GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

PROPOSED NEW CITY OF CORCORAN PARK
GATEWAY PARK
SWC OF ORANGE AVENUE AND OTIS AVENUE
CORCORAN, CALIFORNIA

BSK PROJECT G20-129-11F

PREPARED FOR:

A&M CONSULTING ENGINEERS
310 W MURRAY AVENUE
CORCORAN, CALIFORNIA 93291

SEPTEMBER 8, 2020

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1 INTRODUCTION

1.1 General

This report presents the results of our geotechnical engineering investigation for the proposed City of Corcoran Gateway Park in Corcoran, California. The project site is shown on the Site Vicinity Map, Figure 1. The geotechnical engineering investigation was conducted in general accordance with the scope of services outlined in BSK Proposal GF20-20400, dated June 26, 2020. The proposed improvements and exploratory borings are shown on Figure 2, Boring Location Map.

In the event that significant changes occur in the design or location of the proposed structures, the conclusions and recommendations presented in the report will not be considered valid unless the changes are reviewed by BSK and the conclusions and recommendations are modified or verified in writing as necessary.

1.2 Project Description

We understand that this project consists of the design and construction of a new park. Based on review of the conceptual site plan, we understand the project will include pavilions, restrooms, concrete benches, storage buildings, playground, a multi-purposed concreted open space with benches and ramp, wet play area, and a parking area. We anticipate the structures will be supported on conventional reinforced concrete foundations with slab-on-grade floor, and/or pole-type footings. Retaining walls are anticipated to be less than 6 feet in height. Details of the structures were not available at the time this proposal was prepared, as such, we assume maximum wall and column loads are going to be less than 2 kip/ft and 30 kips, respectively. Other improvements are anticipated to include a drainage basin approximately 7 feet deep, underground utilities, light poles, landscaping, and hardscaping. It is understood permeable pavement is being considered for the parking areas.

1.3 Purpose and Scope of Services

The purpose of the geotechnical investigation is to assess soil conditions at the project site and provide geotechnical engineering recommendations for use by the project designers during preparation of the project plans and specifications. The scope of the investigation included a field exploration, laboratory testing, engineering analysis, and report preparation.

2 FIELD INVESTIGATION AND LABORATORY TESTING

2.1 General

The field exploration, conducted on July 2, 2020 consisted of a site reconnaissance and drilling nine (9) test borings, one (1) percolation test, and one (1) double ring infiltration test. The test borings were drilled to depths of approximately 5 and 20 feet below ground surface (bgs) The test borings were drilled with a truck-mounted drill rig equipped with hollow stem augers. The percolation test was hand drilled and installed to a depth of approximately 2 feet below ground surface (approximately 7 feet below surrounding grade) at the proposed basin and in the pre-existing pit. The approximate boring, piezometer, and double ring locations are presented on Figure 2. Details of the field exploration and the boring logs are provided in Appendix A.

2.2 Laboratory Testing

Laboratory testing of selected soil samples were performed to evaluate certain physical and engineering characteristics and properties. The testing program included: in-situ moisture and density; gradation, shear strength, expansion index, R-value, and corrosion potential. The in-situ moisture and dry density test results are presented on the boring logs in Appendix A. Descriptions of the laboratory test methods and test results are provided in Appendix B.

2.3 Field Testing

One (1) test hole was excavated for use in percolation testing within the approximate location of the proposed basin. The test hole was excavated to an approximate depths of 2 feet bgs. Within the test holes, pea gravel (⅜-inch particle size) was placed at the bottom 3 inches, and a temporary casing was placed on top of the pea gravel. The annulus of the casing was filled with pea gravel to prevent caving of the test hole. The test holes were filled with water to pre-soak overnight.

The following table summarizes the percolation test results. Detailed test results are also attached in Appendix C.

Table 1: Percolation Test Results

Percolation Location	Approximate Depth at Bottom of Hole (ft)	Soil Type at bottom of hole	Percolation Rate[1] (min./in.)
PT-1	2.2	Silty Sand (SM)	6.6

Note: (1) The percolation rates recorded in the field have been corrected to account for the use of pea gravel around the percolation pipe.

One (1) double ring infiltration test was performed at the proposed permeable pavement area. Setup of double ring infiltration tests consisted of removing approximately 6 inches of loose surfaces soils and driving two 20-inch tall steel rings into the ground approximately 3 to 4 inches deep. The steel rings were 12 and 24 inches in diameter. The 12-inch ring was driven inside of the 24-inch ring. Mechanical floats were utilized to maintain a constant head in each ring. Two calibrated supply tanks were utilized to measure the volume of water used per time increment. The tests were setup and allowed to soak the ground for a minimum of four hours. Readings were recorded at set time intervals until the flow rates were stabilized. Data collected from double ring infiltrometer testing in the area of the proposed basin expansion are presented in Table 2. Detailed infiltration test results are provided in Appendix C.

Table 2: Double Ring Infiltrometer Test Results

Test	Soil Type	Depth (Feet)	Test Infiltration Rate	
			(cm/hr)	(ft/day)
DRI-1	Clayey Sand (SC)	0.5	0.22	0.03

The test infiltration rate would be representative of initial infiltration (first 2 to 4 weeks). Percolation characteristics in this report were estimated based on visual observations and limited field infiltration testing. Percolation rates depend on many factors not included as part of our investigation. Additional field or laboratory testing may help better define percolation characteristics of the pavement.

3 SITE CONDITIONS

3.1 Site Description

The project site is anticipated to be situated at the southwest corner of Orange and Otis Avenues. The site is bound to the north by Orange Avenue, to the east by Otis Avenue, and to the west and south by residential properties. At the time of the field investigation the project site contained piles of unknown fill material at the northwestern portion of the site, scattered asphalt pieces and trash, seasonal weeds and grasses, and an approximately 5-foot deep pit on the southwestern portion of the site. The existing pit is located in the approximate area of the proposed sports field.

3.2 Subsurface Conditions

The near surface soil consisted of fine to medium grained silty sand and clayey sand to sandy clay in the upper 3 feet underlain by laterally discontinuing layers of clay, sandy clay, poorly graded sand, and silty sand to the maximum depth of exploration (21.5 feet bgs). The relative density of the coarse-grained soils was loose to medium dense. The consistency of the fine-grained soil was medium stiff to very stiff. The boring logs in Appendix A provide a more detailed description of the soils encountered in each boring, including the applicable Unified Soil Classification System symbols. The approximate locations of the soil borings are shown on the Boring Location Map (Figure 2).

Near site soils were found to have a moderate expansion potential, 66, see Appendix B for results.

3.3 Groundwater

Groundwater was not encountered within the test borings. The California Department of Water Resources indicates the depth to historic groundwater between 20 to 150 feet bgs. However, fluctuations in the groundwater level or the presence of perched groundwater may occur due to variations in rainfall, irrigation, seasonal factors, pumping from wells and other factors that were not evident at the time of our investigation.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based upon the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that there are no soil conditions that would preclude the construction of the proposed park development provided that the recommendations presented in this report are incorporated into the project design and construction. The planned improvements may be supported on shallow reinforced isolated or continuous concrete spread footings, or cast-in-drilled hole pier foundations.

4.2 Soil Corrosivity

Based on test results, on-site, near-surface soils have negligible soluble sulfate and chloride contents, and a moderate minimum resistivity, and are alkaline. Thus, on-site soils are considered to have a low corrosion potential with respect to buried concrete and a moderately corrosive corrosion potential to unprotected metal conduits.

Based on experience of soils in the area, BSK recommends that a Type V cement be used in the formulation of concrete and that buried reinforcing steel protection be provided with a minimum concrete cover required by the American Concrete Institute (ACI) Building Code for Structural Concrete, ACI 318, Chapter 20. Buried metal conduits must have protective coatings in accordance with the manufacturer's specifications. If detailed recommendations for corrosion protection are desired, a corrosion specialist should be consulted.

4.3 Seismic Design Criteria

There are no known active fault zones within the vicinity of the project site. In accordance with Section 1613.2.2 of the 2019 California Building Code (CBC) and Table 20.3-1 of ASCE 7-16, the Site can be classified as Site Class D (stiff soil profile).

Use of the 2019 California Building Code (CBC) seismic design criteria is considered appropriate and the following parameters are considered applicable for the structural design of foundations.

Table 3: Seismic Design Parameters

Seismic Design Parameter	2019 CBC Value		Reference
MCE Mapped Spectral Acceleration (g)	$S_S = 0.773$	$S_1 = 0.28$	USGS Mapped Value
Amplification Factors (Site Class D)	$F_a = 1.2$	F_v = null[1](2.04)[2]	ASCE Table 11.4
Site Adjusted MCE Spectral Acceleration (g)	$S_{MS} = 0.927$	S_{M1} = null[1](0.571)[2]	ASCE Equations 11.4.1-2
Design Spectral Acceleration (g)	$S_{DS} = 0.618$	S_{D1} = null[1] (0.381)[2]	ASCE Equations 11.4.1-4
Geometric Mean PGA (g)	$PGA_M = 0.425$		Section 11.8.3, ASCE 7-16
Site Short Period – T_S (seconds)	$T_S = 0.545$		$T_S = S_{D1}/ S_{DS}$
Site Long Period – T_L (seconds)	$T_L = 12$		USGS Mapped Value

Notes: [1] Requires site-specific ground motion procedure or exception as per ASCE 7-16 Section 11.4.8.

[2] Values from ASCE 7-16 supplement shall only be used to calculate T_S. Values provided based on use of exception, as provided in Section 11.4.8.2 to Site-Specific Ground Motion Procedures and assumes the value of the seismic response coefficient C_s is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$.

As shown above, the short period design spectral response acceleration coefficient, S_{DS}, is greater than 0.5, therefore the Site lies in Seismic Design Category D as specified in Section 1613.2.5 of the 2019 CBC. The long period design spectral response acceleration coefficient, S_{D1}, is greater than 0.2, therefore the Site lies in Seismic Design Category D as specified in Section 1613.2.5 of the 2019 CBC. In accordance with the 2019 CBC, each structure shall be assigned to the more severe seismic design category in accordance with Table 1613.2.5(1) or 1613.2.5(2), irrespective of the fundamental period of vibration of the structure.

4.4 Slope Stability Analysis

The maximum depth and gradient of the inboard slopes were reported to be 7 feet and 2:1 or 2.5:1 (H:V), respectively. The stability of the cut slopes was analyzed for the static and pseudo-static condition using Janbu's and Bishop's Simplified Method of Slices and modeled in the computer program, Slide v7.0. The slope model was analyzed for stability using circular slip surfaces originating and terminating at critical points along the cross sections analyzed. The inputs required for the site include slope geometry, subsurface profile data, groundwater conditions, horizontal ground acceleration, as well as constraints on the upper and lower limits of the search region for the critical slip circle, numbers and locations of initiation and termination points of trial surfaces, and number of trial surfaces for each initiation point.

The values used in our analysis are summarized in the following table:

Table 4: Slope Stability Soil Parameters

Material	Depth (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Clayey Sand (SC)	0-3	116	250	28
Silty Sand (SM)	3-21.5	120	10	31

The horizontal ground motion site coefficient of 0.142g (1/3 of PGA_M) was used in the slope stability analysis. Vertical ground motions and groundwater conditions were not considered in the analysis. For each cross section, 4,851 randomly generated slip circles were analyzed for the critical factor of safety.

