Appendix B

Geotechnical Study

May 20, 2021
Kleinfelder Project No. 20212905.001A

Costco Wholesale
999 Lake Drive
Issaquah, Washington 98027

Attention: Ms. Kim Katz
Director of Real Estate Development

SUBJECT: Geotechnical Study
Proposed Costco Wholesale Warehouse and Fuel Facility
NE Corner of West Herndon Avenue and North Riverside Drive
Fresno, California 93722
CW# 20-0569

Dear Ms. Katz:

Kleinfelder is pleased to present this report summarizing our geotechnical study for the proposed Costco Wholesale Warehouse and Fuel Facility located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The conclusions and recommendations presented in this report are subject to the limitations presented in Section 7.

We appreciate the opportunity to provide geotechnical engineering services to you on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact Andrea Traum 408.595.3275, or Andy Franks, Kleinfelder's Client Account Manager for Costco at 480.650.4905.

Sincerely,

KLEINFELDER, INC.

Dan Dockendorf, EIT
Project Engineer

Andrea Traum, PE, LEED AP
Senior Program Manager

KLEINFELDER 380 North First Street, Suite A, San Jose, CA 95112 p | 949.727.4466

GEOTECHNICAL STUDY
PROPOSED COSTCO WHOLESALE WAREHOUSE AND FUEL FACILITY
NE CORNER OF WEST HERNDON AVENUE AND NORTH RIVERSIDE DRIVE
FRESNO, CALIFORNIA 93722
CW# 20-0569
KLEINFELDER PROJECT NO. 20212905.001A

MAY 20, 2021

A Report Prepared for:

Ms. Kim Katz
Costco Wholesale
999 Lake Drive
Issaquah, Washington 98027

GEOTECHNICAL STUDY
PROPOSED COSTCO WHOLESALE WAREHOUSE AND FUEL FACILITY
NE CORNER OF WEST HERNDON AVENUE AND NORTH RIVERSIDE DRIVE
FRESNO, CALIFORNIA 93722
CW# 20-0569

Dan Dockendorf, EIT
Project Engineer

Brian E. Crystal, PE, GE
Principal Geotechnical Engineer

KLEINFELDER
380 North First Street, Suite A
San Jose, CA 95112
Phone: 831.755.7900

May 20, 2021
Kleinfelder Project No. 20212905.001A

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EXECUTIVE SUMMARY

This report presents the results of Kleinfelder's geotechnical study for proposed Costco Wholesale Warehouse (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The purpose of our geotechnical study was to evaluate soil and groundwater conditions at the site and provide geotechnical recommendations for project design and construction. We based our study on the Costco Wholesale Development Requirements (CWDRs), Version 2020, dated December 18, 2020.

Kleinfelder understands Costco plans to purchase an approximately 23.7-acre site to construct a new approximately 178,000-square-foot warehouse, fuel facility, and car wash. The warehouse building will be a single-story, steel-framed structure (30 feet in height) with concrete-masonry unit and metal walls. The fuel facility will contain three 40,000-gallon underground storage tanks (USTs), a fuel additive UST, four fueling islands, and a pre-manufactured metal canopy. The car wash will consist of an approximately 180-foot tunnel with an automobile queuing area. The building surroundings will consist mainly of surface parking with landscape areas. Two outparcels located on the western side of the property parallel to Riverside Drive are also included in this study. The current civil plans do not specify the future developments for these outparcels.

Grading plans are still in development and the finished floor elevations (FFE) for the warehouse has not yet been established. We anticipate the finished grades of will generally match existing grades, with less than 5 feet of cut or fill. Surface elevations indicate that existing grades vary from a high at approximate Elevation 302 feet at the southern portion of the site bordering West Herndon Avenue to a low at approximate Elevation 294 feet at the northern portion of the site bordering the Riverside Golf Course.

The project site is located north of West Herndon Avenue and east of North Riverside Drive as shown on Figure 1. The warehouse is planned in the southeastern portion of the property and the fuel facility is on the northeastern corner. The remainder of the site will be covered in surface parking and drive aisles and landscaping. At the time of our field exploration, the site was covered by light vegetation and tilled soil. The surface of the site was fairly dry at the time of exploration, when the site was flooded with rain, it was inaccessible with a truck mounted drill rig. Based on a review of aerial photography dating back to 1998 the site was used for agricultural purposes.

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were

drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot. The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

The soils encountered within our borings and test pits were comprised primarily of alluvial fan deposits to the maximum depth of our field explorations (51½ feet bgs). There was an observed "plow zone" across the site at depths varying between 6 and 16 inches deep across the site. This plow zone or topsoil layer consisted of tilled sandy lean clays and silts with variable amounts of sand. The observed organic content of the topsoil was between ½ and 1½ percent. The alluvial deposits underlaying the topsoil were generally composed of interbedded layers of stiff to very stiff silts and clays with variable amounts of sand and medium dense to dense poorly graded sands, and silty sand. Soils between approximately 3 to 6 feet were observed to be weakly to moderately cemented underlain by soils with no visible cementation to the maximum depths explored in this investigation.

Based on the results of our field exploration, it is our professional opinion that the proposed project is geotechnically feasible, provided the recommendations presented in the geotechnical report are incorporated into the project design and construction. We identified the following key geotechnical considerations during our study.

- The proposed Costco warehouse building, fuel facility, and car wash may be supported on a conventional shallow foundation system. Overexcavation and recompaction of the on-site soils is recommended to mitigate loose shallow soils and provide relatively uniform support for the proposed warehouse and other improvements.
- Soils within 10 feet of the warehouse pad (including the entrance canopy, building aprons, utility pads, stairs, ramps, stoops, and the loading dock) should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper, and replaced as structural fill. If fill soils are encountered at the base of the overexcavation within the warehouse pad, the overexcavation should continue until the fill is removed. The on-site soils can be moisture conditioned and reused as structural fill.

- Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditions, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.
- Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.
- Difficult excavation conditions may be encountered within the strongly cemented hardpan layers observed between 4 and 6 feet across the site.
- Organic matter in the topsoil is low (between ½ to 1½ percent) based on laboratory testing Stripping of topsoil is not necessary. However, any roots and vegetative matter in excess of one inch should be removed by screening or raking prior to reuse as structural fill. After screening or raking, the surface soils can be moisture conditioned and used as structural fill.
- Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation, as determined by Kleinfelder.
- The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall.
- We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted at least 92 percent of the soil's maximum dry unit weight (ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.
- The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.

- The resistivity values found for the samples tested indicate that the soil may be corrosive ferrous metals. The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required.
- Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inch per hour be used for the soils at the base of the BMPs.

The findings, conclusions, and recommendations presented in this executive summary should not be relied upon without consulting our geotechnical report for more information. The conclusions and recommendations presented in this report are subject to the limitations presented in Section 7.

1 INTRODUCTION

This report presents the results of Kleinfelder's geotechnical study for proposed Costco Wholesale Warehouse (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The location of the project site is presented on Figure 1, Site Vicinity Map. The purpose of our geotechnical study was to evaluate soil and groundwater conditions at the site and provide geotechnical recommendations for project design and construction. The scope of our services was presented in our proposal titled, "Proposal for Geotechnical Study, Proposed Costco Wholesale Warehouse and Fuel Facility, NEC of West Herndon Avenue and North Riverside Drive, Fresno, California, CW# 20-0569," dated December 4, 2020. We based our study on the Costco Wholesale Development Requirements (CWDRs), Version 2020, dated December 18, 2020.

This report presents a description of the services performed, a discussion of the geotechnical conditions observed at the site, and recommendations developed from our engineering analyses of field and laboratory data. Individuals using this report should read the limitations presented in Section 7.

1.1 PROJECT DESCRIPTION

Kleinfelder understands Costco plans to purchase an approximately 23.7-acre site to construct a new approximately 178,000-square-foot warehouse, fuel facility, and car wash. The warehouse building will be a single-story, steel-framed structure (30 feet in height) with concrete-masonry unit and metal walls. The fuel facility will contain three 40,000-gallon underground storage tanks (USTs), a fuel additive UST, four fueling islands, and a pre-manufactured metal canopy. The car wash will consist of an approximately 180-foot tunnel and automobile queuing area. The building surroundings will consist mainly of surface parking with landscape areas. Two outparcels located on the western side of the property parallel to Riverside Drive are also included in this study. The current civil plans do not specify the future developments for these outparcels.

Based on the CWDRs, we understand maximum column loads will be on the order of 150 kips, typical wall loads will be approximately 4.5 kips per lineal foot, canopy column loads will be approximately 50 kips, and the total slab load (dead plus live loads) will be approximately 500 psf. The warehouse surroundings will consist mainly of parking with a loading dock and some landscaped areas. Parking and drive areas will be paved with either Portland cement concrete or asphalt concrete pavements.

Grading plans are still in development and the finished floor elevations (FFE) for the warehouse has not yet been established. We anticipate the finished grades of will generally match existing grades, with less than 5 feet of cut or fill. Surface elevations indicate that existing grades vary from a high at approximate Elevation 302 feet at the southern portion of the site bordering West Herndon Avenue to a low at approximate Elevation 294 feet at the northern portion of the site bordering the Riverside Golf Course.

1.2 SCOPE OF SERVICES

The scope of our geotechnical study consisted of a literature review, subsurface explorations, geotechnical laboratory testing, engineering evaluation and analysis, and preparation of this report. Studies to assess environmental hazards that may affect the soil and groundwater at the site were beyond our geotechnical scope of services. The following paragraphs present a description of our services.

1.2.1 Task 1 – Background Data Review

We reviewed readily-available published and unpublished geologic literature in our files and the files of public agencies, including selected publications prepared by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the U.S. Geological Survey (USGS). We also reviewed readily available seismic and faulting information, including data for designated earthquake fault zones as well as our in-house database of faulting in the general site vicinity.

1.2.2 Task 2 – Field Exploration

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot.

The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

Prior to commencement of the fieldwork, Underground Service Alert (USA) was notified and various geophysical techniques were used at the boring and test pit locations to identify potential conflicts with subsurface structures. A Kleinfelder staff engineer supervised the field operations and logged the explorations. Selected samples were retrieved, placed in plastic bags, or sealed, and transported to our Stockton laboratory for evaluation. Descriptions used on the logs result from field observations and data, as well as from laboratory test data. Stratification lines on the logs represent the approximate boundary between soil types, and the actual transition may vary and can be gradual. Appendix A presents a description of the field exploration program, exploration logs, test pit logs and a legend of terms and symbols used on the logs.

1.2.3 Task 3 – Laboratory Testing

Laboratory testing was performed on representative bulk and relatively undisturbed samples to assist in soil classification and development of engineering parameters for geotechnical design. Laboratory testing consisted of moisture content, dry unit weight, sieve analysis, wash sieve (percent passing No. 200 sieve), Hydrometer, Atterberg limits, direct shear, unconfined compression, modified Proctor, and R-value. Laboratory testing was performed by Kleinfelder's laboratory with the exception of corrosivity testing, which was performed by Sunland Analytical of Sacramento, California. Appendix B presents the results of the laboratory testing performed for this study.

Analytical testing was performed on a composite topsoil sample for essential elements in accordance with CWDRs, and sixteen topsoil samples were tested for organic content. The topsoil analysis and organic content testing were performed by Waypoint Analytical to assess soil fertility, localized concentrations of various metals, and organic content. Appendix B also presents analytical test results.

1.2.4 Task 4 – Geotechnical Analyses

We analyzed field and laboratory data relative to the finished grades, warehouse layout, and structural loads to provide geotechnical recommendations for design and construction. We evaluated feasible foundation systems, concrete slab support, pavement design, and earthwork.

1.2.5 Task 5 – Report Preparation

This report summarizes the services performed, data acquired, and our findings, conclusions, and geotechnical recommendations for the design and construction of the proposed improvements.

Our report includes the following items:

- An executive summary;
- Vicinity map and field exploration location map showing the approximate boring and test pit locations;
- Boring and test pit logs (Appendix A);
- Results of laboratory testing (Appendix B);
- Discussion of general site conditions;
- Discussion of general subsurface conditions as encountered in our field exploration,
- Discussion of regional and local geology and site seismicity;
- Discussion on liquefaction and seismic settlement;
- Recommendations for seismic design parameters in accordance with the 2019 California Building Code (CBC);
- Recommendations for foundation design, allowable bearing pressures, embedment depths, and compatibility constraints under various loading conditions;
- Anticipated total and differential static settlements;
- Recommendations for site preparation, earthwork, temporary slope inclinations, fill placement, and compaction specifications, including the excavation characteristics of subsurface soil deposits and formational materials;
- Recommendations for support of floor slabs and slabs-on-grade;
- Recommendations for flexible and rigid pavement structural sections for light- and heavy-duty pavement based on Equivalent Single Axle loading presented in the CWDRs;
- Recommendations for design of retaining structures, including active and at-rest lateral earth pressures, passive and frictional resistance, and applicable surcharge loads;
- Fuel Facility Underground Storage Tank (UST) excavation side slopes, including temporary shoring recommendations, if required; and
- Preliminary evaluation of the corrosion potential of the on-site soils

2 SITE CONDITIONS

2.1 SITE DESCRIPTION

The project site is located north of West Herndon Avenue and east of North Riverside Drive as shown on Figure 1. The site is currently bounded by West Herndon Avenue to the south, North Riverside Drive to the east, Riverside Golf Course to the north and a vacant lot and industrial warehouses to the east. The warehouse is planned in the southeastern portion of the property, the fuel facility in the northeastern corner, and the car wash facility directly west of the fuel facility. The remainder of the site will be covered by surface parking and drive aisles and landscaping. Two smaller outparcels located on the northwest and southwest corners of the site are planned to be occupied by other tenants.

At the time of our field exploration, the project site and associated outparcels were covered by light vegetation and plowed/tilled soil. The surface of the site was fairly dry at the time of exploration; however, a few weeks early, the site was flooded and inaccessible with a truck mounted drill rig due to recent rains. Based on a review of aerial photography dating back to 1998 the site was used for agricultural purposes.

3 GEOLOGY

3.1 GEOLOGIC SETTING

Geologic mapping compiled by the CGS (Matthews and Burnett, 1965) indicates the site geology is composed of Recent Great Valley fan deposits north of the San Joaquin River, Recent Great Valley stream and channel deposits within the San Joaquin River, and Pleistocene nonmarine deposits south of the San Joaquin River. The Natural Resources Conservation Survey (NRCS, formerly Soil Conservation Service) has mapped the soils in the project site area as Hanford sandy loam, which consists primarily of sand and silt.

3.2 SUBSURFACE CONDITIONS

The soils encountered within our borings and test pits were comprised primarily of alluvial fan deposits to the maximum depth of our field explorations (51½ feet bgs). There was an observed "plow zone" across the site at depths varying between 6 and 16 inches deep across the site. This plow zone or topsoil layer consisted of tilled sandy lean clays and silts with variable amounts of sand. The observed organic content of the topsoil was between ½ and 1½ percent. The alluvial deposits underlaying the topsoil were generally composed of interbedded layers of stiff to very stiff silts and clays with variable amounts of sand and medium dense to dense poorly graded sands, and silty sand. Soils between approximately 4 to 6 feet were observed to be weakly to strongly cemented (hardpan) underlain by soils with no visible cementation to the maximum depths explored in this investigation.

3.3 GROUNDWATER

According to regional well record data published by the California Department of Water Resources (DWR), current groundwater levels in the site area are between approximately Elevation 197 to 200 feet above mean sea level (msl, based on WGS84 vertical datum). Groundwater was not encountered at the time of the field exploration to a maximum depth of 50 feet below ground surface.

It is possible that groundwater conditions at the site could change due to variations in rainfall, groundwater withdrawal or recharge, construction activities, well pumping, or other factors not apparent at the time the explorations were performed.

3.4 ASSESSMENT OF POTENTIAL GEOLOGIC HAZARDS

3.4.1 Localized Faulting

Earthquakes occur as fractures or boundaries with tectonic plates, which comprise the Earth's crust, or lithosphere, move relative to one-another. These boundaries can be discrete faults observed at the surface or as buried (blind) structures at depth. The site is not located within the California Geologic Survey (CGS) designated Alquist-Priolo Earthquake Fault Zone, and no mapped active fault traces are known to project towards or transverse the site (Hart and Bryant, 2007). Because there are no mapped active or potentially active faults in the general vicinity of the site, the potential for fault-related ground surface rupture at the site is considered low.

The site is located in a region traditionally characterized by low seismic activity. Based on review of published data and a current understanding of the geologic framework and tectonic setting of the proposed development, the primary sources of seismic shaking are anticipated to be the Great Valley Fault and San Andreas Fault, which are located at distances of about 42 miles and 65 miles from the site, respectively.

3.4.2 Landsliding

Landslides and other forms of mass wasting, including mud flows, debris flows, soil slips, and rock falls occur as soil or rock moves down slope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking. Debris flows are known to travel great distances from their source based on the gradients, channel geometry and amount of fluid within the slide mass.

The site and surrounding area are relatively flat; therefore, landslides or other forms of natural slope instability do not represent a hazard to the project.

3.4.3 Liquefaction and Seismic Compression

The term liquefaction describes a phenomenon in which saturated, cohesionless soils temporarily lose shear strength (liquefy) due to increased pore water pressures induced by strong, cyclic ground motions during an earthquake. Structures founded on or above potentially liquefiable soils may experience bearing capacity failures due to the temporary loss of foundation support, vertical settlements (both total and differential), and/or undergo lateral spreading. The factors known to influence liquefaction potential include soil type, relative density, grain size, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking. Liquefaction

is most prevalent in loose to medium dense, silty, sandy, and gravelly soils below the groundwater table. Due to the lack of groundwater in the upper 50 feet below, liquefaction and its adverse effects are not a hazard at this site.

3.4.4 Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors, and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade. The surficial soils are generally sandy lean clays and silts with variable amounts of sand. Based on laboratory test results, the surficial soils exhibit a low expansion potential.

3.4.5 Collapsible Soils

Collapsible soils are characterized by their ability to undergo significant shrinkage (collapse) during inundation. Inundation in soils can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade. Based on soil densities and water contents, the soils encountered are not expected to collapse during inundation, so the impact of collapsible soils for this site is considered low.

3.4.6 Flooding

The Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA) was reviewed to identify the potential flood hazard for the project. This map indicates the site is within Zone X which is defined as being an area outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance flood. Based on this information the potential for the project site to be impacted by regional flooding is considered low. Based on this information the potential for the project site to be impacted by regional flooding is considered low. Flooding could occur from the nearby San Joaquin River located at approximately 2,000 feet north of the site.

3.4.7 Subsidence

The site is not located in an area of known significant ground subsidence due to the withdrawal of subsurface fluids. Subsidence may be present but adverse impacts have not been recorded.

Therefore, the potential for subsidence occurring at the site due to the withdrawal of oil, gas, or water is considered low.

3.4.8 Oil and Gas Fields

The California Division of Oil, Gas & Geothermal Resources (2021) has not mapped this site within any existing local oil field. Based on the map, the site is located approximately 2.5 miles west of abandoned oil wells which are located within the Streets of Brentwood Mall property. No active wells are known to exist within the project boundary. The nearest well is number API 0401920145 located approximately 2.5 miles east of the project site. This well is listed as plugged and abandoned as of April 27, 2018 (DOGGR, 2021).

4 GEOTECHNICAL DESIGN RECOMMENDATIONS

4.1 GENERAL

Based on the results of our field exploration, laboratory testing, and engineering analyses conducted during this study, it is our professional opinion the proposed project is geotechnically feasible, provided the design and construction recommendations presented in this report are incorporated into the project. We identified the following key geotechnical considerations during our study.

- The proposed Costco warehouse building, fuel facility, and car wash may be supported on a conventional shallow foundation system. Overexcavation and recompaction of the on-site soils is recommended to mitigate loose shallow soils and provide relatively uniform support for the proposed warehouse and other improvements.
- Soils within 10 feet of the warehouse pad (including the entrance canopy, building aprons, utility pads, stairs, ramps, stoops, and the loading dock) should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper, and replaced as structural fill. If fill soils are encountered at the base of the overexcavation within the warehouse pad, the overexcavation should continue until the fill is removed. The on-site soils can be moisture conditioned and reused as structural fill.
- Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditioned, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.
- Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.
- Difficult excavation conditions may be encountered within the strongly cemented hardpan layers observed between 4 and 6 feet across the site.
- Organic matter in the topsoil is low (between ½ to 1½ percent) based on laboratory testing. Stripping of topsoil is not necessary. However, any roots and vegetative matter in excess of one inch should be removed by screening or raking prior to reuse as structural fill. After

screening or raking, the surface soils can be moisture conditioned and used as structural fill.

- Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation, as determined by Kleinfelder.
- The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall.
- We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted at least 92 percent of the soil's maximum dry unit weight (ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.
- The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.
- The resistivity values found for the samples tested indicate that the soil may be corrosive ferrous metals. The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required.
- Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inch per hour be used for the soils at the base of the BMPs.

The following opinions, conclusions, and recommendations are based on the properties of the materials encountered in the borings and test pits, the results of the laboratory-testing program, and our engineering analyses performed, and should be incorporated into project design and construction.

4.2 2019 CBC SEISMIC DESIGN PARAMETERS

According to the 2019 California Building Code, every structure, and portion thereof, including non-structural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-16, excluding Chapter 14 and Appendix 11A. The Seismic Design Category for a structure may be determined in accordance with Section 1613.3.5 of the 2019 CBC.

Based on information obtained from the investigation, published geologic literature and maps, and on our interpretation of the 2019 CBC criteria, it is our opinion that the project site may be classified as Site Class D, Stiff Soil, according to Section 1613.3.2 of 2019 CBC and Table 20.3-1 of ASCE/SEI 7-16. Approximate coordinates for the site are noted below.

Latitude: 36.83809 °N
Longitude: 119.90885 °W

The Risk-Targeted Maximum Considered Earthquake (MCER) mapped spectral accelerations for 0.2 seconds and 1 second periods (Ss and S1) were estimated using Section 1613.3 of the 2019 CBC and the California Office of Statewide Planning and Development (OSHPD) seismic design maps web-based application (available at https://seismicmaps.org/). In accordance with Section 11.4.8 of ASCE 7-16, a site-specific ground motion analysis is required for Site Class D sites with an S1 greater than 0.2 g. However, a site-specific ground motion analysis is not required if the seismic response coefficient (Cs) is determined in accordance with requirements of Chapter 12 and exceptions as noted in Section 11.4.8. The assumption that Cs may be determined in accordance with the requirements of Chapter 12 and exceptions as noted in Section 11.4.8 should be verified by the project structural engineer during final design. The 2019 CBC Seismic Design Parameters (non-site-specific) for these structures are summarized in table 1.

TABLE 1
2019 CBC SEISMIC DESIGN PARAMETERS

DESIGN PARAMETER	RECOMMENDED VALUE
Site Class	D
S_s (g)	0.607
S_1 (g)	0.234
F_a	1.315
F_v	N/A*
S_{MS} (g)	0.798
S_{M1} (g)	N/A
S_{DS} (g)	0.532
S_{D1} (g)	N/A
PGA_M (g)	0.351

* Section 11.4.8 of ASCE 7-16 requires a site-specific ground motion hazard analysis be performed for Site Class D sites with S_1 values greater than or equal to 0.2g unless exceptions are taken. If exceptions are taken, then a F_v value of 2.132 could be used only to calculate the T_s value.

