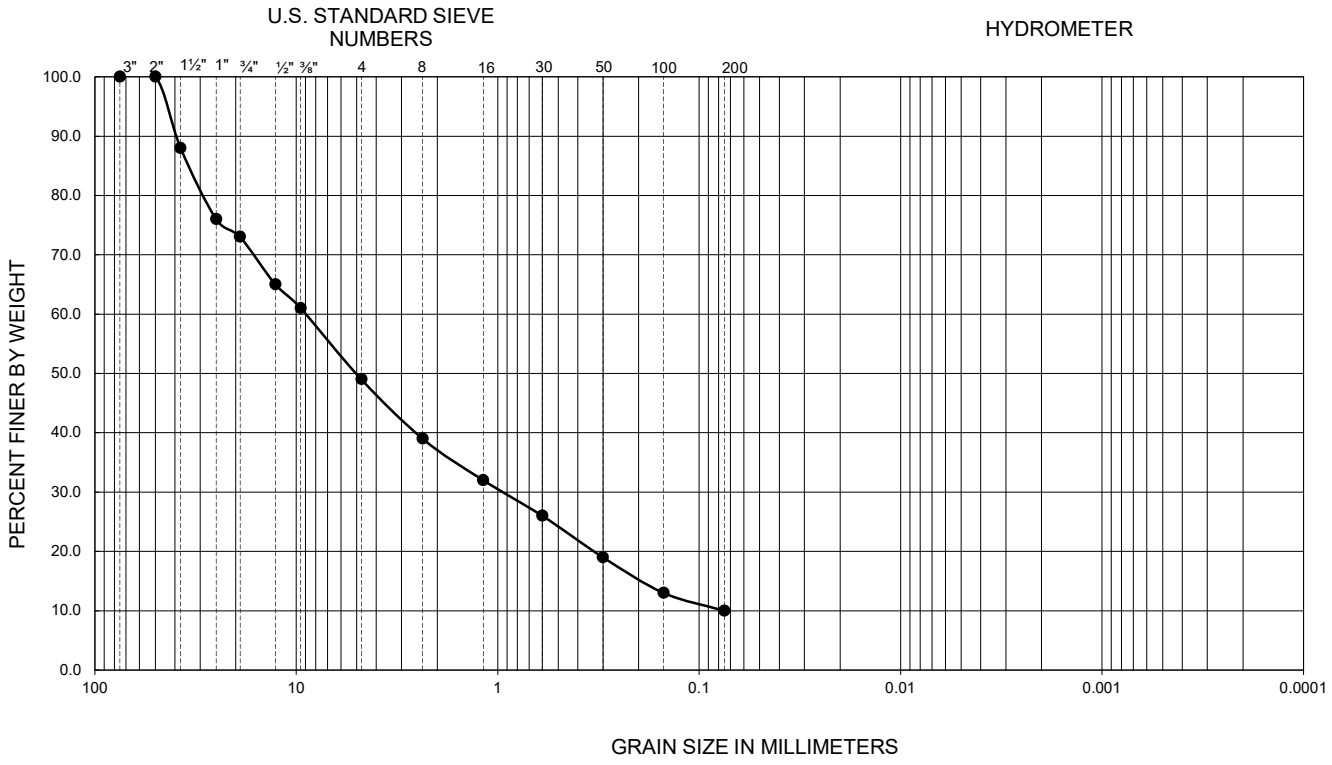
Gradation Analysis
Gradation analysis tests were performed on selected representative samples in general accordance with ASTM D 6913. The grain-size distribution curves are presented on Figures B-1 through B-3. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

200 Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are summarized on Figure B-4.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed soil samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are presented on Figures B-5 and B-6.

