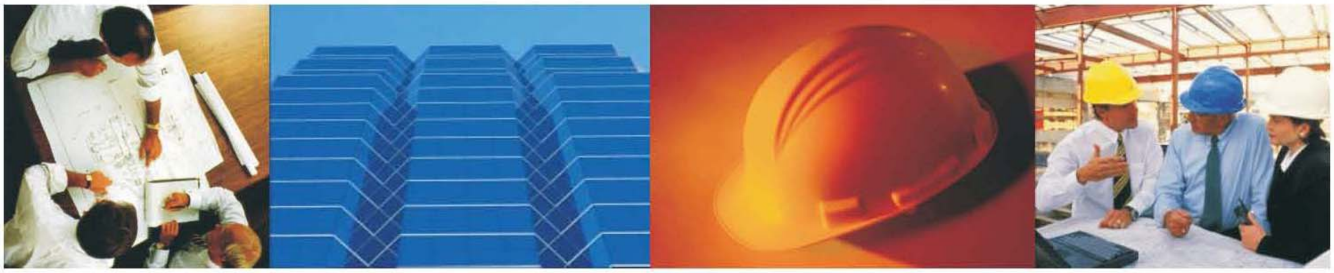

GEOTECHNICAL ENGINEERING INVESTIGATION

FOR

PROPOSED SETA CHILDCARE MODULAR REPLACEMENT – HOPKINS PARK

2317 MATSON DRIVE

SACRAMENTO, CA

PREPARED FOR

Ms. Denise Lee
Sacramento Employment Training Agency
925 Del Paso Boulevard
Sacramento, CA 95815

By

Mr. Ying-Chi Liao, P.E., G.E.
Senior Engineering Manager
MatriScope Engineering Laboratories, Inc.
601 Bercut Drive
Sacramento, California 95811

Project No. 2845
April 11, 2018

MatriScope
Engineering Laboratories, Inc.

April 11, 2018 **MEL File No.: 2845**

Ms. Denise Lee
Sacramento Employment Training Agency
925 Del Paso Boulevard
Sacramento, CA 95815

Subject: **Geotechnical Engineering Investigation**
Proposed SETA Childcare Modular Replacement – Hopkins Park
2317 Matson Drive
Sacramento, CA

Dear Ms. Lee:

In accordance with your authorization, MatriScope Engineering Laboratories, Inc. (MatriScope) has performed a geotechnical engineering investigation for the proposed SETA Childcare Modular Replacement – Hopkins Park project located at 2317 Matson Drive in Sacramento, California. The purpose of our investigation was to explore and evaluate the subsurface conditions at various locations at the site to develop geotechnical engineering recommendations for use in the project design and construction.

It is imperative that MatriScope be provided the opportunity to review, in advance of construction, the civil and foundation plans related to grading and building construction to assure the recommendations contained herein are appropriate for the proposed development.

The attached report presents the results of our data review, field exploration, laboratory testing, and engineering analysis. Based on our investigation, it is our professional opinion the proposed project may be constructed at the subject site provided the recommendations contained in the attached report are implemented into project design and construction.

Recommendations provided herein are contingent on the provisions outlined in the ADDITIONAL SERVICES and LIMITATIONS sections of this report. The project Client and Owner should become familiar with these provisions to assess further involvement by MatriScope and other potential impacts to the proposed project.

Thank you for the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact our office.

Respectfully Submitted,
MatriScope Engineering Laboratories, Inc.

Ying-Chi Liao, P.E., G.E.
Senior Engineering Manager

REGISTERED PROFESSIONAL ENGINEER
YING-CHI LIAO
GE 2154
Exp. 3/31/2020
GEOTECHNICAL
STATE OF CALIFORNIA

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GEOTECHNICAL ENGINEERING INVESTIGATION

PROPOSED SETA CHILD MODULAR REPLACEMENT – HOPKINS PARK

2317 MATSON DRIVE

SACRAMENTO, CA

1. INTRODUCTION

1.1 GENERAL

The proposed SETA Child Modular Replacement – Hopkins Park site is located at 2317 Matson Drive in Sacramento, California. This report contains the results of our geotechnical engineering investigation for the proposed development. The site location relative to the vicinity of the site is shown on Plate 1.

This report includes recommendations related to the geotechnical aspects of project design and construction. Conclusions and recommendations presented in this report are based on the subsurface conditions encountered at the locations of our field exploration and the provisions and requirements outlined in the ADDITIONAL SERVICES and LIMITATIONS sections of this report. Recommendations presented herein should not be extrapolated to other areas or used for other projects without prior review by MatriScope Engineering Laboratories, Inc. (MatriScope).

1.2 PROPOSED CONSTRUCTION

The site is currently occupied by an existing modular structure. We understand that the existing modular structure will be replaced by a new one. The new modular structure will be supported on a stem wall foundation. There will be no concrete interior slabs-on-grade. Concrete sidewalk / flatwork is planned.

