GEOTECHNICAL INVESTIGATION REPORT TRILLIUM AT DOUGLAS RANCH – PHASE 1, VILLAGE 3 SUN VALLEY PARKWAY AND CACTUS ROAD BUCKEYE, ARIZONA



Prepared for:

JF Purchase LLC & TW Purchase LLC

8501 North Scottsdale Road, Suite 120 Scottsdale, Arizona 85253

Prepared by:

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Alpha Project No. 20-G-11044 July 13, 2021



July 13, 2021 Alpha Project No. 20-G-11044

JF Purchase LLC & TW Purchase LLC 8501 North Scottsdale Road, Suite 120 Scottsdale, Arizona 85253

Attention: Linda Cheney

Re: **Geotechnical Investigation Report**

Trillium at Douglas Ranch - Phase 1, Village 3

Sun Valley Parkway and Cactus Road

Buckeye, Arizona

In accordance with your request and authorization, Alpha Geotechnical & Materials, Inc. (Alpha) has performed a geotechnical investigation for the site located west of Sun Valley Parkway and north of the Cactus Road alignment in Buckeye, Arizona. The purpose of this report is to provide recommendations relative to the geotechnical aspects of the design and construction. The purpose of this revision is to include additional laboratory test results and provide additional flexible pavement recommendations.

Based on our findings, the site is considered suitable for the proposed construction, provided foundation systems are properly designed, specified site grading recommendations are used, and foundation bearing soils are not exposed to moisture infiltration or moisture content fluctuation. Specific recommendations regarding the geotechnical aspects of project design and construction are presented in the following report. The recommendations contained within this report are dependent on the provisions provided in the Limitations and Recommended Additional Services sections of this report.

We appreciate the opportunity to provide our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,

ALPHA GEOTECHNICAL & MATERIALS, INC.

Asim Almujaddidi

Geotechnical Staff Professional

Reviewed Bv:

Garrett Clatanoff, PE Geotechnical Engineer

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1.0 EXECUTIVE SUMMARY

July 13, 2021 Alpha Project No. 20-G-11044

JF Purchase LLC & TW Purchase LLC 8501 North Scottsdale Road, Suite 120 Scottsdale, Arizona 85253

Attention: Linda Cheney

Re: Geotechnical Investigation Report

Trillium at Douglas Ranch - Phase 1, Village 3

Sun Valley Parkway and Cactus Road

Buckeye, Arizona

The purpose of this investigation was to evaluate the general surface and subsurface conditions at the referenced site, and to present geotechnical design recommendations for foundations, slab-on-grade, and on-site pavements for the proposed development.

Project Description

The project site is located within approximately 320 acres of the proposed Trillium at Douglas Ranch – Phase 1, Village 3 development, which will include Parcels 32, 33, 35, 37 through 49, 50 and 51. The site is located west of Sun Valley Parkway and north of the Cactus Road alignment in Buckeye, Arizona. The proposed construction will include single- and two-story structures to be used as single-family residences without basements, a water campus, fire station, recreation center, community park, and left turn lanes along Sun Valley Parkway at Wintersburg Parkway and Rosewood Avenue. The structures will be supported on shallow spread-type footings, post tension and/or other conventional shallow foundation systems. Alpha has not been provided with structural loads. However, based on our previous experience with similar structures, we estimate the maximum column and wall loads for the structures will be about 20 kips and 1.5 kips per linear foot, respectively.

Surface Conditions

The project site is primarily undeveloped native desert land. It appears that some earthwork construction consisting of clearing, grubbing and minor grading was previously completed on the eastern portion of the site. There are multiple washes that run east to west through the site and drain into the Hassayampa River on the west boundary of the site. The washes are up to 15 feet deep in some locations. Desert vegetation consisting of large native bushes and trees are spread across the site. The vegetation is denser near the washes. The site is surrounded by native desert land. The site is accessed from Sun Valley Parkway east of the site. Sun Valley Parkway is paved with asphaltic concrete and is a divided roadway with two lanes in the northbound and southbound direction. The site slopes slightly downwards to the southwest.



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Subsurface Conditions

The subsurface soils encountered during the exploration consisted primarily of clayey sand (SC), silty sand (SM), silty clayey sand (SC-SM), sandy silt (ML), and mixtures thereof. The tested soils contain between 4.5 and 61 percent fines (material passing the No. 200 sieve), and between 3 and 52 percent gravel based on laboratory testing. Some cobbles up to inches in diameter were encountered. The soils were typically weakly to moderately cemented and ranged from nonplastic to medium plasticity. The soils in the upper 6 feet were typically characterized as soft to firm with blow counts between 3 and refusal (i.e., 50 blows for less than 6 inches) and a median blow count of 13. The soils between 6 feet and 25 feet below ground surface (bgs) were typically characterized as firm to hard with blow counts between 10 and refusal (i.e., 50 blows for less than 6 inches) and a median blow count of 49. Backhoe refusal on moderately cemented material was encountered in nine test pits near the middle of site at depths between 7 feet bgs and 10 feet bgs.

Site Drainage

Positive drainage is essential to the successful performance of any foundation or slab-on-grade. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the building areas from becoming wet. Desert-type landscaping is advisable near buildings and pavement areas. Plants, which require more water, should be located and drained away from the structural and pavement areas.

Foundations

Laboratory testing has determined the site soils have expansion indices that ranged between 0 and 10. Soils with expansion indices less than or equal to 20 are considered to have very low expansion potential per ASTM D4829. The collapse potential for the site soils is moderate. However, the potential for damage due to the collapse of the site soils is considered negligible provided that the soil improvement measures are implemented in accordance with the recommendations presented in this report. The site is considered to be **Non-Active** given the expansion potential. Spread type footings, conventional slabs and/or post-tensioned slabs bearing on properly compacted engineered fills may be used to support the structures. We anticipate that total and differential settlements for foundations designed in accordance with the recommendations provided in the attached report, will be within generally acceptable tolerance as presented in the attached report. Additional foundation movements could occur if water from any source infiltrates the foundation soils.

Land Subsidence and Earth Fissures

The project site is located 13 miles west of documented earth fissures located within the Luke Study Area based on information accessed at the Arizona Geologic Survey (AZGS) website (2021). The project site is not in an area with a measured land subsidence based on information accessed at from the Arizona Department of Water Resources (ADWR) e-Library (2021).



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Conclusion

Based on our findings, the site is considered suitable for the proposed construction, provided foundation systems are properly designed, specified site grading recommendations are used, and foundation bearing soils are not exposed to moisture infiltration or moisture content fluctuation.

Should you have any questions concerning the contents of this report or any other matter, please do not hesitate to contact our office at (602) 453-3265 x122.

Respectfully submitted,

Alpha Geotechnical & Materials, Inc.

Garrett Clatanoff, PE Geotechnical Engineer

2.0 INTRODUCTION

2.1 General

The purpose of this geotechnical investigation was to evaluate the general surface and subsurface conditions at the referenced site, and to present recommendations related to geotechnical aspects of design and construction of the project for foundations and on-site pavement sections. Results of our investigation are presented within this report. Our scope of services was in general accordance with our proposal 20-G-11044, dated January 21, 2020. This geotechnical report is based on available project information and our experience with similar construction and soil conditions.

Our study included a discussion of previous data, site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analyses, and preparation of this report. This report presents recommendations for design of suitable foundation types, site grading and engineered fill placement, moisture protection, and construction considerations. The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the "Limitations" section of this report.

2.2 Project Description

The project site is located within approximately 320 acres of the proposed Trillium at Douglas Ranch – Phase 1, Village 3 development, which will include Parcels 32, 33, 35, 37 through 49, 50 and 51. The site is located west of Sun Valley Parkway and north of the Cactus Road alignment in Buckeye, Arizona. The proposed construction will include single- and two-story structures to be used as single-family residences without basements, a water campus, fire station, recreation center, community park, and left turn lanes along Sun Valley Parkway at Wintersburg Parkway and Rosewood Avenue. The structures will be supported on shallow spread-type footings, post tension and/or other conventional shallow foundation systems. Alpha has not been provided with structural loads. However, based on our previous experience with similar structures, we estimate the maximum column and wall loads for the structures will be about 20 kips and 1.5 kips per linear foot, respectively.

3.0 INVESTIGATION

3.1 Subsurface Investigation

The subsurface investigation consisted of soil borings and test pits. Details of the subsurface investigation are provided in the following sections.



3.1.1 Soil Borings

The soil borings were performed on January 11, 12, and 13, 2021, at 43 locations within the proposed development. Forty-three soils borings (B-01 through B-43) were advanced beneath the surface to depths between 5 feet and 25 feet for total drill footage of approximately 645 feet. Locations of the soil borings are shown on **Figure 1**.

Wildcat Drilling, Inc (Wildcat) was subcontracted to complete drilling services. Wildcat utilized a truck-mounted CME-45 drill rig to complete the soil borings. An 8-inch outside diameter, hollow-stem auger was used to complete the soil borings.

Soil samples, using standard penetration testing (SPT) or undisturbed ring sampling methods, were obtained at intervals between 2.5 feet and 5 feet. Representative bulk samples of native material were collected from each boring. Completed borings were backfilled with auger cuttings.