A summary of the critical factors of safety is provided in the following table:

Table 5: Critical Factors of Safety
Maximum Slope Height – 7'

Maximum Slope (H:V)	STATIC	PSEUDO-STATIC
2:1	1.6	1.2
2.5:1	2.0	1.4

Based upon the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that there are no soil conditions that would preclude the construction of the proposed basin provided that the recommendations presented in the references report are incorporated into the project design and construction. The proposed lagoon may be design/constructed with a maximum depth of 7 feet below ground surface with inboard slopes of 2H:1V or 2.5H:1V.

4.5 Percolation Characteristics

Data collected from percolation testing in the area of the proposed basin and permeable pavement are presented in Table 6. Detailed infiltration test results are provided in Appendix C.

Table 6: Double Ring Infiltration Test Results

Test	Location	Depth (Feet)	Test Infiltration Rate		
			(cm/hr)	(min/in)	(ft/day)
PT-1	Proposed Basin	0.5	23.5	6.6	18.5
DRI-1	Proposed Parking Lot	0.5	0.22	692.7	0.17

The test infiltration rate would be representative of initial infiltration (first 2 to 4 weeks). With prolonged infiltration, a design rate of about 3.0 and 0.2 feet/day would be more appropriate for DRI-1 and DRI-2, respectively.

Percolation rates depend on many factors not included as part of our investigation. Additional field or laboratory testing may help better define percolation characteristics of the basin and permeable pavement. Maintenance also affects percolation rates. Maintenance should include periodic removal of sediment build-up and not disking or ripping within the basin. Additional recommendations for maintenance of the permeable pavement are provided in Section 4.9.

4.6 Site Preparation and Earthwork Construction

The following procedures must be implemented during site preparation for the proposed improvements. It should be noted that references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM: D1557 (latest test revision) laboratory test procedures.

1. Within the area of the planned improvements, remove existing pavement, concrete curbs and gutter, existing underground utilities, vegetation, and debris to expose a clean soil surface free of deleterious material, such as organic matter. Near surface soils containing vegetation, roots, organics, or other objectionable material must be stripped to a depth of at least 3-inches to expose a clean soil surface. Surface strippings must not be incorporated into engineered fill unless the organic content is less than 3 percent by weight (ASTM: D2974).

   Existing utilities or irrigation pipes must be removed to a point at least 5-feet horizontally outside the proposed building area. Resultant cavities must be backfilled with engineered fill. Abandoned pipelines to remain in place that are less than 2 inches in diameter must be capped at the cutoff point, while pipelines greater than 2 inches in diameter must be filled with a 1-sack sand-cement slurry.

2. Soil disturbed as a result of demolition, undocumented fill deemed to possess inadequate compaction or uniformity, debris, abandoned underground structures must be excavated to expose undisturbed native soil or suitable fill.

3. Following the required demolition, stripping, and/or removal of underground structures, the exposed soil surface in proposed improvement areas or areas to receive fill must be over-excavated uniformly to a minimum depth of 24 inches below existing site grade or below bottom of footing elevation, whichever is greater. Proposed building pads must be underlain by a minimum of two feet of non-expansive material. Exterior concrete flatwork must be underlain by a minimum of one foot of non expansive material. Permeable pavement areas must be underlain by at least one foot of non-expansive material.

   The over-excavation must extend at least 5 feet laterally beyond the outside edge of the proposed foundation or areas to receive fill, whichever distance is greater. The exposed subgrade must be proof-rolled under the observation of a BSK field representative to detect soft or pliant areas. Soft or pliant areas must be over-excavated to firm native soil. The exposed surface must be scarified at minimum of 8 inches, uniformly moisture conditioned to 4 percent above optimum moisture, and compacted to 90 but no more than 92 percent relative compaction.

4. Non-expansive (Expansion Index less than 20 or Plasticity Index less than 12) excavated soils, free of deleterious substances (organic matter, demolition debris, tree roots, etc.) and with less than 3 percent organic content by weight, may be returned to the excavations as engineered fill. Engineered fill must be placed in uniform layers not exceeding 8-inches in loose thickness, moisture-conditioned to within 2 percent of optimum moisture content and compacted to at least 90 percent of the maximum dry density. The upper 12 inches of engineered fill placed as backfill under pavement sections must be compacted to at least 95 percent of the maximum dry density. Acceptance of engineered fill placement must be based on both moisture content at time of compaction and relative compaction.

5. Imported fill materials must be free of deleterious substances and have less than 3 percent organic content by weight. The project specifications must require the contractor to contact BSK for review of the proposed import fill materials for conformance with these recommendations at least two weeks prior to importing to the site, whether from on-site or off-site borrow areas. Imported fill soils must be non-hazardous and be derived from a single, consistent soil type source conforming to the following criteria:

    Maximum Particle Size: 3-inches
    Percent Passing #4 Sieve: 65 – 100
    Percent Passing #200 Sieve: 20 – 45
    Plasticity Index: less than 12
    Expansion Index: < 20

    Low Corrosion Potential:
        Soluble Sulfates: < 1,500 mg/kg
        Soluble Chlorides: < 300 mg/kg
        Soil Resistivity: > 5,000 ohm-cm

Grading operations should be scheduled as to avoid working during periods of inclement weather. Should these operations be performed during or shortly following periods of inclement weather or following irrigation, unstable soil conditions may result in the soils exhibiting a "pumping" condition. This condition is caused by excess moisture, in combination with compaction, resulting in saturation and near zero air voids in the soils. If this condition occurs, the affected soils must be over-excavated to the depth at which stable soils are encountered and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing a method to stabilize the soil subgrade, which must be subject to review by BSK prior to implementation.

4.7 Shallow, Mat, and Pole-Type Foundations

Provided the recommendations contained in this report are implemented during design and construction, it is our opinion that the proposed structures can be supported on shallow, mat, or pole-type foundations. A structural engineer must evaluate reinforcement and embedment depth based on the requirements for the structural loadings.

4.7.1 Shallow Foundations

The proposed at-grade structures may be supported on reinforced concrete spread footings bearing on engineered fill. Footing design must follow the criteria listed below:

The allowable bearing pressure applies to the dead load plus live load (DL + LL) condition. Footing design must follow the criteria listed below:

Table 7: Allowable Bearing Pressure

Footing Embedment[(2)] (inches)	**Minimum Footing Width (inches)**		**Allowable Bearing Capacity[(1)] (psf)**	
	Continuous Footing	**Isolated Spread Footing**	**Continuous Footing**	**Isolated Spread Footing**
12	12	36	3,300	4,300

Note (1) – The bearing pressure can be increased one-third for transient loading such as wind or seismic.
(2) – Measure with respect to the lowest adjacent subgrade surface.

The estimated total and differential settlement for the recommended spread footings is shown below:

Table 8: Anticipated Post-Construction Settlement

Footing Type	**Post-Construction Settlement (inches)**	**Differential Settlement (inches)**	**Angular Distortion**
Continuous	0.5	--	0.005
Isolated	1.0	0.5	--

Isolated footing differential settlement is based on adjacent similarly loaded footings spaced at 30-feet. The settlement values given above are applicable to the maximum loading conditions. For loads, other than the design maximum loads, the settlements can be decreased proportionally.

4.7.2 Mat Foundations

The proposed processing pit, sand lane, mechanical separator, and equipment pad may be supported on a thickened mat/slab foundation. The foundation may be designed for a maximum allowable bearing pressure of 2,000 psf (DL + LL). Estimated total settlement for mat/slabs is approximately 1 inch. Differential settlement across mat/slab foundations is anticipated to be on the order of about half of the total settlement over the length of the mat foundation. The weight of the concrete should be included in evaluating the contact pressure at the base of mat/slab foundations. The weight of embedded concrete can be reduced by the unit weight of soil times the depth of embedded concrete.

Mat foundations must be a minimum of 4-inches thick and must be supported on a compacted subgrade prepared in accordance with the “Site Preparation and Earthwork Construction” section of this report. In order to regulate cracking of the slabs, construction joints and/or saw-cut control joints must be provided in each direction at a maximum spacing of 10 feet on centers along with steel reinforcement as recommended by the project’s Structural Engineer. Control joints must have a minimum depth of one-quarter of the slab thickness. It is recommended that steel reinforcement used in concrete slabs-on-grade consist of steel rebar. Structural concrete slabs-on-grade may be designed using an unadjusted long-term Modulus of Subgrade Reaction (Ks) of 150 pounds per cubic inch (pci) constructed on a properly compacted subgrade or engineered fill. This value is based on the correlations to soil strength using one foot by one-foot plate-load tests and should therefore be scaled (adjusted) to the actual slab width. The adjusted Ks value can be obtained by multiplying the value provided above by $[(B+B_1)/(2B)]^2$, where B is the slab width in feet and B_1 is 1 foot (width of a one foot by one foot plate-load test apparatus).

4.7.3 Pole Type Foundations

Structures such as stadium lighting, signs, etc. may be supported on pole type foundations. This type of foundation must be designed in accordance with Section 1807.3 of the 2019 CBC. However, it is recommended that an allowable lateral soil bearing pressure of 300 psf per foot of embedment be used to develop parameters S1 and S3 rather than one of the values given in Table 1806A.2. This value includes a factor of safety of 2 and may be increased as indicated by 1806.3 and the footnotes to Table 1806.2. Unless the area surrounding the pole foundation is paved or covered with concrete flatwork, the upper 24 inches of soil should be ignored when calculating the minimum depth of embedment.

The following table provides expressions for the allowable and ultimate axial capacity using friction to resist axial loads. The skin friction within the upper two feet of embedded length must be ignored in unpaved areas. The total settlement of pier foundations designed in accordance with these recommendations should not exceed one-half inch.

Table 9: Friction Resistance for Vertical Loads

Allowable (lbs)	Ultimate (lbs)
40 DL^2	100 DL^2

Note (1) – D is pile diameter (feet), and L is the total embedment length (feet).

Prior to placing concrete, loose or disturbed soils must be removed from the bottom of the drilled pier excavations using a flat bottom clean-out bucket or other pre-approved method. A representative of BSK must observe the drilling and clean-out associated with the construction of pier foundations in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report.

Pier deflection may govern the design lateral resistance. If provided with pier geometry, lateral load, and loading eccentricity, the estimated pier head deflection can be provided.

4.8 Lateral Earth Pressures and Frictional Resistance

Lateral loads applied against foundations may be resisted by a combination of passive resistance against the vertical faces of the foundations and friction between the foundation bottom and the supporting subgrade. An unfactored coefficient of friction of 0.53 may be used between soil subgrade and the foundation bottom. The unfactored passive pressure is presented in Table 10. The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage. For resistance against lateral sliding that is countered solely by the passive earth pressure against footings or friction along the bottom of footings, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral resistance against seismic loading conditions, a minimum safety factor of 1.2 is recommended. We based these lateral resistance values on the assumption that the concrete for the foundations is either placed directly against undisturbed soils or that the voids created from the use of forms are backfilled with engineered fill or other approved materials, such as lean concrete. Passive resistance in the upper foot of soil cover below finished grades should be neglected unless the ground surface is confined by concrete slabs, pavements, or other such positive protection. The following earth pressure parameters may be used for designing earth retaining structures and foundations using native material or select non-expansive fill.

Table 10: Lateral Earth Pressures

Lateral Pressure Conditions	Equivalent Fluid Pressure (pcf)	
	Native	Select Non-Expansive Fill
Active Pressure	50	37
At-Rest Pressure	90	56
Passive Pressure	250	300
Dynamic Increment	18.4H	

Notes: 1. H is wall height in feet

Parameters are shown in the above table for drained conditions of select engineered fill or prepared native soil. In addition, the drained condition assumes that positive drainage will be provided away from the structure improvements and that water does not accumulate around the structure and cause a build-up of hydrostatic pressure.

