August 18, 2021
Kleinfelder Project No.: 20220839.002A

Mr. Bruce Playle
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SUBJECT: **Supplement to the Geotechnical Investigation Report**
Proposed New City Hall Site Improvements
501 and 509 West Weber Avenue
Stockton, California

File Reference: "**Geotechnical Investigation Report, Proposed New City Hall Site Improvements, 501 and 509 West Weber Avenue, Stockton California" File No. 20220839.001A/STO21R127105, dated June 21, 2021**

"Report, Soils Investigation, Proposed High Rise Commercial Building, West End Redevelopment Project, Stockton California" Kleinfelder Project No. S-2094-10, dated February 28, 1980

Dear Mr. Playle:

This letter provides a supplement to the previous Geotechnical Investigation Report (GIR) for the design and construction of the New City Hall Site Improvements located in Stockton, California. This supplement is based on a review of Kleinfelder's referenced geotechnical reports and additional engineering analyses.

SUPPLEMENTAL PROJECT INFORMATION

The proposed project includes site improvements for the new City Hall in Stockton, California. The previous report included recommendations for new fire pump house, mechanical equipment enclosures, and other miscellaneous improvements. It is understood that additional recommendations are requested for drilled pier foundations and subgrade modulus for slabs-on-grade within an existing structure.

The following sections of the letter address the additional foundation recommendations. The following information is intended to supplement the previous report, as such all recommendations in the previous shall be adhered to. If there are any conflicting recommendations or inconstancies, the more stringent recommendations shall be followed. Should any of the recommendations require additional consultation, please contact the Geotechnical Engineer of Record for further direction.

GENERAL

It is understood that the requested recommendations are for use in constructing a new pier foundation and slab-on-grade section within an existing building. Therefore, subgrade preparation (e.g., removal and replacement of fill, lime treatment, etc.) as recommended in the previous referenced report will not occur prior to new construction of these improvements. A review of previous boring data from the previously performed investigations revealed that the subgrade soils to a depth of approximately 10 feet below ground surface (bgs) consisted of undocumented fill. The following recommendations assume the undocumented fill will not be mitigated prior to construction.

CONCRETE SLABS-ON-GRADE

Concrete slabs-on-grade should be designed and constructed in accordance with Section 5.6 of the referenced GIR along with the following recommendation:

"It is understood that work is being performed within an existing structure and subgrade preparation will not be performed. Therefore, a modulus of subgrade reaction, K_p (B_p = 1 foot), of 75 pci may be used for elastic analysis of slabs on the undocumented fill subgrade".

PIER FOOTINGS

<u>Allowable Vertical Axial Capacity and Settlement</u>

Axial capacity was developed based on Federal Highway Administration methods using the commercial computer software SHAFT, version 2017.8.4, produced by Ensoft, Inc. Axial loads on drilled piers should be supported by shaft skin friction only. End bearing was not considered in the axial capacity due to strain incompatibility issues between skin friction and end bearing, settlement issues, and the potential for loose materials to exist at the bottoms of the pier holes during construction that cannot be effectively cleaned out. Additionally, due to the presence of undocumented fill, skin friction capacity is neglected in the upper 10 feet.

A curve illustrating the <u>ultimate</u> axial compressive capacity of a unit (1-foot) diameter straight-sided drilled pier installed from existing grade is shown on Figure 4a. Data from the capacity curve shown on attachment Figure 1a are tabulated on Figure 1b. Figures 1a and 1b represent the ultimate axial capacity of a pier under static conditions. Ultimate tensile capacity may be obtained by multiplying the compressive capacity by a factor of 0.8 and adding the weight of the foundation. For evaluation of allowable axial capacity under static conditions, we recommend a factor of safety of 3 be applied to the ultimate capacity. For allowable tension capacity under transient flood, wind, or seismic conditions a safety factor of 1.5 may be used. For allowable sustained tension a safety factor of 3 should be used.

<u>Lateral Resistance</u>

Lateral capacity of deep foundations may be developed through analysis of pier response due to a range of design loads. Table 1 contains recommended input soil parameters for lateral response analysis of deep foundations using the LPILE computer program (by Ensoft, Inc., Version 2013). Program default values may be used for E_{50} and K.