Encountered soils were visually inspected, labeled and classified in the field, and logged in general accordance with ASTM D2488. Field direction and borehole logging were performed by Asim Almujaddidi of Alpha. Logs of all borings are presented in **Appendix A**, which also includes a description of drilling and sampling procedures.

3.1.2 Test Pits

The test pits were excavated on January 8, and 14, 2021, at 27 locations within the proposed development. Twenty-seven test pits (TP-01 through TP-27) were excavated beneath the surface to depths between 3 feet and 12 feet for total excavation footage of approximately 274 feet. Locations of the test pits are shown on **Figure 1**.

JKI Solutions LLC (JKI) was subcontracted to complete excavation services. JKI utilized a John Deer 310 backhoe to excavate the test pits. A 2-foot-wide bucket was used to excavate the test pits.

Representative bulk samples of subgrade material were collected at a maximum of 5-foot intervals. Completed test pits were backfilled with the excavated material.

Encountered soils were visually inspected, labeled and classified in the field, and logged in general accordance with ASTM D2488. Field direction and test pit logging were performed by Asim Almujaddidi of Alpha. Logs of all test pits are presented in **Appendix A**, which also includes a description of excavating and sampling procedures.

3.2 Laboratory Testing

Selected soil samples from the soil borings and test pits were tested in the laboratory for classification purposes and to evaluate their engineering properties. The laboratory tests included:



- Sieve analysis and plasticity index (Atterberg limits) Soil classification. (ASTM C117/C136) (ASTM D4318);
- Consolidation Assessment of compressibility of near-surface soils under embankment fills or structure loads (ASTM D2435);
- Expansion Index Assessment of expansion potential of near-surface soils under embankment fills or structural loads (ASTM D4829);
- In-Place Density Determination of in-place density and moisture at depth (ASTM 2937);
- One-Dimensional Swell Assessment of swell potential of near-surface soils under the pavement (ASTM D4546);
- Moisture-Density Relationship (Proctor) Determination of the maximum dry density and optimum moisture content for earthwork factors. (ASTM D698);
- pH and Resistivity Assessment of the impact of the existing soils on steel. (Arizona Test Method 236).
- Total soluble sulfates and chlorides Assessment of the impact of the existing soils on concrete. Used to determine which type of concrete should be used. (Arizona Test Method 733 and 736); and,

A brief description of each test preformed on the soil samples and the results are presented in **Appendix B**. Laboratory test results are summarized in **Table B-1** along with individual laboratory sheets.

4.0 SITE CONDITIONS

4.1 Surface Conditions

The project site is primarily undeveloped native desert land. It appears that some earthwork construction consisting of clearing, grubbing and minor grading was previously completed on the eastern portion of the site. There are multiple washes that run east to west through the site and drain into the Hassayampa River on the west boundary of the site. The washes are up to 15 feet deep in some locations. Desert vegetation consisting of large native bushes and trees are spread across the site. The vegetation is denser near the washes. The site is surrounded by native desert land. The site is accessed from Sun Valley Parkway east of the site. Sun Valley Parkway is paved with asphaltic concrete and is a divided roadway with two lanes in the northbound and southbound direction. The site slopes slightly downwards to the southwest.

4.2 Regional Geology

The southwest region of Arizona is referred to as the Basin and Range Geologic Province. This province consists primarily of a low dry desert environment with a mixture of long faults, fractured rock and wide alluvial basins. The mountain ranges within the province consist of Precambrian plutonic, volcanic and metamorphic rock.



The project is located within the seismic zone referred to as the Salton Periphery Zone which comprises of several seismic source zones (i.e. San Jacinto, South San Andreas, Imperial, Whittier-Elsinore, Perris, Cerro Prieto, Axial Cortez and the Salton Periphery). The seismic zone, as described by Euge and others (1992), are considered discrete seismic sources with limited potential for producing earthquakes.

4.3 Subsurface Conditions

The subsurface soils encountered during the exploration consisted primarily of clayey sand (SC), silty sand (SM), silty clayey sand (SC-SM), sandy silt (ML), and mixtures thereof. The tested soils contain between 4.5 and 61 percent fines (material passing the No. 200 sieve), and between 3 and 52 percent gravel based on laboratory testing. Some cobbles up to inches in diameter were encountered. The soils were typically weakly to moderately cemented and ranged from nonplastic to medium plasticity. The soils in the upper 6 feet were typically characterized as soft to firm with blow counts between 3 and refusal (i.e., 50 blows for less than 6 inches) and a median blow count of 13. The soils between 6 feet and 25 feet below ground surface (bgs) were typically characterized as firm to hard with blow counts between 10 and refusal (i.e., 50 blows for less than 6 inches) and a median blow count of 49. Backhoe refusal on moderately cemented material was encountered in nine test pits near the middle of site at depths between 7 feet bgs and 10 feet bgs.

4.4 Groundwater Conditions

Groundwater was not encountered during the investigation. Several well sites are located within the vicinity of the project. However, many of these wells are not actively monitored. Readings collected within the last year from well sites within two miles of the site estimate the regional depth to groundwater in the area to be greater than 184 feet below existing grades. This information is available from the ADWR Groundwater Site Inventory database (2021). Seasonal variations could cause fluctuations in the surrounding groundwater depths. In addition, perched water tables may be encountered, especially after flood events.

4.5 Geologic Hazards

4.5.1 Liquefaction Potential

Based on the soil types and soil densities encountered during this investigation along with groundwater not being encountered at the depth explored, the potential for soil liquefaction is considered to be negligible.

4.5.2 Collapsible Soils

Collapsible soils are soils with the potential for a decrease in volume with an increase of external load or moisture. These soils are typically found in areas of alluvial deports within semi-arid to arid climates. Based on the information collected during our field investigation and subsequent laboratory testing, we anticipate collapse-susceptible soils will be encountered during



construction. The collapse potential for the site soils is moderate. However, the potential for damage due to the collapse of the site soils is considered negligible provided that the soil improvement measures are implemented in accordance with the recommendations presented in Section 5.0 of this report.

4.5.3 Land Subsidence and Earth Fissures

The project site is located 13 miles west of documented earth fissures located within the Luke Study Area based on information accessed at the Arizona Geologic Survey (AZGS) website (2021). The project site is not in an area with a measured land subsidence based on information accessed at from the ADWR e-Library (2021).

4.6 Seismic Considerations

The project site is located in south-central Arizona which is an area of low seismic activity. The soil properties in the upper 100 feet of the site are not known in sufficient detail to justify selecting a Site Class C or better. Therefore, the default Site Class D should be used for this site. For structural design based on the 2018 IBC and ASCE7-16 the following seismic parameters should be used:

 $\begin{tabular}{c|cccc} Site Location: Latitude 33.601240^{\circ} N, Longitude 112.701459^{\circ} W \\ \hline Parameter & Value \\ \hline Site Class Definition & D \\ \hline Site Coefficient <math>F_a$ & 1.6 \\ \hline Site Coefficient F_v & 2.4 \\ \hline Spectral Acceleration S_{DS} & 0.195 g \\ \hline Spectral Acceleration S_{D1} & 0.128 g

Table 4.1: Seismic Design Parameters

5.0 ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1 General Excavation

The near surface soils described in Section 4.3 can be found across the site and can be excavated using conventional excavation equipment. The soils encountered below 5 feet may require heavier equipment to excavate due cobbles up to 8 inches in diameter, strongly cemented materials, and dense material. However, construction techniques and sequencing should drive the sizing of this equipment.

Prior to excavation, clearing and grubbing of the area may be necessary to remove trees, brush, stockpiles and other vegetation. If excavated materials are intended to be used for engineered fill as described in Section 5.4.1, special care should be taken to remove as much of the root system as possible to allow for the maximum amount of material to be used as fill. In addition, it may be



necessary to waste material between the surface and approximately one foot below the surface due to vegetation.

5.2 Excavation and Temporary Slopes

Temporary excavation slopes should conform to Occupational Safety and Health Administration and Arizona Division of Occupational Safety and Health regulations. Within this system, the classification of the on-site soils is Type C. It is recommended that unsupported temporary cut slopes in these soils be made no steeper than 1.5H:1V (Horizontal:Vertical) for excavations less than 20 feet.

Spoil piles should be located no closer than 6 feet from the crest of the slopes. Large particles, including large clods, should be kept away from the crest of the slopes. Moisture increases in the soils will weaken them and could cause slope failures. Some localized raveling could occur as the exposed soils dry. The excavations should be protected from storm water runoff or other sources of moisture. Small berms may be necessary to protect the excavations from storm runoff. If the soils are subjected to moisture increases, the stability of the slopes should be reevaluated.

Heavy construction equipment, building materials and vehicular traffic should not be allowed within one-third of the slope height from the top of any excavation. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Arizona.

Under no circumstances should the information provided in this Section be interpreted to mean that Alpha is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

5.3 Site Grading and Drainage

Areas where improvements will be made should be cleared of all structure remnants, debris, undocumented fill, vegetation, top soil and other deleterious materials prior to excavation or ground improvements for foundations and slabs or subgrade preparation for pavements per Sections 5.7, 5.8 and 5.11. Areas where existing utilities are removed, undocumented fill encountered, or other voids caused by removals may be backfilled and compacted in accordance with Sections 5.4 and 5.5. Compaction is necessary to prevent water settling which leads to future ponding.