4.9 Pavement Design Recommendations

4.9.1 Flexible Pavement

One (1) R-Value test was performed on a bulk soil sample in accordance with Caltrans Test Method 301. A design R-value of 35 was considered for silty sand or engineered fill (upper 1 foot in pavement areas) mixed with some native material. A Traffic Index (TI) of 4.0 is appropriate for automobile parking areas without truck traffic. A range of pavement sections have been provided based on Traffic Indexes (T.I.'s) of 4, 5, and 6. The project design consultant may select the pavement section corresponding to the appropriate T.I. value or may contact BSK for additional recommendations. The following table presents asphalt concrete (AC) pavement design sections based upon Caltrans standard methods for pavement design.

Table 11: Minimum Pavement Section (R-Value – 35)

Traffic Index	Asphalt Concrete (inch)	Aggregate Base – Class 2 (inch)
4.0	2.5	4.0
5.0	2.5	5.5
6.0	3.0	7.5

The flexible pavement must conform to and be placed in accordance with the latest Caltrans Standard Specifications. The aggregate base (Class 2) and aggregate subbase (Class 2) must comply with the specifications in Section 26. The aggregate base, subbase, and upper 12 inches of subgrade must be compacted to a minimum of 95 percent relative compaction as determined by the ASTM D1557 or California Test Method 216 (dry weight determination) test procedures.

Pavement areas should be sloped at a gradient of two percent or greater to allow for positive surface drainage. Both the proper surface slope and uniform compaction are necessary for satisfactory pavement performance.

4.9.2 Permeable Pavement

Permeable pavements must be underlain by a minimum of one-foot non-expansive sand fill (as per Section 4.5, except with fines content between 10 and 25 percent) and properly maintained. Table 12 provides minimum permeable pavement sections based on structural only for asphalt treated permeable base. The size of the permeable pavement section must consider reservoir layer depth requirements. The design pavement section for pervious concrete is recommended to be 6 inches of pervious concrete underlain by 6 inches of Class 4 AB and 12 inches non-expansive sand fill (see recommendations for materials below).

Table 12: Minimum Permeable Pavement Section (R-Value – 35)				
Traffic Index	**OGFC (inch)**	**Permeable Asphalt (inch)**	**Aggregate Base – Class 4 (inch)**	**Non-Expansive Sand Fill (inch)**
4.0	1.2	4.0	4.0	12
5.0	1.2	5.0	5.0	12
6.0	1.2	5.5	7.0	12

The flexible pavement must conform to and be placed in accordance with the latest Caltrans Standard Specifications. The open graded friction course (OGFC), aggregate base (Class 4) and non-expansive sand fill (fines content between 10 and 25 percent fines) must comply with the specifications in Section 26. The aggregate base must be compacted to a minimum of 95 percent relative compaction as determined by the ASTM D1557 or California Test Method 216 (dry weight determination) test procedures. The non-expansive sand fill must be compacted to a minimum of 90 percent relative compaction (ASTM D1557), and subgrade soils must be compacted to a minimum of 90 percent relative compaction (ASTM D1557) with water 2 percent above optimum water content.

Construction and maintenance considerations for use of permeable pavement are provided below based on recommendations of the California Stormwater Quality Association (CASQA 2017)[1] and Caltrans Pervious Pavement Design Guidance (Caltrans 2013)[2].

- Permeable pavements should be the last item to be installed during construction. If not installed as a final item, provisions for cleaning and testing the surface infiltration rate at the conclusion of the project shall be provided.
- Once permeable pavement is in place, ensure contributing drainage areas of the construction site have erosion and sediment control measures in place and are maintained until the site is stabilized.
- For porous asphalt, pervious concrete, and permeable interlocking concrete pavements, inspect and remove accumulated loose sediment, debris and litter using regenerative vacuum equipment at least twice per year. Monitor the rate of buildup of leaves, pine needles, and sediment in the surface and adjust this cleaning period as needed.

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[1] CASQA 2017. California Stormwater Quality Association, Removing Barriers to Low Impact Development (LID), Technical Memorandum #2 Permeable Pavement Details and Standards Review, May 2017.

[2] Caltrans 2013. California Department of Transportation, Division of Design, Office of Storm Water Management, Pervious Pavement Design Guidance, 2013.

4.10 Concrete Slabs-on-Grade

Non-structural concrete slab-on-grade must be a minimum of 4-inches thick and must be supported on a compacted subgrade prepared in accordance with the “Site Preparation and Earthwork Construction” section of this report. Existing onsite surface soils are considered to have a low to moderate expansion potential for design purposes. In order to regulate cracking of the slabs, construction joints and/or saw-cut control joints must be provided in each direction at a maximum spacing of 10 feet on centers along with steel reinforcement as recommended by the project’s Structural Engineer. Control joints must have a minimum depth of one-quarter of the slab thickness. It is recommended that steel reinforcement used in concrete slabs-on-grade consist of steel rebar. Structural concrete slabs-on-grade may be designed using an unadjusted long-term Modulus of Subgrade Reaction (Ks) of 200 pounds per cubic inch (pci) constructed on a properly compacted subgrade or engineered fill. This value is based on the correlations to soil strength using one foot by one-foot plate-load tests and should therefore be scaled (adjusted) to the actual slab width. For sandy soils, such as those found at this site, the adjusted Ks value can be obtained by multiplying the value provided above by $[(B+B_1)/(2B)]^2$, where B is the slab width in feet and B_1 is 1 foot (width of a one foot by one foot plate-load test apparatus).

Interior concrete slabs must be successively underlain by 1-½ inches of washed concrete sand; a durable vapor retarder; and a smooth, compacted subgrade surface. The vapor retarder must meet the requirements of ASTM: E1745 Class A and have a water vapor transmission rate (WVTR) of less than or equal to 0.012 Perms as tested by ASTM: E96. Examples of acceptable vapor retarder products include: Stego Wrap (15-mil) Vapor Barrier by STEGO INDUSTRIES LLC; W.R. Meadows Premoulded Membrane with Plasmatic Core; and Zero-Perm by Alumiseal. Because of the importance of the vapor barrier, joints must be carefully spliced and taped.

If migration of subgrade moisture through the slab is not a concern, then the vapor retarder and overlying sand may be reconsidered. The slab subgrade must be kept in a moist condition until the vapor retarder or concrete slab is placed. BSK’s representative must be called to the site to review soil and moisture conditions immediately prior to placing the vapor barrier or concrete slab.

As indicated in the PCA Engineering Bulletin 119, Concrete Floors and Moisture, and applicable ACI Committee reports (see ACI 360R-06, Design of Slabs-on-Ground, dated October 2006 and ACI 302.1R-04, Guide for Concrete Floor and Slab Construction, dated June 2004), the sand layer between the vapor retarder and concrete floor slab may be omitted. The advantage of this option is that it can reduce the amount of moisture that can be transmitted through the slab (especially if the sand layer becomes moist or wet prior to placing the concrete); however, the risk of slab “curling” is much greater. The “curling” may result from a sharp contrast in moisture-drying conditions between the exposed slab surface and the surface in contact with the membrane. As recommended in the referenced ACI Committee reports, measures must be taken to reduce the risk of “curling” such as reducing the joint spacing, using a low shrinkage mix design, and reinforcing the concrete slab. In order to regulate cracking of the slab, we recommend that full depth construction joints and control joints be provided in each direction with slab thickness and steel reinforcing recommended by the structural engineer.

Excessive landscape water or leaking utility lines could create elevated moisture conditions under concrete slabs, which could result in adverse moisture or mildew conditions in floor slabs or walls. Accordingly, care must be taken to avoid excess irrigation around the structures, as well as to periodically monitor for leaking utility lines. Likewise, positive surface drainage must be provided around the perimeter of the structures as discussed in the "Surface Drainage Control" section 4.9.

The adverse effects of moisture vapor transmission on flooring materials can be substantially reduced by the use of a low porosity concrete. This can be achieved by specifying a low water-cement ratio (0.45 or less by weight) a minimum compressive strength of 4,000 psi at 28 days, and a minimum of 7 days wet-curing.

4.11 Excavation Stability

Soils encountered within the upper 10-feet are generally Type C soil in accordance with OSHA (Occupational Safety and Health Administration). The slopes surrounding or along temporary excavations may be must be no steeper than 1.5H:1V for excavations to a maximum depth of 10-feet. Temporary excavations for the project construction must be left open for as short a time as possible and must be protected from water runoff. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations 29 CFR Part 1926, or successor regulations). These excavation recommendations are based on soil characteristics derived from the borings. Variations in soil conditions will likely be encountered during excavation. At the time of construction, BSK must be afforded the opportunity to observe and document sloping and shoring conditions, and the opportunity to provide review of actual field conditions to account for condition variations not otherwise anticipated in the preparation of these recommendations.

4.12 Utility Trench Excavation and Backfill

Pipes and conduits must be bedded and shaded in accordance with the requirements of the pipe manufacturer. Where no specific requirements exist, we recommend a minimum of 6-inches of sand bedding material for pipe installations 12 to 24-inches in diameter. For pipe diameters, smaller than 12-inches, the bedding thickness may be reduced to 4-inches. The bedding material and envelope (up to 6-inches above the pipe) must consist of sand (Sand Equivalent greater than 30), be placed in loose lifts not exceeding 8-inches in thickness, compacted to at least 90 percent of the maximum dry density, and moisture conditioned to within 2 percent of optimum moisture content. Water jetting to attain compaction must not be allowed.

Adequate excavation width must be provided to permit uniform compaction on both sides of utility lines installed within the trench. The trench backfill material may consist of engineered fill. Trench backfill outside the building footprint must be placed in loose lifts not to exceed 8-inches in loose thickness, compacted to at least 90 percent of the maximum dry density, and moisture conditioned to within 2 percent of optimum moisture content. The upper 12-inches of trench backfill below pavement sections must be compacted to at least 95 percent of the maximum dry density. Conduits extending through or below footings must be “sleeved” as determined by the Project Structural Engineer. Utility trench backfill beneath the building areas must be backfilled in accordance with Section 4.4 (Site Preparation and Earthwork Construction).

4.13 Surface Drainage Control

Final grading around site improvements must provide for positive and enduring drainage. Ponding of water must not be allowed on or near the building or paved surfaces. Saturation of the soils immediately adjacent to or below the building area must not be allowed. Irrigation water must be applied in amounts not exceeding those required to offset evaporation, sustain plant life, and maintain a relatively uniform moisture profile around and below, site improvements.

5 PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations, pavements, and earthwork, prior to there being finalized and issued for construction bidding.

6 CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction is a vital extension of this geotechnical investigation. BSK recommends that it be retained for those services. Field review during site preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK’s observations must be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. BSK must also be called to the site to observe foundation excavations, prior to placement of reinforcing steel or concrete, in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. BSK must also be called to the site to observe placement of foundation and slab concrete.

If a firm other than BSK is retained for these services during construction, that firm must notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the geotechnical engineer. Notification must indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendations, or that it will provide independent recommendations.