Soil Corrosivity Tests
Soil pH and resistivity tests were performed on representative soil samples in general accordance with CT 643. The soluble sulfate content and chloride content of the selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-7.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-1	10.0-11.0	--	--	--	0.075	0.96	9.0	120.0	1.4	10	GW-GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-1

GRADATION TEST RESULTS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
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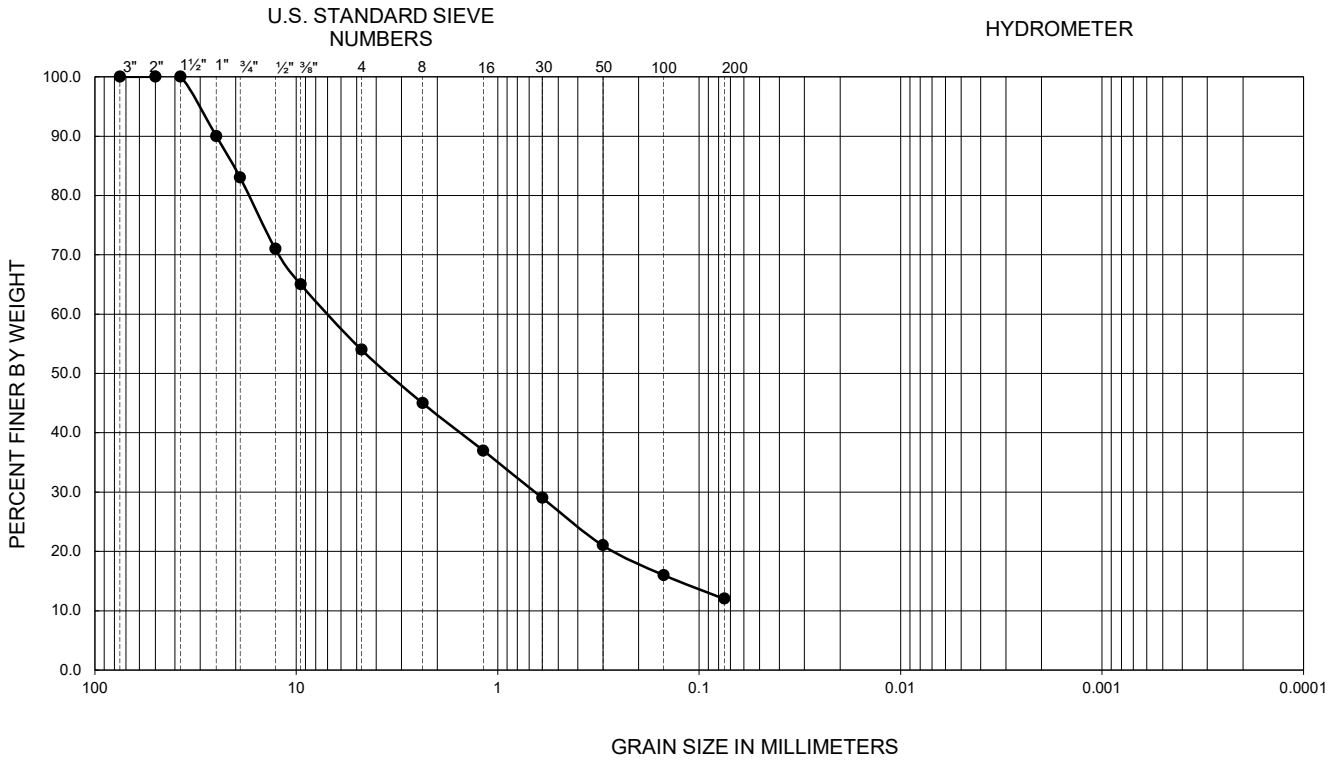
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-1	30.0-30.8	--	--	--	--	--	--	--	--	12	GW-GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-2

GRADATION TEST RESULTS

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PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY, SAN BERNARDINO, CALIFORNIA