Positive site drainage should be provided during construction and maintained thereafter. The final ground surface should be sloped away from the perimeter of any structures at a minimum grade of 5 percent for a minimum distance of 10 feet. Infiltration of water into utility or foundation excavations must be prevented during construction. The drainage design must route all storm



and sprinkler water away from the buildings in a positive manner. All water should be diverted away from areas where it could penetrate the ground surface near the buildings and sidewalks. Where lot lines, walls, slopes or other physical barriers prohibit 6 inches of fall within 10 feet, drains or swales should be provided to ensure drainage away from the structure.

Watering of plants should be avoided adjacent to the buildings. Desert-type landscaping is advisable near the building. Plants, which require more water, should be located and drained away from the building areas.

Roof runoff should be carried away from structures at the ground surface or piped to an underground storm drain system, and in no case should long-term ponding of water be allowed near the structures during or after construction.

Permanent slopes should be no steeper than 3H:1V (Horizontal:Vertical) to promote positive drainage and mitigate erosion. The embankment slope should consist of native cut or compacted fill per Sections 5.4.1 and 5.4.2. To reduce the potential for surface erosion, a berm or "V" ditch may be located at the top of slopes subject to significant overland water flows in order to intercept and redirect surface runoff.

Fill placed on slopes steeper than 5H:1V (Horizontal:Vertical) should be benched into the existing slope. It is recommended that the slope face be compacted per Section 5.5.1.

5.3.1 Earthwork Factors

Based on the laboratory testing and Alpha's experience with similar site conditions, an earthwork factor of 15 percent shrink is recommended when native soils are compacted to 95 percent of the maximum dry density as determined by ASTM D698. Compaction greater than 95 percent of the maximum dry density will increase the total shrink. In addition, ground compaction for the native desert land is anticipated to be moderate. Alpha recommends a ground compaction factor of 0.2 feet be utilized in areas where new embankments are to be constructed or haul roads are anticipated.

5.4 Fill Materials

5.4.1 Engineered Fill

Alpha completed 14 expansion index tests on samples collected from the site. All the tests had an expansion index less than 20. Soils with indices of 20 or less should be considered **Non-Active** with respect to their expansion characteristics when being considered for use as engineered fill. Engineered fill may be required beneath footings or other foundation systems, used to establish grades for slabs-on-grade, used beneath minor structures, backfill voids created during clearing operations, raise site grades, construct pads and as subgrade for pavements. Native soils in the upper 5 feet may be utilized as engineered fill as long as the appropriate compaction and moisture requirements are met based on their expansion characteristics (see Table 5.2 in Section 5.5.1).



Import material may also be used as engineered fill if it meets the requirements presented in Table 5.1.

Sieve Size Percent Passing Required Test 3-inch 100 ASTM C117/136 No. 200 Less than 50 ASTM C117/136 Other Requirements **Expansion Index** 20 or Less **ASTM D4829** Less than 15 Plasticity Index **ASTM D4318** Sulfates Content 1,000 ppm or Less **ARIZ 733** Chloride Content 500 ppm or Less **ARIZ 736**

Table 5.1: Import Material Requirements

Engineered fill should be free of vegetation and other deleterious material and placed in accordance with Section 5.5.1.

Materials greater than 3 inches in largest dimension should not be placed within 2 feet from finished grade (top of engineered fill) beneath footings, slabs, or pavement. Nesting is not permitted and larger materials greater than 3 inches in the largest dimension should be completely encapsulated with finer materials.

5.4.2 Aggregate Base

Aggregate base may be needed beneath slabs, roadways and as bedding material for utilities. The material should meet the requirements of aggregate base material as listed in Maricopa Association of Governments (MAG) *Uniform Standard Specifications and Details for Public Works Constructions* Section 702 (2021).

5.5 Fill Construction

5.5.1 Engineered Fill Placement

Engineered fill material should be utilized as backfill beneath footings, to establish grades for slabs-on-grade, construct pads, and as subgrade for roadways. Engineered fill should meet the requirements of Section 5.4.1. Areas to receive engineered fill should be scarified a minimum of 8 inches, moisture conditioned and compacted to no less than 95 percent of the maximum dry density and within the range of plus 2 percent to minus 2 percent of the optimum moisture content as determined by ASTM D698.

Prior to placement of engineered fill, the material should be moisture conditioned and placed in lifts not to exceed 8 inches thick when compacted with heavy equipment. When using smaller, walk behind compaction equipment, compacted lifts should not exceed 4 inches. Engineered fill should be compacted per Table 5.2.



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Table 5.2: Compaction Requirements

Material Type	Design Element or Site Improvements ¹	Required Compaction ²	Required Moisture Content ²	
	Below Slabs and Post-Tensioned Slabs			
Engineered Fill - Consisting of native soils with an expansion index less than or equal to 20 or import	Below Spread-Type Footings	Minimum 95% of the maximum dry	+2% to -2% of the optimum	
soils.	Below Flexible and Rigid Pavements	density	moisture content	
	General Site and Embankment Fill ³			
	Below Slabs and Post-Tensioned Slabs	Between 90% and 95% the maximum dry density	0% to +4% of the optimum moisture content	
Engineered Fill - Consisting of native soils with an expansion index greater	Below Spread-Type Footings			
than 20. (Active)	Below Flexible and Rigid Pavements	Minimum 95% of the maximum dry density	+2% to -2% of the optimum moisture content	
	General Site and Embankment Fill ³			

^{1 -} Depth of soil improvement or lift thicknesses should follow the recommendation in this report for the given design element. General site fill should refer to fill not directly beneath design elements or within the limits of other soil improvements as recommended in this report.

5.5.2 Aggregate Base Placement

Aggregate base may be needed beneath slabs, roadways and as bedding material for utilities. Aggregate base should meet the requirements of Section 5.4.2. Areas to receive aggregate base should be free of vegetation. Aggregate base should be placed on compacted engineered fill per Table 5.2 in Section 5.5.1. Aggregate based shall be compacted per MAG Section 310 (2021).



^{2 -} Compaction percentage and moisture content requirements should be based on the maximum dry density and optimum moisture content as determined by ASTM D698.

^{3 -} In areas where fill will exceed 5 feet in height the geotechnical engineer should be consulted to determine adequate foundation preparation and embankment compaction requirements.

5.6 Pipe Backfill and Bedding

Pipes should be placed on pipe bedding material meeting the requirements of aggregate base as discussed in Sections 5.4.2 and 5.5.2 of this report. Pipe bedding should be placed from the bottom of the trench to approximately springline.

On-site soils may be utilized as backfill for non-metallic pipes where applicable, provided the soil is free from broken concrete, broken pavement, wood, or other deleterious material and with no piece/clods larger than 2 inches.

Metal pipes should be backfilled with material that meets the manufactures requirements. In the absence of any manufacture's recommendations, Alpha recommends have a pH between 5.0 and 9.0, and a resistivity greater that 2,000 ohm-cm when tested in accordance with Arizona Method 236.

As an alternative to backfill directly above the pipe, Alpha recommends that all utility trenches may be backfilled with ½-sack Controlled Low-Strength Material (CLSM) meeting the requirements of MAG Section 604 (2021). The CLSM should extend from springline to 12 inches above the pipe.

The remainder of the trench should be backfilled with engineered fill material, meeting the requirements of Section 5.4.1, compacted in lifts not to exceed 8 inches when compacted. Each lift should be compacted per Table 5.2 in Section 5.5.1.

5.7 Foundations

Lightly loaded structures may be supported on spread or continuous footings. Geotechnical recommendations for footing foundations, based on anticipated sizes and shapes, are provided in Section 5.7.1.

5.7.1 Isolated Spread or Continuous-Type Footings

Small, isolated spread-type footings should have no single dimensions measuring more than 5 feet, a length to width ratio less than three and be used for supporting columns or other concentrated loads.

Continuous footings should have a length to width ratio greater than three, a width of less than 5 feet and are to be used for supporting walls or other strip type loading. Footings should be designed with the following recommendations:

1. Footings should bear at a minimum depth of 1.5 feet below the lowest adjacent or existing grade, whichever is lower. Footings shall bear on a minimum of 2 feet of engineered fill as outlined in item 4.



- Soils beneath footings should be excavated to a minimum depth of 2 feet below the bottom
 of the footing and laterally beyond the footing edges at a ratio of 1H:1V
 (Horizontal:Vertical).
- 3. The bottom of the footing excavation should be scarified to a depth of 8 inches and then compacted to a minimum of 95 percent of the maximum dry density and within a range of plus 2 percent to minus 2 percent of the optimum moisture content as determined by ASTM D698 prior to the placement of any additional materials.
- 4. Backfill material between the bottom of the footing and bottom of the excavation should consist of engineered fill, as described in Sections 5.4.1 and 5.5.1, in order to provide uniform bearing below the structure.
- Footings should be designed for an allowable bearing pressure of 2,000 pounds per square foot for dead plus normal live loads. The allowable bearing pressure may be increased by one-third when considering transient wind or seismic loading.
- 6. Spread and continuous-type footings should have minimum widths of 2 feet and 1.5 feet, respectively.
- The structural engineer should place resultant pressure on the foundation base in the middle third of the footing. The maximum loading for spread and continuous-type footings should not exceed 50 kips and 10 kips per linear foot, respectively.
- 8. A representative of Alpha should observe the foundation excavations prior to placement of the fill and reinforcing steel.