1.3 PURPOSE AND SCOPE OF SERVICES

Field investigation was performed to explore and evaluate subsurface conditions at various locations at the site in order to develop recommendations related to the geotechnical aspects of project design and construction. This report summarizes the results of our services including:

- A description of the proposed project
- A description of the site surface, subsurface and groundwater conditions observed during our field investigation
- Recommendations related to the geotechnical aspects of:
  - Site preparation and earthwork construction
  - Utility trench excavations and backfill
  - 2016 CBC seismic design coefficients for use in structural analysis
  - Shallow footing design and construction
  - Concrete sidewalk/flatwork
  - Surface drainage and moisture protection
- An appendix which includes a summary of our field investigation and laboratory testing programs

2. FIELD EXPLORATION AND LABORATORY TESTING

2.1 SUBSURFACE EXPLORATION

A subsurface exploration at the site was performed to investigate and sample soils beneath the site on March 31, 2018. Two (2) exploratory borings (B1 and B2) were advanced to a depth of approximate 10.5 feet below the existing ground surface. The borings were drilled with hand auger. Approximate locations of exploratory borings are shown on Plate 2. After completion of drilling, the boreholes were backfilled with soil cuttings generated during the drilling. The obtained soil samples were sealed and transported to our Sacramento laboratory for visual examination and laboratory testing.

2.2 LABORATORY TESTING

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils which may affect the geotechnical aspects of project design and construction. Moisture content, dry density, Expansion Index, Plasticity Index, compaction, and soil corrosivity parameters tests were performed in general accordance with ASTM test methods. Test results are presented on the Log of Boring and/or appendix of this report.

3. SITE CONDITIONS

3.1 SURFACE AND SUBSURFACE CONDITIONS

The site is currently occupied by an existing modular structure. The site is relatively flat. The subsurface soils consist mainly of medium stiff lean clay to the maximum depth explored of 10.5 feet below the existing ground surface approximately.

3.2 GROUNDWATER

At the time of our field investigation, no groundwater was encountered in any our borings. It should be noted that soil moisture conditions within the site will vary depending on rainfall, and/or runoff conditions not apparent at the time of our field investigation. It is common that the soil moisture conditions will change seasonally.

Detailed descriptions of the subsurface conditions encountered during our field investigation are presented on the Log of Boring Plates A-2 and A-3.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

It is our professional opinion the proposed building may be supported on compacted engineered fill or undisturbed competent onsite soils provided the recommendations contained in the attached report are implemented into project design and construction.

4.2 EXPANSIVE SOIL

Based on the results of one Expansion Index test and visual examination of soil samples obtained at the subject site, **the site soil is considered as having medium potential expansion.**

4.3 SOIL CORROSIVITY

Laboratory tests were performed for soil corrosivity parameters (minimum resistivity, pH, chloride and sulfate content) on one selected soil sample obtained from the site. Based on the minimum resistivity test result (750 ohm-cm), soils are considered to have high corrosive potential to buried metallic improvements in accordance with the National Association of Corrosion Engineers' 1984 "Corrosion Basics: an Introduction" interpretation of resistivity.

Results of pH (6.72), chloride (2.6 ppm) and sulfate (70.5 ppm) tests do not indicate a significant corrosive potential to buried concrete structures and, therefore, Type II cement may be used. All underground utility lines should be corrosion-protected per recommendations of a corrosion engineer, if required.

We have provided the above preliminary corrosion test results. These test results are only indicator parameters of potential soil corrosivity for the sample tested. Other soils found on the site may be more, less, or of a similar corrosive nature.

4.4 SITE PREPARATION

4.4.1 Existing Utilities and Landscaping

The existing utility lines within the area of construction to be abandoned, if any, should be removed and disposed of off-site. Existing utility pipelines that extend beyond the limits of the proposed construction and that are to be abandoned in-place should be plugged with cement grout to prevent migration of soil and/or water.

Landscaping removal should include the tree root system and all surface roots larger than ½-inch in diameter. All excavations resulting from removal of these items should be cleaned of loose or disturbed material (including all previously-placed backfill) and dish-shaped (with sides sloped 3 (h): 1(v) or flatter) to permit access for compaction equipment.

4.4.2 Removal, Scarification and Compaction

Preparation of the subgrade exposed by excavation and requirements for engineered fill should be in accordance with recommendations provided below (see section ENGINEERED FILL). The bottom of removal areas should be observed and approved by the geotechnical engineer or his representative prior to scarification and compaction.

It should be noticed that onsite clayey soils have a medium expansion potential. In order to minimize the potential impact to the proposed concrete footings and flatwork, we recommend that following site stripping and any required grubbing, removal and/or over-excavation, the subgrade soils should be removed to at least 12 inches below the design footing bottom and 6 inches below the design subgrade elevation in the flatwork areas.