4.3 FOUNDATIONS

4.3.1 General

Based on the results of our field exploration, laboratory testing, and geotechnical analyses, the proposed warehouse building, fuel facility canopy and car wash may be supported on conventional shallow spread footing foundations founded on subgrade prepared in accordance with Section 5.2.2. Proposed light poles may be supported on drilled pile foundations. Recommendations for the design and construction of shallow foundations and drilled pile foundations are presented below.

4.3.2 Conventional Shallow Foundations

Allowable Soil Bearing Pressure

Footings founded on engineered fill may be designed for a net allowable soil bearing pressure of 3,000 pounds per square foot (psf) for dead plus sustained live loads. Footings should be embedded at least 18 inches below the lowest adjacent exterior grade. A one-third increase in the above bearing pressures can be used for short term load conditions for wind or seismic loads. The footing dimension and reinforcement should be designed by the structural engineer; however, continuous footings should have minimum widths of 18 inches.

Estimated Settlement

We estimate total static settlement for foundations designed and constructed in accordance with the recommendations presented above to be less than 1 inch. Differential static settlement between similarly loaded footings is estimated to be ½ inch or less over 50 feet.

Lateral Resistance

Lateral load resistance may be derived from passive resistance along the vertical sides of the footings, friction acting at the base of the footing, or a combination of the two. An allowable passive resistance of 250 psf per foot of depth may be used for design. Allowable passive resistance values should not exceed 2,500 psf. An allowable coefficient of friction of 0.30 between the base of the footings and the structural fill soils can be used for sliding resistance using the dead load normal stresses. Friction and passive resistance may be combined without reduction. We recommend that the first foot of soil cover be neglected in the passive resistance calculations if the ground surface is not protected from erosion or disturbance by a slab, pavement, or in a similar manner.

4.3.3 Short Drilled Pile Foundations (Light Poles)

Axial Capacity

The compressive axial capacity of drilled piles may be estimated based on an allowable skin friction capacity of 150 pounds per square foot. The upper one foot of the skin friction capacity should be ignored. The uplift capacity may be estimated as 70 percent of the allowable compressive axial capacity. A one-third increase in the allowable capacities may be used for transient loading conditions such as wind or seismic loads.

Settlement

Static settlement of the proposed light pole foundations supported on short drilled piles, as recommended, is estimated to be less than ½ inch.

Lateral Resistance

The drilled pile foundations lateral resistance can be designed in general accordance with Section 1807.3 of the 2019 CBC. We recommend a lateral soil bearing pressure of 250 psf per foot of depth below grade. The total lateral soil bearing pressure should not exceed 2,500 psf per pile. Since drilled piles will act as isolated pole foundations, the allowable lateral soil bearing pressure may be

increased by a factor of 2 for short-term lateral loads provided the structure will not be adversely affected by ½ inch of lateral movement at the ground surface.

4.4 BUILDING SLAB-ON-GRADE

Concrete slab-on-grade floors are appropriate for the proposed warehouse, provided the subgrade is prepared in accordance with Section 5.2.2. In accordance with the CWDRs, we recommend the slab be a minimum nominal thickness of 6 inches and underlain by at least 6 inches of aggregate base material. Aggregate base materials should meet current Caltrans specifications for Class 2 aggregate base. Please note that Caltrans Class 2 aggregate base may utilize recycled materials. The use of recycled material under building slabs is typically not allowed and requires Costco's approval.

A modulus of subgrade reaction of 150 pounds per cubic inch may be used for design of slabs underlain 6 inches of aggregate base material. Pursuant to current Costco Wholesale standard construction design practices, we have evaluated the necessity of using a steel-reinforced slab. Provided the building slabs are constructed on structural fill prepared as recommended in Section 5.2.4, the proposed warehouse buildings can be built with non-reinforced slabs.

Floor slab control joints should be used to reduce damage due to shrinkage cracking. Control joint spacing is a function of slab thickness, aggregate size, slump and curing conditions. The requirements for concrete slab thickness, joint spacing, and reinforcement should be established by the designer, based on experience, recognized design guidelines and the intended slab use. Placement and curing conditions will have a strong impact on the final concrete slab integrity.

Kleinfelder typically recommends installation of a vapor barrier beneath the slab to mitigate potential moisture issues such as flooring performance and mold. However, we understand that Costco Wholesale has determined that moisture barriers are not to be used in construction of Costco Wholesale warehouses due to adverse effects on concrete curing and performance. Therefore, we have provided construction recommendations that do not include installation of a moisture barrier, with the understanding that there will be an increased risk for adverse moisture issues.

4.5 EXTERIOR FLATWORK

Prior to casting exterior flatwork, the subgrade soils should be scarified, moisture conditioned, and recompacted or overexcavated, as recommended in Section 5.2.2. Additionally, all flatwork

should be underlain at a minimum by 4.0 inches of aggregate base moisture conditioned to at least the optimum moisture content and compacted to not less than 95 percent relative compaction (ASTM D1557). Flatwork should be at least four inches thick. Flatwork subjected to wheel loads should be designed in accordance with Section 4.8.

4.6 SITE DRAINAGE

Foundation and slab performance depends greatly on proper irrigation and how well runoff water drains from the site. This drainage should be maintained both during construction and over the entire life of the project. The ground surface around structures should be graded such that water drains away from structures without ponding. The surface gradient needed to do this depends on the landscaping type. Surface gradients should conform to current Costco Wholesale standards and the CBC.

Pavement underdrains at drainage inlets and catch basins should be included as shown in Detail 16_16 of the CWDRs. Drains should be designed and constructed per Costco's standard details and laterals should extend at least 10 feet from the catch basins. Perimeter foundation drains are not necessary.

Where slabs or pavement areas abut landscaped areas, the aggregate base and subgrade soil should be protected against saturation. Vertical cut off structures are recommended to reduce lateral seepage under slabs from adjacent landscaped areas. Vertical cut-off structures may consist of deepened concrete perimeters, or equivalent, extending at least three inches below the base/subgrade interface. Vertical cut-off structures should be poured neat against undisturbed native soil or compacted fill. The cut-off structures should be continuous.

Operations personnel should be instructed to limit irrigation to the minimum level necessary to properly sustain landscaping plants. Should excessive irrigation, waterline breaks, or unusually high rainfall occur, saturated zones and "perched" groundwater may develop, which could soften subgrade and reduce pavement life, and could also create potholes. We also recommend that the downspouts from roof drains be connected to a designed subsurface drainage system such as a storm sewer, etc. to avoid discharging water onto pavement areas and backfill zones around the warehouse.

Potential sources of water such as water pipes, drains, and the like should be frequently examined for signs of leakage or damage. Any such leakage or damage should be promptly repaired.

Sewer lines beneath the warehouse should have a sufficient slope (at least 1 percent). Plumbing and utility lines should be provided with flexible joints or oversized sleeves where they penetrate floor slabs to prevent breakage caused by different slab movement. In addition, utility trenches should be plugged with cohesive backfill where they enter the building to reduce moisture infiltration along pipe bedding material. The cohesive backfill materials should have a plasticity index (PI) between 15 and 30 and no less than 70 percent of the particles passing the No. 200 sieve.

4.7 RETAINING STRUCTURES

Design earth pressures for retaining structures depend primarily on the allowable wall movement, wall inclination, type of backfill materials, backfill slopes, surcharges, and drainage. The earth pressures provided assume that granular (sandy) soils will used as backfill. The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall. Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the walls. Walls that are free to rotate at least 0.002 radians (deflection at the top of the wall of at least 0.002 x H, where H is the unbalanced wall height) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The recommended active and at-rest earth pressures and passive resistance values are provided in Table 2.

TABLE 2
LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES
(ONSITE/IMPORTED GRANULAR BACKFILL)

Wall Movement	Backfill Condition	Equivalent Fluid Pressure (pcf)	Seismic Increment (pcf)
Free to Deflect (active condition)	Level	40	9H*
Restrained (at-rest condition)		60	N/A**

*Note: * Walls supporting more than 6 feet of backfill should be designed to support an incremental seismic lateral pressure, which is applied as a triangular pressure distribution with a maximum pressure at the bottom of the wall, not inverted, and H is the height of the wall.*

*** for restrained walls, use the static active earth pressure and seismic increment to check the seismic condition; use at-rest earth pressure only to check the static condition; the larger loading of both cases should be used for the design of restrained walls.*

The above lateral earth pressures do not include the effects of surcharges (e.g., traffic, footings), compaction, or truck-induced wall pressures. Any surcharge (live, including traffic, or dead load) located within a 1:1 (horizontal to vertical) plane drawn upward from the base of the excavation

should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind walls may be calculated by multiplying the surcharge by 0.33 for cantilevered walls under active conditions and 0.50 for restrained walls under at-rest conditions. Walls adjacent to areas subject to vehicular traffic should be designed for a 2-foot equivalent soil surcharge (250 psf). Lateral load contributions from other surcharges located behind walls may be provided once the load configurations and layouts are known.

Walls should be properly drained or designed to resist hydrostatic pressures. Adequate drainage is essential to provide a free-drained backfill condition so that there is no hydrostatic buildup behind the wall. Walls should also be appropriately waterproofed to reduce the potential for staining. Drainage behind loading dock walls can consist of weep holes placed along the base of the wall. Weep holes should be spaced 10 to 15 feet apart and connected with a gravel drain consisting of approximately 2 cubic feet of clean gravel per foot of wall length wrapped with filter fabric. Other types of retaining walls should have a continuous back drain as described below.

For backfill of walls with a continuous back drain, except for the upper 2 feet, the backfill immediately behind retaining walls (minimum horizontal distance of 2 feet measured perpendicular to the wall) should consist of free-draining ¾-inch crushed rock wrapped with filter fabric. The upper 2 feet of cover backfill should consist of relatively impervious material. A 4-inch-diameter perforated PVC pipe, placed perforations down at the bottom of the rock layer leading to a suitable gravity outlet, should be installed at the base of the walls.

As an alternative to the gravel drain noted above, a manufactured drain panel may be utilized behind retaining walls in addition to normal waterproofing. This system generally consists of a prefabricated drain panel lined with filter fabric. At the wall base, we recommend that a gravel drain be installed to collect and discharge drainage to a suitable outlet. The drain should consist of a 4-inch-diameter perforated PVC pipe, placed perforations down at the bottom of approximately 2 cubic feet of clean gravel per foot of wall length. The gravel drain should be wrapped in filter fabric (Mirafi 140N or equivalent). The pipe should be sloped to drain to a suitable outlet and cleanouts should be provided at appropriate intervals.

If drainage behind the wall is omitted, the wall should be designed for full hydrostatic pressure. The design of any drain system should be submitted to Kleinfelder for review to check that our recommendations have been properly incorporated into the design. Installation of the drainage system should be reviewed and documented by a Kleinfelder representative.

4.8 PAVEMENT SECTIONS

The required pavement structural sections will depend on the expected wheel loads, volume of traffic, and subgrade soils. We have provided asphalt concrete pavement sections for traffic indices provided in the CWDRs (Costco, 2020). Positive drainage of the paved areas should be provided since moisture infiltration into the subgrade may decrease the life of pavements. Curbing located adjacent to paved areas should be founded in the subgrade, not the aggregate base, in order to provide a cutoff, which reduces water infiltration into the base course.

The following pavement sections provided above are based on the soil conditions encountered during our field exploration, our assumptions regarding final site grades, and limited laboratory testing.

4.8.1 Costco Pavement Design Parameters

We developed pavement design recommendations using traffic loading parameters provided in the Costco Wholesale Development Requirements and the following test data:

- A 20-year pavement design life;
- Light-duty pavements subject to 6,600 passenger vehicle trips per day (Traffic Index of 5.0);
- Heavy-duty pavements subject to 30 tractor-trailer truck tips per day (Traffic Index of 7.0);
- For asphalt concrete pavements, a design R-value of 50 based on laboratory test results; and
- For Portland cement concrete (PCC) Pavements, a 28-day flexural strength (modulus of rupture determined by the third-point method) of at least 550 pounds per square inch (psi) (approximate compressive strength of 4,000 psi); a modulus of subgrade reaction (k value) of 150 pounds per cubic inch (pci) for native subgrade; and interlock at the control joints.

4.8.2 Asphalt Concrete Pavement

We have developed new asphalt concrete pavement, also referred to as Hot Mix Asphalt (HMA) pavements sections in accordance the Caltrans Highway Design Manual in lieu of the Asphalt Institute Manual Series (MS-1) so that the pavement structural sections are somewhat comparable to the existing sections. HMA should conform to requirements of the Costco Wholesale Specification Section 321216, Asphalt Paving. Table 2 presents recommended HMA

pavement sections. The designer should select the appropriate pavement sections based on project requirements. Prior to placement of aggregate base, pavement subgrade should be prepared in accordance with Section 5.2.2.

TABLE 3
RECOMMENDED MINIMUM ASPHALT CONCRETE PAVEMENT SECTIONS

Traffic Use	Traffic Index, TI	Asphalt Concrete* (inches)	Aggregate Base* (inches)
Light-Duty Pavement	5.0	3.0	4.0
Heavy-Duty Pavement	7.0	4.0	5.0

* Rounded to the closest ½ inch.

4.8.3 Asphalt Performance Grade Binder

An asphalt performance grade (PG) binder of 64-10 should be used for the project and is locally available. This recommendation was developed in accordance with Costco Wholesale Asphalt Paving Specification Section 321216. Air temperature data near the project site was used with the MERRA Climate Data option and the PG binder was selected using the FHWA program LTTPBind Online web-based tool based on the AASHTO M323-13 standard. The high-end and low-end temperature rating was selected to provide a reliability of at least 98 and 90 percent, respectively.

4.8.4 Portland Cement Concrete Pavement

We designed PCC pavement in accordance with the Portland Cement Association (PCA) Thickness Design for Concrete Pavements (PCA, 1984) using the design parameters stated above. For heavy-duty pavements, we recommend that PCC pavement should be comprised of 7.0 inches of PCC with 4.0 inches of aggregate base. Prior to placement of aggregate base, pavement subgrade should be prepared in accordance with Section 5.2.2.

Longitudinal and transverse joint spacing should not exceed 12 feet and 15 feet, respectively. Joint details should conform to PCA guidelines. Expansion joints in concrete slabs should be sealed with petroleum resistant sealant to prevent minor releases from impacting subsurface soil.

4.8.5 Aggregate Base

Aggregate base materials should meet current Caltrans specifications for Class 2 aggregate base and be compacted to at least 95 percent relative compaction (ASTM D1557). Caltrans Class 2 aggregate base utilizes recycled materials and require Costco's approval prior to use.

4.8.6 Pavement Maintenance

Pavements may undergo movement due to changes in subgrade moisture content. This movement tends to accelerate pavement deterioration. A crack sealing program should be performed annually to slow pavement deterioration. Any areas where surface water stands on the surface should be remediated. Over time, as cracking becomes more pronounced, a slurry seal coat should be applied.

4.9 SOIL CORROSIVITY

We performed laboratory testing for parameters commonly used to evaluate corrosivity of soils, including pH, minimum resistivity, chloride, and soluble sulfate content. Table 4 presents the results.

TABLE 4
CORROSION TEST RESULTS

Location	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (percent)	Soluble Chloride Content (percent)
TP-2	4-6	4,020	7.4	7.8	3.4
TP-4	4-6	6,160	7.3	11.5	3.0
TP-6	4-6	3,480	6.9	25.9	2.8
TP-9	4-6	10,450	6.4	1.0	0.8
TP-10	4-6	7,240	6.7	4.6	0.9

These tests are a generalized indicator of soil corrosivity for the samples tested. Other soils on site may be more, less, or similarly corrosive in nature. Imported fill materials should be tested to confirm that their corrosion potential is not more severe than those noted.

Although Kleinfelder does not practice corrosion engineering, resistivity values between 3,000 to 5,000 ohm-cm are normally considered corrosive and resistivity values between 5,000 to 10,000

ohm-cm are considered moderately corrosive to buried ferrous metals (NACE, 2006). The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required. The project structural engineer should review this data to determine if remedial measures are necessary for the concrete reinforcing steel.

4.10 INFILTRATION TESTING AND STORMWATER MANAGEMENT

We evaluated the feasibility for infiltration throughout surrounding parking areas by performing a total of four borehole infiltration tests. Infiltration may be controlled primarily by factors such as the type and porosity of the surface filtering media, maintenance of these media, surface slope, surface vegetation, and intensity, duration, and type of precipitation. Surface drainage and maintenance will typically determine the site's infiltration rate and the amount of water that will infiltrate for any given storm.

Based on visual soil classification and laboratory testing of the soil samples collected during our field explorations, the upper approximately 1 to 2 feet of the subsurface soils consist predominantly sandy lean clays and silts with variable amounts of sand underlain by sandy silts and silty sands to 5 feet bgs. Table 5 summarizes the unfactored short-term in-situ percolation rates for each test location.

TABLE 5
UNFACTORED SHORT-TERM PERCOLATION RATES

Infiltration Test Location	Tested Depth from Ground Surface (ft)	Short-Term Percolation Rate (in/hr)	Soil Description
INF-1	3-5	0.36	Sandy Silt (ML)
INF-2	3-5	1.38	Silty Sand (SM)
INF-3	3-5	0.75	Silty Sand (SM)
INF-4	3-5	1.05	Silty Sand (SM)

Note: Short-term percolation rate includes a reduction factor using the "Porchet Method" to adjust for non-vertical percolation through the sides of the borehole.

The short-term percolation rates provided in Table 5 have been reduced to account for non-vertical percolation through the sides of the borehole, but do not include any safety factors for long-term performance. While Fresno County does not provide specific guidance on a factor of safety, we recommend using a factor of safety of at least 3 due to the variability in test results and to account for long-term performance. The civil engineer should determine the applicability

of the factor of safety and may apply a higher factor of safety depending on the performance objectives. The long-term infiltration rate was estimated by dividing the short-term percolation rates shown in Table 4 and are presented in Table 6.

TABLE 6
LONG-TERM INFILTRATION RATES

Infiltration Test Location	Short-Term Percolation Rate (in/hr)	Minimum Recommended Factor of Safety	Long-Term Infiltration Rate (in/hr)
INF-1	0.36	3	0.1
INF-2	1.38	3	0.5
INF-3	0.75	3	0.3
INF-4	1.05	3	0.4

Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inches per hour be used for the basin invert elevations between 3 to 5 feet bgs.

If infiltration BMPs are impractical due to existing site constraints, we recommend alternatives, such as bio-filtration/bio-retention systems (bio-swales and planter boxes), be implemented at the project site. If bio-filtration/bio-retention systems are employed, we recommend that the BMPs be built such that water exiting from them will not seep into the foundation areas or beneath slabs and pavement. If planters are located within 10 feet of the building or building foundations, or adjacent to slabs and pavements, then some means of diverting water away from the building, building foundation soils, or soils that support slabs and pavements would be required, such as lining the planters.

5 CONSTRUCTION RECOMMENDATIONS

5.1 GENERAL

The following recommendations should be used by the contractor for construction of the project.

5.2 EARTHWORK

5.2.1 General

Site preparation and earthwork operations should be performed in accordance with applicable codes, safety regulations and other local, state, or federal specifications, and the recommendations included in this report. References to maximum dry unit weights are established in accordance with the latest version of ASTM Standard Test Method D1557 (modified Proctor). The earthwork operations should be observed and tested by a representative of Kleinfelder.

5.2.2 Site Preparation

Abandoned utilities and other existing features within the proposed development areas (if any are encountered) should be removed and the excavation(s) backfilled with engineered fill. Debris produced by demolition operations, including wood, steel, piping, plastics, etc., should be separated and disposed of off-site. Existing utility pipelines or conduits that extend beyond the limits of the proposed construction and are to be abandoned in place, should be plugged with non-shrinking cement grout to prevent migration of soil and/or water. Demolition, disposal, and grading operations should be observed and tested by a representative of Kleinfelder.

Prior to grading and subgrade preparation, all vegetation should be cut and removed from the site. Roots and vegetative matter in excess of one inch should be removed by screening or raking. Other than plant roots, organic matter in the topsoil is minimal based on our laboratory testing (between ½ and 1½ percent). Based on the organic content tests, stripping of topsoil is not necessary. After grubbing, the surface soils can be moisture conditioned and recompacted as structural fill.

Soils within 10 feet of the warehouse building pad should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper. If fill soils are encountered at the base of the overexcavation within the building pads, the overexcavation should continue until the fill is removed. It should be noted that some isolated

areas did encounter fill deeper than 4 feet bgs. The overexcavated soils can be moisture conditioned and recompacted as structural fill.

Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditioned, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.

Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.

Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation as determined by Kleinfelder.

Should grading be performed during or following extended periods of rainfall, the moisture content of the near-surface soils will be significantly above the optimum moisture content. These conditions could seriously impede grading by causing an unstable subgrade condition. Typical remedial measures include deep scarification and drying, removal and replacement with crushed rock and geotextile fabric, and/or lime treatment.

The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.

5.2.3 Foundation Excavations

Shallow Foundations

Following excavation to the foundation subgrade elevations, the exposed subgrade should be observed by a representative of the geotechnical engineer to evaluate the presence of satisfactory materials at design elevations. If unsatisfactory material, such as soft or disturbed soil, debris or

otherwise unsuitable soil is present at the base of footing excavations, then unsuitable materials should be overexcavated and replaced (e.g. with structural concrete, 2-sack sand-cement slurry, structural fill) to the depth and extent determined by the geotechnical engineer.

Drilled Pile Foundations

The performance and capacities of piles can be influenced significantly by the selected construction methods and procedures used. Construction methods that create large zones of disturbance around the drilled shafts can lead to lower than expected skin friction due to excessive stress relief around the shaft length. Drilling of the pile shafts should be accomplished using conventional heavy-duty excavation equipment maintained in good condition.

The on-site soils contain sandy layers and caving of the pile shafts could occur. Temporary steel casing may be required to stabilize the sides of the pile shaft. Concrete should be placed immediately after drilling of the hole is complete. The concrete should be pumped to the bottom of the drilled shaft using a down hole tremie. If steel casing is used, the casing should be removed as the concrete is placed but the bottom of the casing should be kept at least 5 feet below the top of the concrete.

5.2.4 Fill Material and Compaction Criteria

All material placed below foundation elements, structural elements, slabs, parking areas and roadways should be considered structural fill. The on-site soils, minus debris, organic matter, or other deleterious materials may be used as structural fill. Rock or other soil fragments greater than 3 inches in size should not be used in the fills.

Import soils, if required, should have no particles greater than 3 inches in maximum dimension, no less than 70 percent of the particles passing the No. 4 sieve, no more than 30 percent of particles passing the No. 200 sieve, and a Plasticity Index (PI) less than 12. The contractor should provide documentation that all imported soil is free of hazardous materials, including petroleum or petroleum byproducts, chemicals, and harmful minerals. Test results with the geotechnical and analytical properties of the proposed import material should be provided to Costco for approval prior to transportation and use on site.

We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted to at least 92 percent of the soil's maximum dry unit weight

(ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.

Fill should be placed in loose horizontal lifts not more than 8 inches thick (loose measurement). The moisture content of the fill should be maintained at -2 to +2 percent of optimum for sandy soils and above optimum for clayey soils during compaction. The moisture content of the clayey fill is considered very important, and therefore, both relative compaction and moisture content should be used to evaluate compaction acceptance. If both criteria are not within the specified tolerances, the fill should not be accepted, and the contractor should rework the material until the fill is placed within the specified tolerances.