5.7.2 Settlement

Alpha estimates settlement of footings designed and constructed in accordance with the recommendations provided in Section 5.7.1 will not exceed 3/4 inch. However, a representative of Alpha should observe the foundation excavations and surface preparation prior to placement of any fill material or reinforcing steel. When bearing and uplift values are increased by one-third to consider transient wind or seismic loading, settlement may increase to 1 inch.

5.7.3 Lateral Resistance

Lateral loads may be resisted by soil friction and by the passive resistance of the soils acting on the sides of the footing. A coefficient of friction of 0.38 may be used between the footings and the supporting soils. The passive resistance of the properly-compacted structural fill or undisturbed native soils against spread footings may be calculated assuming an allowable equivalent fluid unit weight of 150 pounds per cubic foot (pcf). A one-third increase in the passive value may be used for wind or seismic loads. The frictional resistance and the passive resistance of the soils may be combined without reduction in determining the total lateral resistance.



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5.8 Post-Tension Slabs

Post-tension slabs may be used to support the lightly loaded structures. Based on the design procedure outlined in the Post-Tensioning Institute's *Design and Construction of Post-Tensioned Slabs-on-Ground, 3rd Edition* (2008), the site soils are classified as **Non-Active**, and the following design parameters should be implemented.

Recommended design parameters (Non-Active Soils):

Maximum Allowable Bearing Pressure, q₂: 1,250 psf (at grade)

Coefficient of Subgrade Reaction, k: 250 pounds per cubic inch

Areas where post-tension slabs are to be constructed should be cleared in accordance with Section 5.3. The slabs should bear on a minimum of 12 inches of compacted engineered fill as measured from the bottom of the turndown. The compacted engineered fill should extend a minimum of 5 feet beyond the edges of the slab. Engineered fill shall meet the requirements provided in Section 5.4.1 and be compacted per Section 5.5.1. Excavation beneath the slab may be necessary to accommodate the 12 inches of engineered fill. The surface on which engineered fill will be placed should be scarified a minimum of 8 inches, moisture conditioned and compacted to 95 percent of the maximum dry density and within a range of plus 2 percent to minus 2 percent of the optimum moisture content as determined by ASTM D698 prior to the placement of any additional materials.

Structures bearing on prepared subgrade as presented in this Section may experience total settlement of approximately ½ -inch. Differential settlement is expected to be less than ¼-inch between similarly loaded areas. Additional foundation movements could occur if the supporting soils become wetted, please refer to Section 5.3 for drainage requirements.

5.9 Lateral Earth Pressures for Walls

Rigid, absolutely restrained walls that can tolerate little or no movement should be designed for the at-rest earth pressure represented by an equivalent-fluid unit weight of 60 pcf for level structure backfill. That value is based on a compacted moist unit weight of 120 pcf and an effective (drained) friction angle of 30 degrees for level, free-draining backfill. Walls that can tolerate rotation (movement of the top of the wall) or lateral translation equal to or greater than about 0.002 times the height of the wall (height, H, is defined as measured from bottom of footing to top of level backfill) should be designed for active earth pressure represented by an equivalent-fluid soil unit weight of 40 pcf for level structure backfill. Vertical surcharge loads and/or hydrostatic pressures will increase the recommended equivalent-fluid unit weight. The resultant lateral earth loads should be assumed to act at a distance of one-third H above the wall base, where H is as defined above.

If heavy mechanical compaction equipment will be operating within a distance of one-half the retained height (defined as being from the backfill grade at the back of the wall to the wall base), additional earth pressure induced by compaction should be used in wall design. The additional



earth pressure should be estimated using the procedure presented by Clough and Duncan (1991). If compaction equipment used adjacent to the walls is to consist of small rollers and tampers, the additional earth pressure should not be used.

The wall backfill should consist of free-draining backfill and backfill drainage provisions, such as weep holes. These provisions should be designed so that the effect of hydrostatic pressure on the wall should not require consideration.

5.10 Corrosion Potential

5.10.1 Sulfate and Chloride Content

Selected samples of the near-surface soils encountered at the site were subjected to chemical analysis for the purpose of corrosion assessment. The samples were tested for soluble sulfates, and soluble chlorides. The samples were tested in general accordance with Arizona Test Methods 733, and 736 for soluble sulfates, and soluble chlorides, respectively. The test results are provided in **Appendix B**.

Based on provisions of American Concrete Institute (ACI) 318 Section 4.3, Table 4.3.1, Requirements for Concrete Exposed to Sulfate-Containing Solutions a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. Based on the laboratory results, sulfate contents of the site soils tested indicate a negligible degradation potential to concrete which places no restrictions on and cement type.

Based on the available published data regarding chloride ion content in soils a concentration of 500 ppm or greater is considered corrosive and may require additional concrete cover over reinforcement. Based on the laboratory results of the sample collected for this project, chloride contents of the site soils tested indicate that the soil has potential for degradation of concrete and requires a minimum of 3 inches of concrete cover over reinforcement.

5.10.2 pH and Resistivity

Three samples of the near-surface soil were tested for corrosion potential testing. The testing performed consisted of pH and resistivity in accordance with Arizona Test Method 236. The laboratory pH values determined ranged from 8.2 to 8.6. The resistivity values determined ranged from 682 to 1,500 ohm-centimeters (ohm-cm). Soil where the pH is greater than 9.0 and/or the resistivity is less than 2,000 ohm-cm requires the use of special pipes and/or pipe coatings. Based on these results, there is potential for corrosion of buried steel pipes and other buried steel structures. Special consideration should be given to the design and use of corrosion protected steel piping and structures. It is recommended that the pipe type and/or coating be selected in accordance with manufacturer requirements.



5.11 Pavement Sections

5.11.1 Flexible Pavement

Alpha has completed a flexible pavement design in general accordance with the Maricopa County Department of Transportation (MCDOT) *Roadway Design Manual* (2020) for local streets, collector streets, arterial roadways, and Sun Valley Parkway. Traffic counts and percent trucks were not provided for local streets, collector streets or arterial roadways so Alpha made assumptions for each value. Traffic volumes were provided by the Maricopa County website and collected along Sun Valley Parkway, north of McDowell Road. The traffic design parameters for local and collector roadways are provided in Table 5.3.

Table 5.3: Traffic Design Parameters

Design Parameter	Local	Collector	Arterials	Sun Valley Parkway
Traffic Volume (Vehicles per Day)	1,000	2,500	7,500	7,748
Growth Rate	0.1%	0.1%	2%	2%
Percent Trucks	2%	2%	3%	3%
Car Load Equivalency Factor	0.0008	0.0008	0.0008	0.0008
Truck Load Equivalency Factor	1.2	1.2	1.2	1.2
Directional Distribution	50%	50%	50%	50%
Lane Distribution	100%	100%	90%	90%
Design Period	20 years	20 years	20 years	20 years
ESALs	82,194	155,771	1,168,129	1,206,755

The pavement design was done in accordance with the MCDOT *Roadway Design Manual* (2020). These calculations are provided in **Appendix C**. Based on these calculations and a correlated R-value of 26, the required structural numbers for local streets, collector streets, arterial streets, and Sun Valley Parkway are 1.58, 1.91, 2.82, and 2.85, respectively. The flexible pavement sections for these roadways are provided in Table 5.4.

Table 5.4: Flexible Pavement Section

Roadway Type	Asphaltic Concrete Thickness	Aggregate Base Thickness
Local Street	2 inches	7 inches
Collector Streets	3 inches	6 inches
Arterial Roadways	4 inches	10 inches
Sun Valley Parkway (Parkways)	4 inches	10 inches

The pavement section materials should be placed as described hereafter. Subgrade material should meet the engineered fill requirements presented in Section 5.4.1. The subgrade should be



scarified to a depth of 8 inches, moisture conditioned and compacted to 95 percent of the maximum dry density and within the range of plus 2 percent to minus 2 percent of the optimum moisture content as determined by ASTM D698.

Aggregate base materials should meet the requirement of Section 5.4.2 and compacted per Section 5.5.2.

Asphaltic concrete material should meet MAG Section 710 (2021) or local standards and should be placed in general accordance with MAG Section 321 (2021) or local standards.

5.11.2 Rigid Pavement

In areas where rigid pavement may be necessary, a minimum of 6 inches of Portland cement concrete should be used. Portland cement concrete pavement should be placed over 4 inches of aggregate base and 8 inches of improved subgrade. In areas where heavier traffic will be encountered due to commercial or heavy residential activities, the Portland cement concrete section should be increased to a minimum of 8 inches. The rigid pavement sections are provided in Table 5.5.

Roadway Type

Portland Cement
Concrete Pavement
Thickness

Light Residential
6 inches
4 inches

Heavy Residential
8 inches
4 inches

Table 5.5: Rigid Pavement Sections

The pavement section materials should be placed as described hereafter. Subgrade material should meet the engineered fill requirements presented in Section 5.4.1. The subgrade should be scarified to a depth of 8 inches, moisture conditioned and compacted to 95 percent of the maximum dry density and within the range of plus 2 percent to minus 2 percent of the optimum moisture content as determined by ASTM D698.