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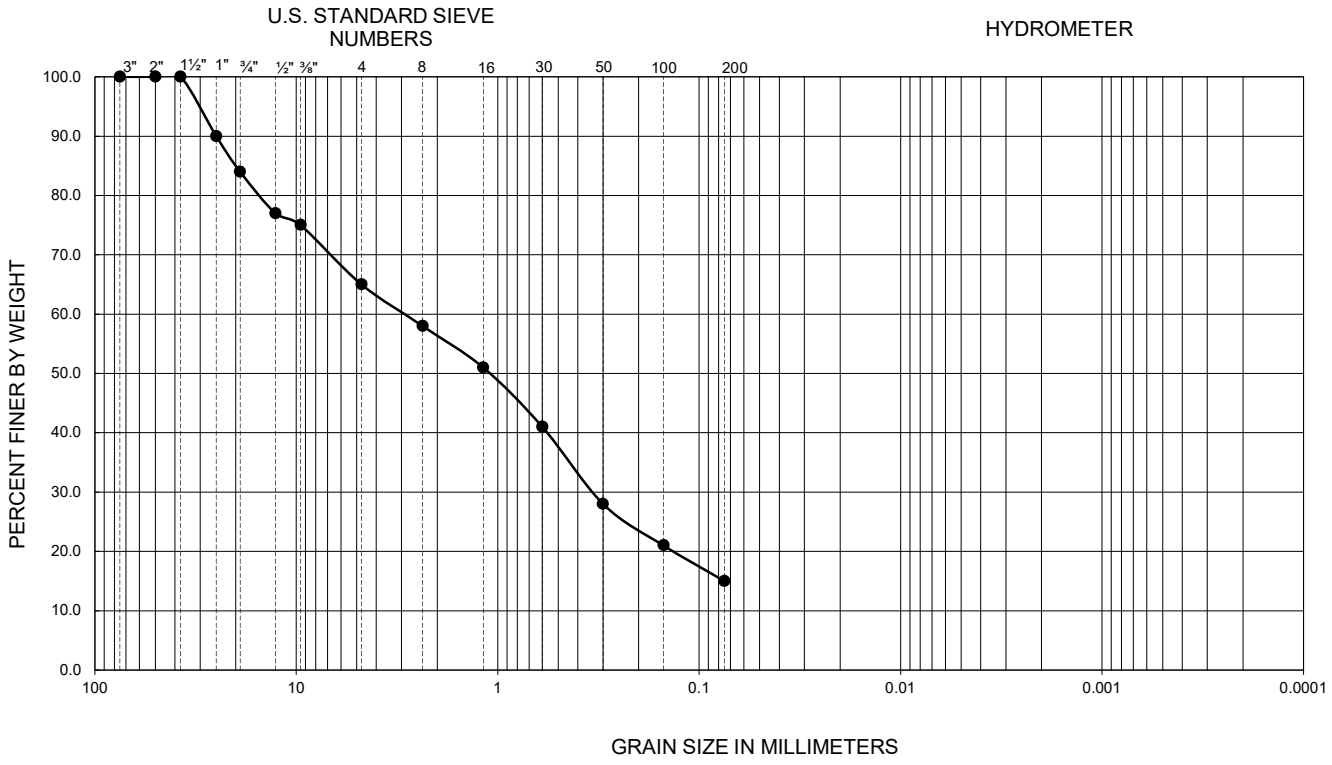
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-6	20.0-20.8	--	--	--	--	--	--	--	--	15	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-3

GRADATION TEST RESULTS

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PAAKUMA SPORTS FIELD LIGHTING PROJECT
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SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-2	0.0-5.0	SILTY GRAVEL WITH SAND	52	14	GM
B-3	0.0-4.5	SILTY SAND WITH GRAVEL	64	17	SM
B-4	0.0-3.0	SILTY GRAVEL WITH SAND	55	15	GM
B-5	20.0-20.8	SILTY SAND WITH GRAVEL	66	23	SM
B-6	10.0-10.8	SILTY SAND	97	35	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE B-4