Processing of on-site soil maybe required prior to placement as structural fill. Processing may require ripping the material, disking to break up clumps, and blending to attain uniform moisture contents necessary for compaction. Compaction of mass graded areas should be accomplished with a sheep's foot type roller compactor to aid in moisture conditioning. Utility trench backfill should be mechanically compacted. Flooding should not be permitted. Table 7 presents structural fill placement and compaction criteria.

TABLE 7
STRUCTURAL FILL PLACEMENT AND COMPACTION CRITERIA

Fill Location/Use	Material Type	Relative Compaction[1] (ASTM D698)	Moisture Content Range	Minimum Compaction Testing Frequency Per Lift
Aggregate Base for Pavements and Concrete Slabs	Aggregate Base	At least 95 percent	-2 to +2% of optimum	10,000 Square Feet
Structural Areas (Building Pads)	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	10,000 Square Feet
Subgrade for Pavements, Sidewalks and Other Flatwork Areas	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	15,000 Square Feet
Foundation and Retaining Wall Backfill	Imported Material	At least 95 percent for sandy soils	-2 to +2% of optimum	1,000 Square Feet

Utility Trenches Backfill	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	150 Linear Feet
Lawns or Unimproved Areas	On-site Soils or Imported Material	At least 90 percent	-2 to +2% of optimum	20,000 Square Feet

Note: [1] Where two or more compaction specifications coincide, the more stringent specification should be utilized.

5.2.5 Excavation Characteristics

The upper soils are sandy soils. The excavations for the USTs and foundations should be excavatable with conventional heavy-duty construction equipment maintained in good condition. However, caving of the sidewalls during excavation in sandy soils may occur depending on conditions at the time of excavation and should be anticipated by the contractor. In addition, difficult excavation may be encountered in heavily-cemented, hardpan layers located between 4 and 6 feet below grade.

A representative of Kleinfelder should be present during excavation in this area to observe the soil conditions. If soft, loose, or deleterious materials are encountered in the base of the excavation then the materials should be removed and replaced as compacted fill or otherwise remediated to provide competent bearing material under site improvements.

5.2.6 Temporary Excavations

All excavations must comply with applicable local, state, and federal safety regulations, including OSHA requirements. The responsibility for excavation safety and stability of temporary construction slopes lies solely with the contractor. We are providing this information below solely as a service to our client. Under no circumstances should this information provided be interpreted to mean that Kleinfelder is assuming responsibility for final engineering of excavations or shoring, construction site safety, or the contractors' activities; such responsibility is not being implied and should not be inferred.

Minor sloughing and/or raveling of slopes should be anticipated as they dry out. Where space for sloped embankments is not available, shoring will be necessary. In addition, excavations within a 1:1 plane extending downward from a horizontal distance of 2 feet beyond the bottom outer edge of existing improvements should not be attempted without bracing and/or underpinning the footings, as discussed above. The geotechnical engineer or their field representative should

observe the excavations so that modifications can be made to the excavations, as necessary, based on variations in the encountered soil conditions. All applicable excavation safety requirements and regulations, including OSHA requirements, should be met.

All trench excavations should be braced and shored in accordance with good construction practice and all applicable safety ordinances and codes. Stockpiled (excavated) materials should be placed no closer to the edge of an excavation than a distance equal to the depth of the excavation, but no closer than 4 feet.

5.2.7 Oversize Material

Oversized material (e.g. material greater than 3 inches in diameter) is not anticipated to be encountered. However, if encountered, material larger than 3 inches in diameter should be removed and disposed of off-site.

5.2.8 Trench Backfill

Pipe zone backfill (i.e. material beneath and in the immediate vicinity of the pipe) should consist of imported soil less than ¾-inch in maximum dimension. Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of onsite soil or imported fill that meets the requirements for engineered fill provided above.

If imported material is used for trench zone backfill, we recommend it consist of silty sand. In general, gravel should not be used for trench zone backfill due to the potential for soil migration into the relatively large void spaces present in this type of material and for water seepage along trenches backfilled with coarse-grained sand and/or gravel.

Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local building requirements 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 backfill should be placed and compacted in accordance with recommendations provided for engineered fill in Section 5.2.4. Mechanical compaction is recommended; ponding or jetting should be avoided, especially in areas supporting structural loads or beneath concrete slabs supported on grade, pavements, or other improvements.

5.3 UNSTABLE SUBGRADE CONDITIONS

Should grading be performed during or following extended periods of rainfall, the moisture content of the near-surface soils will be significantly above the optimum moisture content. The moisture contents of the near surface soils during our field exploration were over optimum moisture content from recent rains and irrigation from agricultural use. These conditions could seriously impede grading by causing an unstable subgrade condition. Typical remedial measures include the following:

- Drying: Drying unstable subgrade involves disking or ripping wet subgrade to a depth of approximately 18 to 24 inches and allowing the exposed soil to dry. Multiple passes of the equipment (likely on a daily basis) will be needed because as the surface of the soil dries, a crust forms that reduces further evaporation. Frequent disking will help prevent the formation of a crust and will promote drying. This process could take several days to several weeks depending on the material, the depth of ripping, the number of passes, and the weather.
- Removal and Replacement with Crushed Rock and Geotextile Fabric: Unstable subgrade could be overexcavated 12 to 24 inches below existing grade and replaced with ¾- or 1-inch crushed rock underlain by geotextile fabric. The geotextile fabric should consist of a woven geotextile, such as Mirafi HP series or equivalent. The final depth of removal will depend upon the conditions observed in the field once overexcavation begins. The geotextile fabric should be placed in accordance with the manufacturer's recommendations.
- Chemical Treatment: Unstable subgrade could be stabilized by mixing the upper 12 to 18 inches of the subgrade with Portland cement, Class C flyash or lime. For estimating purposes, an application rate of 10 to 12 percent Class C flyash, 3 to 5 percent high calcium quick lime, or 4 to 5 percent Portland cement may be used. Final application rates should be determined in the field at the time of construction in consultation with the geotechnical engineer. Chemical treatment should be performed by a specialty contractor experienced in this work. Since soil treatment uses the on-site soil, the expense of importing material can be avoided.

5.4 EXTERIOR FLATWORK

Prior to casting exterior flatwork, the existing soils should be overexcavated and subgrade soils should be moisture conditioned and recompacted as recommended in Section 5.2.2. The

moisture content of the finished subgrade soils should be maintained around optimum prior to the placement of any flatwork or structural fill. Careful control of the water/cement ratio should be performed to avoid shrinkage cracking due to excess water or poor concrete finishing or curing.

5.5 TEMPORARY SHORING

5.5.1 General

Temporary shoring may be required in the proposed UST area where the excavation cannot be adequately sloped. Temporary shoring may consist of a turn-key shoring system, soldier piles and lagging, or other system. General recommendations for design of temporary shoring are presented below.

The shoring design must be provided by a civil engineer registered in the State of California and experienced in the design and construction of shoring under similar conditions. Once the final excavation and shoring plans are complete, the plans and design should be reviewed by Kleinfelder for conformance with the design intent and geotechnical recommendations provided herein.

5.5.2 Lateral Pressures

For the design of cantilevered shoring, an equivalent fluid pressure of 40 pounds per cubic foot (pcf) may be used for level backfill. Where the surface of the retained earth slopes up away from the shoring, a greater pressure should be used. Design data can be developed for additional cases when the design conditions are established.

In addition to the recommended earth pressure, any surcharge (live, including traffic, or dead load) located within a 1H:1V plane drawn upward from the base of the shored excavation should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind the wall may be calculated by multiplying the surcharge by 0.33 for the level backfill condition. Lateral load contributions of surcharges located at a distance behind the shored wall may be provided once the load configurations and layouts are known. As a minimum, a 2-foot equivalent soil surcharge (250 psf) is recommended to account for traffic or nominal construction loads. It should be noted that the above pressures do not include hydrostatic pressure and assume groundwater will not be encountered in the excavation.

5.5.3 Design of Soldier Piles

All soldier piles should extend to a sufficient depth below the excavation bottom to provide the required lateral resistance. We recommend the required embedment depths be calculated based on the principles of force and moment equilibrium. For this method, the allowable passive pressure against soldier piles that extend below the level of excavation may be assumed to be equivalent to a fluid pressure of 300 pcf. The maximum lateral resistance value should not exceed 3,000 psf. To account for arching, the passive resistance may be assumed to act over a width 2.4 times the width of the embedded portion of the pile, provided adjacent piles are spaced at least 2.5 pile diameters, center-to-center.

Drilling of the soldier pile shafts could be accomplished using heavy-duty drilling equipment. The on-site soils are sandy, and caving of the pile shafts could occur. In addition, difficult drilling may be encountered in heavily-cemented, hardpan layers. Temporary steel casing may be required to stabilize the sides of the pile shaft. Concrete for piles should be placed immediately after the drilling of the hole is complete. The concrete should be pumped to the bottom of the drilled shaft using a tremie. Once concrete pumping is initiated, a minimum head of 5 feet of concrete above the bottom of the tremie should be established and maintained throughout the concrete placement to prevent contamination of the concrete by soil inclusions. If steel casing is used, the casing should be removed as the concrete is placed.

To develop full lateral resistance, provisions should be taken to assure firm contact between the soldier piles and undisturbed materials. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the soldier pile that is below the planned excavated level should provide sufficient strength to adequately transfer the imposed loads to the surrounding materials.

5.5.4 Lagging

Continuous treated timber lagging should be used between the soldier piles. The lagging should be installed as the excavation proceeds. If treated timber is used, the lagging may remain in place after backfilling. The lagging should be designed for the recommended earth pressure but limited to a maximum value of 400 psf.

Some caving and running of the upper soils should be anticipated. To reduce the potential for loss of ground and settlement of the soil behind the wall, the contractor should backfill any space between the lagging and the cut slope with clean sand or sand-cement slurry after installation.

5.5.5 Deflection

Shoring adjacent to existing structures or improvements should be designed and constructed to reduce potential movement. The shoring system designer should evaluate potential deflections in their design.

5.5.6 Monitoring

Some deflection of the shored excavation should be anticipated during the planned excavation. We recommend the project civil engineer perform a survey of all existing utilities and structures adjacent to the shored excavation. The purpose of this survey would be to evaluate the ability of existing utility lines or improvements to withstand horizontal movements associated with a shored excavation and to establish the baseline condition in case of unfounded claims of damage. If existing improvements are not capable of withstanding anticipated lateral movements, alternative shoring systems may be required.

Horizontal and vertical movements of the shoring system should be monitored by a licensed surveyor. The construction monitoring and performance of the shoring system are ultimately the contractor's responsibility. However, at a minimum, we recommend that the top of shoring be surveyed prior to excavation and that the top and bottom of the soldier beams be surveyed on a weekly basis until the shoring is not needed. Surveying should consist of measuring movements in vertical and two perpendicular horizontal directions.

5.6 PAVEMENTS

5.6.1 HMA Design

Hot Mix Asphalt (HMA) should conform to requirements of the Costco Wholesale Specification Section 321216, Asphalt Paving. Section 1.3.C of the HMA specification requires that the HMA section be placed in at least two lifts. The HMA specification allows the use of ½- or ¾-inch Nominal Maximum Aggregate Size (NMAS) mixes for the base course and ⅜- or ½-inch NMAS mixes for surface course. Maximum and minimum HMA compacted lift thicknesses are provided in Table 3.1 in Section 3.3.B of the HMA specification.

5.6.2 Construction Considerations

The pavement sections provided above are contingent on the following recommendations being implemented during construction.

- Pavement subgrade should be prepared as recommended in Section 5.2.2.
- Subgrade soils should be in a stable, non-pumping condition at the time the aggregate base materials are placed and compacted.
- Aggregate base materials should be compacted to at least 95 percent relative compaction (ASTM D1557).
- Asphalt paving materials and placement methods should meet current Costco Wholesale Specifications Section 321216.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

Note that pavement materials and construction must be completed in strict accordance with the Costco's specifications that contain very specific pavement material (asphalt, aggregate and concrete) criteria and construction practices to be used (compaction and material sampling). The general contractor and pavement construction subcontractor should be aware that asphalt and concrete mix designs must be submitted to the design architect and Kleinfelder at least 45 days prior to the scheduled production and laydown for review and approval.

6 ADDITIONAL SERVICES

6.1 PLANS AND SPECIFICATIONS REVIEW

We recommend Kleinfelder perform a review of geotechnical related portions of the project plans and specifications before they are finalized to see that geotechnical recommendations have been properly interpreted and implemented during design. If we are not accorded the privilege of performing this review, we can assume no responsibility for misinterpretation of our recommendations.

6.2 CONSTRUCTION OBSERVATION AND TESTING

The construction process is an integral design component with respect to the geotechnical aspects of a project. Because geotechnical engineering is an inexact science due to the variability of natural processes, and because we sample only a limited portion of the soils affecting the performance of the proposed structure, unanticipated or changed conditions can be encountered during grading. Proper geotechnical observation and testing during construction are imperative to allow the geotechnical engineer the opportunity to verify assumptions made during the design process. Therefore, we recommend that Kleinfelder be retained during the construction of the proposed improvements to observe compliance with the design concepts and geotechnical recommendations, and to allow design changes in the event that subsurface conditions or methods of construction differ from those assumed while completing this study.

Our services are typically needed at the following stages of grading:

- After demolition and grubbing;
- During grading;
- During the installation of temporary construction shoring;
- After the overexcavation, but prior to subgrade preparation;
- During utility trench backfill;
- During fill placement of wall backfill;
- During base placement and site paving; and
- After excavation for foundations.

7 LIMITATIONS

This geotechnical study has been prepared for the exclusive use of Costco Wholesale and their agents for specific application to the proposed Costco Wholesale (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The findings, conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The scope of services was limited to a background data review and the field exploration described in Section 1.2. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on our field exploration and laboratory testing programs, and engineering analyses.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

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 or groundwater conditions could vary between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated Traffic Index or locations of the improvements, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid until the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of this report and the nature of the new project, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party and the client agrees to defend, indemnify, and hold harmless Kleinfelder from any claims or liability associated with such unauthorized use or non-compliance.

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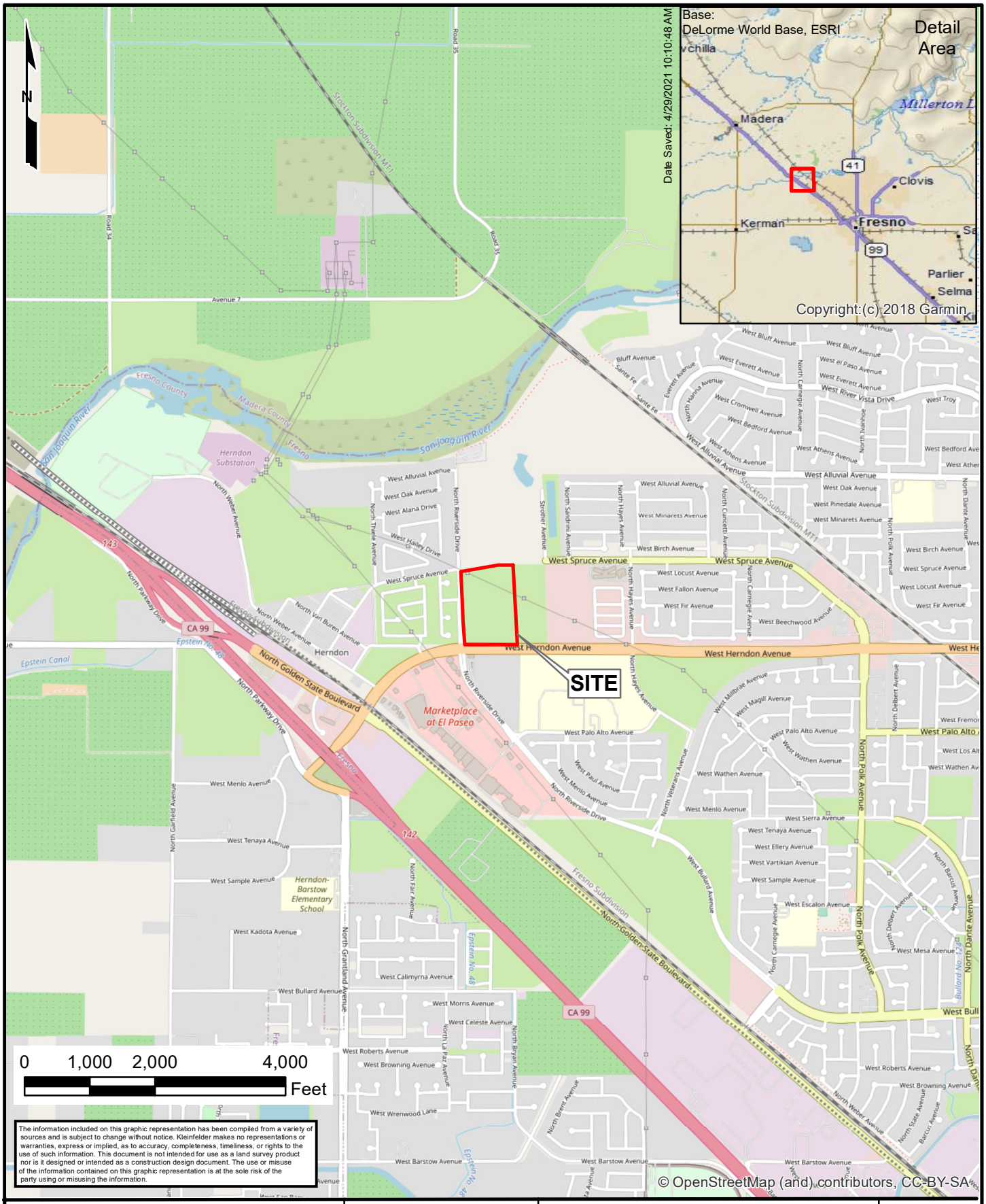
Figures



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SITE VICINITY MAP

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

1

LEGEND

- PROPERTY BOUNDARY
- BORING LOCATION (Kleinfelder, 2021 Investigation)
- INFILTRATION TEST LOCATION (Kleinfelder, 2021 Investigation)
- TEST PIT LOCATION (Kleinfelder, 2021 Investigation)

0 200 400

SCALE: 1" = 200' SCALE IN FEET

REFERENCE:
BASE MAPPING CREATED FROM PLAN TITLED " PRELIMINARY OVERALL GRADING, SHEET C1.10", DATED: 04/01/2021 AND PREPARED BY KIMLEY HORN AND ASSOCIATES, INC.

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CHECKED BY	DD
DATE:	04/29/2021
REVISED:	

EXPLORATION LOCATION MAP

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
2

PLOTTED: 4/29/2021 9:51 AM BY: jeff sala
CAD FILE: W:\2021\20212905.001A - Costco Fresno New Warehouse\20212905.dwg LAYOUT: F2

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Appendix A

APPENDIX A
FIELD EXPLORATIONS

GENERAL

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot.

The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

Prior to commencement of the fieldwork, Underground Service Alert (USA) was notified and various geophysical techniques were used at the boring locations to identify potential conflicts with subsurface structures. In addition, Kleinfelder also employed a private utility location company (1st Call Utility location services) to clear all excavation areas prior to the commencement of fieldwork.

The boring and test pit logs are presented as Figures A-3 through A-62. An explanation to the log is presented as Figures A-1 through A-2. The Boring/Test Pit Log describes the earth materials encountered, samples obtained and show field and laboratory tests performed. The log also shows the location, boring/test pit number, drilling/excavation date and the name of the drilling/excavation subcontractor. The borings and test pits were logged by a Kleinfelder engineer using the Unified Soil Classification System. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual.

A modified-California sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 2.5-inch O.D., 2-inch I.D. split barrel shaft that is pushed or driven a total of 18-inches into the soil at the bottom of the boring. The soil was retained in six-inch sleeves for laboratory testing. An additional 2 inches of soil from each drive remained in the cutting shoe and was usually discarded after visually classifying the soil. The sampler was driven using a

140-pound hammer falling 30 inches. The total number of blows required to drive the sampler the final 12 inches is termed blow count and is recorded on the Log of Boring.

Samples were also obtained using a Standard Penetration Sampler (SPT). This sampler consists of a 2-inch O.D., 1-inch I.D. split barrel shaft that is advanced into the soils at the bottom of the drill hole a total of 18 inches. The sampler was driven using a 140-pound hammer falling 30 inches. The total number of hammer blows required to drive the sampler the final 12 inches is termed the blow count (N) and is recorded on the Log of Boring. The procedures we employed in the field are generally consistent with those described in ASTM Standard Test Method D1586.

Bulk and grab samples of the near-surface soils were directly retrieved from the auger cuttings from the borings and the excavated material in the test pits.

SAMPLE/SAMPLER TYPE GRAPHICS

BULK SAMPLE

CALIFORNIA SAMPLER
(3 in. (76.2 mm.) outer diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER
(2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

WATER LEVEL (level where first observed)

WATER LEVEL (level after exploration completion)

WATER LEVEL (additional levels after exploration)

OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS
WOH - Weight of Hammer
WOR - Weight of Rod

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu≥4 and 1≤Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu<4 and/ or 1>Cc>3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu≥4 and 1≤Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu<4 and/ or 1>Cc>3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (Half or more of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu≥6 and 1≤Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu<6 and/ or 1>Cc>3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu≥6 and 1≤Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu<6 and/ or 1>Cc>3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (Half or more of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit 50 or greater)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDED ON THIS LEGEND.

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DATE: 2/10/2021

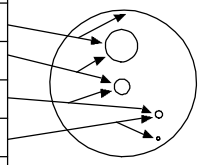
GRAPHICS KEY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-1

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



SECONDARY CONSTITUENT

	AMOUNT	
Term of Use	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N_{60} (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q_u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

PLASTICITY

DESCRIPTION	LL	Either the LL or the PI (or both) may be used to describe the soil plasticity. The ranges of numbers shown here do not imply that the LL ranges correlate with the PI ranges for all soils.	PI
Non-Plastic	NP		NP
Low	< 30		< 15
Medium	30 - 50		15 - 25
High	> 50		> 25

LL is from Casagrande, 1948. PI is from Holtz , 1959.