Aggregate base materials should meet the requirement of Section 5.4.2 and compacted per Section 5.5.2.

Portland cement concrete material should meet MAG Class A, per Section 725 (2021) and should be placed in general accordance with MAG Section 324 (2021).

5.12 Sidewalks

Sidewalk sections should be constructed in accordance with MAG Section 340 (2021) and designed in general accordance with the MAG Standard Detail 230 (2021).



6.0 CLOSURE

6.1 Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field exploration, laboratory test results, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the test pits excavated during the field subsurface exploration. It is anticipated that some variations in the soil conditions will exist on-site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractor, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report is for the exclusive purpose of providing Geotechnical Engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed the site geology and the possible presence of geologic hazards.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on 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, should notify Alpha of such intended use. Based on the intended use of this report, Alpha may require that additional work be performed and that an updated report be issued.

6.2 Recommended Additional Services

This report is a **geotechnical report** completed to characterize the proposed Trillium at Douglas Ranch – Phase 1, Village 3 Development.



The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction. These tests and observations should be performed by the Geotechnical Engineer's representative and should include, but are not necessarily be limited to the following:

- Observe and document that any existing surficial vegetation and other deleterious materials have been removed from the site as required in site preparation section.
- Approve any material used as engineered fill in building areas to document that it meets the requirements outlined above before placement.
- Monitor the scarification operations of the exposed subgrade.
- Monitor scarification operations to document those footings are bearing in soils as recommended above.
- Monitor the backfill procedures.
- Perform field density tests, as needed, to verify compaction compliance. The representative should monitor the progress of compaction and filling operations.
- Keep records of on-site activity and progress.

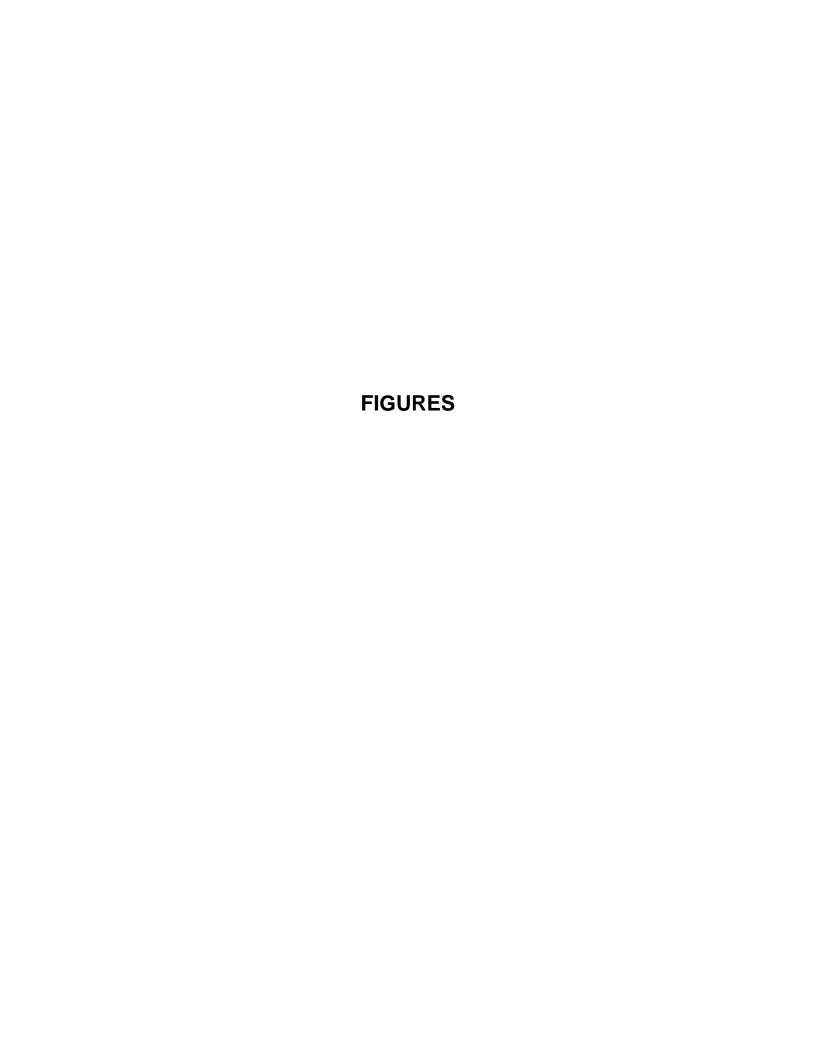
Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Construction testing, including field and laboratory evaluation of fill and backfill materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

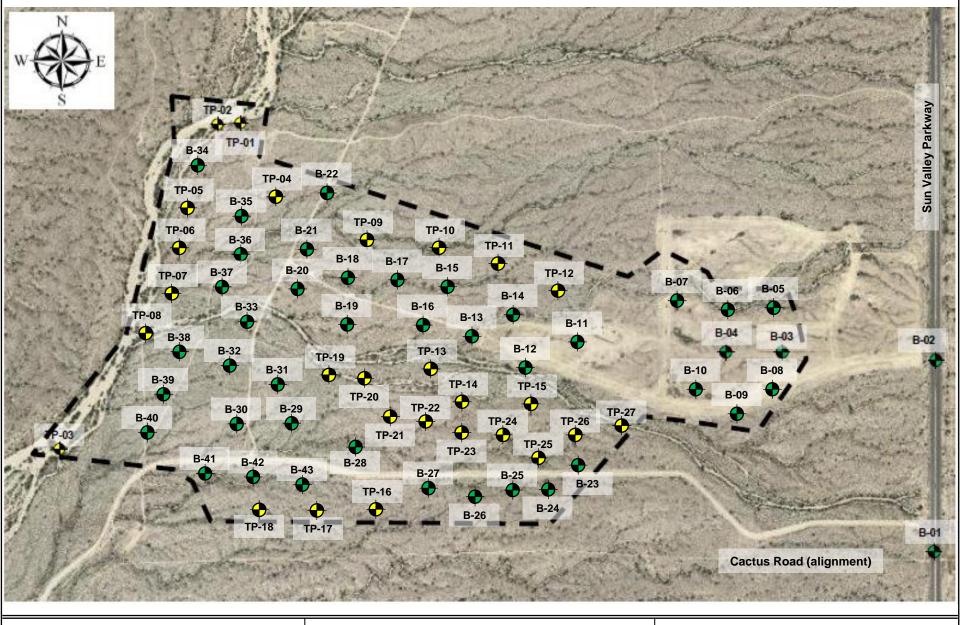


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Trillium at Douglas Ranch –
Phase I, Village 3
Sun Valley Parkway & Cactus Road
Buckeye, Arizona

Figure 1 – Overall Boring Map

Approximate Boring Location

Approximate Test Pits Location

www.maricopa.gov

Alpha Geotechnical & Materials, Inc.

APPENDIX A Field Investigation

FIELD INVESTIGATION

SOIL BORINGS AND TEST PITS

The subsurface conditions at the site were explored on January 8, 11, 12, 13, and 14, 2021 by excavating 27 soil test pits using John Deere 310 Backhoe and advancing 43soil test borings using a CME-45 truck-mounted drill rig. The locations of soil test pits and borings for this investigation are shown in Figure 1 of the report.

Our engineer maintained a log of the excavations and borings; visually classified soils encountered according to the Unified Soil Classification System (USCS) (see USCS Table) and obtained samples of the subsurface materials.

SAMPLING PROCEDURES

Bulk samples were taken from the borings and test pits at selected intervals. Soil samples were packaged and sealed in the field to reduce moisture loss and returned to our laboratory for further testing. The soil borings and test pits were backfilled with excavated materials at the completion of each boring and test pit.

Dynamically driven tube samples are obtained at selected intervals in the borings. Two-inch outside diameter, 1 3/8-inch inside diameter samples are used to obtain the standard penetration resistance in accordance with ASTM D1586. "Undisturbed" samples are obtained with 3-inch outside diameter samples lined with 2.42-inch inside diameter brass rings in accordance with ASTM D3550. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free gall drop above ground hammer required to advance the samples in 6-inch increments. The values are expressed in blows per 6 inches on the boring logs.

LIST OF ATTACHMENTS

The following exhibits are attached and complete this appendix.