7 LIMITATIONS

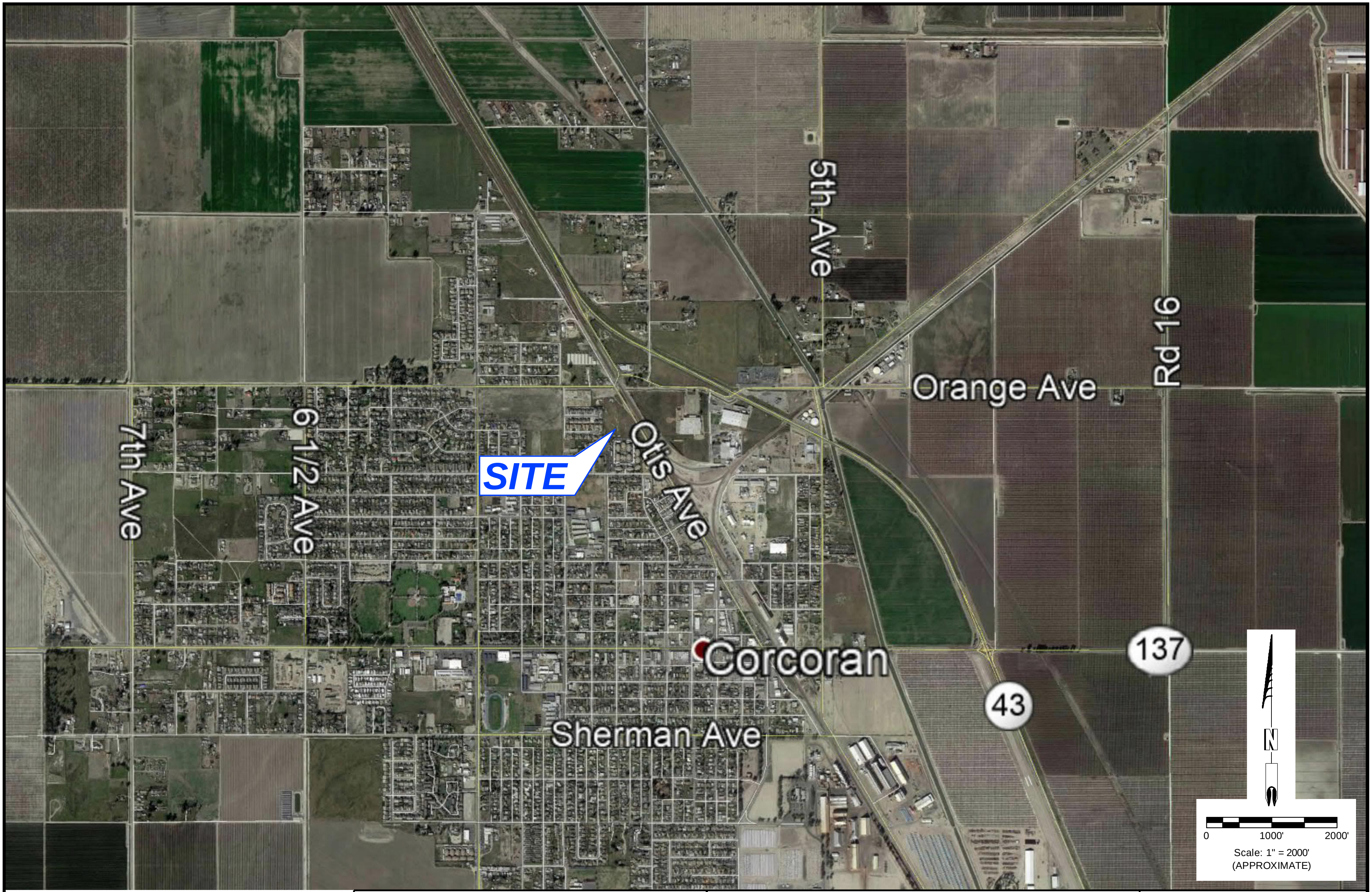
The analyses and recommendations submitted in this report are based upon the data obtained from the test borings performed at the locations shown on Figure 2. The report does not reflect variations, which may occur between or beyond the borings. The nature and extent of such variations may not become evident until additional exploration and testing is performed or construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices, which existed in Kings County at the time the report was written. No other warranties either express or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

FIGURES



REFERENCE IMAGE: Google Earth

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SITE VICINITY MAP

City of Corcoran
Gateway Park
SWC of Orange Ave. & Otis Ave.
Corcoran, California

FIGURE 1

JOB NO. G20-129-11F
DATE July 7, 2020
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS

P:\FRS\Active\GEO\G2012911F – City of Corcoran Gateway Park\Graphics\G20-129-11F.dwg User:tgonzalez Plotted:Jul 07, 2020 – 12:40pm Last Save:Jul 02, 2020 – 10:30am

LEGEND:

⊕ B- 9 APPROXIMATE BORING LOCATIONS

○ PT-1 APPROXIMATE PIEZOMETER LOCATION

◎ DRI-1 APPROXIMATE DOUBLE RING INFILTROMETER LOCATION

REFERENCE IMAGE: Google Earth

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BORING LOCATION MAP

City of Corcoran
Gateway Park
SWC of Orange Ave. & Otis Ave.
Corcoran, California

FIGURE 2

JOB NO. G20-129-10F
DATE July 17, 2020
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS

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APPENDIX A

FIELD EXPLORATION

APPENDIX A
Field Exploration

The field exploration was conducted on July 2, 2020, under the oversight of a BSK Engineer. The test borings were drilled to depths of approximately 5 and 21.5 feet below ground surface (bgs). The approximate locations of the test borings are illustrated on Figure 2, Boring Location Map.

The soil materials encountered in the test borings were visually classified in the field and logs were recorded during the drilling and sampling operations. Visual classification of the materials encountered in the test borings were made in general accordance with the Unified Soil Classification System (ASTM: D2487). A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff on the basis of observations made at the time of drilling while the actual boundaries between different soil types may be gradual and soil conditions may vary at other locations.

Subsurface samples were obtained at the successive depths shown on the boring logs by driving samplers, which consisted of a 2.5-inch inside diameter (I.D.) California Sampler or a 1.4-inch I.D. Standard Penetration Test (SPT) Sampler. The samplers were driven 18 inches using a 140-pound, automatic hammer dropping 30 inches. The number of blows required to drive the last 12 inches was recorded as the blow count (blows/foot) on the log of borings. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. Disturbed soil samples were obtained using the Split-Spoon Sampler (marked X in logs) and were placed and sealed in polyethylene bags. At the completion of the field exploration, the test borings were backfilled with the soil cuttings, as set forth in BSK's proposal.

It should be noted that the use of terms such as "loose", "medium dense", "dense" or "very dense" to describe the consistency of a soil is based on sampler blow count and is not necessarily reflective of the in-place density or unit weight of the soils being sampled. The relationship between sampler blow count and consistency is provided in the following Tables A-1 and A-2 for coarse grained (sandy and gravelly) soils and fine grained (silty and clayey) soils, respectively.

Table A-1: Density of Coarse-Grained Soil versus Sampler Blow Count

Consistency	SPT Blow Count Blows / Foot)	2.5” I.D. Cal. Sampler (Blows / Foot)
Very Loose	<4	<6
Loose	4 – 10	6 – 15
Medium Dense	10 – 30	15 – 45
Dense	30 – 50	45 – 80
Very Dense	>50	>80

Table A-2: Consistency of Fine-Grained Soil versus Sampler Blow Count

Consistency	SPT Blow Count (Blows / Foot)	2.5” I.D. Cal. Sampler (Blows / Foot)
Very Soft	<2	<3
Soft	2 – 4	3 – 6
Medium Stiff	4 – 8	6 – 12
Stiff	8 – 15	12 – 24
Very Stiff	15 – 30	24 – 45
Hard	>30	>45

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS, POOORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

■	Modified California	RV	R-Value
⧓	Standard Penetration Test (SPT)	SA	Sieve Analysis
⊠	Split Spoon	SW	Swell Test
◩	Pushed Shelby Tube	TC	Cyclic Triaxial
◫	Auger Cuttings	TX	Unconsolidated Undrained Triaxial
✋	Grab Sample	TV	Torvane Shear
⧄	Sample Attempt with No Recovery	UC	Unconfined Compression
CA	Chemical Analysis	(1.2)	(Shear Strength, ksf)
CN	Consolidation	WA	Wash Analysis
CP	Compaction	(20)	(with % Passing No. 200 Sieve)
DS	Direct Shear	▽	Water Level at Time of Drilling
PM	Permeability	▼	Water Level after Drilling(with date measured)
PP	Pocket Penetrometer		

SOIL CLASSIFICATION CHART AND LOG KEY

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Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

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Boring: **B-1**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
							▨	SC	**Clayey SAND** - brown, moist, fine to medium grained sand, medium plasticity	
1										
2	■	✋					▨	SP-SC	**Poorly Graded SAND with Clay** - light brown gray, moist, medium dense, fine to coarse grained sand, medium plasticity, weakly cemented	
3	■		39	115.8	6.7					
4										
5	■						▨	CL	**CLAY** - brown, moist, very stiff, trace fine grained sand	white striations
6	■		25							
7										
8										
9										
10	■						▨	CL	**Sandy CLAY** - brown, moist, very stiff, fine to medium grained sand	
11	■		27							
12										
13										
14										
15	⧗									
16	⧗		6							
17									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project No.: G20-129-11F
Logged By: S. Jue
Checked By: N. Popenoe

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Boring: **B-2**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
0								SM	**Silty SAND** - brown, moist, medium dense, fine grained sand	
1										
2	■									
3	■		21	96.7	15.1					
4										
5	■									
6	■		32						... fine to medium grained sand	
7										
8										
9										
10	■							CL	**Sandy CLAY** - brown, moist, very stiff, fine grained sand, low plasticity	
11	■		27							
12										
13										
14								SC	**Clayey SAND** - brown, moist, medium dense, fine to medium grained sand, low plasticity	
15	⧗									
16	⧗		13							
17									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

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Boring: **B-3**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
								SC	**Clayey SAND** - grayish brown, moist, medium dense, fine grained sand, weakly cemented	
1										
2	■									
3	■		37	119.6	12.6					
4										
5	■									
6	■		53						... dense, fine to medium grained sand	
7										
8										
9										
10	■									
11	■		20						... medium dense, fine grained sand	
12										
13										
14										
15	⧗							ML	**Sandy SILT** - brown, moist, stiff, fine grained sand	
16	⧗		12							
17									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project No.: G20-129-11F
Logged By: S. Jue
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Page 1 of 1

Boring: **B-4**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
								SM	**Silty SAND** - grayish brown, moist, medium dense, fine grained sand	
3	■		33	99.8	4.3					
								SP	**Poorly Graded SAND** - very pale brown, moist, medium dense, fine grained sand	
6	■		63					SC	**Clayey SAND** - light brown gray, moist, dense, fine grained sand, moderately cemented	
								CL	**CLAY** - brown, moist, very stiff, trace fine grained sand, medium plasticity	
11	■		25							
16	⧗		17							
									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

Boring: **B-5**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
							▨	CL	**Sandy CLAY** - brown, moist, loose, fine to medium grained sand, low plasticity	
1							▨			
2	■	✋					▨			
3	■		12	95.6	18.0	56	▨			
4							▨			
5	■						▨		...yellowish brown, stiff, trace silt, decrease in sand content	
6	■		15				▨			
7							▨			
8							▨			
9							▨			
10	■						⁘	SM	**Silty SAND** - yellowish brown, moist, medium dense, fine grained sand, trace clay, weakly cemented	
11	■		39				⁘			
12							⁘			
13							⁘			
14							⁘			
15	⧗						⁘			
16	⧗		14				⁘			
17									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: City of Corcoran Gateway Park

Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

Boring: **B-6**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
0							▨	SC	**Clayey SAND** - brown, moist, medium dense, fine to medium grained sand	
1							▨			
2	■	🖑					▨			
3	■	🖑	19	104.8	10.9		▨			
4		🖑					▨			
5	■						▨			
6	■		35				▨			
7							▨			
8							▨			
9							▨			
10	■						▨			
11	■		24				▨			
12							▨			
13							▨			
13.5							▨	CL	**CLAY** - brown, moist, medium stiff, trace fine grained sand, trace silt	
14							▨			
15	⧗						▨			
16	⧗		7				▨			
16.5									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
17										
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