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

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CHECKED BY: DD
DATE: 2/10/2021

SOIL DESCRIPTION KEY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-2

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-1**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84017°
Longitude: -119.90781°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, organic material, fine sand (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, pink to brown, moist, hard, iron oxide	S3		BC=12 17 20	6" 6" 6"		28.9						
290	5		Trace fine sand	S4		BC=11 20 19	6" 6" 6"								
			Sandy SILT (ML): non-plastic, pink to brown, moist, very stiff, iron oxide	S5		BC=5 10 9	6" 6" 6"								
285	10		**SILT (ML)**: low plasticity, pink, moist, hard, iron oxide	S6		BC=11 14 21	6" 6" 6"		12.9	99.6					
			Poorly Graded SAND (SP): fine to medium-grained, pink, moist, dense												
280	15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.												
275	20														
270	25														
265	30														

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-1

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FIGURE
A-3

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-2**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84002°
Longitude: -119.99090°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
290	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, pink to brown, white mottling, moist, very stiff, weak to moderately cemented, iron oxide	S3		BC=10 12 9	6" 6" 6"		28.1			71			
285	5		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink to reddish brown, moist, dense	S4		BC=15 20 20	6" 6" 6"		10.1 15.6	99.2					
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, yellowish brown, moist, medium dense	S5		BC=4 4 6	6" 6" 6"		2.1						
280	10		Fine to coarse grained sand	S6		BC=7 11 21 PP=4.5	6" 6" 6"		10.9	102.2					
			SILT (ML): low plasticity, light pink, moist, stiff, weakly cemented												
275	15														
270	20														
265	25														
260	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-2

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FIGURE
A-4

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-3**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83934°
Longitude: -119.90809°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, red, (Plow depth observed = 0-6 inches)	S1 S2											Hand Auger down to 1.5 feet
			Clayey SAND (SC): fine to medium-grained, non-plastic to low plasticity, red, moist, moderately cemented	S3					6.6						Switched to Hollow Stem Auger
290	5		**Clayey SAND with Silt (SC)**: very dense, strongly cemented	S4 S5		BC=25 30 50/3"	NR 6" 6"								
			SILT with Sand (ML): non-plastic, pink to reddish yellow, moist, hard	S6		BC=2 15 17	6" 6" 6"		10.7						
285	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to coarse-grained, yellowish brown, moist, dense	S7		BC=12 17 19 PP=4.5	6" 6" 6"		3.8	104.2					
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-3

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FIGURE
A-5

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-4**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83929°
Longitude: -119.90932°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine to medium sand, (Plow depth observed = 0-5 inches)	S1					8.4						Hand Auger down to 1.5 feet
				S2											
				S3					5.6						Switched to Hollow Stem Auger
			Clayey SAND (SC): fine to medium-grained, low plasticity, red, moist, hard pan layer at 2.75 feet	S4											
290	5		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pinkish brown, moist, dense	S5		BC=14 18 18	6" 6" 6"		10.0						
			Poorly Graded SAND (SP): reddish brown, moist, medium dense	S6		BC=12 12 15	6" 6" 6"		2.6	98.2					
285	10		Loose	S7		BC=3 4 5	6" 6" 6"					3.8			
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-4

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FIGURE
A-6
PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-5**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84022°
Longitude: -119.90800°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Clayey SAND (SC): non-plastic, pale brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Lean CLAY with Sand (CL)												Hand layer from 2.5 to 3 feet
			Clayey SILT (CL-ML): low to medium plasticity, brown, moist, hard, moderately cemented	S3		BC=16 16 20	6" 6" 6"		21.0						Switched to Hollow Stem Auger
290	5		Low plasticity	S4		BC=27 43 45	6" 6" 6"		15.0	110.0					
			Silty SAND (SM): non-plastic, pink, moist, dense, fine to medium grained sand, iron oxide	S5		BC=8 18 24	6" 6" 6"		11.1	106.8					
285	10		4" Layer of (CL-ML) at 11 feet	S6		BC=11 16 18	6" 6" 6"		11.3	98.1					
			Sandy SILT (ML): non-plastic, brown, moist, hard, fine sand	S7		BC=15 30 27	6" 6" 6"		10.0						
280	15		**SILT with Sand (ML)**: non-plastic, pale brown, moist, very stiff, fine sand	S8		BC=10 11 15	6" 6" 6"		6.3	101.3					
			SILT (ML): non-plastic, pink to brown, moist, hard	S9		BC=12 16 17	6" 6" 6"								
275	20		Low to medium plasticity	S10		BC=15 30 50/6"	6" 6" 6"		10.4	114.3					
			Medium plasticity, very stiff	S11		BC=8 8 14	6" 6" 6"								
270	25		Non plasticity, hard	S12		BC=23 32 49 BC=0									
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-5

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FIGURE
A-7

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-6**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84004°
Longitude: -119.90816°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-7 inches)	S1											Hand Auger down to 1.25 feet
				S2					10.4						Hand layer from 1.25 to 2.5 feet
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, weakly cemented						31.8						Switched to Hollow Stem Auger
				S3		BC=30 31 35	6" 6" 6"								
290	5		**Silty CLAY with Sand (CL-ML)**: low plasticity, brown, moist, hard, weak to moderately cemented, fine to medium sand			BC=25 30 35	6" 6" 6"								
				S4					5.0	111.8			NP	NP	
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, yellowish brown, moist, very dense			BC=7 9 12	6" 6" 6"								
			SILT with Sand (ML): fine-grained, non-plastic, pale brown to reddish yellow, moist, very stiff	S5					6.2	108.5					
285	10					BC=7 9 12	6" 6" 6"								
			Poorly Graded SAND (SP): fine to coarse-grained, pink, moist, medium dense	S6											
			SILT with Sand (ML): non-plastic, brown, moist, hard, weakly cemented			BC=10 31 30	6" 6" 6"								
			Low plasticity	S7											
280	15		Moderately cementation, medium plasticity			BC=20 20 21	6" 6" 6"								
				S8					8.7	98.9					
			Pink to brown			BC=13 21 29	6" 6" 6"								
			Increase in sand content	S9											
275	20		Brown to yellowish brown, fine sand, low plasticity			BC=25 30 32	6" 6" 6"								
				S10											
			Poorly Graded SAND (SP): pink to brown, moist, medium dense, fine sand			BC=2 5 8	NR NR NR								
				S11											
270	25					BC=4 8 10	NR								
				S12											
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-6

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FIGURE
A-8
PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-7**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84000°
Longitude: -119.90836°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine sand, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 1.5 feet
				S2					10.5						
			SILT (ML): low plasticity, brown, moist, hard, moderately to strongly cemented												Hand layer from 1.5 to 3.25 feet
				S3		BC=38 48 50/3"	6" 6" 6"		27.5				NP	NP	Switched to Hollow Stem Auger
290	5			S4		BC=21 20 25	6" 6" 6"		10.7	109.3					
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, non-plastic, yellowish brown, moist, dense												
			Sandy SILT (ML): non-plastic, pale brown, moist, very stiff, fine to medium sand	S5		BC=11 11 12	6" 6" 6"								
285	10			S6		BC=7 9 8	6" 6" 6"								
			Poorly Graded SAND with Silt (SP-SM): reddish yellow, moist, medium dense, fine sand												
			SILT (ML): non-plastic, pink to brown, moist, hard	s7		BC=13 14 41	6" 6" 6"								
280	15		**SILT with Sand (ML)**: non-plastic, pale brown, moist, very stiff	S8		BC=7 9 21	6" 6" 6"								
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, trace fine sand	S9		BC=25 25 41	6" 6" 6"		11.7	120.2					
275	20		**SILT with Sand (ML)**: non-plastic, pink to brown, moist, stiff	S10		BC=7 6 7	6" 6" 6"								
				S11		BC=5 7 8	6" 6" 6"								
270	25		**Poorly Graded SAND with Silt (SP-SM)**: brown pale, moist, medium dense, fine sand	S12		BC=9 10 11	6" 6" 6"								
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-7

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-9

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-8**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83988°
Longitude: -119.90844°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 1.5 feet
				S2											Hand layer from 1.5 to 3.5 feet
290	5		**Sandy SILT (ML)**: non-plastic, brown to yellish brown, moist, hard, moderately to strongly cemented, fine sand	S3		BC=31 48 50/2"	6" 6" 6"								Switched to Hollow Stem Auger
			SILT (ML): low plasticity, brown, moist, very stiff, weakly cemented	S4		BC=13 16 12	6" 6" 6"		11.9	101.1					
285	10		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink to brown, moist, medium dense	S5		BC=8 10 14	6" 6" 6"								
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, reddish yellow, moist, dense	S6		BC=9 15 24	6" 6" 6"		6.2	108.5					
280	15		**SILT with Sand (ML)**: low to medium plasticity, reddish yellow, moist, medium stiff	S7		BC=2 4 9	6" 6" 6"					73			
			SILT (ML): non-plastic, pinkish brown, moist, hard	S8		BC=6 12 20	6" 6" 6"								
275	20		Trace fine sand, yellowish brown, very stiff	S9		BC=12 12 13	6" 6" 6"								
				S10		BC=8 9 16	6" 6" 6"		9.0	102.8					
270	25		**SILT with Sand (ML)**: non-plastic, pale brown, moist, stiff, fine sand	S11		BC=3 4 6	6" 6" 6"					82			
			SILT (ML): low to medium plasticity, pale brown, moist, hard, iron oxide	S12		BC=8 16 25	6" 6" 6"								
265	30														
260															

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-8

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-10

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-9**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83877°
Longitude: -119.90798°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1					9.5						Hand Auger down to 2.5 feet
				S2											
			Sandy Lean CLAY (CL): red, fine to medium grained sand	S3					11.1						Switched to Hollow Stem Auger
	5		**Silty CLAY with Sand (CL-ML)**: low plasticity, brown, moist, hard, weakly cemented, fine sand Decrease in sand content	S4		BC=7 12 50/2"	6" 6" 6"								
290			**SILT with Clay (ML)**: non-plastic, reddish brown to light brownish gray, moist, hard			BC=20 25 24	6" 6" 6"								
			Poorly Graded SAND with Silt and Clay (SP-SM): non-plastic, yellowish brown, moist, medium dense, fine to medium sand	S5					11.9	100.8					
	10					BC=3 7 9	6" 6" 6"								
285			**Silty SAND (SM)**: non-plastic, pink, moist, medium dense, fine sand	S6					11.2	100.8		47			
	15		**SILT with Sand (ML)**: non-plastic, pink, moist, hard, fine sand	S7		BC=9 13 18	6" 6" 6"		11.1						
280															
	20		**Poorly Graded SAND with Clay (SP-SC)**: non-plastic, olive brown, moist, dense, fine to medium sand	S8		BC=12 16 21	6" 6" 6"		6.9	112.0					
275															
	25		**Poorly Graded SAND (SP)**: fine to medium-grained, brown, moist, medium dense Fine to coarse grained	S9		BC=7 8 10	6" 6" 6"		2.6			3.1		
270															
	30			S10		BC=5 5 7	6" 6" 6"								
265															

LABORATORY RESULTS

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-9

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-11

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-9**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83877°
Longitude: -119.90798°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
260			**Poorly Graded SAND (SP)**: fine to medium-grained, brown, moist, medium dense	S11		BC=6 7 9	6" 6" 6"
	40		**Silty CLAY with Sand (CL-ML)**: low to medium plasticity, pink to brown, moist, very stiff, weakly cemented, fine sand	S12		BC=6 13 16	6" 6" 6"
255	45		**SILT with Sand (ML)**: non-plastic, pale brown, moist, hard, fine sand	S13		BC=14 43 50/2"	6" 6" 6"
250	50		**Sandy Lean CLAY (CL)**: medium plasticity, light reddish brown, moist, very stiff, weakly cemented, fine sand	S14		BC=9 9 12	6" 6" 6"
245							
	55						
240							
	60						
235							
	65						
230							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/5/2021

BORING LOG KB-9

COSTCO FRESNO NEW WAREHOUSE
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FIGURE
A-11

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-10**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83875°
Longitude: -119.90853°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Sandy Lean CLAY (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1 / S2											Hand Auger down to 2 feet
			Lean CLAY with Sand (CL): low to medium plasticity, brown, moist, fine sand	S3					11.3						Switched to Hollow Stem Auger
	5		**Silty CLAY (CL-ML)**: medium plasticity, yellowish brown, moist, hard	S4		BC=17 23 28	6" 6" 6"		16.5	100.6			26	5	
290			**Poorly Graded SAND (SP)**: fine to coarse-grained, reddish yellow, moist, medium dense	S5		BC=7 8 9	6" 6" 6"		1.4	102.2					
	10		Pink to reddish yellow	S6		BC=4 5 7	6" 6" 6"		1.1	97.1					
285															
	15		**Silty CLAY (CL-ML)**: medium plasticity, pink to brown, moist, hard	S7		BC=7 16 19	6" 6" 6"		18.3						
280			**Lean CLAY with Sand (CL)**: medium plasticity, dark pink, moist, very stiff												
	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, pink, moist, dense	S8		BC=8 14 21	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-10

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
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FRESNO, CALIFORNIA 93722

FIGURE
A-12

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-11**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83871°
Longitude: -119.90914°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.75 feet
				S2											
			Moderately cemented	S3					9.7						Switched to Hollow Stem Auger
290	5		**SILT (ML)**: non-plastic, black to brown, moist, medium stiff, weakly cemented	S4		BC=3 6 7	6" 6" 6"		11.0	100.5					
			Stiff	S5		BC=6 6 13	6" 6" 6"		10.9	99.4					
285	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, non-plastic, yellowish brown, moist, dense	S6		BC=12 14 21	6" 6" 6"		5.7	106.1					
280	15		**SILT with Sand (ML)**: fine-grained, non-plastic, pink to brown, moist, hard	S7		BC=10 20 24	6" 6" 6"		9.1						
275	20		**Poorly Graded SAND (SP)**: fine to medium-grained, pink to brown, moist, dense	S8		BC=7 14 20	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/5/2021

BORING LOG KB-11

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
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FRESNO, CALIFORNIA 93722

FIGURE
A-13

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-12**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Cool/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83875°
Longitude: -119.91006°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-9 inches)	S1					9.0						Hand Auger down to 0.75 feet Switched to Hollow Stem Auger
			Clayey SAND (SC): low to medium plasticity, reddish yellow, white mottle, moist, very stiff, strongly cemented	S2		BC=8 11 18	6" 6" 6"		4.7	107.1					
290	5		**Poorly Graded SAND with Clay (SP-SC)**: fine to medium-grained, non-plastic, reddish yellow to pink, moist, very dense, moderately cemented	S3		BC=11 30 40	6" 6" 6"								
			SILT with Sand (ML): non-plastic, pink, moist, very stiff, fine sand	S4		BC=3 12 13	6" 6" 6"		9.5	94.0					
285	10		**SILT (ML)**: low to medium plasticity, pink, moist, stiff, weakly cemented	5A		BC=4 6 8	6" 6" 6"		21.5						
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/5/2021

BORING LOG KB-12

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
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FRESNO, CALIFORNIA 93722

FIGURE
A-14

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-13**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny & cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83844°
Longitude: -119.91035°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-9 inches)	S1											Hand Auger down to 1.0 feet
				S2											Switched to Hollow Stem Auger
				S3					3.9						
			Poorly Graded SAND with Clay (SP-SC): fine to medium-grained, low plasticity, reddish brown, moist, moderately cemented												
	5		**SILT (ML)**: pink, moist, very stiff, moderately to strongly cemented												
			Trace fine sand, non plastic	S4		BC=9 10 18	6" 6" 6"		6.2	105.6					
290			**SILT with Sand (ML)**: pink to reddish brown, moist, very stiff			BC=6 9 10	3" 6" 6"		17.1						
	10			S5											
						BC=13 18 23	6" 6" 6"								
			Poorly Graded SAND (SP): fine to coarse-grained, reddish yellow & pink, moist, dense	S6											
285															
	15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.												
280															
	20														
275															
	25														
270															
	30														
265															

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-13

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
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FRESNO, CALIFORNIA 93722

FIGURE
A-15

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-14**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83843°
Longitude: -119.90938°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.0 feet
				S2											
				S3					8.9						Switched to Hollow Stem Auger
			Sandy Lean CLAY (CL): low to medium plasticity, reddish brown, moist, fine to medium sand												
	5		**SILT with Sand (ML)**: low plasticity, pink with iron oxyde, moist, hard, weak to moderately cemented	S4		BC=17 21 34 PP=3.5	6" 6" 6"								
290			**Silty SAND (SM)**: fine-grained, pink, moist, medium dense	S5		BC=6 7 8	6" 6" 6"		5.0						
	10		Very dense	S6		BC=25 50/5"	NR								
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

KLEINFELDER
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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-14

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-16

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-15**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83838°
Longitude: -119.90912°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2					9.5						
			SILT with Sand (ML): light yellowish brown, low to moderate, moist, stiff, fine sand												Switched to Hollow Stem Auger
						BC=5 5 5	6" 6" 6"		13.9						
			SILT (ML): low plasticity, yellowish brown, white mottling, moist, stiff	S3											
290	5		Moderately to strongly cementation, hard			BC=6 15 16	6" 6" 6"								
				S4					13.2	104.4					
			Poorly Graded SAND (SP): fine to coarse-grained, yellowish brown, moist, medium dense			BC=5 7 9	6" 6" 6"								
				S5					11.2	94.5					
285	10					BC=5 5 6	NR NR 6"		16.0						
			Clayey SILT with Sand (CL-ML): low to medium plasticity, yellowish brown, moist, stiff, fine to coarse sand	S6											
280	15		**Poorly Graded SAND with Sand (SP)**: fine to coarse-grained, pink, moist, medium dense			BC=8 9 17	6" 6" 6"								
				S7					2.2	109.1					
			Lean CLAY with Sand (CL): medium plasticity, yellowish brown, moist, very stiff												
275	20		**Poorly Graded SAND (SP)**: fine to medium-grained, reddish yellow, moist, medium dense			BC=7 7 9	6" 6" 6"								
				S8											
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-15

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-17

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-16**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83846°
Longitude: -119.90884°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approx. Elevation (ft)	Depth (ft)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches)	S1					8.9						Hand Auger down to 2.5 feet
				S2											
			Increase in sand content	S3					18.5						Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, yellowish brown, moist, hard												
	5					BC=35 43 32	6" 6" 6"								
290			**SILT with Sand (ML)**: low plasticity, yellowish brown, moist, hard, fine to medium sand	S4					10.4	118.1					
			Poorly Graded SAND (SP): fine to coarse-grained, reddish yellow, moist, medium dense			BC=6 8 5	6" 6" 6"								
				S5					7.7	106.2					
	10					BC=5 7 9	6" 6" 6"								
285				S6											
			Fine grained, trace clay												
	15					BC=3 5 9	6" 6" 6"								
280			**Lean CLAY with Sand (CL)**: medium plasticity, moist, stiff	S7											
			Poorly Graded SAND (SP): fine to coarse-grained, pink, moist, medium dense												
	20					BC=9 13 14	6" 6" 6"								
275				S8											
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-16

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-18

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-17**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83846°
Longitude: -119.90885°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, fine sand, (Plow depth observed = 0-12 inches)	S1					10.1				17	6	
				S2											
				S3					9.3						
	5		**Silty CLAY (CL-ML)**: low to medium plasticity, reddish brown, moist, hard	S4		BC=13 25 33 PP=>4.5	6" 6" 6"		21.1	102.1					
290			**Poorly Graded SAND with Silt and Clay (SP-SM)**: fine to medium-grained, non-plastic, reddish yellow, moist, medium dense	S5		BC=7 7 9	6" 6" 6"		6.3						
	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, non-plastic to low plasticity, brown, moist, medium dense, trace Silt and Clay	S6		BC=9 10 10	6" 6" 6"		3.1	110.7					
285															
	15		**Clayey SAND (SC)**: fine to coarse-grained, low plasticity, olive brown, moist, medium dense	S7		BC=7 8 13	3" 6" 6"								
280															
	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, pale red to pink, moist, medium dense	S8		BC=6 8 12									
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-17

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-19

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-18**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83824°
Longitude: -119.90793°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low plasticity, red, fine to medium sand, (Plow depth observed = 0-7 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Iron present, increase in sand content						6.9						Switched to Hollow Stem Auger
				S3											
	5		**Sandy SILT (ML)**: reddish yellow, moist, hard, moderately to strongly cemented, fine to medium sand	S4		BC=18 38 37	6" 6" 6"		32.6						
			SILT (ML): low plasticity, pink to brown, moist, hard, moderately cemented	S5											
290			**Silty SAND (SM)**: non-plastic, brownish pink, moist, medium dense, iron oxide	S6		BC=13 17 16	6" 6" 6"		6.6	102.3					
	10		**Poorly Graded SAND with Silt (SP-SM)**: fine-grained, non-plastic, pink, moist, medium dense	S7		BC=4 6 6	6" 6" 6"								
285															
	15		Increase in sand size, fine to coarse grained	S8		BC=9 12 12	6" 6" 6"		2.6	112.8					
280			**Silty SAND (SM)**: fine-grained, olive brown, moist, medium dense												
	20			S9		BC=5 5 5	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-18

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-20

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-19**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83822°
Longitude: -119.90842°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, reddish brown, (Plow depth observed = 0-12 inches)	S1					8.1						
				S2											
			Lean CLAY with Sand (CL): medium plasticity, red												
			SILT (ML): low plasticity, pink to red, moist, hard, moderately to strongly cemented	S3		BC=17 15 18	6" 6" 6"		22.1						
290	5		Iron oxide	S4		BC=9 21 41 PP=>4.5	6" 6" 6"		23.5						
			Trace fine sand, very stiff	S5		BC=9 10 16	6" 6" 6"								
285	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S6		BC=6 6 8	6" 6" 6"								
280	15		Fine to coarse grained	S7		BC=4 7 12	3" 6" 6"								
275	20		Yellowish brown, trace Silt, fine to medium grained, dense	S8		BC=13 16 16	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-19

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FIGURE
A-21

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-20**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83821°
Longitude: -119.90903°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-4 inches)	S1											Hand Auger down to 1.5 feet
				S2					21.0						Switched to Hollow Stem Auger
			Silty CLAY with Sand (CL-ML): low plasticity, reddish yellow, moist, very stiff, fine sand	S3		BC=31 15 10	6" 6" 6"								
290	5		Moderate to strongly cemented, hard, non plastic	S4		BC=10 25 43	6" 6" 6"		17.5	103.3					
			Poorly Graded SAND (SP): fine to coarse-grained, pink to yellow, moist, medium dense	S5		BC=9 9 17	6" 6" 6"		1.7	103.0					
285	10			S6		BC=6 7 9	6" 6" 6"		1.1	101.0					
280	15		**Silty SAND (SM)**: yellowish brown, moist, dense, fine sand	S7		BC=6 7 26	4" 6" 6"								
275	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, light gray to pink, moist, dense	S8		BC=10 16 21	6" 6" 6"								
270	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.												
265	30														

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-20

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-22

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BORING LOG KB-21

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Cool/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

Latitude: 36.83803°
Longitude: -119.91001°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0	**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches)	S1					9.9						Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
		Clayey SAND (SC): fine to medium-grained, low plasticity, reddish yellow, moist, medium dense, moderately to strongly cemented	S2		BC=14 14 8	6" 6" 6"					27			
290	5	**Poorly Graded SAND with Clay (SP-SC)**: fine to coarse-grained, yellowish brown, moist, medium dense, trace 1/2" gravel	S3		BC=8 10 17	6" 6" 6"		4.3	121.4					
		Poorly Graded SAND (SP): fine to medium-grained, reddish yellow to pink, moist, medium dense	S4		BC=4 4 6	6" 6" 6"								
285	10	Increase in sand size, fine to coarse grained	S5		BC=4 6 9	6" 6" 6"		2.3	106.5					
280	15													
275	20													
270	25													
265	30													

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-21

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-23

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-22**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83793°
Longitude: -119.90899°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Red, increase in sand content, fine to medium sand	S3					6.3						Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: low to medium plasticity, brown to reddish brown, moist, hard	S4		BC=20 23 17	6" 6" 6"		14.9	105.6					
290			Increase in sand content	S5		BC=11 11 13	6" 6" 6"		9.8	109.3					
	10		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pale brown, moist, medium dense												
285			**Poorly Graded SAND (SP)**: yellowish brown, moist, medium dense, fine to coarse sand, trace fine gravel	S6		BC=4 6 6	6" 6" 6"		3.2	98.3		2.9			
	15		Slight decrease in sand size, fine to medium grained	S7		BC=5 6 9	6" 6" 6"								
280			**Silty SAND (SM)**: brown, moist, medium dense, fine sand												
	20			S8		BC=4 6 8	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-22