Unified Soil Classification System Boring Logs Test Pit Logs

	UNIFIED	SOIL CLAS	SIFICATION	I SYSTEM	CONSISTEN	CY OR RELAT	IVE DENSITY	
			Group					
N	lajor Divisions	T	Symbols	Typical Names		CRITERIA		
	Gravels	Clean	GW	Well-graded gravels and gravelsand mixtures, little or no fines		<u>dard Penetrati</u> nsity of Granula		
	(50% or more of coarse	Gravels	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetrat Resistan		elative Density	
Coarse- Grained	fraction retained on	Gravels With	GM	Silty gravels, gravel-sand-silt mixtures	(blows/		,	
Soils (More than	No. 4 sieve)	Fines	GC	Clayey gravels, gravel-sand- clay mixtures	0-4	ļ	Very Loose	
50% retained on	Sands	Clean	SW	Well-graded sands and sand- gravel mixtures, little or no fines	5-10	0	Loose	
No. 200 sieve)	(More than 50% of	Sands	SP	Poorly graded sands and sand- gravel mixtures, little or no fines	11-3	11-30 N		
	coarse fraction	Sands	SM	Silty sands, sand-gravel-silt mixtures	31-5	60	Dense	
	passes No. 4 sieve)	With Fines	SC	Clayey sands, sand-gravel-clay mixtures	>50		Very Dense	
			ML	inorganic silts, very fine sands, silty or clayey fine sands, clayey silts with slight plasticity		dard Penetrati stency of Cohes		
Fine- Grained		Silts and Clays quid Limit 50% or less)		Inorganic clays of low to medium plasticity, gravelly clays, silty clays, sandy clays lean clays	Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (Tons/ft2)	
Soils (50% or				Organic silts and organic silty clays of low plasticity	0-4	Very Soft	<0.25	
more passes No. 200 sieve)	Silte and	I Clave	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	5-8	Soft	0.25-0.50	
	(Liquid Limit g	Silts and Clays Liquid Limit greater than 50%)		Inorganic clays of high plasticity, fat clays	9-15 Moderately 0 Firm		0.50-1.00	
		3070)		Organic clays and organic silts of medium to high plasticity	16-30	Firm	1.00-2.00	
High	nly Organic So	ils	PT	Peat, humus, and swamp soils with high organic content	31-50	Very Firm	2.00-4.00	
				That riight organic content	>50	Hard	>4.0	

	3	3" 3	3/4" #4	4 #	10 #4	40	#200 U.S. Standard Sieve
Unified Soil		Gı	avel		Sand		
Classification	Cobbles	coarse	fine	coarse	medium	fine	Silt or Clay

	MOISTURE CONDITIONS	MATERIAL QUAN	<u>ITITY</u>	<u>OTI</u>	OTHER SYMBOLS		
Slightly Moist	Absence of moisture, dusty, dry to the touch	rare	<2%	U	Undisturbed Sample		
		occasional	<5%	S	SPT Sample		
Moist	Damp but no visible water	trace	10%	Α	Auger Sample		
Wet	Visible free water; usually is below water table	some	20%	D	Disturbed Bulk Sample		
		considerable	30%				

BASIC LOG FORMAT:

USCS Soil Type, Other Soil Types Present (Modifiers, Gradation, Angularity), Gradation/Angularity of Main Soil Type Modifier, Fradation/Angularity of Main Soil Type, Structure, Cementation, Plasticity, Color, Moisture, Firmness/Density, Dry Strength, Odor, Additional Descriptions



Alpha	Pro	oject	Numb	er:			2	0-G-11044	4	Boring No) <u>.</u>	B-01				
Proje					Tr	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45				
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer			
Date(s) C	omp	lete:					1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map			
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No					
0												Visual Classific	ation			
5		8	4	5	5			SC	slightly moist moderately firm	CLAYEY SAND WITH GRAVEL some fine grained, subangular to subrounded gravel, predominantly graded, subangular to subrounded sand, medium plasticity, light br						
	\triangle															
										Stopped auger at 4'6" Stopped sampler at 6' Backfilled with drill cutting						
The stratification lines represent the approximate boundary lines												Comple Time Ve-	u. S. – Split Speep			
									nay be gradual.		A = Aug	er Cuttings U = Relatively L	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk			
					2504	West	South	Materia ern Ave a 85282			DEPTH N/A	GROUNI TIME N/A	DWATER DATE N/A			

Alpha	Pre	oject	Numb	er:			2	0-G-11044	1	Boring No.		B-02				
Proje	ct N	lame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45				
Proje	ct L	ocat	ion:				Buc	keye, Arizo	ona	Boring Type:		Hollow Stem Aug	juer			
Date(s) C	omp	lete:				,	1/11/2021		Boring Location	1:	See Figure 1 - Si	te Map			
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drilling	g No	otes:				
0		1										Visual Classific	ation			
5		S	3	4	3			SC-SM	slightly moist moderately firm	SILTY CLAYEY SAND trace fine grained, subangular to subrounded gravel, predominant medium grained, subangular to subrounded sand, medium plastic brown						
	\triangle									Stopped auger a	at 4'6	6"				
										Stopped sample Backfilled with d	er at	6' cutting				
			Alph	oil and road a Ge 2504	ock types: otechi West	In-situ, the nical & South	Materia ern Ave	A = DEP1	TH	Sample Type Key er Cuttings U = Relatively U GROUNE TIME N/A	ndisturbed Ring D = Disturbed Bulk					
The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual. Alpha Geotechnical & Materials, Inc. 2504 West Southern Avenue Tempe, Arizona 85282										DEP1	TH	er Cuttings U = Relatively U GROUND TIME	ndisturbed Ring D = Disturbed DWATER DATE			

Alpha	Pre	oiect	Numl	oer:			0-G-1104	4	Boring No.		B-03			
Projec					Т	rillium at			Phase I, Village 3	Rig Type:		CME-45		
Projec								keye, Ariz		Boring Type:		Hollow Stem Aug	auer	
Date(s								1/11/2021		Boring Location	٠.	See Figure 1 - S	-	
	3, 0	ор						171172021		Field and Drillin			по мар	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks		.g			
0						I						Visual Classific	ation	
	V	S	5	5	7			SM	slightly moist	SILTY SAND	d euk	nangular to subrounde	ed gravel, predominantly	
	Λ									medium grained,	suba	angular to subrounded	d sand, weakly cemented,	
									moderately firm to hard	medium plasticity	y, bro	own		
		S	7	25	28									
	X		•	20	20									
	Λ													
5		S	14	50.	/5"									
	\triangle													
10		S	31	50.	/5"									
	Χ	3	31	30,	7.5					note: incraese in	fines	content below 10'		
15	X	S		50/5"										
20	\times	S	27	50	/4"									
	The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.											Sample Type Key: S = Split Spoon A = Auger Cuttings U = Relatively Undisturbed Ring D = Disturbed Bulk		
									als, Inc.			GROUNI	-	
										DEP [*]		TIME	DATE	
	2504 West Southern Avenue Tempe, Arizona 85282											N/A	N/A	

Alph	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.	B-03				
Proje	ct N	ame			Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:	CME-45				
Proje	ct L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Type:	Hollow Stem Au	guer			
Date	(s) C	omp	lete:					1/11/2021		Boring Location:	See Figure 1 - S	ite Map			
		4)		a)		CF)		_		Field and Drilling	Notes:				
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks						
20											Visual Classific	cation			
	X	S						SC	slightly moist						
									hard	note: increase in g	arvel content below 20'				
										note: increase in sa	and content below 25'				
25	\bigvee	S	19	39	50/4"										
	\triangle										0.41011				
										Stopped auger at Sampler refused a	24'6" at 25'10"				
										Backfilled with dr	ill cutting				
			<u>i</u>												
									boundary lines nay be gradual.	A = A	uger Cuttings U = Relatively I	y: S = Split Spoon Undisturbed Ring D = Disturbed Bulk			
									als, Inc.	DEPTH		DWATER DATE			
				2				ern Ave		N/A	N/A	N/A			
	Tempe, Arizona 85282														

Projec		•	Numb					0-G-1104	4	Boring No).	B-04		
	ct N	ame	:		Tr	rillium at	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45		
Projec	ct L	ocati	ion:				Buc	keye, Ariz	zona	Boring Ty	pe:	Hollow Stem Au	guer	
Date(s) Complete:								1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)		Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling N	otes:		
Sa S						Dry [Š	⊃ ຮັ						
0										Visual Classification				
\	\bigvee	S	3	4	6			SM	slightly moist	SILTY SAND trace fine grained, subangular to subrounded gravel, predominantly well				
	\bigwedge									graded, subangular to subrounded graver, predominantly well graded, subangular to subrounded sand, medium plasticity, brown				
-									moderately firm to hard					
7		S	6	8	12									
	X		Ŭ											
ľ	/ \													
5	\ /	S	19	33	50/4"					note: increase in fines content below 5'				
	X									note: weak	ote: weakly cemented below 5'			
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										noto: fino t	o modium	grained subangular t	o subrounded sand below 5'	
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			<i></i>		/4"									
20 S 31 50/4"														
	The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.									Sample Type Key: S = Split Spoon A = Auger Cuttings U = Relatively Undisturbed Ring D = Disturbed Bulk				
	Alpha Geotechnical & Materials, Inc.										GROUNDWATER			
2504 West Southern Avenue										-	DEPTH	TIME	DATE	
Tempe, Arizona 85282										-	N/A	N/A	N/A	

Alph	a Pro	oject	Numb	er:	20-G-11044					Boring No.	B-04			
Proje	ect N	ame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:	CME-45			
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Type:	Hollow Stem Aug	uer		
Date	(s) C	omp	lete:					1/11/2021		Boring Location:	See Figure 1 - Si	te Map		
(E				C L					Field and Drilling Notes:					
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks					
20		<u> </u>						00		Visual Classification				
s								SC	slightly moist	note: increase in garvel content below 20'				
								hard						
										note: increase in fines content below 20'				
					= 0 /0 !!									
25	\bigvee	S	13	39	50/3"									
	\triangle									Stangard average at	AIO!			
										Stopped auger at 24'6" Sampler refused at 25'9"				
										Backfilled with dri	II cutting			
	The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.									Sample Type Key: S = Split Spoon A = Auger Cuttings U = Relatively Undisturbed Ring D = Disturbed Bulk				
Alpha Geotechnical & Materials, Inc.										DEPTH	GROUND TIME	WATER DATE		
2504 West Southern Avenue Tempe, Arizona 85282										N/A	N/A	N/A		
rempe, Anzona 65262														