The exposed excavation bottom should be scarified to a depth of at least 8 inches; uniformly moisture-conditioned and compacted as required in the ENGINEERED FILL section. After the excavation bottom is approved by the geotechnical engineer, the excavation should be backfilled with non-expansive engineered fill to the design finish subgrade elevation. The removal, scarification and compaction of the site soils should extend to a horizontal distance of at least 2 feet beyond the outer edges of foundations or concrete flatwork/sidewalk.

4.5 TEMPORARY EXCAVATION

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing the information below solely as a service to our client. Under no circumstances should the information provided be interpreted to mean that MatriScope is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

4.6 ENGINEERED FILL

4.6.1 Materials

All engineered fill soils (on-site and imported soils) should be nearly-free of organic, rubble, rubbish, deleterious debris, or contaminated materials, and less than 3 inches in maximum dimension.

<u>On-Site Soils</u>
In general, near-surface, on-site soils similar to those encountered in our borings may be used in engineered fills, provided they are free of deleterious debris, organics and adequately moisture-conditioned during placement as recommended in the COMPACTION CRITERIA section. The exception is on-site soils (expansive clays) should not be used in the up 12 inches below footing bottom and 6 inches below the concrete flatwork.

<u>Imported Soils</u>
All imported fill materials to be used for engineered fill should be sampled and tested by the project Geotechnical Engineer prior to being transported to the site. As a minimum, all imported fill should be free of contamination and be granular with a 3-inch maximum particle size, a Plasticity Index less than 15 and less than 30 percent passing the number 200 sieve; essentially non-plastic. Imported gravel fill should be, as a minimum, washed gravel, free from vegetation and debris, with a 1-inch maximum particle size and less than 5 percent passing the number 200 sieve.

4.6.2 Compaction Criteria

Soils scarified and material to be used for engineered fill should be uniformly moisture-conditioned (near and at least 3 percent above optimum moisture content for sandy materials and clay, respectively), placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90 percent relative compaction as determined by the current ASTM (American Society for Testing and Materials) Test Method D1557. The aggregate base materials should be compacted to a minimum of 95 percent relative compaction.

4.7 TRENCH PREPARATION AND BACKFILL

4.7.1 Subgrade Preparation

Prior to placement of utility bedding, the exposed subgrade at the bottom of trench excavations should be examined to detect soft, loose, or unstable areas. Loose materials at trench bottoms resulting from excavation disturbance should be removed to firm material. If soft or unstable areas are encountered, these areas should be over-excavated to a depth of at least 2 feet or to a firm base and be replaced with additional bedding material. Where excavations cross the existing trench backfill materials, the need for and extent of over-excavation or stabilization measures should be evaluated by the Geotechnical Engineer on a case-by-case basis.

4.7.2 Backfill Materials

Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) should consist of clean washed sand and/or crushed rock. If crushed rock is used for pipe zone backfill, we recommend it should have a maximum particle size less than 1 inch and have less than 5 percent passing No. 200 U.S. sieve. Where crushed rock is used, the material should be completely surrounded by a non-woven filter fabric such as Mirafi 140N or equivalent. Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local codes and/or bedding requirements for specific types of pipes. We recommend the project Civil Engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of native soil and approved imported fill material that meets the requirements provided above for engineered fill.

4.7.3 Compaction Criteria

All trench backfill should be placed and compacted in accordance with recommendations provided above for engineered fill. Mechanical compaction is recommended; ponding or jetting should not be allowed, especially in areas supporting structural loads or beneath concrete slabs supported-on-grade, pavements, or other improvements.

4.8 2016 CALIFORNIA BUILDING CODE SEISMIC DESIGN PARAMETERS

Structures should be designed for lateral force requirements as set forth in Chapter 16 of the 2016 California Building Code (CBC). We recommend the following parameters:

Table 1
2016 CBC Seismic Design Parameters

Seismic Design Parameter	Symbol	Recommended Value
Mapped Spectral Acceleration at Short Period	Ss	**0.707**
Mapped Spectral Acceleration at 1-Second Period	S_1	**0.300**
Site Class	A-F	**D**
Site Coefficient at Short Period	F_a	**1.235**
Site Coefficient at 1-Second Period	F_v	**1.800**
Spectral Response Accelerations	S_{MS}	**0.872g**
	S_{M1}	**0.540g**
Design Spectral Response Accelerations	S_{DS}	**0.582g**
	S_{D1}	**0.360g**
Long-period Transition Period	T_L	**12 seconds**
MCE_G Peak Ground Acceleration Adjusted for Site Class Effects	PGA_M	**0.317g**
Site coordinates: Latitude 38.48675 degrees North Longitude 121.48296 degrees West		

4.9 SHALLOW FOUNDATIONS

4.9.1 Allowable Bearing Pressures

We recommend shallow footings constructed of reinforced concrete and founded on newly constructed non-expansive engineered fills as recommended in the SITE PREPARATION section of this report be used for support of the proposed building. Footings should be a minimum of 12 inches wide and embedded a minimum of 12 inches below the lowest final adjacent subgrade. The structural engineer should evaluate the need for reinforcement of foundation based on the anticipated loads. As a minimum, continuous footings should be reinforced with a minimum of four No. 4 reinforcing bars, placed two each near the top and bottom, to provide structural continuity and allow the foundations to span isolated soil irregularities.