Table 1
Allowable Lateral Passive Resistance

Depth (feet)	Model P-Y Curve	Effective Unit Weight (lb/ft^3)	Cohesion, c (psf)
0 to 10	Stiff Clay w/o Free Water	110	0
10 to 19	Stiff Clay w/o Free Water	125	2000
19 to 20	Stiff Clay w/o Free Water	63	2000
20 to 23	Soft Clay	58	500
23 to 35	Stiff Clay w/o Free Water	63	1440

Passive resistance should not be used within the upper 10 feet due to the undocumented fill. The passive pressure only considers soil strength. Tolerable pier deflection may govern the design lateral resistance. If provided with pier geometry, lateral load, and loading eccentricity, Kleinfelder can provide the estimated pier head deflection.

Design and Construction Considerations

Prior to placing steel or concrete, pier excavations should be cleaned of all debris, loose, or soft soil, and water. All pier excavations should be observed by the project Geotechnical Engineer of Record just prior to placing steel or concrete. The purpose of these observations is to check that the bearing soils actually encountered in the foundation excavations are similar to those assumed in analysis and to verify the recommendations contained herein are implemented during construction.

LIMITATIONS

This supplement has been performed in accordance with the generally accepted standard of practice that currently exists in the area. No warranty, express or implied, is made. Limitations noted in the referenced reports are still applicable.

ADDITIONAL SERVICES

We recommend Kleinfelder conduct a general review of final plans and specifications to evaluate that our earthwork and foundation recommendations have been properly interpreted and implemented during design. In the event Kleinfelder is not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

We recommend that all earthwork during construction be monitored by a representative from Kleinfelder, including site preparation, placement of all engineered fill, construction of slab subgrade, and all pier excavations. The purpose of these services would be to provide Kleinfelder 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.

CLOSURE

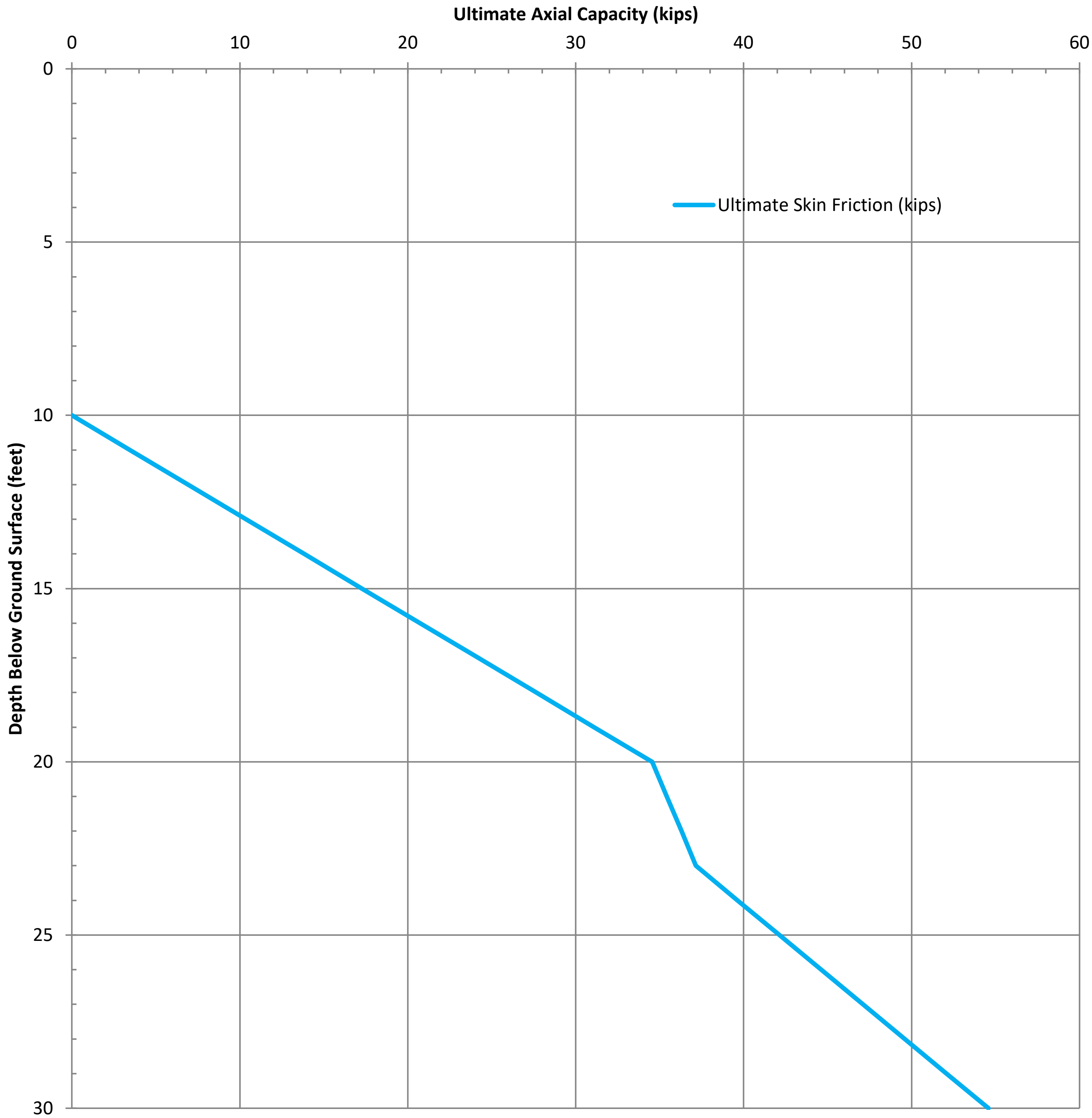
Kleinfelder appreciates the opportunity to continue to provide geotechnical engineering services during the design phase of this project. If there are any questions concerning the information presented in this letter, please contact the undersigned at your convenience.
Respectfully,