Alpha	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No).	B-05	
Proje	ct N	ame	:		Tı	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/11/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		0						011		CH TV CAL	VID.	Visual Classific	ation
	X	S	2	2	3			SM	slightly moist		grained, su		ed gravel, predominantly fine to d sand, medium plasticity,
	X	S	12	16	23								
5	X	S	13	14	16								
10	X	S	29	29	13					note: incre	ase in grav	rel content below 10'	
15	\times	S		50/3"						note: weak	dy cemente	ed below 15'	
										Stopped a Sampler re Backfilled	efused at	14'9"	
										+			
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U GROUND	Indisturbed Ring D = Disturbed Bulk
					2504	West	South	Materia ern Ave a 85282			DEPTH N/A	TIME N/A	DATE N/A

Alpha	Pro	ject	Numb	er:			20	0-G-1104	4	Boring No	·.	B-06	
Projec	t N	ame	:		Tı	rillium at	Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Projec	t L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date(s	s) C	omp	lete:				,	1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0	A 1	c	2	1	7			CM		SILTY SAI	ND.	Visual Classific	ation
	X	S	3	4	7			SM	slightly moist moderately firm to firm	trace fine o	grained, su	bangular to subrounde I, medium plasticity, b	ed gravel, predominantly fine to rown
	\langle	S	7	8	14								
5_/	X	S	10	11	13					note: incre	ase in grav	vel content below 5'	
-													
10		S	28	50,	/4"			SC		CLAYEY S	SAND		
15	X	S	34	50,					slightly moist hard	trace fine g medium gr medium pl	grained, su ained, sub asticity, bro	angular to subrounded	ed gravel, predominantly fine to d sand, weakly cemented, low
										Stopped a Sampler re			
										Backfilled			
										<u> </u>			
				etween s	oil and r	ock types:	In-situ, th	e transition i	boundary lines may be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
									als, Inc.		DEPTH	GROUNI TIME	DWATER DATE
				2				ern Ave a 85282		ļ	N/A	N/A	N/A

Alpha	a Pr	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-07	
Proje	ct N	ame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	guer
Date((s) C	omp	lete:					1/11/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No	otes:	
0		_			_					011 77/ 044	ID 14/17/14	Visual Classific	ation
	\langle	S	3	5	6			SM	slightly moist		le fine gra	ined, subangular to su	brounded gravel, predominantly d, medium plasticity, brown
	\bigvee	S	8	8	8								
5	\bigvee	S	6	8	14					note: weakl	ly cemente	ed below 5'	
10	×	s		50/5"						note: increa	ase in grav	vel content below 10'	
15	X	S	18	50	/5"								
										Stopped a Sampler re Backfilled	efused at	15'5"	
			<u> </u>										
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
					2504	West	South	Materia ern Ave a 85282		-	DEPTH N/A	GROUND TIME N/A	DATE N/A

Alph	a Pro	oject	Numb	er:			2	0-G-1104	1	Boring No).	B-08	
Proje	ct N	ame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		0	7	10	11			ec		CLAYEY S	SAND	Visual Classific	ation
	X = X	S	26	34	50/5"			SC	slightly moist firm to hard	occasional predomina	trace fine ntly fine to	grained, subangular to medium grained, sub- edium plasticity, browr	angular to subrounded sand,
5	\triangle	S		50/5"									
10		S	13	19	27							vel content below 10' d content below 10'	
15	X	S	28	50/	'4"								
										Stopped a Sampler r Backfilled	efused at	15'4"	
	<u> </u>									1			
				Alph	oil and r	otech	In-situ, th	Materia			A = Aug		r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk DWATER DATE
				2				ern Ave a 85282			N/A	N/A	N/A

Alph	a Pro	oject	Num	ber:			2	0-G-1104	4	Boring No).	B-09	
Proje	ect N	lame	:		Т	rillium a	t Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Au	guer
Date	(s) C	omp	lete:				,	1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0			4.0	4.0						CL AVEV	CAND WIT	Visual Classific	ation
	<u>X</u> 7	S	10	42	11			SC	slightly moist firm to hard	considerat predomina	ole some fantly well gr		ar to subrounded gravel, ubrounded sand, weakly
5	X	S	28	50/5"									
15	X	S	27	50						note: incre	ease in fine	vel content below 10' s content below 10'	
										Sampler r	auger at 14 refused at I with drill	15'4"	
				<u> </u>									
	•					•							
									boundary lines may be gradual.		A = Aug	er Cuttings U = Relatively L	y: S = Split Spoon Jndisturbed Ring D = Disturbed Bulk
					2504	West	South	k Materi ern Ave na 85282			DEPTH N/A	GROUNI TIME N/A	DWATER DATE N/A

Alpha	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No	·.	B-10	
Proje	ct N	ame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	s) C	omp	lete:				,	1/11/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		C	^	11	10			60		CLAVEVS	AND	Visual Classific	ation
	X	S	9	11	13			SC	slightly moist		grained, su ained, sub	angular to subrounded	ed gravel, predominantly fine to d sand, weakly cemented,
5	X	S	18	27	23								
	<u>X</u>									note: fine g	grained sar	nd below 5'	
10		S	25		50/3"								
15	\times	S	39	50,	/4"					note: increa	ase in grav	vel content below 15'	
										Stopped a Sampler ro Backfilled	uger at 14 efused at	'6" 15'4"	
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U GROUND	Indisturbed Ring D = Disturbed Bulk
					2504	West	South	ern Ave a 85282			DEPTH N/A	TIME N/A	DATE N/A

Alph	a Pro	oject	Num	ber:			2	20-G-1104	4	Boring No		B-11	
Proje	ect N	lame	:		Т	rillium a	t Dougla	as Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Augu	uer
Date	(s) C	omp	lete:					1/11/2021		Boring Lo	cation:	See Figure 1 - Site	е Мар
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0			•					014		CII TV CAN	ID WITH	Visual Classifica	tion
	X	S	3	3	4			SM	slightly moist		grained, su	bangular to subrounde	d gravel, predominantly well dium plasticity, light brown
	X	S	4	6	7								
5	X	S	11	16	21					note: weak			
10	X	S	27	50	/5"								
15	_ X	S		50/5"									
										Stopped a Sampler re Backfilled	efused at	14'11"	
				The etro	ification	lines repr	acent the	annrovimato	boundary lines			Sample Type Key:	S - Split Spoon
									may be gradual.		A = Aug	er Cuttings U = Relatively Un	disturbed Ring D = Disturbed Bulk
					2504	West	South	& Materi ern Ave na 85282			DEPTH N/A	GROUND\ TIME N/A	WATER DATE N/A

Alpha	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-12	
Proje	ct N	ame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	e:	Hollow Stem Aug	uer
Date	(s) C	omp	lete:					1/11/2021		Boring Loc	ation:	See Figure 1 - Si	te Map
		4		a)		CF)		r		Field and D	Prilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0		0	2	4	5			SC		CLAYEY SA	AND	Visual Classific	ation
	X	S	3	4	5			30	slightly moist	occasional f	fine graine		ounded gravel, predominantly
	$/ \setminus$								moderately firm to	fine grained	sand, lov	v medium plasticity, br	own
									hard				
	\bigvee	S	5	7	7								
	Λ												
_		S	23	27	32								
5	X	o	23	21	32					note: weakly	y cemente	ed below 5'	
	\triangle												
			<u> </u>	<u> </u>									
			<u> </u>										
10	X	S	<u> </u>	50/5"							:	ual acontact balance 401	
										note: incrae	se in grav	el content below 10'	
			<u> </u>										
15	\times	S	:	50/5"						Stopped au	iger at 14	l'e"	
										Sampler re	fused at	14'11"	
										Backfilled v	with drill	cutting	
			т	he strat	ification	lines repre	esent the	approximate	boundary lines			Sample Type Key	: S = Split Spoon
									may be gradual.		A = Aug	er Cuttings U = Relatively U	ndisturbed Ring D = Disturbed Bulk
									als, Inc.	-	DEPTH	GROUND TIME	DATE DATE
				2				ern Ave a 85282			N/A	N/A	N/A
					10	inpe,	, \11ZUI	u 0020	=				

Alpha	a Pr	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-13	
Proje	ct N	lame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	uer
Date	s) C	omp	lete:					1/11/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No	otes:	
0		0	0	40	4.4			014		CII TV CAN	ID WITH (Visual Classific	ation
	X	S	9	13	14			SM	slightly moist		grained, su bangular to	bangular to subrounde	ed gravel, predominantly well eakly cemented, medium
	Z 	U		50/5"									
5	X	S	28	25	28								
										note: increa	ase in grav	vel content below 8'	
10	X	S	31	50/	/4"								
15		S	38	50,	/5"								
										Stopped at Sampler re Backfilled	efused at	15'5"	
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.			GROUND	ndisturbed Ring D = Disturbed Bulk
				2				ern Ave a 85282			DEPTH N/A	TIME N/A	DATE N/A