NO. 200 SIEVE ANALYSIS TEST RESULTS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
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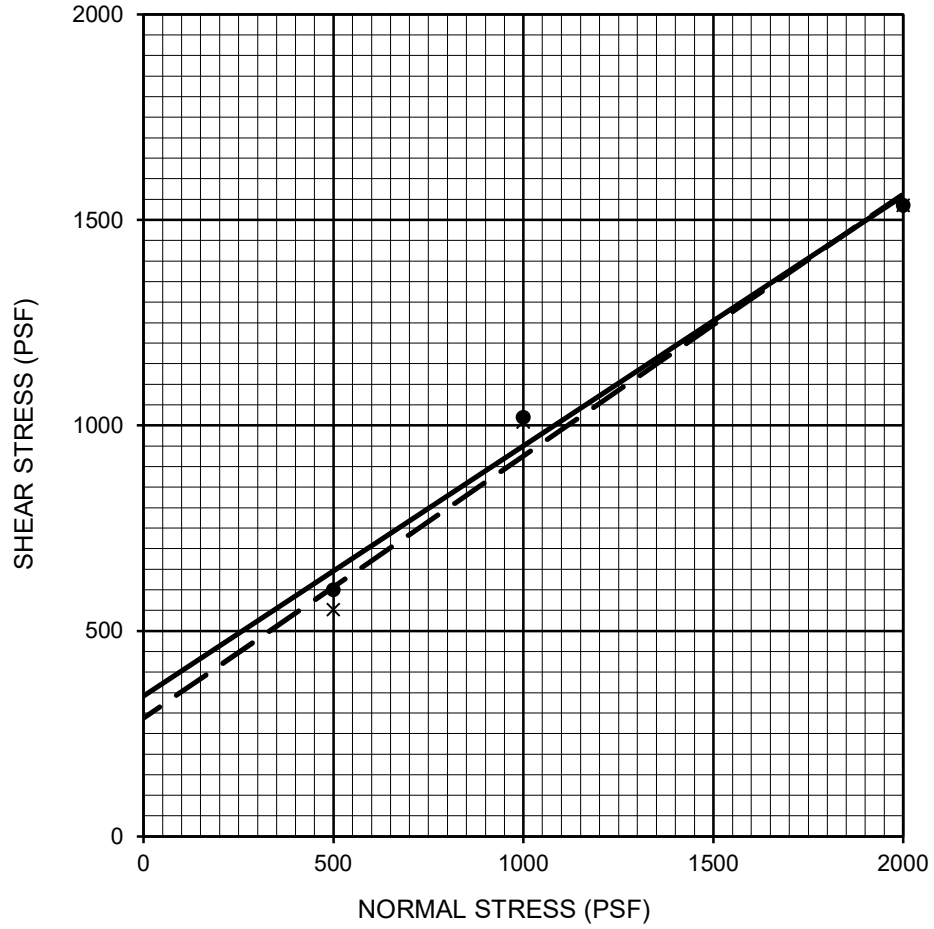
212647001_B-4_200-WASH @ B-2A -- B-6B



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
WELL-GRADED GRAVEL WITH SILT AND SAND	●——	B-1	10.0-11.0	Peak	342	31	GW-GM
WELL-GRADED GRAVEL WITH SILT AND SAND	– – X – –	B-1	10.0-11.0	Ultimate	288	33	GW-GM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-5