KLEINFELDER, INC

Adam AhTye, PE
Staff Engineer II

Steven Wiesner, PE, GE #3027
Principal Geotechnical Engineer

Attachments: Figure 1 – Ultimate Axial Capacity



Notes:

1. Axial capacities of drilled piers with diameters other than one foot may be obtained by multiplying the unit capacity by the diameter of the pile (in feet).
2. Ultimate tensile capacity may be obtained by multiplying the ultimate compressive capacity by a factor of 0.8.
3. The curve represents ultimate axial capacity of a straight-sided drilled pier. See text discussion for factor of safety and group effects.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20220839.002A DRAWN BY: AA CHECKED BY: SW DATE: 8/18/2021 REVISED:	ULTIMATE AXIAL CAPACITY UNIT DIAMETER (1-FOOT) DRILLED PIER PROPOSED NEW CITY HALL SITE IMPROVEMENTS 501 AND 509 W. WEBER AVENUE STOCKTON, CALIFORNIA	FIGURE 1a

Depth (ft)	Ultimate Axial Capacity (Kips)	Depth (ft)	Ultimate Axial Capacity (Kips)
11	3.5	26	44.6
12	6.9	27	47.1
13	10.4	28	49.6
14	13.8	29	52.1
15	17.3	30	54.6
16	20.7		
17	24.2		
18	27.6		
19	31.1		
20	34.6		
21	35.4		
22	36.3		
23	37.2		
24	39.6		
25	42.1		

Notes:

1. Axial capcities of drilled piers with diameters other than one foot may be obtained by multiplying the unit capacity by the diameter of the pile (in feet).
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KLEINFELDER Bright People. Right Solutions.	PROJECT NO.:	20220839.002A	ULTIMATE AXIAL CAPACITY UNIT DIAMETER (1-FOOT) DRILLED PIER	FIGURE
	DRAWN BY:	AA		1b
	CHECKED BY:	SW	PROPOSED NEW CITY HALL SITE IMPROVEMENTS 501 AND 509 W. WEBER AVENUE STOCKTON, CALIFORNIA	
	DATE:	8/18/2021		
	REVISED:			