BSK Associates
550 W. Locust Ave.
Fresno, CA 93650
Telephone: (559) 497-2880
Fax: (559) 497-2886

Project: City of Corcoran Gateway Park

Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

Boring: **B-7**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
								SC	**Clayey SAND** - yellowish brown, moist, medium dense, fine grained sand, trace silt, moderately cemented	
1										
2	■	✋								
3	■		38	110.7	5.6					
4										
5	■									
6	■		37	99.0	7.0					
7										
8										
9										
10	■									
11	■		45						... medium dense to dense	
12										
13										
14										
15	⧗									
16	⧗		10							
17									Boring terminated at approximately 16.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

BSK Associates
550 W. Locust Ave.
Fresno, CA 93650
Telephone: (559) 497-2880
Fax: (559) 497-2886

Project: City of Corcoran Gateway Park

Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

Boring: **B-8**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
							▨	SC	**Clayey SAND** - brown, moist, fine grained sand	
1							▨			
2	■	✋					▨			
3	■		15				▨		... medium dense	
4							▨			
5										
6									Boring terminated at approximately 5 feet. No groundwater encountered. Backfilled with soil cuttings.	
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

BSK Associates
550 W. Locust Ave.
Fresno, CA 93650
Telephone: (559) 497-2880
Fax: (559) 497-2886

Project: City of Corcoran Gateway Park

Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA

Project No.: G20-129-11F

Logged By: S. Jue

Checked By: N. Popenoe

Boring: **B-9**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
								SC	**Clayey SAND** - light brownish gray, moist, medium dense, fine grained sand	
1										
2	■									
3	■		24	99.6	13.2			SM	**Silty SAND** - light brownish gray, moist, medium dense, fine grained sand	
4										
5	■									
6	■		49						... dense	
7										
8										
9								SP	**Poorly Graded SAND** - very pale brown, moist, fine grained sand	
10	■									
11	■		30							
12								SM	**Silty SAND** - brown, moist, medium dense, fine grained sand	
13										
14										
15	⧗									
16	⧗		13							
17										
18										
19										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 21.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

BSK Associates
550 W. Locust Ave.
Fresno, CA 93650
Telephone: (559) 497-2880
Fax: (559) 497-2886

Project: City of Corcoran Gateway Park
Location: SWC of Orange Avenue and Otis Avenue, Corcoran, CA
Project No.: G20-129-11F
Logged By: S. Jue
Checked By: N. Popenoe

Boring: **B-9**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
	⧗						▨	SC	**Clayey SAND** - brown, moist, medium dense, fine grained sand, medium plasticity *(continued)*	
21			13							
22									Boring terminated at approximately 21.5 feet. No groundwater encountered. Backfilled with soil cuttings.	
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										

Drilling Contractor: Baja Exploration
Drilling Method: CME 75
Drilling Equipment: Hollow Stem Auger
Date Started: 7/2/20
Date Completed: 7/2/20

Surface Elevation:
Sample Method: 2.5" I.D. Cal Mod & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 21.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

APPENDIX B

LABORATORY TESTING

APPENDIX B
Laboratory Testing

The results of laboratory testing performed in conjunction with this project are contained in this Appendix. The following laboratory tests were performed on soil samples in general conformance with applicable standards.

In-Situ Moisture and Density

The field moisture content and in-place dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM: D2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in accordance with ASTM: D2937 test procedures. Test results are presented on the boring logs in Appendix A.

Sieve Analysis Test

One (1) Sieve Analysis Test was performed on a selected soil sample in the area of planned construction. The test was performed in general accordance with Test Method ASTM: D422. The results of the test are presented on Figure B-1.

Expansion Index Test

One (1) expansion index test was performed in general accordance with ASTM D-4829. The specimen was moisturized and compacted to a dry density and moisture content corresponding to a degree of saturation between 48 to 52 percent, was subjected to a 1-PSI normal load and then saturated. The vertical movement of the specimen was monitored during the process. The test results are presented on Figure B-2.

Direct Shear Test

One (1) direct shear test was performed on a test specimen trimmed from a selected soil sample. The three-point shear test was performed in general accordance with ASTM Test Method D3080, Direct Shear Test for Soil under Consolidated Drained Conditions. The test specimens, each 2.42 inches in diameter and 1 inch in height, were subjected to shear along a plane at mid-height after allowing for pore pressure dissipation. The results of this test are presented on Figure B-3.

R-Value Test

The Resistance-Value result of one (1) samples of the surficial soil was obtained in accordance with California Department of Transportation's Test Method CA 301. The results of the R-Value tests are presented on Figure B-4.

Soil Corrosivity

The results of chemical analyses performed on a bulk soil sample using California Test Method 643 (for minimum resistivity and pH) and CT-417 (for soluble sulfate), and CT-422 (for chlorides) are presented below.

SUMMARY OF CHEMICAL TEST RESULTS

Sample Location	pH	Sulfate (mg/kg)	Chloride (mg/kg)	Minimum Resistivity (ohms-cm)
B-5 at 0 - 5'	9.3	40	35	1,370

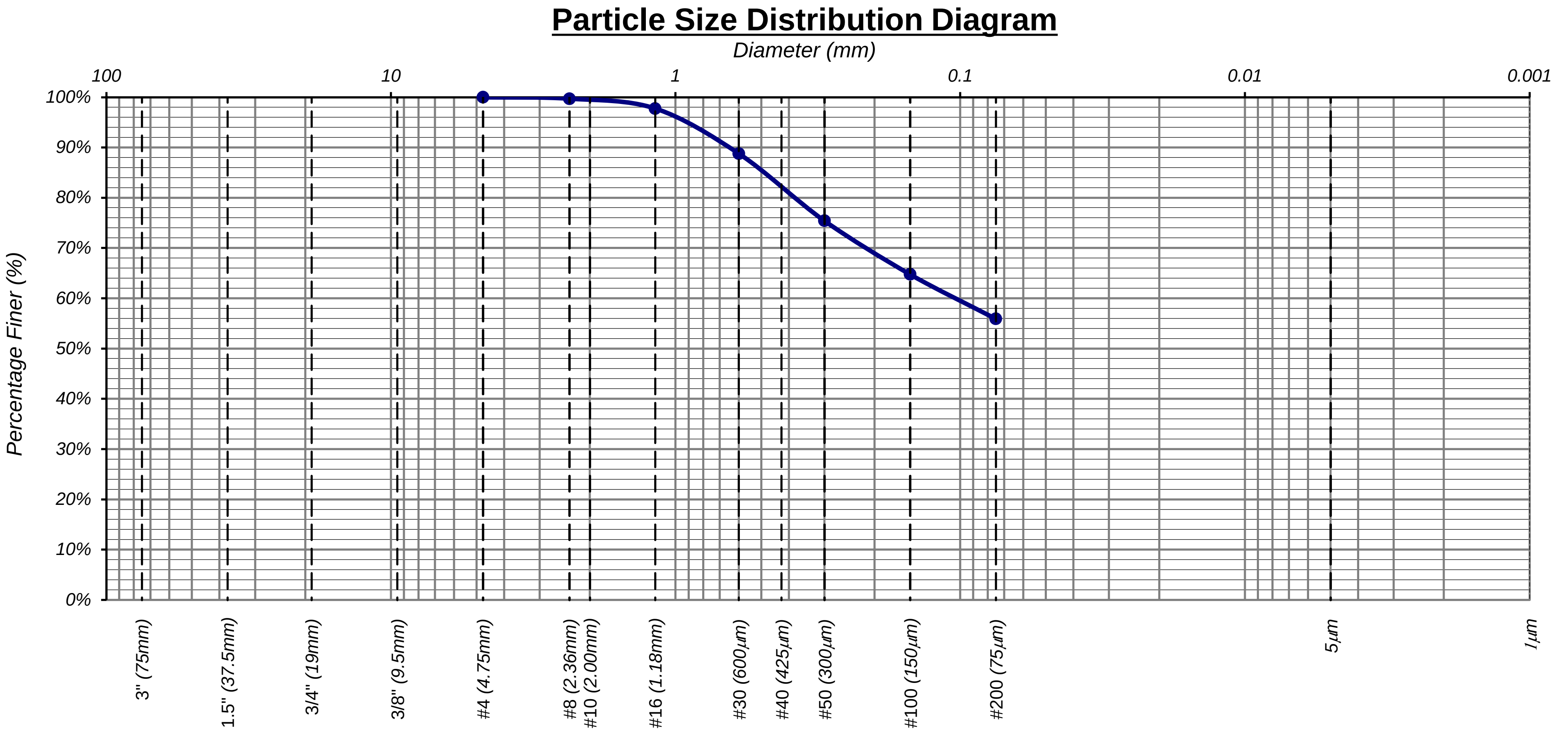
BSK ASSOCIATES

FIGURE B-1

550 W. Locust Ave.
Fresno, CA 93650
Ph: (559) 497-2880
Fax: (559) 497-2886

Gradation Analysis Report
ASTM D-422 / ASTM C-136

Project Name: City of Corcoran Gateway Park
Project Number: G20 - 129 - 11F
Report Date: 7/10/2020
Sample Location: B - 5 @ 0 - 5'
Sample Lab ID:
Sample Date: 7/2/2020
Sample Description: Sandy CLAY (SC), brown, moist, fine to medium grained sand
Test Date: 7/9/2020



Clear Square Openings (ASTM C-136)			US Standard Series (ASTM D-422)			Hydrometer Readings (ASTM D-422)
Cobble	Gravel		Sand			Silt (Non-Plastic) to Clay (Plastic)
	Coarse	Fine	Coarse	Medium	Fine	

% Gravel = 0% **% Sand = 44%** **% Fines = 56%**

FIGURE B-2

550 W. Locust Avenue
Fresno, CA 93650
Ph: (559) 497-2868
Fax: (559) 485-6140

Expansion Index of Soils

ASTM D 4829 / UBC Standard 18-2

Project Name: CITY OF CORCORAN GATEWAY **Report Date:** 7/10/2020
Project Number: G20 - 129 - 11F **Sample Date:** 7/2/2020
Lab Tracking ID: **Test Date:** 7/9/2020
Sample Location: B - 5 @ 0' - 5'
Sample Source
Sampled By: S. JUE **Tested By:** D. MESSFIN **Reviewed By:**

TEST DATA

INITIAL SET-UP DATA			
Sample + Tare Weight (g)	761.5		
Tare Weight (g)	368.6	**FINAL TAKE-DOWN DATA**	
Moisture Content Data		**Moisture Content Data**	
Wet Weight + Tare	100.0	Wet Weight + Tare	314.6
Dry Weight + Tare	91.1	Dry Weight + Tare	266.4
Tare Weight (g)	0	Tare Weight (g)	16.2
Moisture Content (%)	9.8%	Moisture Content (%)	19.3%
Initial Volume (ft^3)	0.007272	Final Volume (ft^3)	0.007764
Remolded Wet Density (pcf)	119.1	Final Wet Density (pcf)	121.2
Remolded Dry Density (pcf)	108.5	Final Dry Density (pcf)	101.6
Degree of Saturation	**48**	**Degree of Saturation**	**79**

EXPANSION READINGS

Initial Gauge Reading (in)	0.13965
Final Gauge Reading (in)	0.2073
Expansion (in)	0.06765