An allowable bearing pressure of 2,500 pounds per square foot (psf) may be used for shallow foundations with the above minimum dimensions. The allowable bearing pressure provided above is a net value; therefore, the weight of the foundation (which extends below grade) may be neglected when computing dead loads. The allowable bearing pressure applies to dead plus live loads and may be increased by 1/3 for short-term loading due to wind or seismic forces.

4.9.2 Estimated Settlements

Total settlement of an individual foundation will vary depending on the plan dimensions of the foundation and the actual load supported. Based on anticipated foundation dimensions and loads, we estimate maximum settlement of foundations designed and constructed in accordance with the preceding recommendations to be less than one inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than 1/2 inch. Settlement of all foundations is expected to occur rapidly and should be essentially complete shortly after initial application of the loads.

4.9.3 Lateral Resistance

Resistance to lateral loads (including those due to wind or seismic forces) may be provided by frictional resistance between the bottom of concrete foundations and the underlying soils, and by passive soil pressure against the sides of the foundations. A coefficient of friction of 0.3 may be used between cast-in-place concrete foundations and the underlying soil. Additional allowable passive pressure available in engineered fill or undisturbed native soil may be taken as equivalent to the pressure exerted by a fluid weighing 300 pounds per cubic foot (pcf). These two modes of resistance should not be added unless the frictional component is reduced by 50 percent, since full mobilization of the passive resistance requires some horizontal movement, which significantly diminishes the frictional resistance.

4.9.4 Construction Considerations

Prior to placing steel or concrete, footing excavations should be cleaned of all debris, loose or soft soil, and water. All footing excavations should be observed by the project Geotechnical Engineer just prior to placing steel or concrete to verify the recommendations contained herein are implemented during construction.

4.10 EXTERIOR CONCRETE SIDEWALKS AND FLATWORK

Concrete sidewalks and flatwork should be a minimum of 4 inches thick and may be underlain by compacted engineered fills as recommended in the SITE PREPARATION and ENGINEERED FILL sections of this report.

4.11 SITE DRAINAGE AND MOISTURE PROTECTION

Foundation and flatwork performance depends greatly on how well runoff waters drain from the site. This drainage should be maintained both during construction and over the entire life of the project. The ground surface should be graded so that water flows rapidly away from structures and flatwork without ponding. The surface gradient needed to do this depends on the landscaping type. In general, pavement and lawns within five feet of buildings should slope away at gradients of at least two percent. Densely vegetated areas should have minimum gradients of 5 percent away from buildings in the first five feet if it is practical to do so. Planters should be built so that water exiting from them will not seep into the foundation areas or beneath flatwork.

5. ADDITIONAL SERVICES

All earthworks during construction should be monitored by the MatriScope or his representatives, including site preparation, placement of all engineered fill, and trench backfill, construction of flatwork subgrade, and all foundation excavations. It is essential that the finished subgrade and foundation excavation in all areas to receive engineered fill or to be used for the future support of structures, concrete flatwork sections be observed and approved by MatriScope prior to placement of engineered fill, reinforcing steel placement and/or concrete pouring.

The purpose of these services would be to provide MatriScope the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