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-24

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-23**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Warm	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83796°
Longitude: -119.90855°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, red, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.1						Hand Auger down to 1.0 feet
				S2											Switched to Hollow Stem Auger
						BC=33 50/2"	4" 6"		16.1						
			Silty SAND (SM): fine to medium-grained, non-plastic, brown, moist, very dense, strongly cemented	S3											
290	5		**Poorly Graded SAND (SP)**: fine to medium-grained, yellowish brown, moist, medium dense	S4		BC=3 3 7	6" 6" 6"		3.5	107.5					
			Sandy SILT (ML): fine-grained, non-plastic, pale brown, moist, very stiff	S5		BC=6 9 15	6" 6" 6"		5.7	103.0					
285	10		**Silty SAND (SM)**: fine to medium-grained, pale reddish brown, moist, dense	S6		BC=10 19 28	6" 6" 6"		9.3	103.5					
			SILT (ML): low plasticity, pink, moist, hard												
280	15		**Silty SAND (SM)**: fine to medium-grained, yellowish brown, moist, medium dense	S7		BC=6 6 11	6" 6" 6"					34			
275	20			S8		BC=14 30 50	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-23

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-25

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-24**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83799°
Longitude: -119.90808°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approx. Elevation (ft)	Depth (ft)	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0	**Sandy Lean CLAY (CL)**: fine to medium-grained, low plasticity, reddish brown, low cemented, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 1.5 feet
			S2											
			S3					21.5						Switched to Hollow Stem Auger
		Sandy SILT (ML): reddish yellow to pale red												
		SILT (ML): non-plastic, pink to brown, white mottling, moist, very stiff, strongly cemented	S4		BC=8 12 11	6" 6" 6"								
290	5	No cementation, low plasticity, trace fine sand, iron oxide	S5		BC=8 12 21	6" 6" 6"		19.4	101.3					
		Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, pale red, moist, loose	S6		BC=4 3 4	6" 6" 6"		3.4						
285	10	No silt, trace up to 3/8" subrounded to subangular gravel, medium dense	S7		BC=5 5 8	6" 6" 6"		1.5	116.5					
		Reddish yellow, dense												
280	15		S8		BC=8 15 20	6" 6" 6"								
		Sandy SILT (ML): olive brown, moist, hard, fine sand												
275	20		S9		BC=21 25 23 PP=4.5	6" 6" 6"								
270	25													
265	30													

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-24

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-26

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-25**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83771°
Longitude: -119.90790°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-10 inches)	S1 S2											Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
									5.0	113.7					
			Clayey SAND (SC): fine to medium-grained, non-plastic, reddish brown, moist, very dense	S3		BC=50/2"	2"								
	5		Decrease in Clay, medium dense	S4		BC=3 20 15 13	6" 6" 6"		5.7						
290			**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, reddish yellow, moist, dense	S5		BC=14 19 13	6" 6" 6"		7.5	106.9					
	10		Decrease in Silt, medium dense	S6		BC=5 7 10	6" 6" 6"		9.5						
285			**Poorly Graded SAND (SP)**: yellowish brown to reddish yellow, moist, medium dense, fine sand												
	15			S7		BC=6 10 13	6" 6" 6"		1.9	101.9					
280			**SILT with Sand (ML)**: low plasticity, pinkish brown, moist, hard, low cemented, fine sand												
	20		Non plastic	S8		BC=12 16 25	6" 6" 6"								
275			The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.												
	25														
270															
	30														
265															

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-25

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-27

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-26**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83773°
Longitude: -119.90833°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Clayey SAND (SC)**: fine-grained, non-plastic, red, moist, (Plow depth observed = 0-6 inches)	S1 S2											Hand Auger down to 2.0 feet Switched to Hollow Stem Auger
						BC=23 21 15	6" 6" 6"								
			Silty SAND (SM): pink to brown, moist, dense, moderately cemented, fine sand	S3					23.7						
	5		**Sandy SILT (ML)**: low plasticity, yellowish brown, moist, very stiff, weak to moderately cemented, fine sand			BC=8 11 17	6" 6" 6"								
				S4					9.0	108.4		64			
290			Very stiff			BC=10 14 21	6" 6" 6"								
				S5					9.0	108.4					
	10		**SILT (ML)**: low plasticity, pink & red, moist, very stiff			BC=11 17 21	6" 6" 6"								
285				S6											
	15		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, yellowish brown, moist, medium dense			BC=9 10 14	6" 6" 6"								
280				S7											
	20		**SILT with Sand (ML)**: non-plastic, pink, moist, hard			BC=11 17 27	6" 6" 6"								
				S8											
275	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-26

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-28

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-27**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83773°
Longitude: -119.90885°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Silty SAND (SM)**: fine to medium-grained, low plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.0 feet
				S2											
			SILT (ML): brown, moist, moderately to strongly cemented	S3					12.7						Switched to Hollow Stem Auger
	5			S4		BC=13 8 9	6" 6" 6"		8.1	103.1					
290			**Poorly Graded SAND with Sand (SP-SM)**: non-plastic, brown, moist, medium dense, fine sand			BC=5 8 10	6" 6" 6"					8.7			
			Decrease in Silt content	S5					5.5	102.5					
	10			S6		BC=4 4 8	6" 6" 6"								
285			**Sandy SILT (ML)**: non-plastic, pale brown to pink, moist, stiff, fine sand												
	15					BC=8 10 1	6" 6" 6"								
280			Very stiff	S7											
			Silty SAND (SM): pink to brown, moist, medium dense, fine sand												
	20					BC=10 11 12	6" 6" 6"								
				S8											
275			The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.												
	25														
270															
	30														
265															

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-27

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-29

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-28**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83757°
Longitude: -119.90963°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches) Low to medium plasticity	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
				S3		BC=13 21 13	3" 6" 6"								
	5		**Poorly Graded SAND with Silt (SP-SM)**: fine to coarse-grained, yellowish brown, moist, medium dense						5.6	115.2					
			SILT (ML): non-plastic, yellowish brown, moist, stiff, weak cemented, trace fine sand	S4		BC=4 6 6	4" 6" 6"								
290			**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink, moist, very stiff	S5		BC=9 22 23	6" 6" 6"		11.7	108.8					
	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, non-plastic, reddish yellow, moist, medium dense	S6		BC=4 6 8	6" 6" 6"								
285	15														
280															
	20														
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/8/2021

BORING LOG KB-28

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-30

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-29**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83745°
Longitude: -119.90896°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Silty SAND (SM)**: low plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2											
				S3											Switched to Hollow Stem Auger
	5		Fine to medium sand, pale brown, medium dense	S4		BC=8 7 10	6" 6" 6"		6.8	112.2					
290	10		**Poorly Graded SAND with Silt (SP-SM)**: non-plastic, pink to brown, moist, medium dense, fine sand	S5		BC=6 6 5	6" 6" 6"		4.3	96.2					
			6" Layer of Sllt, brown	S6		BC=10 19 20	6" 6" 6"		9.8	105.1					
285	15		**Silty SAND (SM)**: non-plastic, pale brown, moist, dense, fine sand												
			Sandy SILT (ML): non-plastic, pale brown, moist, very stiff, fine sand	S7		BC=10 14 11	6" 6" 6"								
280	20		Dense												
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, weak to moderately cemented, trace sand	S8		BC=6 16 17	6" 6" 6"								
275	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.												
270	30														
265															

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-29

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-31

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-30**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83753°
Longitude: -119.90850°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.9						Hand Auger down to 3.0 feet
				S2											
			Clayey SAND (SC): fine to medium-grained, low plasticity, red, moist	S3					10.8			34			Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: non-plastic, pink to reddish brown, moist, hard, fine sand			BC=7 16 17	6" 6" 6"								
				S4					9.0	104.1					
			Poorly Graded SAND with Silt (SP-SM): reddish yellow, moist, medium dense, fine sand			BC=4 4 7	6" 6" 6"								
290			**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S5					1.1	90.4					
	10					BC=10 11 21	6" 6" 6"								
			Silty SAND (SM): yellowish brown, dense, fine sand, poorly graded	S6											
285															
	15		Medium dense	S7		BC=7 9 10	6" 6" 6"								
280															
	20		**SILT (ML)**: low plasticity, pink to brown, moist, hard	S8		BC=7 10 11 PP=4.5	3" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-30

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-32

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-31**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83751°
Longitude: -119.90805°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Decrease in Clay content	S3					8.8						Switched to Hollow Stem Auger
	5		**Sandy SILT (ML)**: non-plastic, pink to reddish yellow, moist, hard, moderately to strongly cemented, fine sand	S4		BC=15 23 24 PP=>4.5	6" 6" 6"		17.5	98.3					
290			**Poorly Graded SAND (SP)**: non-plastic, yellowish brown, moist, loose, fine sand	S5		BC=3 4 5	2" 6" 6"	SM				13			
	10		Medium dense	S6		BC=4 8 12	6" 6" 6"		2.8	100.2					
285			**Silty SAND (SM)**: reddish brown, medium dense, fine sand												
	15		Increase in sand content	S7		BC=8 10 12	6" 6" 6"								
280			**SILT (ML)**: low plasticity, pink, moist, very stiff, weakly cemented												
	20		**Sandy SILT (ML)**: non-plastic, pink to brown, moist, hard, fine sand	S8		BC=12 24 50/3"	6" 6" 6"								
275	25														
270	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-31

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-33

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-32**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83728°
Longitude: -119.90788°
Approximate Ground Surface Elevation (ft.): 300.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, fine sand, (Plow depth observed = 0-6 inches)	S1					8.8						
				S2											
			Decrease in Clay content	S3					6.4						
									4.0	119.6					
295	5		**Poorly Graded SAND with Clay (SP-SC)**: non-plastic, red, moist, medium dense, fine to medium sand, gravel (up to 3/8" subangular subrounded)	S4		BC=12 10 9	6" 6" 6"								
			Fine to coarse sand, loose	S5		BC=4 4 6	6" 6" 6"		2.5	113.3					
290	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pinkish brown, moist, medium dense	S6		BC=4 5 6	6" 6" 6"					6.2			
285	15		Fine to coarse grained, brown, dense	S7		BC=8 16 16	6" 6" 6"								
280	20		Very dense, pink	S8		BC=17 26 27	6" 6" 6"								
			SILT (ML): low plasticity, light pink, moist, hard, low cemented												
275	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.												
270	30														

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-32

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-34

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-33**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83735°
Longitude: -119.90832°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.0						Hand Auger down to 1.75 feet
				S2											Switched to Hollow Stem Auger
			Clayey SAND (SC): fine to medium-grained, non-plastic, red, moist, dense	S3		BC=24 27 24	6" 6" 6"								
	5		**Sandy SILT (ML)**: non-plastic, pink to brown, moist, hard, moderately to strongly cemented, fine sand Stiff	S4		BC=16 17 7	6" 6" 6"		14.5						
290			**Silty SAND (SM)**: reddish yellow, moist, loose, fine sand	S5		BC=6 6 3	6" 6" 6"		6.6	105.2					
	10		Fine to medium grained	S6		BC=2 3 6	6" 6" 6"					25			
285			**Sandy SILT (ML)**: low plasticity, pink, moist, very stiff, low cemented, fine sand												
	15			S7		BC=7 11 13	6" 6" 6"								
			Poorly Graded SAND (SP): fine to medium-grained, pink to brown, moist, medium dense	S8					5.3						
280															
	20		Fine sand, dense												
				S9		BC=7 13 21 PP=>4.5	6" 6" 6"								
			SILT (ML): low plasticity, pink, moist, hard												
275	25														
270	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-33

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-35

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-34**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83725°
Longitude: -119.90873°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: red, moist, loose, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Lean CLAY with Sand (CL): low to medium plasticity, reddish brown, moist Decrease in sand content	S3					9.0				19	5	Switched to Hollow Stem Auger
	5		**Sandy SILT (ML)**: non-plastic, yellowish brown, moist, hard, moderately to strongly cemented, fine sand			BC=32 49 50	6" 6" 6"								
				S4					12.9	106.8					
			SILT (ML): non-plastic, brownish gray, moist, hard, weakly cemented			BC=16 31 36	6" 6" 6"								
290			Moderately cemented, iron oxide	S5					19.4	98.2					
	10		**Silty SAND (SM)**: yellowish brown, moist, dense, fine sand			BC=9 16 23	6" 6" 6"								
			SILT (ML): low plasticity, brownish gray, moist, hard	S6					8.3	112.4					
285															
	15		**Silty SAND (SM)**: non-plastic, pink t yellowish brown, moist, medium dense, fine sand			BC=5 6 8	6" 6" 6"					22			
				S7											
280															
	20		Decrease in sand content, pink, very dense	S8		BC=17 19 50/4"	6" 6" 6"								
			SILT (ML): non-plastic, light brownish gray, moist, hard	S9											
275															
	25		**Silty SAND (SM)**: non-plastic, light gray, moist, medium dense, fine sand			BC=10 13 19	6" 6" 6"								
				S10					3.8	95.3					
270															
	30		**SILT with Sand (ML)**: light gray, moist, very stiff, fine sand			BC=7 8 11	6" 6" 6"								
				S11					7.9			76			
265			**Silty CLAY (CL-ML)**: medium plasticity, gray, moist, very stiff												

LABORATORY RESULTS

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-34

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-36

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-34**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83725°
Longitude: -119.90873°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
260	40		**Silty CLAY (CL-ML)**: medium plasticity, gray, moist, very stiff	S12 S13		BC=8 16 16 PP=3.75	6" 6" 6"
			SILT with Sand (ML): non-plastic, brownish gray, moist, hard, weak to moderately cemented, fine sand	S14		BC=25 29 33	6" 6" 6"
255	45		**Poorly Graded SAND (SP)**: gray to light gray, moist, very dense, fine sand				
			Silty SAND (CL-ML): medium plasticity, yellowish brown, moist, trace fine to medium sand	S15		BC=12 18 18	6" 6" 6"
250	50		**Clayey SAND with Silt (SC)**: fine to medium-grained, low plasticity, yellowish brown, moist, dense	S16		BC=11 17 17	6" 6" 6"
245	55						
240	60						
235	65						
230							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-34

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-36

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-35**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83705°
Longitude: -119.90914°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): fine to medium-grained, low plasticity, reddish yellow, moist, (Plow depth observed = 0-8 inches)	S1 / S2					6.7						Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
295	5		**Poorly Graded SAND with Clay (SP-SC)**: fine to coarse-grained, non-plastic, yellowish brown, moist, medium dense, trace 3/8" gravel, subrounded to subangular	S3		BC=2 10 12	6" 6" 6"								
			Poorly Graded SAND with Gravel (SP): fine to coarse-grained, yellowish brown to brown, moist, loose	S4		BC=3 3 2	6" 6" 6"		3.5			6.9			
290	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, pink to brown, moist, medium dense	S5		BC=5 7 10	6" 6" 6"		1.5	103.7					
			Decrease in sand size, fine to medium grained	S6		BC=3 4 10	6" 6" 6"								
285	15														
280	20														
275	25														
270	30														
265															

LABORATORY RESULTS

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-35

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-37

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BORING LOG KB-36

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.23702°
Longitude: -119.90781°
Approximate Ground Surface Elevation (ft.): 301.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
300			**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2											
				S3											Switched to Hollow Stem Auger
			Sandy Lean CLAY (CL): low plasticity, reddish yellow, moist, weak to moderately cemented, fine to medium sand												
	5		**Clayey SAND (SC)**: fine to medium-grained, low plasticity, reddish yellow, moist, medium dense, weakly cemented, trace 3/8" gravel	S4		BC=9 7 8	6" 6" 6"								
295															
				S5		BC=4 2 4	6" 6" 6"								
	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, reddish brown, moist, loose, trace 3/8" subrounded gravel												
290			Pink to brown, medium dense	S6		BC=7 7 9	6" 6" 6"								
	15														
285															
	20														
280															
	25														
275															
	30														
270															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
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DATE:	3/9/2021

BORING LOG KB-36

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-38

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-37**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83765°
Longitude: -119.90779°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, red, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2					10.8						
			Increase in sand content	S3					10.3						Switched to Hollow Stem Auger
	5		**Poorly Graded SAND with Silt (SP-SM)**: fine-grained, yellowish brown, moist, medium dense	S4		BC=6 10 9	6" 6" 6"		4.3						
290			**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S5		BC=6 9 11	6" 6" 6"		1.8	99.3					
	10		**Silty SAND (SM)**: fine-grained, reddish yellow, moist, medium dense	S6		BC=4 5 8	6" 6" 6"								
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-37

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-39

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-38**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83864°
Longitude: -119.90785°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Decrease in sand content (metal formate)	S3											Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: low plasticity, pink, moist, hard, moderately cemented	S4		BC=19 25 25 PP=>4.5	6" 6" 6"		5.6	119.7					
290			Weak cementation, fine sand, medium stiff	S5		BC=3 4 4	6" 6" 6"		10.5						
	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium stiff	S6		BC=5 8 10	6" 6" 6"		1.9	101.2					
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-38

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-40

PAGE: 1 of 1

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining	**PERCOLATION TEST HOLE LOG INF-1**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84003°
Longitude: -119.90856°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): reddish brown, moist												2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2
			Silty SAND (SM): reddish brown, moist, medium dense, fine to medium-grained												
290	5		**Sandy SILT (ML)**: brownish gray, moist, very stiff, Moderately Cemented	INF-1		BC=12 16 9	12"								
285	10														
280	15														
275															

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-1

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-41

PAGE: 1 of 1

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining	**PERCOLATION TEST HOLE LOG INF-2**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83927°
Longitude: -119.90917°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
295	0		**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist				
			Silty SAND (SM): reddish brown, moist, fine to medium-grained				
				INF-2		BC=3 2 5	12"
	5						
290							
	10						
285							
	15						
280							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
							2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-2

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FRESNO, CALIFORNIA 93722

FIGURE
A-42

PAGE: 1 of 1

PERCOLATION TEST HOLE LOG INF-3

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83808°
Longitude: -119.91016°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, reddish brown, moist												2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2
			Silty SAND (SM): reddish brown, moist, medium dense, fine to medium-grained												
				INF-3		BC=12 7 7	12"								
	5														
290															
	10														
285															
	15														
280															

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-3

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-43

PERCOLATION TEST HOLE LOG INF-4

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83711°
Longitude: -119.90929°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
295	5		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist **Silty SAND (SM)**: brown, moist, medium dense, fine to medium-grained	INF-4		BC=5 12 12	
290	10						
285	15						
280							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
							2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-4

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-44

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 10'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 1

Latitude: 36.83963°
Longitude: -119.90856°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): fine to coarse-grained sand, reddish brown, Observed Plow Depth 16 inches deep	1									
			Silty SAND (SM): reddish brown, strongly cemented, hard pan	2									
290	5												
285	10												

The test pit was terminated because of backhoe refusal (▲) at approximately 3.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/16/2021

TEST PIT LOG TP- 1

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-45

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 9'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 2

FIELD EXPLORATION

Latitude: 36.83896°
Longitude: -119.91019°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, reddish brown, moist, Observed Plow Depth 7 inches deep	1									**R-Value=** 75
			Poorly Graded SAND with Silt (SP-SM): fine to coarse-grained sand, yellowish brown, moist, fine to coarse gravel										
290				2									Corrosion
	5												
			Poorly Graded SAND (SP): fine to coarse-grained sand, reddish brown, moist, trace cementation										
			grades to medium to coarse sand										
285													
	10												
280													
	15												
275													

The test pit was terminated because of caving at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A

DRAWN BY: JDS

CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 2

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-46

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 16'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 3

FIELD EXPLORATION

Latitude: 36.83879°
Longitude: -119.90825°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
295	0		**Sandy Lean CLAY (CL)**: low to medium plasticity, reddish brown, Observed Plow Depth 12 inches deep	1	
			Silty SAND (SM): fine to medium-grained, reddish brown, moderate to strong cementation		
				2	
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown with light brownish gray		
290					
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/16/2021

TEST PIT LOG TP- 3

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-47

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 4

FIELD EXPLORATION

Latitude: 36.83824°
Longitude: -119.90981°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): low plasticity, reddish brown, Observed Plow Depth 12 inches deep	1									**Proctor - ASTM D1557 Method A=** Max. Dry Unit Wt.: 128.5 pcf Opt. Water Content: 8.2%
			Sandy SILT (ML): fine to coarse-grained sand, reddish brown										
			moderately cemented	2									
290	5												
			Poorly Graded SAND (SP): fine-grained sand, yellowish brown										
285	10												
280	15												

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 4

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

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PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 5

FIELD EXPLORATION

Latitude: 36.83831°
Longitude: -119.90827°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
295	0		**Sandy Lean CLAY (CL)**: reddish brown, Observed Plow Depth 12 inches deep	1	
			Silty SAND (SM): fine to coarse-grained sand, yellowish brown, moderate to strong cementation		
			light gray with reddish brown intermixed		
			Poorly Graded SAND (SP): fine-grained sand, light gray	2	
	5		**Sandy SILT (ML)**: fine-grained sand, non-plastic, light brownish gray		
290			**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown and light gray intermixed		
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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TEST PIT LOG TP- 5

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FRESNO, CALIFORNIA 93722

FIGURE

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PAGE: 1 of 1

TEST PIT LOG TP- 6

Date Begin - End:	1/19/2021	**Excavation Company:**	Landscape Services
Logged By:	SL	**Excavation Crew:**	Dan
Hor.-Vert. Datum:	Not Available	**Excavation Equip.:**	CAT 420E
Plunge:	N/A degrees	**Excav. Dimensions:**	12'x 2' ft
Weather:	Sunny/Cool		

Latitude: 36.83782°
Longitude: -119.90804°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, reddish brown, Observed Plow Depth 12 inches deep	1									
			Silty SAND (SM): fine to coarse gained sand, light grayish brown										
295													
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown and light gray	2									Corrosion
290													
	10		The test pit was terminated at approximately 9.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.										
285													
	15												
280													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	2/16/2021

TEST PIT LOG TP- 6

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-50

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 7

FIELD EXPLORATION

Latitude: 36.83755°
Longitude: -119.90900°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): dark brown, Observed Plow Depth 15 inches deep	1									**R-Value=** 75
295			**Poorly Graded SAND with Silt (SP-SM)**: fine-grained sand, dark brown, moderately cemented										
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown	2									
290			fine-grained sand, light gray, some moderate cementation										
	10												
285													
	15												
280													

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 7

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-51

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 8

FIELD EXPLORATION

Latitude: 36.83742°
Longitude: -119.90874°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
			Sandy Lean CLAY (CL): reddish brown, Observed Plow Depth 6 inches deep	1	
			Silty SAND (SM): fine to medium-grained sand, light gray, weak cementation		
			Poorly Graded SAND (SP): fine-grained sand, light gray, some moderate cementation, hard pan		
295				2	
	5		yellowish brown		
290					
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE: 2/16/2021