Uncorrected Expansion Index	**68**
Corrected Expansion Index, EI	**66**

Classification of Expansive Soil

EI	Potential Expansion
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

BSK ASSOCIATES

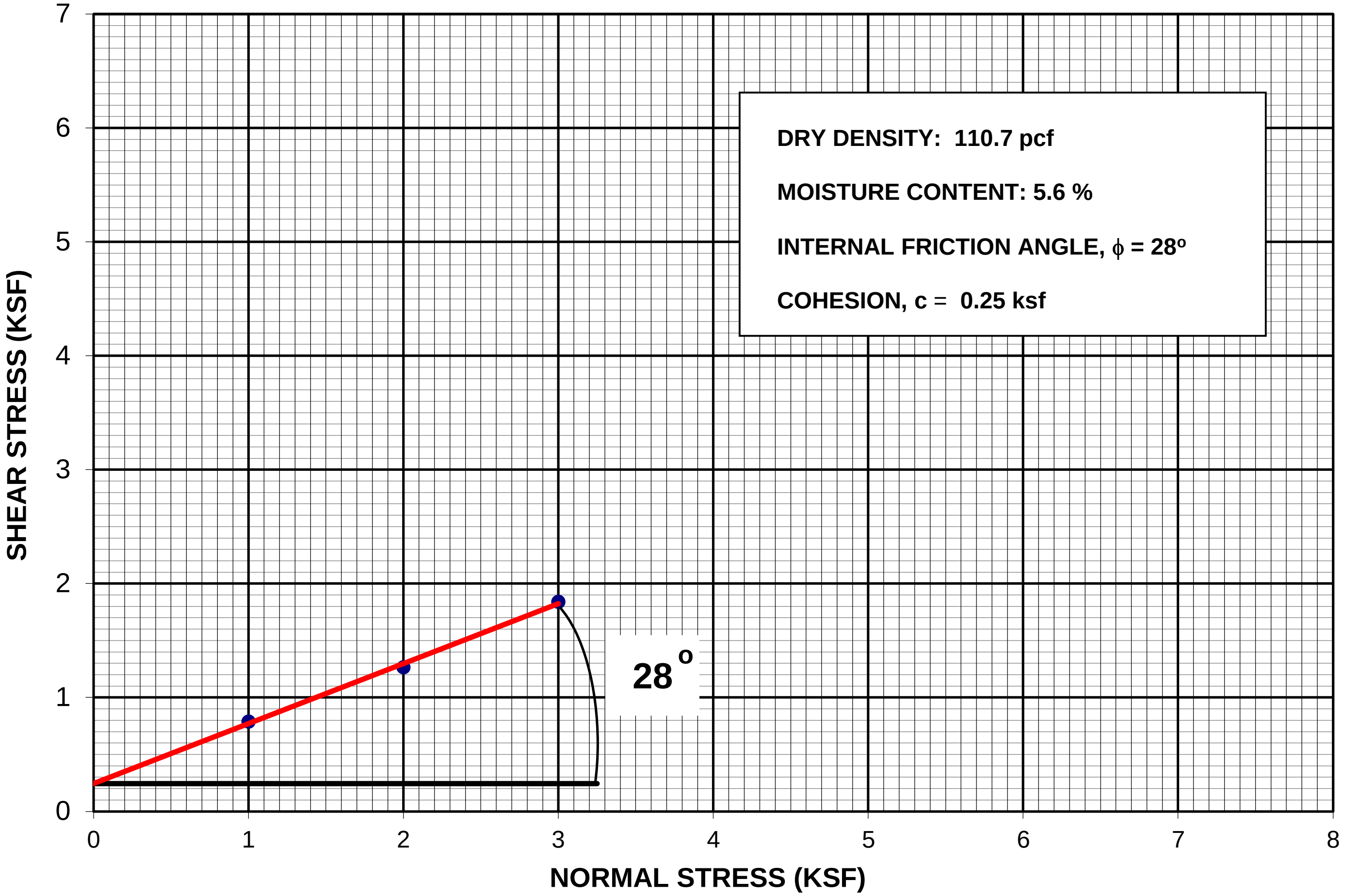
550 W. Locust
Fresno, CA 93650
Ph: (559) 497-2880
Fax: (559) 497-2886

Direct Shear Test

ASTM D-3080

Project Name: City of Corcoran Gateway Park
Sampled By: S. Jue
Sample Date: 7/2/2020
Tested By: D.Messfin
Test Date: 7/9/2020
Project Number: G20 - 129 - 11F
Lab Tracking ID: N/A
Report Date: 7/16/2020
Sample Location: B-7 @ 3'
Sample Description: Clayey SAND (SC), yellowish brown, moist, fine grained sand

SHEAR STRENGTH DIAGRAM



DRY DENSITY: 110.7 pcf

MOISTURE CONTENT: 5.6 %

INTERNAL FRICTION ANGLE, ϕ = 28º

COHESION, c = 0.25 ksf

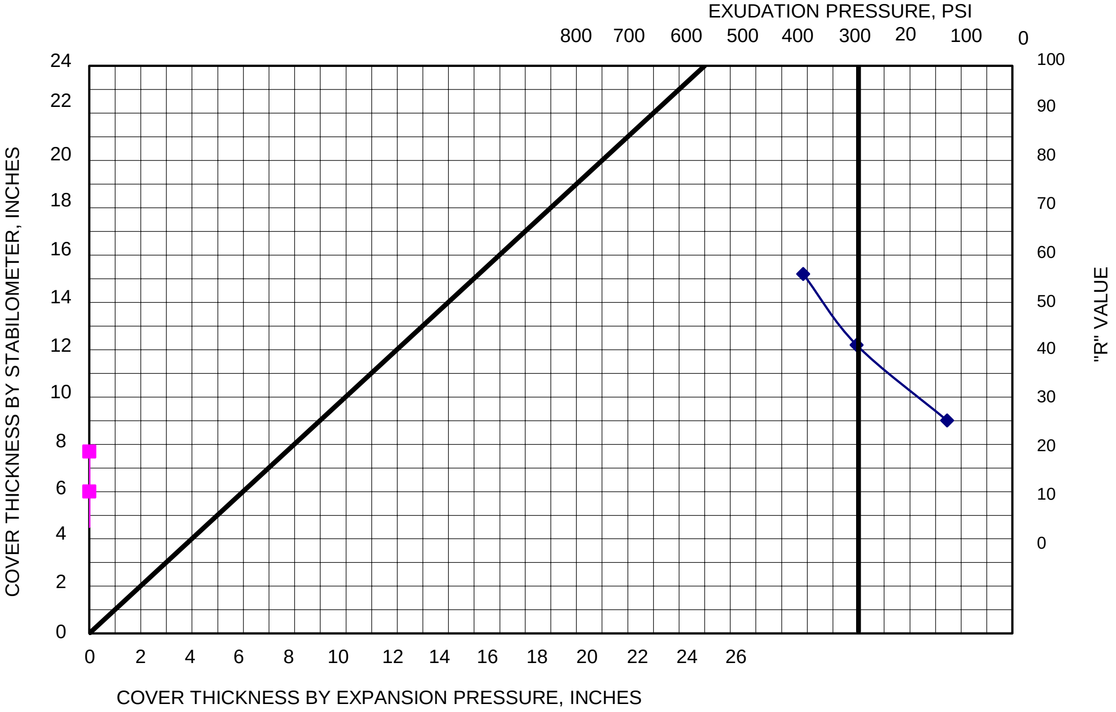
Standard Test Methods for Resistance R-Value and Expansion Pressure of Compacted Soil

ASTM D-2844

FIGURE B-4
700 22nd St.
Bakersfield, CA 93301
Ph: (661) 327-0670
Fax: (661) 324-4217

Project Name:	City of Corcoran Gateway Park
Project Number:	G20-129-11F
Lab Tracking ID:	B20-109
Sample Location:	B-8 @ 0.0-5.0 feet bgs

Sample Date:	7/6/2020
Test Date:	7/15/2020
Report Date:	7/15/2020
Tested By:	ILT Remotigue



Sample Description: SM/SC: Silty Sand: Fine to Medium.

SPECIMEN	A	B	C
EXUDATION PRESSURE, LOAD (lb)	5123.6	3816.2	1597.6
EXUDATION PRESSURE, PSI	408	304	127
EXPANSION, * 0.0001 IN	-0.0028	0.0017	0.0034
EXPANSION PRESSURE, PSF	0	0	0
STABILOMETER PH AT 2000 LBS	48	72	98
DISPLACEMENT	4.58	4.32	4.78
RESISTANCE VALUE "R"	56	41	25
"R" VALUE CORRECTED FOR HEIGHT	56	41	25
% MOISTURE AT TEST	12.3	13.3	14.3
DRY DENSITY AT TEST, PCF	119.4	116.3	117.2
"R" VALUE AT 300 PSI EXUDATION PRESSURE	**41**		
"R" VALUE BY EXPANSION PRESSURE TI = 4.0, GF=1.50	**N/A**		

Reviewed By: *Ian Leo T. Remotigue*

APPENDIX C

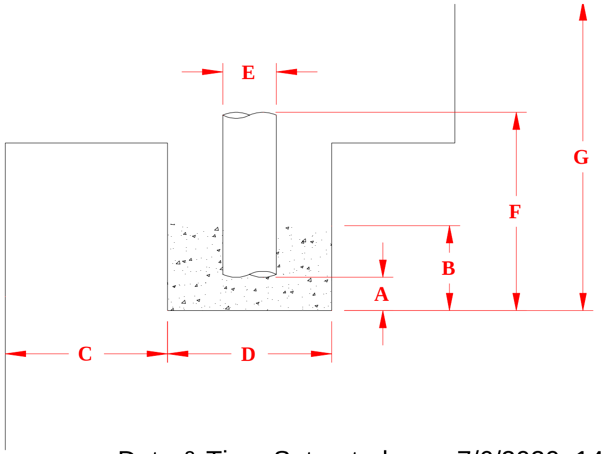
PERCOLATION AND DOUBLE RING INFILTROMETER TEST RESULTS

BSK ASSOCIATES

PERCOLATION TEST DATA SHEET

FIGURE C-1
550 W. Locust Ave.
Fresno, CA 93650
Ph: (559) 497-2868
Fax: (559) 497-2886

Project Name:	City of Corcoran Gateway Park	Project No.:	G20-129-11F
Project Location:	SWC of Orange Ave and Otis Ave	Pit No.:	PT-1



A.	Gravel Layer Depth, in.	3
B.	Total Gravel Thickness, in.	17
C.	Distance from Shelf, ft.	NA
D.	Hole Diameter, in.	4
E.	Case Diameter, in.	2
F.	Reference Depth, in.	36
G	Hole Depth, ft.	2.17
	Depth to Groundwater	NA
Soil Type		Clayey Sand (SC)

Date & Time Saturated: 7/6/2020, 14:01
Depth of Water after 24-hour Saturation: 0