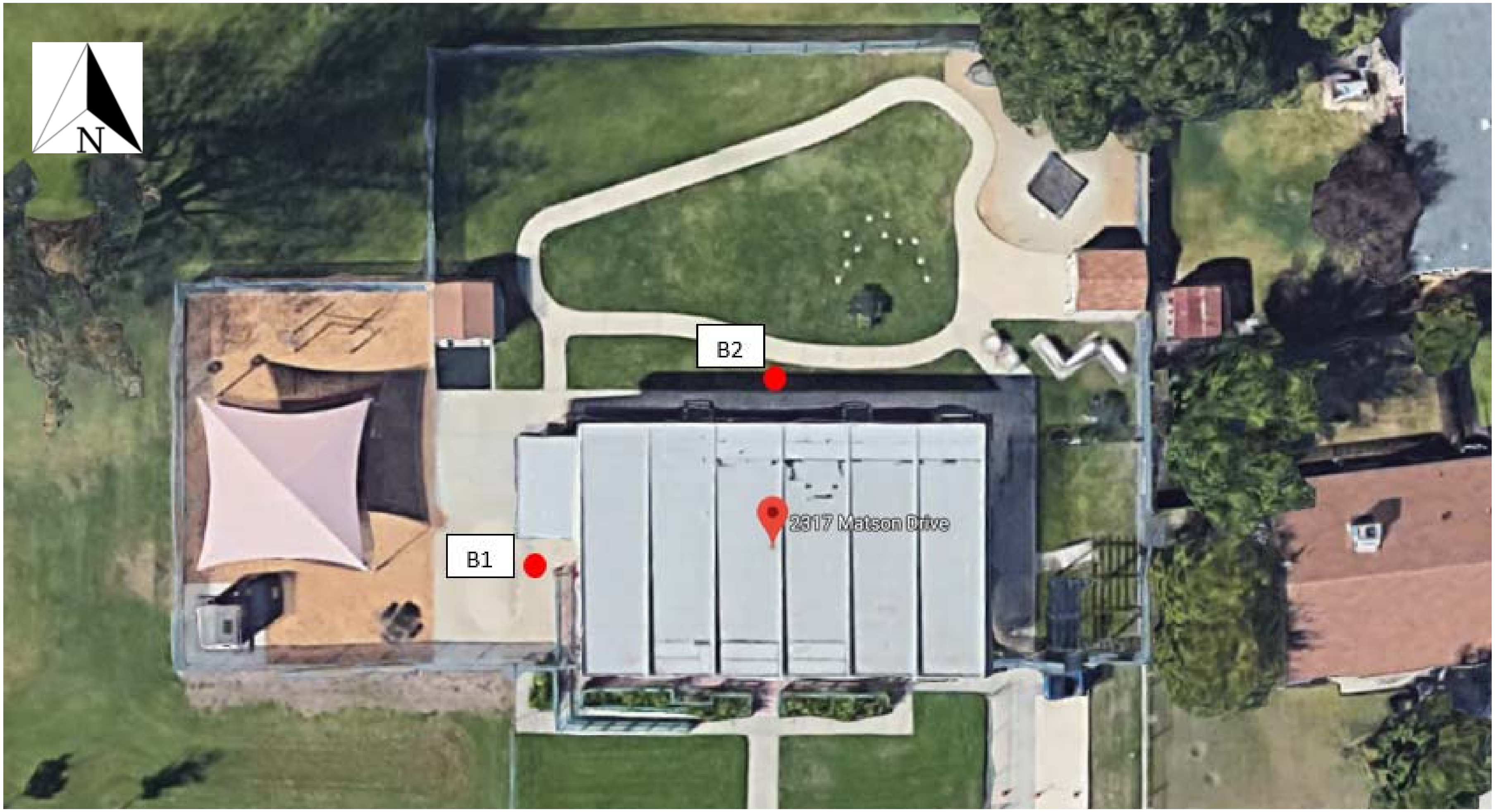
6. LIMITATIONS

Conclusions and recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction which differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, our recommendations should also be reviewed.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied. The recommendations provided in this report are based on that an adequate program of tests and observations will be conducted by MatriScope during the construction phase in order to evaluate compliance with our recommendations.

Site Vicinity Map

MatriScope Engineering Laboratories, Inc.	601 Bercut Drive Sacramento, CA 95811 Phone: (916) 375-6700 Fax: (916) 447-6702 www.matriscope.com	Project No.: 2845 Project Name: Proposed SETA Childcare Modular Replacement -Hopkins Park Location: 2317 Matson Drive, Sacramento, CA Date: 4/11/2018	Plate 1



Legend:

B1 ● Approximate Boring Location

Boring Location Map

MatriScope Engineering Laboratories, Inc.	601 Bercut Drive Sacramento, CA 95811 Phone: (916) 375-6700 Fax: (916) 447-6702 www.matriscope.com	Project No.:	2845	**Plate** 2
		Project Name:	Proposed SETA Childcare Modular Replacement – Hopkins Park	
		Location:	2317 Matson Drive, Sacramento, CA	
		Date:	4/11/2018	

APPENDIX A

FIELD INVESTIGATION AND LABORATORY TESTING

FIELD INVESTIGATION

General

The subsurface conditions at the site were explored on March 31, 2018 by drilling 2 borings to a maximum depth of 10.5 feet below existing ground surface. Borings were drilled using hand tools with a 2-inch-diameter sampler. The approximate locations of borings performed for this investigation are shown on Plate 2 of the report.

Borings were located in the field by visual sighting and/or pacing from existing site features. Therefore, the location of borings shown on Plate 2 should be considered approximate and may vary from that indicated at the site. After completion of drilling, the boreholes were backfilled with the soil cutting generated during field exploration.

Our representative maintained logs of the borings, visually classified soils encountered according to the Unified Soil Classification System (see Plate A1) and obtained relatively undisturbed and bulk samples of the subsurface materials. Logs of Borings are presented on Plates A-2 and A-3.

Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance and returned to our Sacramento laboratory for further examination and testing.

LABORATORY TESTING

General

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils which may affect the geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Moisture Content and Dry Unit Weight

Moisture content and dry unit weight tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading and relative soil strength and compressibility. Moisture content was evaluated in general accordance with ASTM D2216; and dry unit weight, ASTM D2937. Results of these tests are presented on the logs of Borings.

Atterberg Limits

Atterberg Limits (Liquid Limit and Plasticity Limit) tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Tests were performed in general accordance with ASTM D4318. Results of these tests are summarized in Table A1 below. The laboratory test report is attached.