TEST PIT LOG TP- 8

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-52

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 9

FIELD EXPLORATION

Latitude: 36.83726°
Longitude: -119.90824°
Approximate Ground Surface Elevation (ft.): 300.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): low plasticity, reddish brown, Observed Plow Depth 16 inches deep	1									**Proctor - ASTM D1557 Method A=** Max. Dry Unit Wt.: 133.8 pcf Opt. Water Content: 7.2%
			Sandy SILT (ML): reddish brown, moderate to strong cementation										
				2									
295	5		fine-grained sand, light gray, moderatly cemented										Corrosion
			fine to medium-grained sand, reddish brown										
290	10		fine to coarse-grained sand, grades to poorly graded sand										
285	15												

The test pit was terminated at approximately 10.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A

DRAWN BY: JDS

CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 9

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-53

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP-10

FIELD EXPLORATION

Latitude: 36.83721°
Longitude: -119.90966°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, reddish brown, dry, Observed Plow Depth 16 inches deep	1									
			Silty SAND (SM): fine to coarse-grained, reddish brown, moist, weak to moderate cementation										
			moderate cementation intermixed										
295				2									
	5												Corrosion
			light gray, moderate to strong cementation										
290													
	10												
285													
	15												
280													

The test pit was terminated at approximately 9.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DRAWN BY: JDS

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DATE: 2/16/2021

TEST PIT LOG TP-10

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-54

PAGE: 1 of 1

TEST PIT LOG TP-11

Date Begin - End:	4/24/2021	**Excavation Company:**	Landscape Services
Logged By:	SD	**Excavation Crew:**	Dan
Hor.-Vert. Datum:	Not Available	**Excavation Equip.:**	CAT 420E
Plunge:	N/A degrees	**Excav. Dimensions:**	12'x 2' ft
Weather:	Clear/Sunny		

FIELD EXPLORATION

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Sandy Lean CLAY (CL): fine to medium-grained sand, brown, moderately cemented, plowed zone 0-10"	1			2.8						
			2									
		SILT with Sand (ML): dark grayish brown, strongly cemented, Hard Pan	3			13.3				NP	NP	
5												
10												
15												

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.
GENERAL NOTES:

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PROJECT NO.:	20212905.001A
DRAWN BY:	JDS
CHECKED BY:	DD
DATE:	5/7/2021

TEST PIT LOG TP-11

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-55

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-12

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		FIELD EXPLORATION			LABORATORY RESULTS							
		Latitude: ° Longitude: ° Surface Condition: Grass & Weeds										
		Sandy Lean CLAY: fine-grained sand, brown, moist, plowed zone 0-9"	1			3.1						
			2									
		increase in sand content reddish brown										
		strongly cemented	3			23.7						
		Hard Pan										
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 5/7/2021

TEST PIT LOG TP-12

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-56

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 10'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-13

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds			LABORATORY RESULTS							
		Sandy SILT (ML): fine-grained sand, brown, weakly cemented, plowed zone 0-9"	1			3.2						
			2									
		SILT with Sand (ML): dark grayish brown, Hard Pan	3									
5												
10												
15												

The test pit was terminated because of backhoe refusal (↑) at approximately 5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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TEST PIT LOG TP-13

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-57

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-14

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (CL): fine to medium-grained sand, brown, plowed zone 0-8"	1			2.9						
			2									
		Silty SAND (SM): strongly cemented, Hard Pan	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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DATE: 5/7/2021

TEST PIT LOG TP-14

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-58

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-15

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Sandy Lean CLAY (CL): yellowish brown, moist, plowed zone 0-12"	1			2.6				17	2	
			2									
		SILT with Sand (ML): grayish brown to yellowish brown, moist, Hard Pan										
		Poorly Graded SAND with Silt (SP-SM): fine to medium-grained sand, reddish brown, moist	3									
5												
10												
15												

FIELD EXPLORATION

LABORATORY RESULTS

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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TEST PIT LOG TP-15

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE

A-59

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-16

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown, moist, plowed zone 0 to 11"	1			3.8				19	2	
			2									
		Sandy SILT (ML): reddish brown to brown, Hard Pan										
5		**Lean CLAY with Sand (CL)**: fine-grained sand, medium plasticity, trace sand	3			4.6						

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

10

15

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TEST PIT LOG TP-16

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FRESNO, CALIFORNIA 93722

FIGURE

A-60

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 11'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-17

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown pale, moist, plowed zone 0 to 10"	1			2.0						
			2									
		Poorly Graded SAND with Silt (SP-SM): moist	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

10

15

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TEST PIT LOG TP-17

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE

A-61

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-18

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown, moist, plowed zone 0 to 11"	1			3.8						
			2									
		Silty SAND (SM): olive brown, moist	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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TEST PIT LOG TP-18

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE

A-62

PAGE: 1 of 1

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Appendix B

APPENDIX B
LABORATORY TESTING

GENERAL

Laboratory tests were performed on selected samples as an aid in classifying the soils and to evaluate physical properties of the soils that may affect foundation design and construction procedures. Laboratory testing was performed by Kleinfelder's in house laboratory. Corrosivity testing was performed by Sunland Analytical and Topsoil analytical testing was performed by Waypoint Analytical. The tests were performed in general conformance with the current ASTM or Caltrans standards. A description of the laboratory-testing program is presented below.

MOISTURE AND UNIT WEIGHT

Moisture content and dry unit weight tests were performed on selected samples recovered from the borings. Moisture contents were determined in general accordance with ASTM Test Method D 2216; dry unit weight was calculated using the entire weight of the samples collected in general accordance with ASTM Test Method D 7263. Results of these tests are presented on the boring logs and attached to this appendix.

WASH SIEVE

Selected soil samples were tested for the percent passing the No. 200 sieve, which was performed by wash sieving in accordance with ASTM Standard Test Method D1140. Results of these tests are presented on the boring logs and attached to this appendix.

ATTERBERG LIMITS

Atterberg limits testing was performed on a selected soil samples to assist in classification. Testing was performed in general accordance with ASTM D4318. Results of these tests are presented on the boring logs and attached to this appendix.

UNCONFINED COMPRESSIVE STRENGTH

Select drive samples were tested for their relative compressive strength in accordance with ASTM Standard Test Method D 2166. Results are presented as an attachment to this appendix.

MAXIMUM DENSITY AND OPTIMUM MOISTURE

Maximum density and optimum moisture content testing was performed on one bulk sample of the near surface soils to evaluate the compaction characteristics of the onsite soils. Maximum density and optimum moisture content testing was performed in general accordance with ASTM Standard Test Method D1557, Method B. The test result is attached.

DIRECT SHEAR

Select drive samples were tested for direct shear in accordance with ASTM Standard Test Method D 3080. Results are presented as an attachment to this appendix.

R-VALUE

Resistance value (R-value) tests were performed on selected bulk soil samples obtained to evaluate pavement support characteristics of the near-surface onsite soils. R-value tests were performed in accordance with ASTM Standard Test Method D2844. The test results are attached to this appendix.

SOIL CORROSIVITY TESTS

A series of chemical tests were performed on a selected sample of the near-surface soils to estimate pH, resistivity and sulfate and chloride contents. Test results may be used by a qualified corrosion engineer to evaluate the general corrosion potential with respect to construction materials. The tests were performed by Sunland Analytical of Sacramento, CA. The results of the tests are presented in Table 4 of Section 4.9 of the report and attached to this appendix.

TOPSOIL ANALYTICAL TESTS

Topsoil analytical testing was performed on one composite sample of the near-surface soils by Waypoint Analytical of Anaheim, California. The composite topsoil sample was tested for percentages of organic matter, percentages of deleterious material, pH, mineral content, micro and macro nutrient content, and herbicide presence in the soil. Eight discrete topsoil samples were tested for organic contents. The test results are presented in the Waypoint Analytical report attached to this appendix.

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-1	3.0			28.9								
KB-1	11.0	S6		12.9	99.6							
KB-2	3.0	S3	BROWN SILT (ML)	28.1				71				
KB-2	5.0			10.1								
KB-2	6.0	S4		15.6	99.2							
KB-2	7.5			2.1								
KB-2	11.0	S6		10.9	102.2							
KB-3	2.0	S3		6.6								
KB-3	7.5			10.7								
KB-3	11.0	S7		3.8	104.2							
KB-4	0.5	S2		8.4								
KB-4	2.0	S3		5.6								
KB-4	5.0			10.0								
KB-4	8.5	S6		2.6	98.2							
KB-4	10.0	S7	REDDISH BROWN POORLY GRADED SAND (SP)					3.8				
KB-5	3.0			21.0								
KB-5	6.0	S4		15.0	110.0							
KB-5	8.5	S5		11.1	106.8							
KB-5	11.0	S6		11.3	98.1							
KB-5	12.5			10.0								
KB-5	16.0	S8		6.3	101.3							
KB-5	21.0	S10		10.4	114.3							
KB-6	0.5	S2		10.4								
KB-6	2.0			31.8								
KB-6	6.0	S4		5.0	111.8				NP	NP	NP	
KB-6	8.5	S5		6.2	108.5							
KB-6	16.0	S8		8.7	98.9							
KB-7	0.5	S2		10.5								

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic
NA = Not Available

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LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
B-1

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-7	3.0	S3		27.5					NP	NP	NP	
KB-7	6.0	S4		10.7	109.3							
KB-7	18.5	S9		11.7	120.2							
KB-8	6.0	S4		11.9	101.1							
KB-8	11.0	S6		6.2	108.5							
KB-8	12.5	S7	REDDISH YELLOW SILT WITH SAND (ML)					73				
KB-8	21.0	S10		9.0	102.8							
KB-8	22.5	S11	BROWN SILT WITH SAND (ML)					82				
KB-9	0.5	S2		9.5								
KB-9	2.0	S3		11.1								
KB-9	8.5	S5		11.9	100.8							
KB-9	11.0	S6		11.2	100.8			47				
KB-9	15.0			11.1								
KB-9	21.0	S8		6.9	112.0							
KB-9	25.0	S9	BROWN POORLY GRADED SAND (SP)	2.6				3.1				
KB-10	2.0	S3		11.3								
KB-10	6.0	S4	YELLOWISH BROWN SILTY CLAY (CL-ML)	16.5	100.6				26	21	5	
KB-10	8.5	S5		1.4	102.2							
KB-10	11.0	S6		1.1	97.1							
KB-10	15.0			18.3								
KB-11	2.0	S3		9.7								
KB-11	6.0	S4		11.0	100.5							
KB-11	8.5	S5		10.9	99.4							
KB-11	11.0	S6		5.7	106.1							
KB-11	15.0			9.1								
KB-12	0.0	S1		9.0								
KB-12	4.0	S2		4.7	107.1							
KB-12	8.5	S4		9.5	94.0							

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LABORATORY TEST RESULT SUMMARY

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FIGURE
B-2

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-12	10.0			21.5								
KB-13	2.0	S3		3.9								
KB-13	6.0	S4		6.2	105.6							
KB-13	7.5			17.1								
KB-14	1.5	S3		8.9								
KB-14	7.5			5.0								
KB-15	0.5	S2		9.5								
KB-15	3.0			13.9								
KB-15	6.0	S4		13.2	104.4							
KB-15	8.5	S5		11.2	94.5							
KB-15	10.0			16.0					NP	NP	NP	
KB-15	16.0	S7		2.2	109.1							
KB-16	0.5	S2		8.9								
KB-16	2.0	S3		18.5								
KB-16	6.0	S4		10.4	118.1							
KB-16	8.5	S5		7.7	106.2							
KB-17	0.5	S2	REDDISH BROWN SILTY CLAY (CL-ML)	10.1					17	11	6	
KB-17	3.0	S3		9.3								
KB-17	6.0	S4		21.1	102.1							
KB-17	7.5			6.3								
KB-17	11.0	S6		3.1	110.7							
KB-18	2.0			6.9								
KB-18	5.0			32.6								
KB-18	8.5	S6		6.6	102.3							
KB-18	16.0	S8		2.6	112.8							
KB-19	0.5	S2		8.1								
KB-19	3.0			22.1								
KB-19	6.0	S4		23.5								

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LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
B-3

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-20	2.0			21.0								
KB-20	6.0	S4		17.5	103.3							
KB-20	8.5	S5		1.7	103.0							
KB-20	11.0	S6		1.1	101.0							
KB-21	0.0	S1		9.9								
KB-21	3.0	S2	REDDISH YELLOW CLAYEY SAND (SC)					27				
KB-21	6.0	S3		4.3	121.4							
KB-21	11.0	S5		2.3	106.5							
KB-22	2.0	S3		6.3								
KB-22	6.0	S4		14.9	105.6							
KB-22	8.5	S5		9.8	109.3							
KB-22	11.0	S6	YELLOWISH BROWN POORLY GRADED SAND (SP)	3.2	96.4			2.9				
KB-23	0.5	S2		10.1								
KB-23	2.0			16.1								
KB-23	6.0	S4		3.5	107.5							
KB-23	8.5	S5		5.7	103.0							
KB-23	11.0	S6		9.3	103.5							
KB-23	15.0	S7	YELLOWISH BROWN SILTY SAND (SM)					34				
KB-24	1.5			21.5								
KB-24	6.0	S5		19.4	101.3							
KB-24	7.5			3.4								
KB-24	11.0	S7		1.5	116.5							
KB-25	2.0			5.0	113.7							
KB-25	5.0			5.7								
KB-25	8.5	S5		7.5	106.9							
KB-25	10.0			9.5								
KB-25	16.0	S7		1.9	101.9							
KB-26	3.0	S3		23.7								

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
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LABORATORY TEST RESULT SUMMARY

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FIGURE
B-4

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-26	6.0	S4	YELLOWISH BROWN SANDY SILT (ML)	9.0	108.4			64				
KB-26	8.5	S5		9.0	108.4							
KB-27	2.0	S3		12.7								
KB-27	6.0	S4		8.1	103.1							
KB-27	7.5	S5	BROWN POORLY GRADED SAND WITH SILT (SP-SM)					8.7				
KB-27	8.5	S5		5.5	102.5							
KB-28	4.0			5.6	115.2							
KB-28	8.5	S5		11.7	108.8							
KB-29	6.0	S4		6.8	112.2							
KB-29	8.5	S5		4.3	96.2							
KB-29	11.0	S6		9.8	105.1							
KB-30	0.5	S2		10.9								
KB-30	2.5	S3	REDDISH BROWN CLAYEY SAND (SC)	10.8				34				
KB-30	6.0	S4		9.0	104.1							
KB-30	8.5	S5		1.1	90.4							
KB-31	2.0	S3		8.8								
KB-31	6.0	S4		17.5	98.3							
KB-31	7.5	S5	BROWN POORLY GRADED SAND WITH SILT (SP-SM)					13				
KB-31	11.0	S6		2.8	100.2							
KB-32	0.5	S2		8.8								
KB-32	2.0	S3		6.4								
KB-32	4.0			4.0	119.6							
KB-32	8.5	S5		2.5	113.3							
KB-32	11.0	S6	BROWN POORLY GRADED SAND (SP)					6.2				
KB-33	0.5	S2		10.0								
KB-33	4.0			14.5								
KB-33	8.5	S5		6.6	105.2							
KB-33	11.0	S6	REDDISH YELLOW SILTY SAND (SM)					25				

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LABORATORY TEST RESULT SUMMARY

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FRESNO, CALIFORNIA 93722

FIGURE
B-5

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-33	16.0	S8		5.3								
KB-34	2.0	S3	BROWNINSH GRAY SILTY CLAY (CL-ML)	9.0					19	14	5	
KB-34	6.0	S4		12.9	106.8							
KB-34	8.5	S5		19.4	98.2							
KB-34	11.0	S6		8.3	112.4							
KB-34	15.0	S7	LIGHT GRAY SILTY SAND (SM)					22				
KB-34	26.0	S10		3.8	95.3							
KB-34	31.0	S11	LIGHT GRAY SILT WITH SAND (ML)	7.9				76				
KB-35	0.5	S2		6.7								
KB-35	5.0	S4	BROWN POORLY GRADED SAND WITH GRAVEL (SP)	3.5				6.9				
KB-35	8.5	S5		1.5	103.7							
KB-37	0.5	S2		10.8								
KB-37	2.0	S3		10.3								
KB-37	5.0	S4		4.3								
KB-37	8.5	S5		1.8	99.3							
KB-38	6.0	S4		5.6	119.7							
KB-38	7.5	S5		10.5								
KB-38	11.0	S6		1.9	101.2							
TP-10	5.0	2										Corrosion
TP-11	0.0	1		2.8								
TP-11	4.0	3	BROWN SILT WITH SAND (ML)	13.3					NP	NP	NP	
TP-12	0.0	1		3.1								
TP-12	3.0	3		23.7								
TP-13	0.0	1		3.2								
TP-14	0.0	1		2.9								
TP-15	0.0	1	YELLOWISH BROWN SANDY LEAN CLAY (CL)	2.6					17	15	2	
TP-16	0.0	1	BROWN SANDY SILT (ML)	3.8					19	17	2	
TP-16	4.0	3		4.6								

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic
NA = Not Available

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/10/2021

LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
B-6

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-17	0.0	1		2.0								
TP-18	0.0	1		3.8								
TP- 2	0.0	1	BROWN POORLY GRADED SAND WITH SILT (SP-SM)									**R-Value=** 75
TP- 2	4.5	2										Corrosion
TP- 4	0.0	1	REDDISH BROWN SANDY SILT (ML)									**Proctor - ASTM D1557 Method A=**
												Maximum Dry Unit Weight: 128.5 pcf
												Optimum Water Content: 8.2%
TP- 6	5.0	2										Corrosion
TP- 7	0.0	1	DARK BROWN POORLY GRADED SAND WITH SILT (SP-SM)									**R-Value=** 75
TP- 9	0.0	1	REDDISH BROWN SANDY SILT (ML)									**Proctor - ASTM D1557 Method A=**
												Maximum Dry Unit Weight: 133.8 pcf
												Optimum Water Content: 7.2%
TP- 9	5.0	2										Corrosion

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic
NA = Not Available

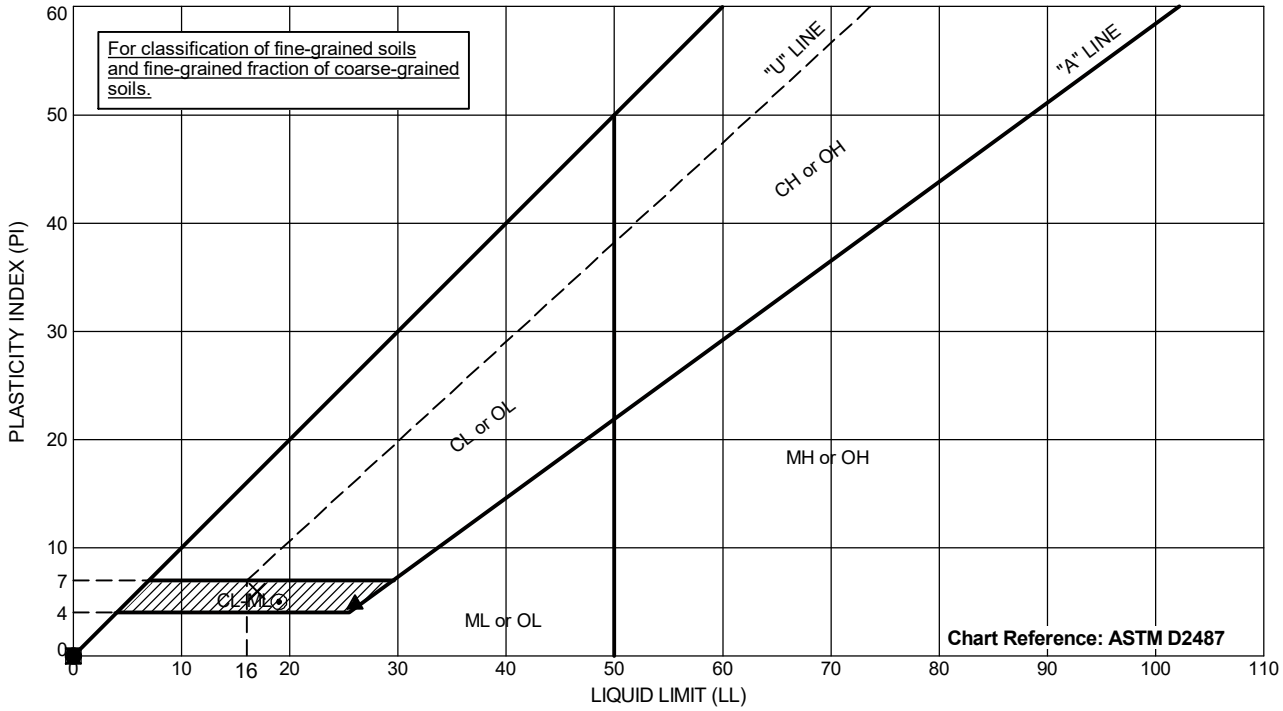
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/10/2021

LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
B-7



Exploration ID		Depth (ft.)	Sample Number	Sample Description	Passing #200	LL	PL	PI
●	KB-6	6	S4		NM	NP	NP	NP
⊠	KB-7	3	S3		NM	NP	NP	NP
▲	KB-10	6	S4	YELLOWISH BROWN SILTY CLAY (CL-ML)	NM	26	21	5
×	KB-17	0.5	S2	REDDISH BROWN SILTY CLAY (CL-ML)	NM	17	11	6
⊙	KB-34	2	S3	BROWNISH GRAY SILTY CLAY (CL-ML)	NM	19	14	5

Testing performed in general accordance with ASTM D4318.
NP = Nonplastic
NA = Not Available
NM = Not Measured

KLEINFELDER
Bright People. Right Solutions.