DIRECT SHEAR TEST RESULTS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY, SAN BERNARDINO, CALIFORNIA

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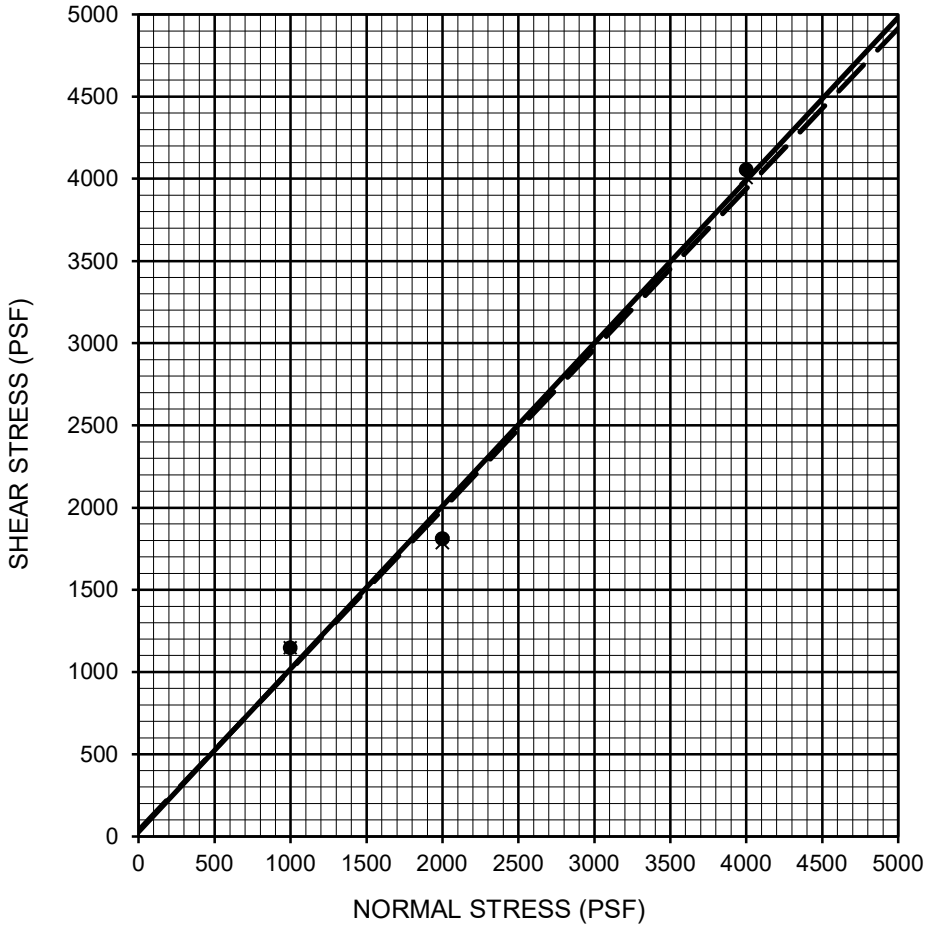

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
SILTY SAND WITH GRAVEL	—●—	B-6	20.0-20.8	Peak	26	45	SM
SILTY SAND WITH GRAVEL	– – X – –	B-6	20.0-20.8	Ultimate	38	44	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-6

DIRECT SHEAR TEST RESULTS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
17825 SYCAMORE CREEK LOOP PARKWAY, SAN BERNARDINO, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-3	0.0-4.5	6.5	20,871	10	0.001	65
B-6	15.0-16.0	6.6	2,114	30	0.003	70

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE B-7

CORROSIVITY TEST RESULTS

PAAKUMA SPORTS FIELD LIGHTING PROJECT
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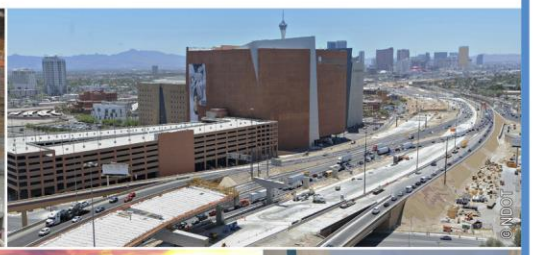

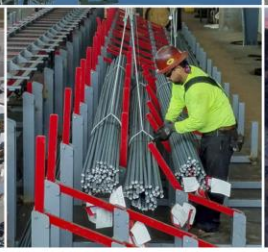
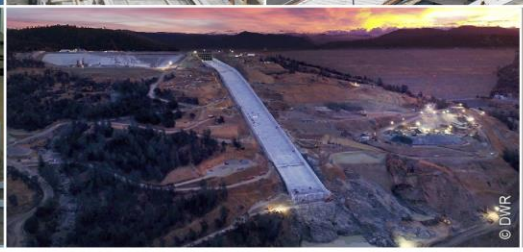

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