Table A1
Atterberg Limits Test Results

Boring No.	Sample Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Unified Soil Classification System
B1	0-5	48	15	33	CL

Expansion Index

Expansion Index (EI) test was performed on one remolded, fine-grained soil sample considered representative of the anticipated floor slab subgrade. Test procedures were in general accordance with ASTM Test Method D4829. Test result is shown in Table A2. The tested soil, with an EI value of 63, is considered having a medium expansion potential based on ASTM D4829.

Table A2
Expansion Index Test Result

Boring No.	Sample Depth (feet)	Expansion Index	Expansion Potential
B1	0-5	63	Medium

Compaction

Compaction test was performed on one near-surface bulk soil sample to evaluate maximum dry density and optimum moisture content. Test procedures were in general accordance with

ASTM D1557. Results of this test are presented in Table A3. Laboratory test report is included in this appendix.

Table A3
Compaction Test Result

Boring No.	Sample Depth (feet)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B2	0-5	119.4	13.3

Soil Corrosivity

Chemical tests were performed on one sample of the near-surface soils encountered at the site for the purpose of corrosion assessment. The sample was tested for pH, minimum resistivity, soluble sulfates, and soluble chlorides. The sample was tested in general accordance with California Test Methods 643, 422, and 417 for pH and minimum resistivity, soluble chlorides, and soluble sulfates, respectively. The test results are presented in Table A4 and attached in this appendix.

Table A4
Corrosivity Test Results

Boring No.	Sample Depth (feet)	Minimum Resistivity (Ohm-Cm)	pH	Water Soluble Sulfates (ppm)	Water Soluble Chlorides (ppm)
B1	0-5	750	6.72	70.5	2.6

The 2003 California Department of Transportation (Caltrans) Corrosion Guidelines considers a site to be corrosive if water-soluble chloride content is 500 ppm or greater, sulfate concentration is 2,000 ppm or greater, or pH is 5.5 or less.

The Corrosion Guidelines indicates resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not used by Caltrans to define a corrosive area. With the exception of Mechanically Stabilized Embankment (MSE) walls, soil and water are not tested by Caltrans for chlorides and sulfates if the minimum resistivity is greater than 1,000 ohm-cm because a minimum resistivity greater than 1,000 ohm-cm indicates that the chloride and sulfate contents are low (i.e. low corrosion potential).

We have provided the above preliminary corrosion test results. These test results are only indicator parameters of potential soil corrosivity for the sample tested. Other soils found on the site may be more, less, or of a similar corrosive nature.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Plate A-1 Unified Soil Classification System
Plates A-2 and A-3 Log of Boring B-1 and B-2
Atterberg (Liquid and Plastic) Limits Test Report
Compaction Test Report
Corrosivity Test Report

UNIFIED SOIL CLASSIFICATION SYSTEM

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATION

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

MatriScope
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PLATE

A1

LOG OF BORING

Project Proposed SETA Childcare Modular Replacement - Hopkins Park		**Sheet no.** 1 of 1	**Hole Number** **B1**	
Site Location 2317 Matson Drive, Sacramento, CA 95648		**Project Number** 2751	**Logged By** Tim P.	**Checked By** Ying-Chi Liao
Started 3/31/2018	**Completed** 3/31/2018	**Driller** Cal-Nev GeoExploration	**Boring Dia.** 2"	**Total Depth** 10.5'
Drill Method Hand Auger		**Drill Equipment**	**Depth to Groundwater** None	
Sample Type Hand Sampler		**Elevation** N/A	**Latitude** N/A	**Longitude** N/A

SAMPLE NUMBER	BLOWS/6"	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	USCS SYMBOLS	SAMPLE DEPTH	DESCRIPTION AND CLASSIFICATION
					0			LEAN CLAY, sandy, brown, medium stiff, moist
1-1	32 50/5.5"	23.7	95.1		2		X	stiff
1-2	103	21.6	102.6		5	CL	X	light brown
1-3	63				10		X	
					10.5			Boring was ended at 10.5'. No groundwater was encountered.
					15			
					20			
					25			

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PLATE
A2

LOG OF BORING

Project Proposed SETA Childcare Modular Replacement - Hopkins Park	**Sheet no.** 1 of 1	**Hole Number** **B2**	
Site Location 2317 Matson Drive, Sacramento, CA 95648	**Project Number** 2751	**Logged By** Tim P.	**Checked By** Ying-Chi Liao
Started 3/31/2018 / **Completed** 3/31/2018	**Driller** Cal-Nev GeoExploration	**Boring Dia.** 2"	**Total Depth** 10.5'
Drill Method Hand Auger	**Drill Equipment**	**Depth to Groundwater** None	
Sample Type Hand Sampler	**Elevation** N/A	**Latitude** N/A	**Longitude** N/A