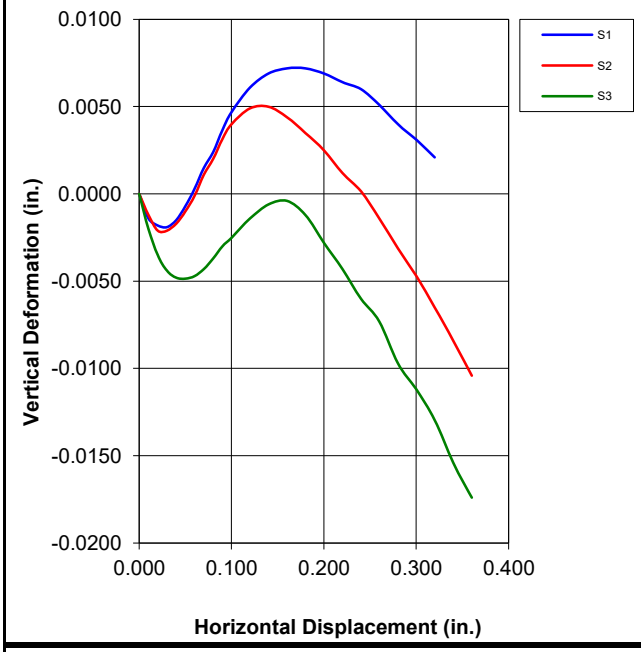
PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

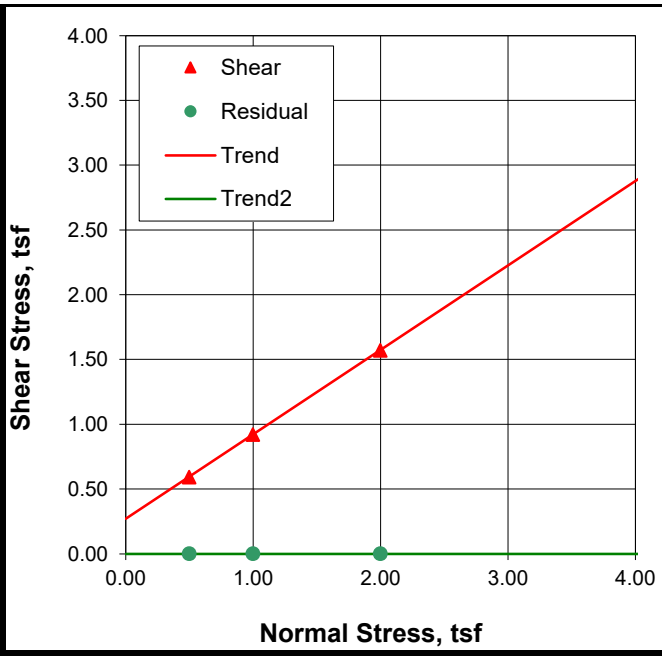
ATTERBERG LIMITS

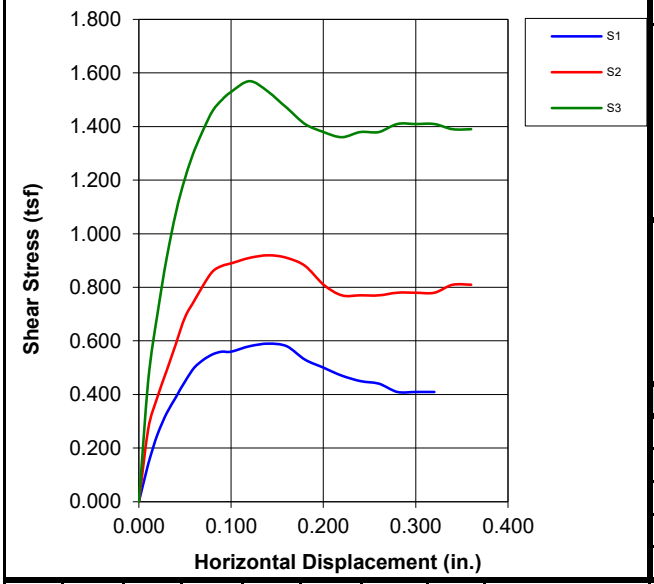
COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

B-8







Specimen Number		1	2	3	4
Initial	Water Content, %	3.8	3.3	3.5	
	Dry Density, pcf	104.6	106.4	105.7	
	Void Ratio	0.611	0.584	0.595	
	Saturation, %	16.9	15.2	15.7	
	Diameter, in	2.42	2.42	2.42	
	Height, in	0.96	0.96	0.96	
At Test	Water Content, %	20.5	21.4	20.4	
	Dry Density, pcf	112.2	111.3	112.5	
	Void Ratio	0.491	0.506	0.500	
	Diameter, in	2.42	2.42	2.42	
	Height, in	0.89	0.91	0.90	
Maximum Shear Stress, tsf		0.59	0.92	1.57	
Residual Shear Stress, tsf		na	na	na	
Hoizontal Displacment, in.		0.140	0.140	0.120	
Normal Stress, tsf		0.50	1.00	2.00	
Strain Rate, in./min.		0.005	0.005	0.005	

LL:	nm	PL:	nm	PI:	nm	G_S:	2.70	Assumed

	c, tsf	ϕ, deg.	Tan ϕ
Failure	0.3	33.1	0.65
Residual	na	na	na

Test Conditions: Undisturbed / Inundated

Specimen 1: Light Brownish Gray Sandy Silt

Specimen 2: Light Brownish Gray Sandy Silt

Specimen 3: Light Brownish Gray Sandy Silt

Boring:	KB-8
Sample:	S4
Depth, ft:	8
Test Date:	3/5/21

Remarks: nm = not measured, na = not applicable

The determination of strength envelopes and the development of relationships to aid in interpreting and evaluating test results are beyond the scope of this test method. The user of this report retains the sole responsibility to evaluate and approve any interpreted values from the testing.

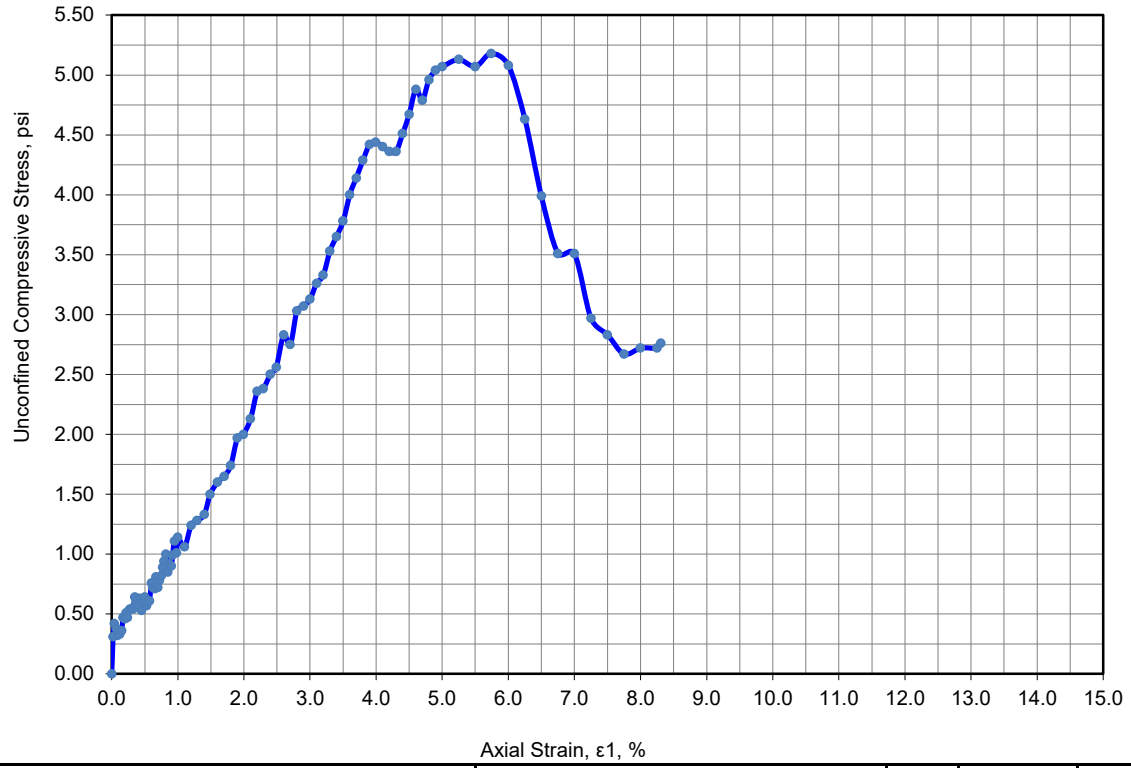
KLEINFELDER
Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.: 20212905
ENTRY BY: A. Catanuso
CHECKED BY:
DATE: 3/8/21

DIRECT SHEAR TEST ASTM D3080

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RVIERSIDE DR
FRESNO, CALIFORNIA 93722

FIGURE
B-9



Specimen Failure Picture				
	Specimen No.			1
	Initial	Diameter, in	D_O	2.40
		Height, in	H_O	5.29
		Height to Diameter Ratio		2.21
		Water Content, %	ω_O	9.6
		Dry Density, lbs/ft^3	γd_o	93.1
		Saturation, %	S_O	32.0
		Void Ratio	e_O	0.810
	Time to Failure, min.		t_f	5.8
	Unconfined Compressive Strength, psi		q_u	5.18
	Shear Strength, psi		s_u	2.59
	Strain at Failure, %		ε_f	5.7
	Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Light Brownish Gray SILT

Amount of Material Finer than the No. 200, %: nm

LL:	PL:	PI:	G_S:	Specimen Type:	Test Method:
nm	nm	nm	2.70 Assumed	Intact	ASTM D2166

Boring:	KB-8
Sample:	S8
Depth, ft:	16.0
Test Date:	3/11/21

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

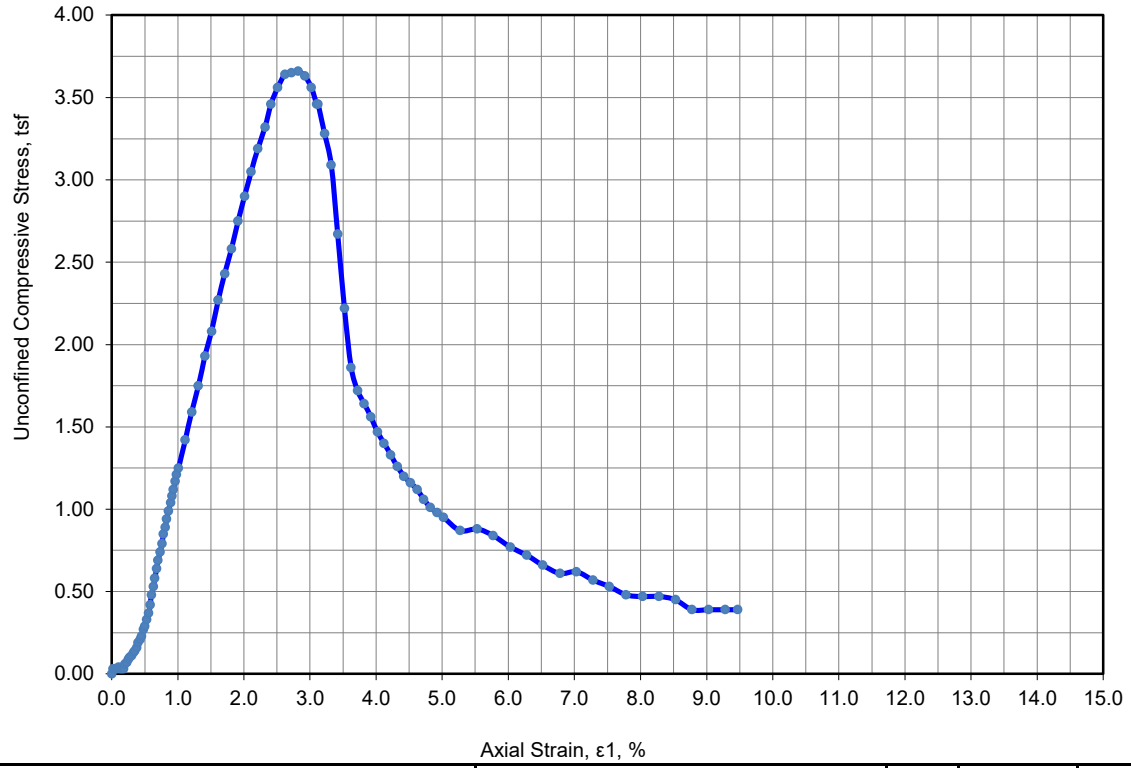
PROJECT NO.:	20212905
ENTRY BY:	A Catanuso
CHECKED BY:	J. Slinkard
DATE:	3/15/2021

UNCONFINED COMPRESSION TEST (UC)

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RVIERSIDE DR
FRESNO, CALIFORNIA 93722

FIGURE

B-10



Specimen Failure Picture

Specimen No.			1
Initial	Diameter, in	D_O	2.41
	Height, in	H_O	5.03
	Height to Diameter Ratio		2.08
	Water Content, %	ω_O	21.7
	Dry Density, lbs/ft^3	γd_o	100.8
	Saturation, %	S_O	87.4
	Void Ratio	e_O	0.672
Time to Failure, min.		t_f	5.6
Unconfined Compressive Strength, tsf		q_u	3.66
Shear Strength, tsf		s_u	1.83
Strain at Failure, %		ε_f	2.8
Average Rate of Strain to Failure, %/min		$\dot{\varepsilon}$	0.5

Description of Specimen: Light Brownish Gray SILT

Amount of Material Finer than the No. 200, %: nm

LL:	PL:	PI:	G_S:	Specimen Type:	Test Method:
nm	nm	nm	2.70 Assumed	Intact	ASTM D2166

Boring:	KB-7
Sample:	S7
Depth, ft:	13.5
Test Date:	3/11/21

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20212905
ENTRY BY:	A Catanuso
CHECKED BY:	J. Slinkard
DATE:	3/15/2021

UNCONFINED COMPRESSION TEST (UC)

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RVIERSIDE DR
FRESNO, CALIFORNIA 93722

FIGURE

B-11

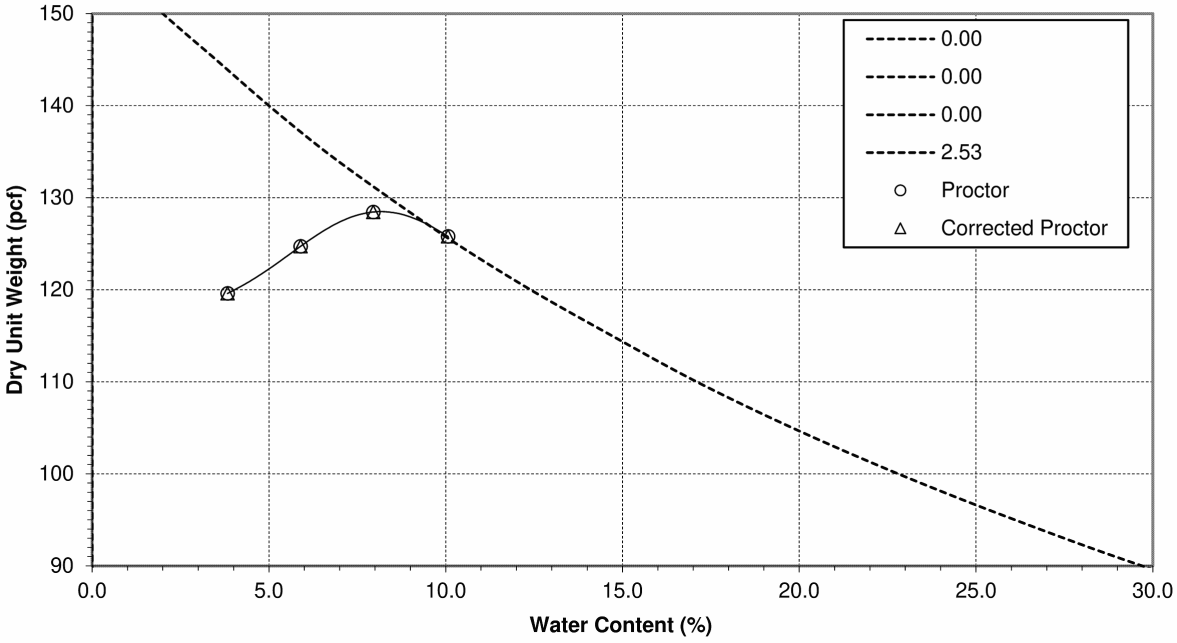
Laboratory Test Report

Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/29/2021** by **J. Carmichael**

Material Description: **Reddish Brown Sandy Silt**

Location: **TP - 4 @ 0'-3'**



Test Method: ASTM D1557 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	**128.5**	**na**
Optimum Water Content (%)	**8.2**	**na**
Oversize Fraction, retained on #4 (%)		**<5**
Bulk Specific Gravity of Oversize Fraction		**na**

Rammer Type: Manual

Specimen Preparation: Moist

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

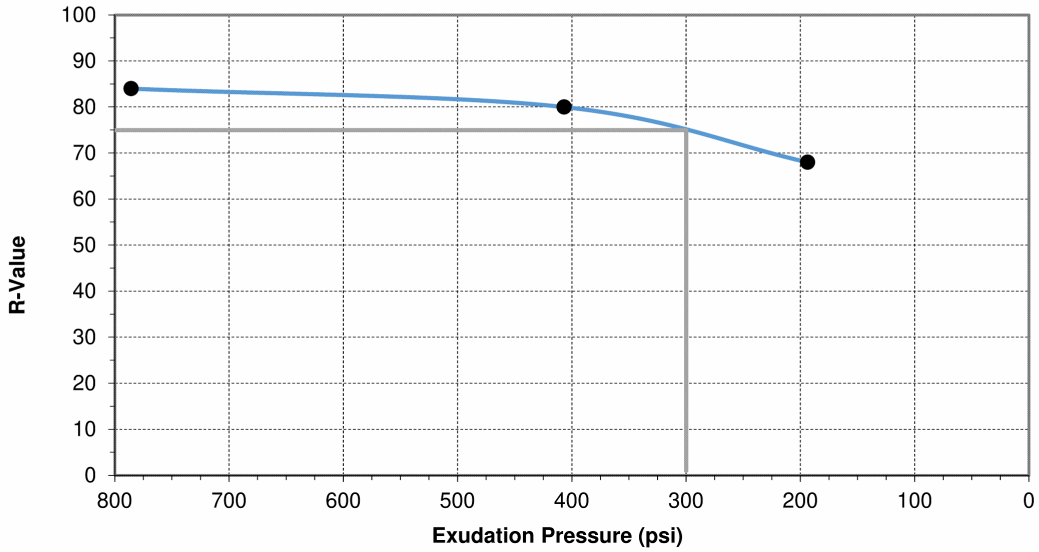
Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/28/2021** by **K. DeSouza**

Test Method: **ASTM D2844**

Material Description: **Yellowish Brown Poorly Graded SAND with silt and gravel**

Specific Location: **TP-2 0'-3'**



Briquette No.	A	B	C
Dry Unit Weight at Test (pcf)	126.7	125.3	125.8
Expansion Pressure (psf)	35	74	113
Exudation Pressure (psi)	194	407	786
Moisture at Time of Test (%)	9.1	8.7	8.2
Resistance Value	68	80	84
R - VALUE AT 300 PSI EXUDATION PRESSURE:			**75**

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

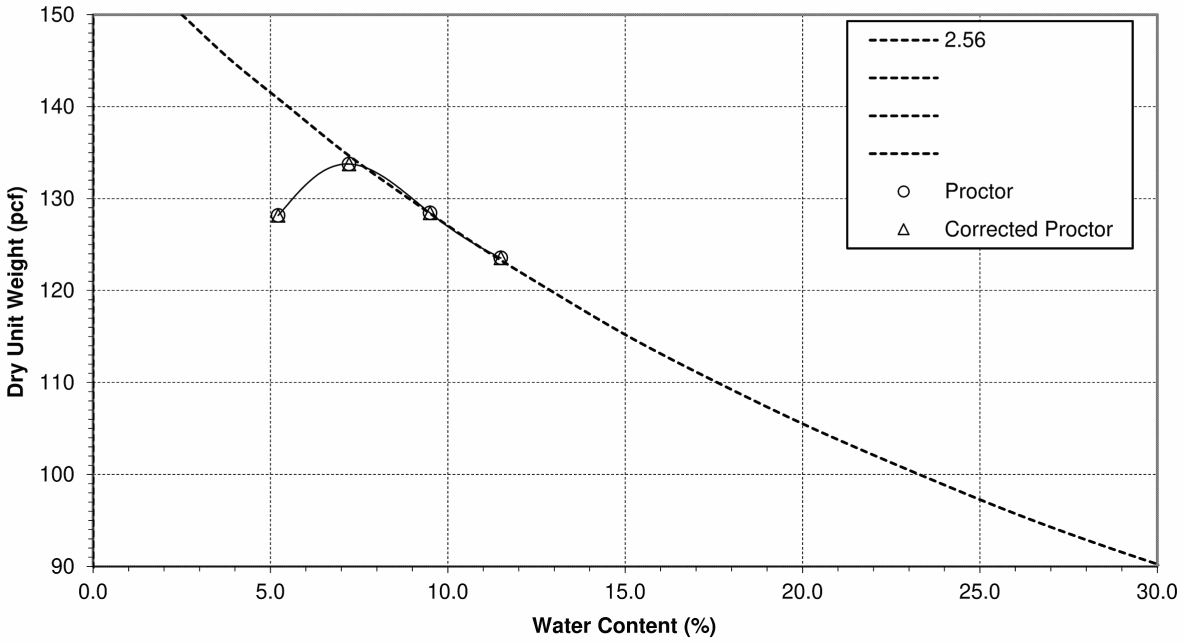
Laboratory Test Report

Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/29/2021** by **K. DeSouza**

Material Description: **Reddish Brown Sandy Silt**

Location: **TP-9 @ 0'-3'**



Test Method: ASTM D1557 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	**133.8**	**na**
Optimum Water Content (%)	**7.2**	**na**
Oversize Fraction, retained on #4 (%)		**<5**
Bulk Specific Gravity of Oversize Fraction		**na**

Rammer Type: Manual

Specimen Preparation: Moist

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

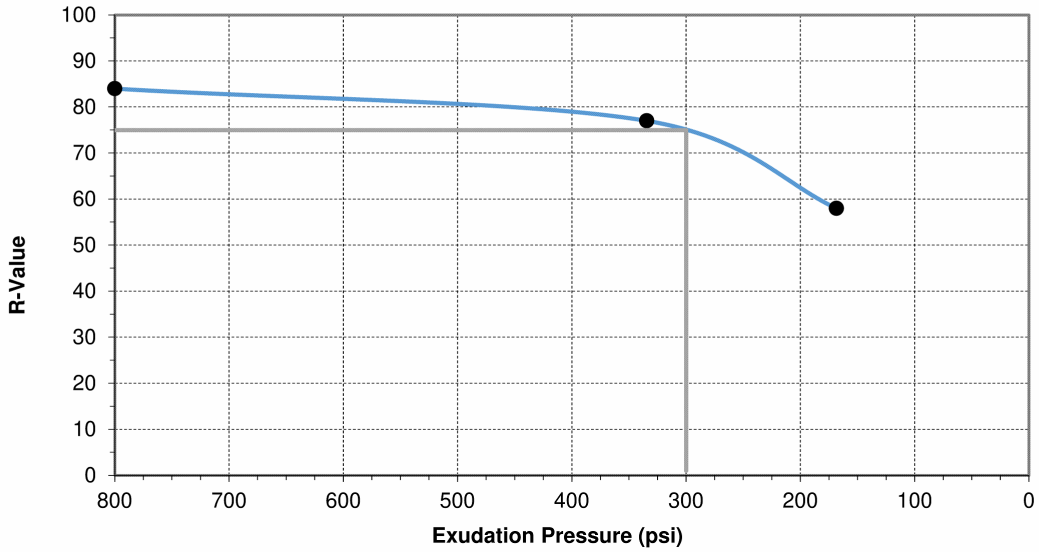
Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/28/2021** by **K. DeSouza**

Test Method: **ASTM D2844**

Material Description: **Dark Brown Poorly Graded SAND with silt**

Specific Location: **TP-7 0'-3'**



Briquette No.	A	B	C
Dry Unit Weight at Test (pcf)	121.0	121.3	121.2
Expansion Pressure (psf)	0	39	74
Exudation Pressure (psi)	168	334	800
Moisture at Time of Test (%)	11.1	10.2	9.3
Resistance Value	58	77	84
R - VALUE AT 300 PSI EXUDATION PRESSURE:			**75**

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21
Boring No. / Location: INF-1
Sample ID: 21-SAC-00367
Sample Depth, ft.: 3.5
Material Description: Brownish Gray Sandy Silt
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	90
No. 20	88
No. 40	80
No. 60	73
No. 140	59
No. 200	53.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.029	38.0
0.019	32.6
0.012	27.2
0.008	22.6
0.006	19.9
0.003	15.4
0.001	12.7

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-2
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	96
No. 20	88
No. 40	68
No. 60	53
No. 140	41
No. 200	37.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.031	25.0
0.021	19.2
0.012	14.4
0.009	11.5
0.006	9.6
0.003	7.7
0.001	5.8

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-3
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	98
No. 20	90
No. 40	71
No. 60	59
No. 140	43
No. 200	34.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.033	15.5
0.022	11.6
0.013	7.8
0.009	6.8
0.006	5.8
0.003	3.9
0.001	2.9

Specific Gravity:	2.7 Assumed

Reviewed By: _____

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20211905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-4
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	98
No. 20	90
No. 40	72
No. 60	58
No. 140	40
No. 200	31.9

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.034	14.6
0.022	10.7
0.013	7.8
0.009	6.8
0.006	5.8
0.003	4.9
0.001	3.9

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Sunland Analytical

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

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

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

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-2 BAG @4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174954.