Begin Test	Initial Depth to Water*, in.	Refilled	End Test	Final Depth to Water*, in.	Test Duration, min.	Water Drop, in.	**Drop Rate min./in.****
8:11	8.4	X	8:26	15.8	15.0	7.4	**3.9**
8:27	8.4	X	8:42	13.2	15.0	4.8	**6.1**
8:45	8.4	X	9:00	12.8	15.0	4.4	**6.6**
9:01	8.4	X	9:16	12.5	15.0	4.1	**7.2**
9:17	8.4	X	9:32	12.6	15.0	4.2	**7.0**
9:32	8.4	X	9:47	13.3	15.0	4.9	**5.9**
9:48	8.4	X	10:03	13.2	15.0	4.8	**6.1**
10:03	8.4	X	10:18	13.4	15.0	5.0	**5.8**
10:18	8.4	X	10:33	12.7	15.0	4.3	**6.8**
10:33	8.4	X	10:48	14.0	15.0	5.6	**5.2**
10:48	8.4	X	11:20	17.6	32.0	9.2	**6.8**
11:23	8.4	X	11:38	14.8	15.0	6.4	**4.6**
11:40	8.4	X	11:48	13.1	8.0	4.7	**3.3**
11:51	15.1		11:56	16.4	5.0	1.3	**7.4**
11:56	16.4		12:04	18.8	8.0	2.4	**6.5**
12:04	18.8		12:09	20.0	5.0	1.2	**8.1**
12:11	14.2	X	12:16	17.6	5.0	3.5	**2.8**
12:16	17.6		12:21	19.2	5.0	1.6	**6.3**
12:21	19.2		12:26	20.6	5.0	1.4	**6.8**
12:26	20.6		12:31	21.7	5.0	1.1	**9.0**
12:50	8.4	X	12:55	13.1	5.0	4.7	**2.1**
12:55	13.1		13:00	14.4	5.0	1.3	**7.4**
13:00	14.4		13:05	15.2	5.0	0.8	**11.6**
13:05	15.2		13:10	16.7	5.0	1.4	**6.8**
13:10	16.7		13:15	17.8	5.0	1.1	**9.0**

Average = **6.6**

*Depth below reference datum
**Corrected for full depth gravel in annulus

Figure C-2

550 W. Locust
Fresno, CA 93650
Ph: (559) 497-2880
Fax: (559) 497-2886

Double Ring Infiltration Test

ASTM D3385

Project Name: City of Corcoran Gateway Park
Project Number: G20-129-11F
Test Location:
Saturation Date: 7/2 & 7/6/2020
Test Date: 7/8/2020
Tested By: S. Jue

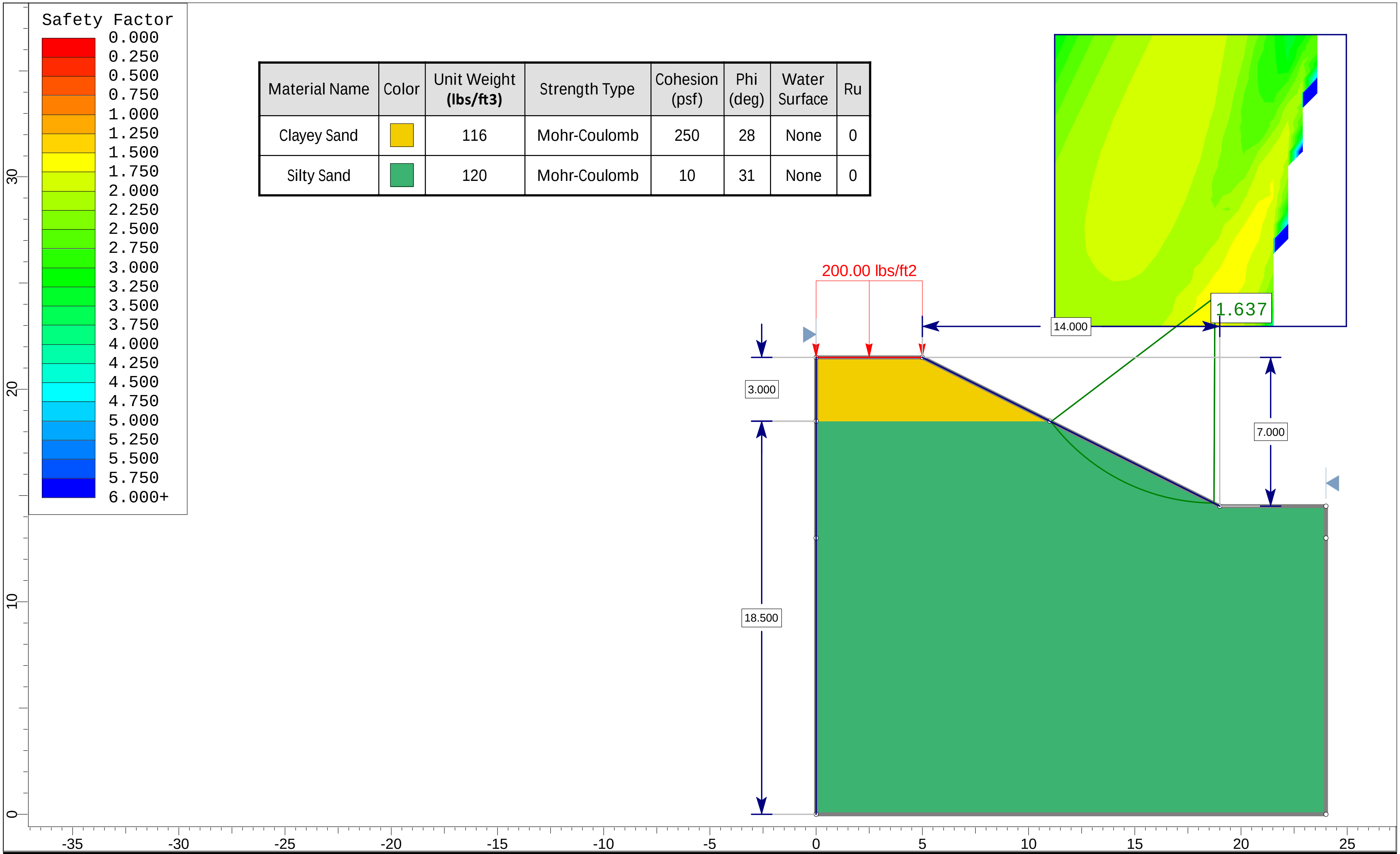
	Area (cm^2)	Depth of Liquid (cm)	Containers Vol/ΔH (cm^3/cm)
Inner Ring	729.66	24.13	54
Annular Space	2188.98	24.13	168.33

	Inner Flow Rate (cm/hr)	Annular Flow Rate (cm/hr)
Average Last 8	0.22	0.03

Trail No		Time (hr:min)	Elapsed Time/Cumulative (min)	Flow reading				Incremental Infiltration Rate	
				Inner Reading		Annular Space			
				Reading (cm)	Flow (cm^3)	Reading (cm)	Flow (cm^3)	Inner (cm/h)	Annular (cm/h)
1	S	7:39	3.00	56.7	221.4	58	84.2	6.07	0.77
	E	7:42	3.00	52.6		57.5			
2	S	7:42	3.00	52.6	297	57.5	117.8	8.14	0.54
	E	7:45	6.00	47.1		56.8			
3	S	7:45	3.00	47.1	248.4	56.8	134.7	6.81	0.41
	E	7:48	9.00	42.5		56			
4	S	7:48	4.00	42.5	340.2	56	202.0	6.99	0.43
	E	7:52	13.00	36.2		54.8			
5	S	7:52	3.00	36.2	248.4	54.8	202.0	6.81	0.35
	E	7:55	16.00	31.6		53.6			
6	S	7:55	3.00	31.6	199.8	53.6	202.0	5.48	0.29
	E	7:58	19.00	27.9		52.4			
7	S	7:58	6.00	27.9	459	52.4	606.0	6.29	0.66
	E	8:04	25.00	19.4		48.8			
8	S	8:04	3.00	19.4	151.2	48.8	235.7	4.14	0.23
	E	8:07	28.00	16.6		47.4			
9	S	8:07	3.00	16.6	183.6	47.4	269.3	5.03	0.24
	E	8:10	31.00	13.2		45.8			
10	S	8:10	3.00	13.2	199.8	45.8	286.2	5.48	0.23
	E	8:13	34.00	9.5		44.1			
11	S	8:13	5.00	9.5	248.4	44.1	303.0	4.09	0.21
	E	8:18	39.00	4.9		42.3			
12	S	9:19	2.00	42.9	799.2	41.9	269.3	32.86	0.18
	E	9:21	41.00	28.1		40.3			
13	S	9:21	4.00	28.1	351	40.3	471.3	7.22	0.29
	E	9:25	45.00	21.6		37.5			
14	S	9:25	3.00	21.6	243	37.5	471.3	6.66	0.27
	E	9:28	48.00	17.1		34.7			
15	S	9:28	4.00	17.1	232.2	34.7	454.5	4.77	0.24
	E	9:32	52.00	12.8		32			
16	S	9:32	3.00	12.8	178.2	32	353.5	4.88	0.18
	E	9:35	55.00	9.5		29.9			
17	S	10:00	2.00	57	32.4	27	50.5	1.33	0.02
	E	10:02	57.00	56.4		26.7			
18	S	10:02	3.00	56.4	54	26.7	67.3	1.48	0.03
	E	10:05	60.00	55.4		26.3			
19	S	10:05	3.00	55.4	32.4	26.3	101.0	0.89	0.04
	E	10:08	63.00	54.8		25.7			
20	S	10:08	4.00	54.8	27	25.7	101.0	0.56	0.04
	E	10:12	67.00	54.3		25.1			
21	S	10:12	3.00	54.3	16.2	25.1	84.2	0.44	0.03
	E	10:15	70.00	54		24.6			
22	S	10:15	2.00	54	10.8	24.6	50.5	0.44	0.02
	E	10:17	72.00	53.8		24.3			
23	S	10:17	2.00	53.8	5.4	24.3	50.5	0.22	0.02
	E	10:19	74.00	53.7		24			
24	S	10:19	3.00	53.7	16.2	24	84.2	0.44	0.03
	E	10:22	77.00	53.4		23.5			
25	S	10:22	3.00	53.4	5.4	23.5	67.3	0.15	0.02
	E	10:25	80.00	53.3		23.1			
26	S	10:25	2.00	53.3	5.4	23.1	84.2	0.22	0.03
	E	10:27	82.00	53.2		22.6			
27	S	10:27	2.00	53.2	5.4	22.6	67.3	0.22	0.02
	E	10:29	84.00	53.1		22.2			
28	S	10:29	2.00	53.1	5.4	22.2	50.5	0.22	0.02
	E	10:31	86.00	53		21.9			
29	S	10:31	2.00	53	5.4	21.9	67.3	0.22	0.02
	E	10:33	88.00	52.9		21.5			
30	S	10:33	2.00	52.9	5.4	21.5	84.2	0.22	0.03
	E	10:35	90.00	52.8		21			
31	S	10:35	2.00	52.8	5.4	21	67.3	0.22	0.02
	E	10:37	92.00	52.7		20.6			
32	S	10:37	2.00	52.7	5.4	20.6	101.0	0.22	0.03
	E	10:39	94.00	52.6		20			
33	S	10:56	7.00	52.2	64.8	16.3	235.7	0.76	0.06
	E	11:03	101.00	51		14.9			
34	S	11:03	3.00	51	32.4	14.9	50.5	0.89	0.01
	E	11:06	104.00	50.4		14.6			

APPENDIX D

SLOPE STABILITY RESULTS



Material Name	Color	Unit Weight **(lbs/ft3)**	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Clayey Sand	🟨	116	Mohr-Coulomb	250	28	None	0
Silty Sand	🟩	120	Mohr-Coulomb	10	31	None	0