SAMPLE NUMBER	BLOWS/6"	MOISTURE (%)	DRY DENSITY (pcf)	PENETROMETER (tsf)	DEPTH (feet)	USCS SYMBOLS	SAMPLE DEPTH	DESCRIPTION AND CLASSIFICATION
					0	CL		LEAN CLAY, brown, medium stiff, moist
2-1	36	23.7	100.4		2		☒	stiff
2-2	66	28.4	90.0		5		☒	light brown
2-3	46				10		☒	
					10.5			Boring was ended at 10.5'. No groundwater was encountered.
					15			
					20			
					25			

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PLATE **A3**

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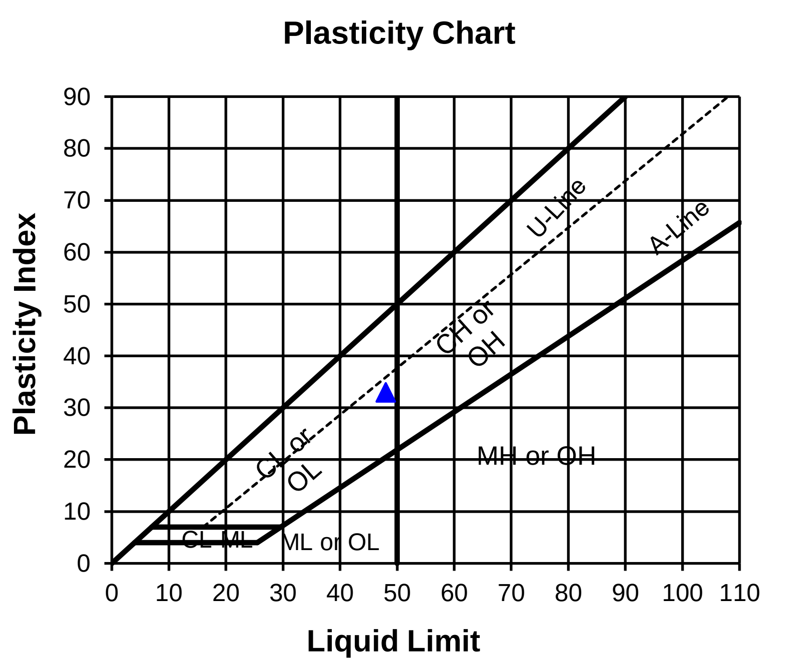
LIQUID AND PLASTIC LIMITS AND PLASTICITY INDEX OF SOILS (ASTM D4318)

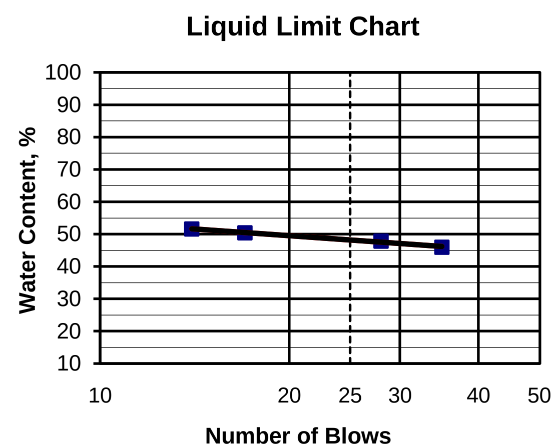
Project	DSA File No.	DSA/LEA No.	DSA App. No.	Job No.	Date
Proposed SETA Childcare Modular				2845	04/11/18

Address	Lab ID.	Total Wt. *(g)*	Ind Retained #4 *(g)*	Ind Retained #40 *(g)*	Ind Retained #200 *(g)*
2317 Matson Drive, Sacramento	17839				

Material Description	Sampling Location	Sample Date	Retained #4 *(%)*	Retained #40 *(%)*	Retained #200 *(%)*
Lean Clay	B1-Bulk 0-5'	03/31/18			

	Plastic Limit		Liquid Limit			
A. Run Number	1	2	A	B	C	D
B. Tare Number	c1	dj2	d1	cc	e1	e6
C. Wt. of Wet Soil + Tare *(g)*	19.1	19.5	25.9	26.8	25.6	30.2
D. Wt. of Dry Soil + Tare *(g)*	18.5	19.0	22.2	22.9	22.2	25.5
E. Wt. of Tare *(g)*	15.0	15.0	15.1	15.2	15.0	15.1
F. Wt. of Water *(g)*	0.5	0.6	3.7	3.9	3.5	4.8
G. Wt. of Dry Soil *(g)*	3.5	3.9	7.2	7.7	7.2	10.4
H. Moisture *(%)*	**15.3**	**15.0**	51.6	50.5	47.9	46.0
I. Number of Blows			**14**	**17**	**28**	**35**





Liquid And Plastic Limits		Unified Soil Classification
LL.	**48**	**CL**
PL.	**15**	
PI.	**33**	

Remarks	

Technician	Soussan N.	Professional Engineer	Ying-Chi Liao

MatriScope Engineering Laboratories, Inc.