EVALUATION FOR SOIL CORROSION

Soil pH	7.41	
Minimum Resistivity	4.02 ohm-cm (x1000)	
Chloride	3.4 ppm	00.00034 %
Sulfate	7.8 ppm	00.00078 %

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

Sunland Analytical

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

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

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

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-4 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174955.

EVALUATION FOR SOIL CORROSION

Soil pH	7.33	
Minimum Resistivity	6.16 ohm-cm (x1000)	
Chloride	3.0 ppm	00.00030 %
Sulfate	11.5 ppm	00.00115 %

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

Sunland Analytical

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

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

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

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-6 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174956.

EVALUATION FOR SOIL CORROSION

Soil pH	6.87	
Minimum Resistivity	3.48 ohm-cm (x1000)	
Chloride	2.8 ppm	00.00028 %
Sulfate	25.9 ppm	00.00259 %

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

Sunland Analytical

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Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

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

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-9 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174957.

EVALUATION FOR SOIL CORROSION

Soil pH	6.43	
Minimum Resistivity	10.45 ohm-cm (x1000)	
Chloride	0.8 ppm	00.00008 %
Sulfate	1.0 ppm	00.00010 %

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

Sunland Analytical

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

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

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

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-10 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174958.

EVALUATION FOR SOIL CORROSION

Soil pH	6.72	
Minimum Resistivity	7.24 ohm-cm (x1000)	
Chloride	0.9 ppm	00.00009 %
Sulfate	4.6 ppm	00.00046 %

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

SUNLAND ANALYTICAL LAB
11419 Sunrise Gold Cr., Ste.10
Rancho Cordova, CA 95742
(916)852-8557

INVOICE

Inv.No. 103917

Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

Date 02/03/2021
Terms: NET 30, 30+ 15%
Customer P.O.#
Requestor: Dockendorf

ATTENTION ACCOUNTS PAYABLE

* Please indicate Invo.# on remittance

SUN NOS.	SAMPLE LOCATION		ANALYSIS	PRICE
174954	20212905.001A	TP-2 BAG @4-6	CTP.1	144.00
174955	20212905.001A	TP-4 BAG @ 4-6	CTP.1	144.00
174956	20212905.001A	TP-6 BAG @ 4-6	CTP.1	144.00
174957	20212905.001A	TP-9 BAG @ 4-6	CTP.1	144.00
174958	20212905.001A	TP-10 BAG @ 4-6	CTP.1	144.00
		********* Total *********		720.00

Anaheim Office
March 19, 2021
Report 21-068-0006

Kleinfelder, Inc.
380 North First Street
Suite A
San Jose CA 95112

Attn: Dan Dockendorf

RE: Costco Fresno - New Warehouse & Fuel GEO Fresno, CA Job #: 20212905.001A

Background

One composite sample was processed on March 09, 2021 identified as soil from areas where new landscaping is scheduled for installation. Fertilizer and amendment recommendations were requested. The sample was analyzed for horticultural suitability, fertility and physical characteristics. The results of the analyses are attached. Organic matter testing was run separately on individual subsamples and these results are also attached.

Analytical Results and Comments

The reaction of the sample is slightly acidic at a pH of 6.3 with free lime favorably absent. These levels are within the range preferred for most plants. Salinity (ECe), sodium, chloride and boron are safely low. The sodium adsorption ratio (SAR) indicates that sodium is adequately balanced by soluble calcium and magnesium; this balance is important for soil structure quality, which relates to the rate at which water infiltrates the soil. Extractable aluminum is low.

According to the USDA Soil Classification system, the texture of the less than 2mm fraction of the soil is classified as sandy loam. Organic matter content is low at 0.66% dry weight. Based on this information the estimated infiltration rate is moderate at 0.35 inch per hour. Infiltration rates may vary due to differences in compaction across the site.

In terms of soil fertility, phosphorus is low and nitrogen is slightly below optimum. All of the other major nutrients are sufficient for proper plant nutrition at this time. Of the micronutrients; manganese is sufficient. Copper, zinc and iron are low.

Recommendations

Incorporation of nitrogen and phosphorus fertilizer is recommended at the time of planting. Incorporation of a nitrogen stabilized organic amendment or composted greenwaste product is recommended in order to improve soil nutrient holding capacity and porosity. If a composted greenwaste amendment is chosen, that would provide additional phosphorus and potassium as well as supplemental micronutrients, product depending.

The primary symptom of zinc and iron deficiencies is a general yellowing of leaves with veins remaining green. In severe cases, leaves may become pale yellow or whitish, but veins remain green. Brown spots may develop between veins and leaf margins may turn brown. Zinc deficiencies typically appear first on older, interior leaves. Iron deficiency shows first and more severely on the newer growth at branch tips. If these symptoms are present after plant installation they may be treated with an application of a chelated

micronutrient product at the manufacturer's recommended rate. Incorporation of a composted greenwaste amendment would also provide additional micronutrients and may be sufficient to negate any deficiency, product depending.

Boron is safely low for general ornamental plants and may be below optimum levels for plant nutritional purposes. Irrigation water often supplies sufficient boron to meet plant nutritional requirements. However, if boron is low in the irrigation water and/or plants show symptoms of boron deficiency after they are well established, you may consider an application of a product containing boron at the manufacturer's label rate. Boron deficiency symptoms often include stunted or deformed younger growth and tight internodes. Tissue testing can be performed to identify a boron deficiency if it is suspected. Incorporation of a composted greenwaste amendment may be sufficient to negate this deficiency, product depending.

To Prepare for Mass Planting:
Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The following materials should then be evenly spread and thoroughly blended with the top 6 inches of soil to form a homogenous layer:

Amount per 1000 Square Feet	
5 cubic yards	Nitrogen Stabilized Organic Amendment*
9 pounds	Ammonium Phosphate (16-20-0)*

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. of dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that provides a substantial amount of phosphorus, the ammonium phosphate should be replaced with ammonium sulfate (21-0-0) at a 7 pound rate.

To Prepare Backfill For Trees and Shrubs:

- Excavate planting pits at least twice as wide as the diameter of the rootball.
- Soil immediately below the rootball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.
- The top of the rootball should be at or slightly above final grade.
- The top 12 inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

3 parts	Site Soil
1 part	Nitrogen Stabilized Organic Amendment*

Uniformly blended with:

Amount / Cubic Yard of Backfill	
1/2 pound	Ammonium Phosphate (16-20-0)*

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. of dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that provides a substantial amount of phosphorus, the ammonium phosphate should be replaced with ammonium sulfate (21-0-0) at a 1/3 lb. per cubic yard rate.

- Backfill below 12 inches required for 24 inch box or larger material should not contain the organic amendment or fertilizer.
- Ideally a weed and turf free zone should be maintained just beyond the diameter of the planting hole. A 2-4 inch deep layer of coarse mulch can be placed around the tree or shrub. Mulch should be kept a minimum 4 inches from the trunk.
- Irrigation of new plantings should take into consideration the differing texture of the rootball substrate and surrounding soil matrix to maintain adequate moisture during this critical period of establishment.

Maintenance

Maintenance fertilization should rely primarily on a nitrogen only program supplemented with a complete fertilizer in the fall and spring. Beginning 60 days after planting, ammonium sulfate (21-0-0) should be applied at a rate of 5 pounds per 1000 square feet with reapplication every 45-60 days. Alternatively, slow release Sulfur Coated Urea (43-0-0) may be applied at 6 pounds per 1000 square feet every 90 days. Once plants are performing satisfactorily, the frequency of fertilization may be decreased depending on color and rate of growth desired. In the winter for a quick greening effect, calcium nitrate (15.5-0-0) may be applied at a 6 pound rate if applicable. Early fall and spring, substitute a complete fertilizer such as 15-15-15 to help insure continuing adequate phosphorus and potassium.

Alternatively, Blood Meal (12-0-0) provides available nitrogen fairly rapidly while materials such as Feather Meal (12-0-0), Soybean or Cotton Seed Meal (7-1-1) are slower to provide available nitrogen, but they extend the length of time they make this contribution. In order to provide a good supply of nitrogen for a 3-4 month time frame a good combination would be 6 pounds Blood Meal and 14 pounds Feather Meal per 1000 square feet. In the fall and spring, substitute a complete organic fertilizer such as 5-5-5 applied at the manufacturer's label rate. Or, nutrient rich composted greenwaste may be spread in a 1 to 2 inch layer, which generally carries enough nutrition to boost complete nutrition though a source of nitrogen might also be added at a half rate to assure adequate nitrogen availability.

If we can be of any further assistance, please feel free to contact us.

Joe Kiefer, CCA

jkiefer@waypointanalytical.com

Emailed 20 Pages: ddockendorf@kleinfelder.com

Report Number
21-068-0006

Account Number
01944

4741 East Hunter Ave. Suite A
Anaheim, CA 92807
Main 714-282-8777 ° Fax 714-282-8575
www.waypointanalytical.com

Send To: Kleinfelder, Inc.
380 North First Street
Suite A
San Jose, CA 95112

Purchase Order: 20212905.001A
Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22841
Sample ID: KB 1 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	1.25		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22842
Sample ID: KB 1 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.74		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22843
Sample ID: KB 14 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.98		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22844
Sample ID: KB 14 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.38		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22845
Sample ID: KB 18 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.91		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22846
Sample ID: KB 18 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.76		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22847
Sample ID: KB 25 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	1.19		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22848
Sample ID: KB 25 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.32		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22849
Sample ID: KB 27 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.59		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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San Jose, CA 95112

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Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22850
Sample ID: KB 27 - S2- 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.60		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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21-068-0006

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Report Date: 03/15/2021
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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22851
Sample ID: KB 28 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.94		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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Report Date: 03/15/2021
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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22852
Sample ID: KB 28 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.52		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22853
Sample ID: KB 36 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.60		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22854
Sample ID: KB 36 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.36		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Report Date: 03/15/2021
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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22855
Sample ID: KB 38 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.88		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22856
Sample ID: KB 38 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.39		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

COMPREHENSIVE SOIL ANALYSIS

Report No : **21-068-0006**
Purchase Order : 20212905.001A
Date Recd : 03/09/2021
Date Printed : 03/15/2021

Sample Description - Sample ID	Half Sat %	pH	ECe dS/m	NO_3-N ppm	NH_4-N ppm	PO_4-P ppm	K ppm	Ca ppm	Mg ppm	Cu ppm	Zn ppm	Mn ppm	Fe ppm	Organic % dry wt.	Lab No.
	TEC	Qual Lime		Sufficiency Factors											
Composite	12	6.3	0.3	10	7	2	126	938	216	0.3	0.9	4	8	0.66	22857
	67	None		0.7		0.1	1.8	1.0	1.8	0.4	0.3	0.7	0.3		

Saturation Extract Values						SAR	Gravel %		Percent of Sample Passing 2 mm Screen					USDA Soil Classification	Lab No.
									Sand						
Ca meq/L	Mg meq/L	Na meq/L	K meq/L	B ppm	SO_4 meq/L		Coarse 5 - 12	Fine 2 - 5	Very Coarse 1 - 2	Coarse 0.5 - 1	Med. to Very Fine 0.05 - 0.5	Silt .002-.05	Clay 0-.002		
2.7	0.9	0.5	0.3	0.09	0.7	0.4	0	0.6	6.6	12.4	41.1	20.8	19.0	Sandy Loam	22857

22857 Chloride (Cl) = 0.470 meq/L
22857 Aluminum = 2.18 meq/L

Sufficiency factor (1.0=sufficient for average crop) below each nutrient value. N factor based on 200 ppm constant feed. SAR = Sodium adsorption ratio. Half Saturation %=approx field moisture capacity. Nitrogen(N), Potassium(K), Calcium(Ca) and Magnesium(Mg) by sodium chloride extraction. Phosphorus(P) by sodium bicarbonate extraction. Copper(Cu), Zinc(Zn), Manganese(Mn) & Iron(Fe) by DTPA extraction. Sat. ext. method for salinity (ECe as dS/m),Boron (B), Sulfate(SO_4), Sodium(Na). Gravel fraction expressed as percent by weight of oven-dried sample passing a 12mm(1/2 inch) sieve. Particle sizes in millimeters. Organic percentage determined by Walkley-Black or Loss on Ignition.

* LOW , SUFFICIENT , HIGH

4741 East Hunter Ave. Suite A
Anaheim, CA 92807
Main 714-282-8777 ° Fax 714-282-8575
www.waypointanalytical.com

Sample Summary Table

Report Number: **21-068-0005**

Client Project Description: **Costco Fresno - New Warehouse & Fuel GEO**
Fresno, CA
Job #: 20212905.001A

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
89358	Composite	Formulation		03/09/2021	SW-7471A	
89358	Composite	Formulation		03/09/2021	SW-DRYWT	
89358	Composite	Formulation		03/09/2021	6010D	

: A&L Analytical Laboratories, Inc., Memphis, TN

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4741 East Hunter Ave. Suite A
Anaheim, CA 92807
Main 714-282-8777 ° Fax 714-282-8575
www.waypointanalytical.com

01944
Kleinfelder, Inc.
380 North First Street
Suite A
San Jose , CA 95112

Project Information : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

Report Number : **21-068-0005**

REPORT OF ANALYSIS

Report Date : 03/17/2021
Received : 03/09/2021

Lab No : **89358**
Sample ID : **Composite**

Matrix: **Formulation**
Sampled:

Analytical Method: 6010D
Prep Method: 3050B

Prep Batch(es): **L541320** 03/15/21 08:42

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Barium	**76.6**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Copper	**11.6**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Arsenic	**3.99**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Silver	<1.34	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Chromium	**19.5**	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Cadmium	<0.536	mg/Kg - dry	0.536	5	03/16/21 18:46	TJS	L541650
Total Cobalt	**6.25**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Molybdenum	<1.34	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Nickel	**14.1**	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Lead	**7.00**	mg/Kg - dry	1.61	5	03/16/21 18:46	TJS	L541650
Total Selenium	<2.68	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Zinc	**32.1**	mg/Kg - dry	6.70	5	03/16/21 18:46	TJS	L541650
Total Beryllium	**0.772**	mg/Kg - dry	0.268	5	03/16/21 18:46	TJS	L541650
Total Antimony	<2.68	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Thallium	<5.36	mg/Kg - dry	5.36	5	03/16/21 18:46	TJS	L541650
Total Vanadium	**42.8**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650

Qualifiers/ Definitions

B Analyte detected in blank
DF Dilution Factor
MQL Method Quantitation Limit

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4741 East Hunter Ave. Suite A
Anaheim, CA 92807
Main 714-282-8777 ° Fax 714-282-8575
www.waypointanalytical.com

01944
Kleinfelder, Inc.
380 North First Street
Suite A
San Jose , CA 95112

Project Information : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

Report Number : **21-068-0005**

REPORT OF ANALYSIS

Report Date : 03/17/2021
Received : 03/09/2021

Lab No : **89358**
Sample ID : **Composite**

Matrix: **Formulation**
Sampled:

Analytical Method: SW-7471A **Prep Batch(es):** **L541464** 03/16/21 11:00
Prep Method: SW-7471A (PREP)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Mercury (Total)	**0.05540** B	mg/Kg - dry	0.01425	1	03/16/21 13:54	DDB	L541729

Analytical Method: SW-DRYWT

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	**6.68**	%		1	03/15/21 17:50	FMM	L541529

Qualifiers/ Definitions

B Analyte detected in blank
MQL Method Quantitation Limit
DF Dilution Factor

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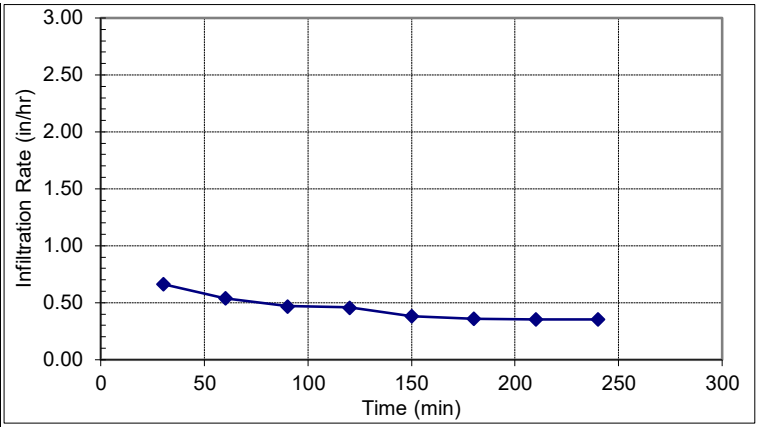
Appendix C

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-1

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
30	30.00	0.53	4.76	0.67
30	60.00	0.43	5.77	0.54
30	90.00	0.38	6.6	0.47
30	120.00	0.37	6.7	0.46
30	150.00	0.31	8.0	0.38
30	180.00	0.30	8.4	0.36
30	210.00	0.29	8.6	0.35
30	240.00	0.29	8.5	**0.36**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.00	Final period drop delta d (in):	3.52
Starting water level (ft, bgs):	3.00	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.50	Diameter of boring (in):	6
Water column height Ho (in):	30		

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Project No.: 20212905.001A

Boring Percolation Test Method

Costco Fresno New Warehouse
NEC of W. Herndon Ave & North Riverside Dr.
Fresno, California 93722

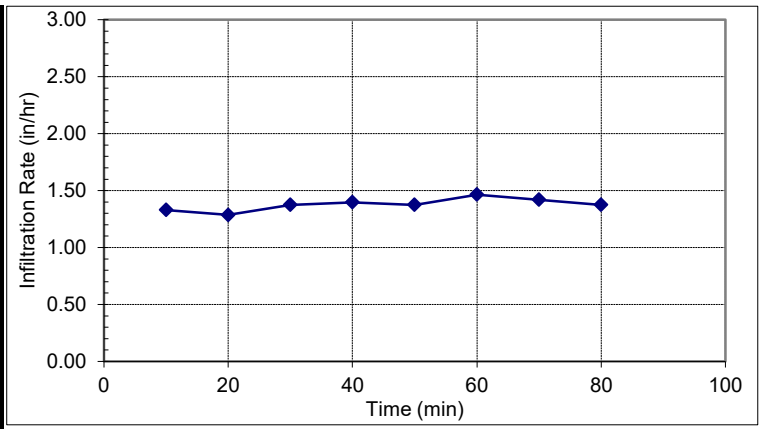
Figure
C-1

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-2

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.32	2.60	1.33
10	20.00	0.31	2.69	1.29
10	30.00	0.33	2.5	1.38
10	40.00	0.34	2.5	1.40
10	50.00	0.33	2.5	1.38
10	60.00	0.35	2.4	1.47
10	70.00	0.34	2.5	1.42
10	80.00	0.33	2.5	**1.38**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.0	Final period drop delta d (in):	3.96
Starting water level (ft, bgs):	3.0	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.20	Diameter of boring (in):	6
Water column height Ho (in):	26.4		

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Fresno, California 93722

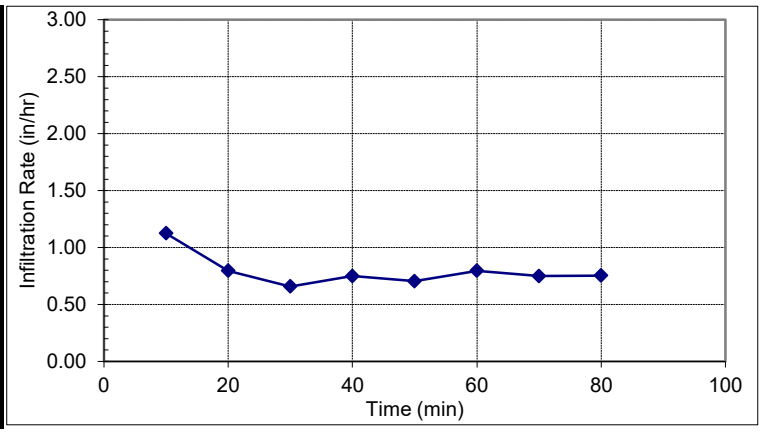
Figure
C-2

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-3

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.25	3.33	1.13
10	20.00	0.18	4.63	0.80
10	30.00	0.15	5.6	0.66
10	40.00	0.17	4.9	0.75
10	50.00	0.16	5.2	0.70
10	60.00	0.18	4.6	0.80
10	70.00	0.17	4.9	0.75
10	80.00	0.17	4.9	**0.75**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.0	Final period drop delta d (in):	2.05
Starting water level (ft, bgs):	3.0	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.00	Diameter of boring (in):	6
Water column height Ho (in):	24		

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Project No.: 20212905.001A

Boring Percolation Test Method

Costco Fresno New Warehouse
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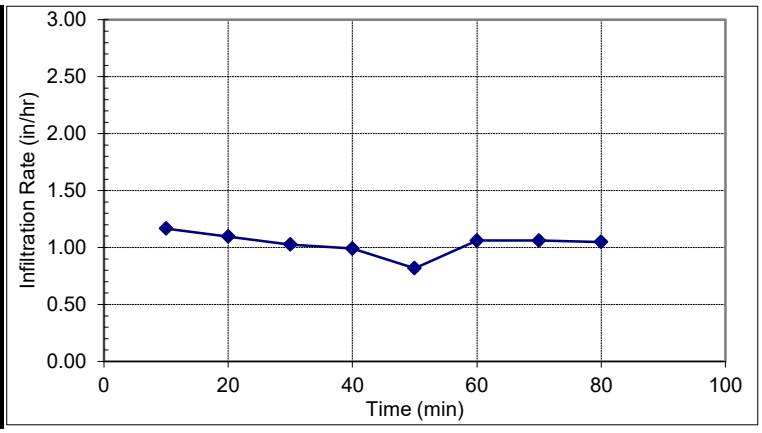
Figure
C-3

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-4

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.35	2.38	1.17
10	20.00	0.33	2.53	1.10
10	30.00	0.31	2.7	1.03
10	40.00	0.30	2.8	0.99
10	50.00	0.25	3.3	0.82
10	60.00	0.32	2.6	1.06
10	70.00	0.32	2.6	**1.06**
10	80.00	0.32	2.6	**1.05**



$$I_t = \frac{\Delta H\ \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	2.5	Final period drop delta d (in):	3.8
Starting water level (ft, bgs):	2.5	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.25	Diameter of boring (in):	6
Water column height Ho (in):	33		

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Project No.: 20212905.001A

Boring Percolation Test Method

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Fresno, California 93722

Figure
C-4