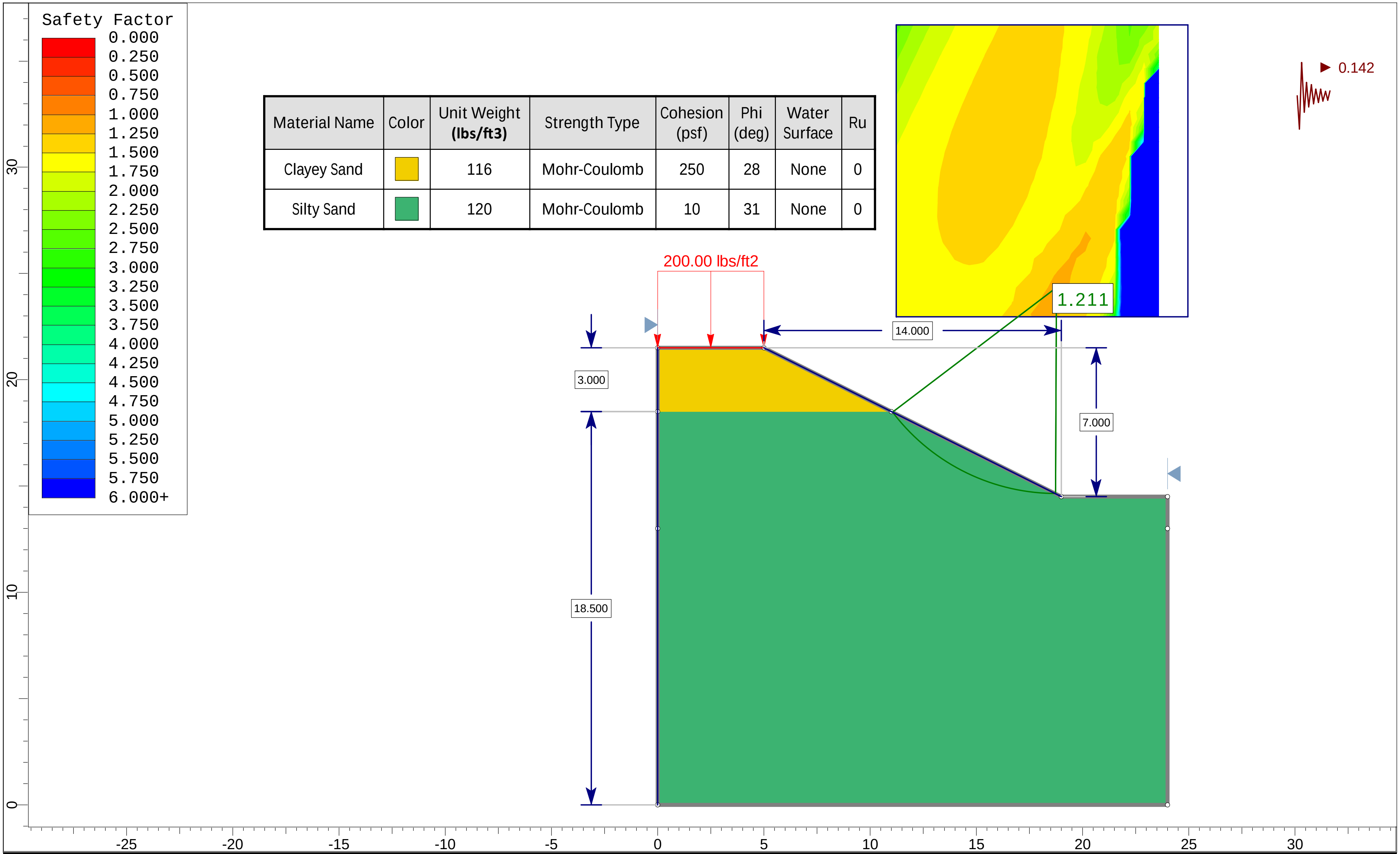
Project
City of Corcoran Gateway Park

Analysis Description
G20-129-11F

Drawn By S. Jue
Scale 1:75
Company BSK Associates

Date 7/16/2020, 1:59:54 PM
File Name g20-129-11f.slmd

SLIDEINTERPRET 7.038



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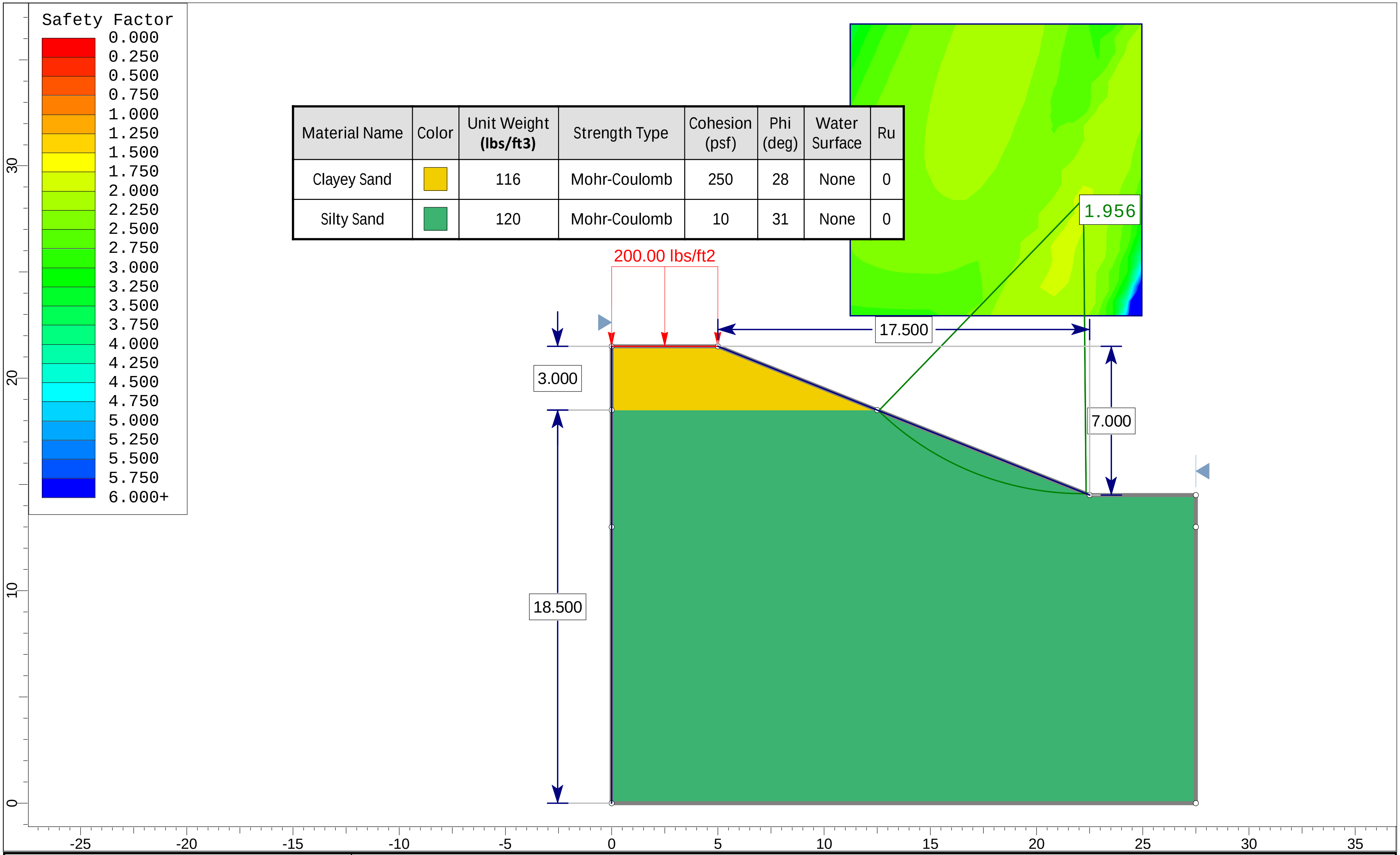
SLIDEINTERPRET 7.038

Project	City of Corcoran Gateway Park		
Analysis Description	G20-129-11F		
Drawn By	S. Jue	*Scale*	1:75
Company	BSK Associates		
Date	7/16/2020, 1:59:54 PM	*File Name*	g20-129-11f.slmd



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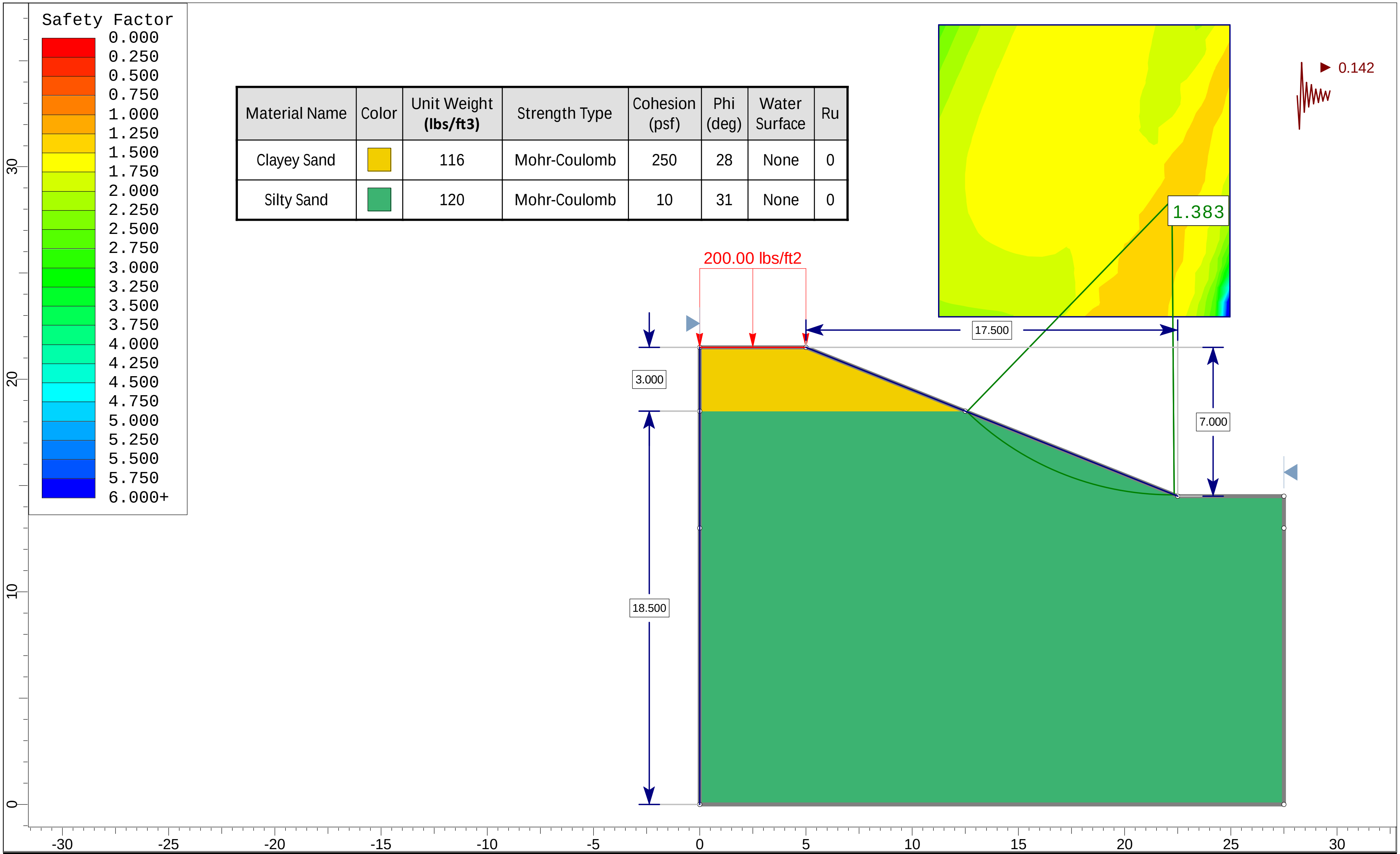
Date	7/16/2020, 1:59:54 PM	*File Name*	g20-129-11f.slmd



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