COMPACTION CHARACTERISTICS OF SOIL (ASTM D1557)

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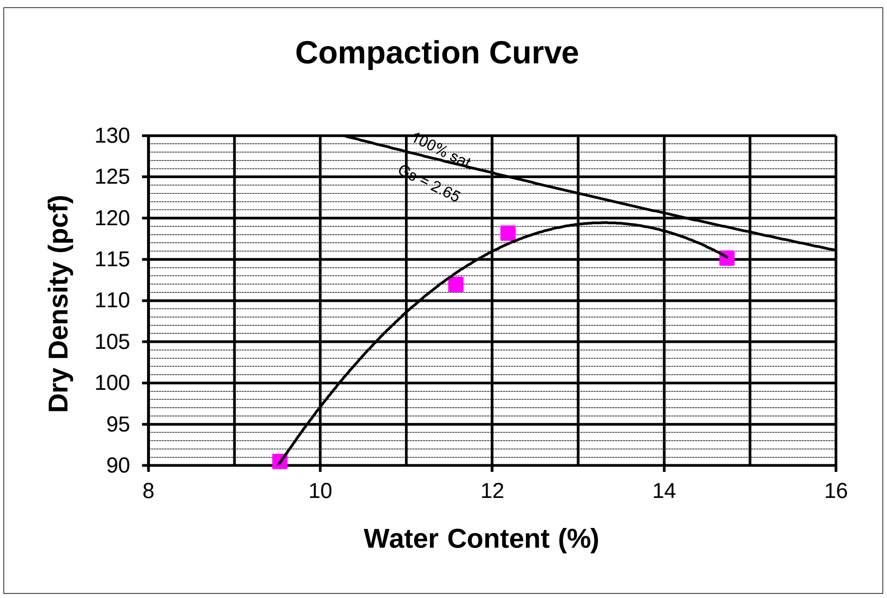
LABORATORY COMPACTION TEST

JOB NO.	LAB ID.	DSA/LEA NO.	DSA FILE NO.	DSA APPLICATION NO.		REPORT DATE
2845	17861					4/11/2018
PROJECT				MATERIAL DESCRIPTION		
Proposed SETA Childcare Modular Replacement - Hopkins Park				Brown Clay		
ADDRESS				PROCEDURE	SIEVE_Oversize	OVERSIZE < 5 %
2317 Matson Drive, Sacramento				A	#4	Yes
TOTAL WT. *(g)* USED IN PROCESSING	WT. *(g)* Oversize	DRY *(g)* Oversize	DRY *(g)* Finer	TOTAL % Oversize	TOTAL % Finer	SG_Oversize
SAMPLING LOCATION	SAMPLE DATE	DIA. OF MOLD (in.)	LAYERS	BLOWS / LAYER	HAND TAMPER	☐
B2-Bulk 0-5'	3/31/18	4	5	25	MECHANICAL TAMPER	☑

A. WATER ADDED *(CC)*	0	50	100	150	Finer	Oversize
B. MOLD NUMBER						
C. WT. OF WET SOIL + MOLD *(gm)*	3898.7	3929.1	4044.4	4037.3		
D. WT. OF MOLD *(gm)*	2402.2	2042.2	2042.2	2042.1		
E. WT. OF WET SOIL *(gm)*	1496.5	1886.9	2002.2	1995.2		
F. VOLUME OF MOLD *(ft^3)*	0.033	0.033	0.033	0.033		
G. WET DENSITY *(pcf)*	99.1	124.9	132.6	132.1		
H. CONTAINER NO.	1	60	54	tp		
I. WT. OF WET SOIL + TARE *(gm)*	681.3	760.5	743.8	856.0		
J. WT. OF DRY SOIL + TARE *(gm)*	641.7	703.8	687.1	782.3		
K. WT. OF TARE *(gm)*	226.1	214.0	221.8	282.0		
L. WT. LOSS *(gm)*	39.6	56.7	56.7	73.7		
M. WT. OF DRY SOIL *(gm)*	415.6	489.8	465.3	500.3		
N. MOISTURE *(%)*	**9.5**	**11.6**	**12.2**	**14.7**		
O. DRY DENSITY *(pcf)*	**90.5**	**112.0**	**118.2**	**115.2**		



TEST RESULTS	
OPTIMUM WATER CONTENT %	13.3
MAXIMUM DRY DENSITY pcf	119.4
ROCK CORRECTED TEST RESULTS	
OPTIMUM WATER CONTENT %	
MAXIMUM DRY DENSITY pcf	

REMARKS:

Technician	Soussan N.	Professional Engineer	Ying-Chi Liao

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 04/06/2018
Date Submitted 04/03/2018

To: Steve Lee
Matriscope Engineering Laboratories
601 Bercut
Sacramento, CA 95811

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2845 Site ID : B1-BULK.
Thank you for your business.

* For future reference to this analysis please use SUN # 76559-159545.

EVALUATION FOR SOIL CORROSION

Soil pH	6.72	
Minimum Resistivity	0.75 ohm-cm (x1000)	
Chloride	2.6 ppm	00.00026 %
Sulfate	70.5 ppm	00.00705 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422