Alph	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-14	
Proje	ct N	lame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Type	e:	Hollow Stem Aug	uer
Date	(s) C	omp	lete:					1/11/2021		Boring Loca	ation:	See Figure 1 - Si	te Map
		•		E E		CF)		ر		Field and D	rilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0		·	4	-	7			00		CLAYEY SA	MD	Visual Classifica	ation
	X	S	4	5	7			SC	slightly moist	occasional fi	ine graine		ounded gravel, predominantly
	Λ								moderately firm to	fine grained	sand, lov	to medium plasticity,	brown
									hard				
	\bigvee	S	7	7	11								
	λ												
5	\bigvee	S	19	28	33					note: weakly	cemente	ed below 5'	
	Λ												
10	\bigvee	S	23	50	/5"					note: increas	se in grav	rel content below 10'	
	/ \												
15	\times	S		50/5"						Stopped au	gor of 4	ie"	
										Sampler ref	used at	14'11"	
										Backfilled w	vith drill	cutting	
									boundary lines may be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	: S = Split Spoon ndisturbed Ring D = Disturbed Bulk
									als, Inc.			GROUND	WATER
								ern Ave		1	DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe,	Arizon	a 85282	2		111/74	IV/A	I N/ A

Alph	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-15	
Proje	ect N	ame	:		Tı	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/11/2021		Boring Lo	cation:	See Figure 1 - Si	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No		
0		C	7	0	40			00		CL AVEV S	AND	Visual Classific	ation
	X	S	7	8	10			SC	slightly moist		rained, su ained, sub		ed gravel, predominantly fine to d sand, low to medium
5	X	S	38	12 50	12								
3	X	0	30	30,	-					note: weak			
10	X	S	13	18	25					note: increa	ase in grav	el content below 10'	
45			27	50,	/2"								
15	X	S	37	50/	. J								
										Stopped a Sampler re Backfilled	efused at	15'3"	
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U GROUND	Indisturbed Ring D = Disturbed Bulk
					2504	West	South	Materia ern Ave a 85282	nue	- - -	DEPTH N/A	TIME N/A	DATE N/A

Alpha	a Pro	oject	Numb	er:			2	0-G-11044	4	Boring No.	-	B-16					
Proje	ct N	ame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45					
Proje	ct L	ocati	ion:				Bucl	keye, Arizo	ona	Boring Typ	oe:	Hollow Stem Aug	juer				
Date	(s) C	omp	lete:				,	1/11/2021		Boring Loc	cation:	See Figure 1 - Si	te Map				
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Orilling No	otes:					
0												Visual Classific	ation				
	\ \ \ \	S	2	13	15			SM	slightly moist		rained, su		ed gravel, predominantly fine to I sand, medium plasticity,				
5		S	8	23	42												
10		S	27	50.	/4"					note: weakly cemented below 5'							
15		S		50/5"						note: increa	ase in grav	vel content below 10'					
10		3		50/3						Stopped at Sampler re Backfilled	efused at	14'11"					
			-	The -4 ···	ifio-+	lines =	noort 41	nnegative et e	houndon (!i	1		Occupie Toronto	u. C. Colit Coor-				
									boundary lines nay be gradual.		A = Aug		ndisturbed Ring D = Disturbed Bulk				
					2504	West	South	Materia ern Ave a 85282	nue		DEPTH N/A	GROUND TIME N/A	DATE N/A				

Alph	a Pr	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-17	
Proje	ect N	lame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Buck	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				1	1/11/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	otes:	
0		C	0	0	0			CM		SILTY SAI	ND	Visual Classific	ation
	V	S	3	2	2			SM	slightly moist	rare fine g	rained, sub		d gravel, predominantly fine
	\triangle								soft to moderately	grained sa	nd, low pla	sticity, brown	
									firm				
	\bigvee	S	2	2	2								
	Λ												
5		S	6	7	7								
	X	Ū		,	,								
	\triangle												
								SC	a Park the case 2 at	CLAYEY S			
									slightly moist				ed gravel, predominantly fine to d sand, medium plasticity,
10	\7	S	8	12	16				firm to very firm	brown			
	X												
15	\bigvee	S	8	22	23					note: incre	ase in grav	vel content below 15'	
	\triangle									_			
										Stopped a Stopped s			
										Backfilled			
				<u> </u>		ļ				<u> </u>			
									boundary lines may be gradual.		A = Aug		r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	a Ge	otechr	nical &	Materi	als, Inc.			GROUNE	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe, <i>i</i>	Arizon	a 85282	2		1 1// 1	1 3/7 3	13//3

Alpha	a Pro	oject	Num	ber:			2	0-G-1104	4	Boring No	o.	B-18	
Proje	ct N	lame	:		Tı	rillium a	t Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	cona	Boring Ty	/pe:	Hollow Stem Aug	guer
Date((s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
				_		Ű.				Field and	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0		c	7		10			60		CLAYEY S	SAND	Visual Classific	ation
	\bigvee	S	7	9	10			SC	slightly moist			angular to subrounde	d gravel, predominantly fine to
	\triangle								firm to very firm	medium graphs		angular to subrounde	d sand, low to medium
)	4.4	40	26								
	V	S	11	18	20								
	\triangle												
5	\ /	S	13	17	18								
	X												
	/_\												
10	/	S	16	9	7								
	X									note: incre	ease in grav	vel content below 10'	
				:									
15		S	13	10	11								
	X												
											auger at 14		
											sampler at I with drill		
												-	
				<u> </u>									
											T		
									boundary lines may be gradual.		A = Aug		y: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	na Ge	otech	nical 8	k Materi	als, Inc.		DEDT		DWATER
					2504	West	South	ern Ave	enue		DEPTH N/A	TIME N/A	DATE N/A
					Te	empe,	Arizor	na 8528	2				

Alph	a Pr	oject	Numl	oer:			2	0-G-1104	4	Boring No.		B-19	
Proje	ct N	lame	:		Tı	rillium at	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Type	:	Hollow Stem Augus	er
Date	(s) C	omp	lete:					1/12/2021		Boring Loca	ation:	See Figure 1 - Site	Мар
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dr	rilling No		
0	.	S	6	8	11			SC		CLAYEY SA	ND	Visual Classificat	ion
	X	3	0	0	11			30	slightly moist moderately firm to	trace fine gra	ained, su	bangular to subrounded angular to subrounded s	gravel, predominantly fine to cand, medium plasticity,
		U		55					very firm				
	/												
5	\bigvee	S	15	16	18								
	Δ												
										note: increas	se in grav	vel content below 7'	
											3		
10		S	14	9	5								
	X												
15	X	S	14	9	7								
	$m{m{\mu}}$									Stopped aug	ger at 14	l'6"	
										Stopped sar Backfilled w	mpler at	16'	
										_aoi.iiioa W	41111		
								-					
										<u> </u>			
									boundary lines		۸ – ۸۰۰	Sample Type Key: S	
			b						may be gradual.		A = Aug	er Cuttings U = Relatively Und GROUNDW	listurbed Ring D = Disturbed Bulk VATER
								k Materi ern Ave	als, Inc. enue		DEPTH	TIME	DATE
								a 8528			N/A	N/A	N/A

Alpha	a Pro	oject	Num	ber:			2	:0-G-1104	4	Boring No).	B-20	
Proje	ct N	lame	:		Т	rillium a	t Dougla	as Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		C	1	2	2			CM		SILTY SAN	ND	Visual Classifica	ation
	X	S	1	2	2			SM	slightly moist	occasional	fine graine		ounded gravel, predominantly ounded sand, nonplastic, brown
	X	S	4	5	6								
5	X	S	7	8	8							vel content below 5'	
10		S	8	9	11								
15	X	S	8	12	13								
										Stopped a Stopped s Backfilled	ampler at	16'	
				etween s	soil and ı	rock types	: In-situ, th	ne transition i	boundary lines may be gradual.			GROUND	ndisturbed Ring D = Disturbed Bulk
					2504	West	South	ern Ave na 8528	enue		DEPTH N/A	TIME N/A	DATE N/A

Alph	a Pro	oject	Numb	er:			2	20-G-1104	4	Boring No	·.	B-21	
Proje	ct N	ame	:		Tı	rillium at	Dougla	as Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	tes:	
0					_			1 1		OANDY OF		Visual Classific	ation
_	<u> </u>	<i>S</i>	1	1 11	2			ML	slightly moist very soft to moderately firm		fine graine		ounded gravel, considerable bunded sand, low plasticity,
10		<i>σ</i>	6	5	7					note: incre	ase in san	d and gravel content b	elow 5'
10	X	5	0		,			SP-SM		SAND WIT			
15	X	S	8	10	11				slightly moist medium dense	trace fine graded, su	grained, su bangular to	bangular to subrounde o subrounded sand, no	ed gravel, predominantly well onplastic, brown
										Stopped a Stopped s Backfilled	ampler at	16'	
										-			
				Alph	oil and r	ock types:	In-situ, th				DEPTH	GROUND TIME	ndisturbed Ring D = Disturbed Bulk DWATER DATE
								na 85282			N/A	N/A	N/A

Alph	a Pr	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-22	
Proje	ect N	lame	:		Tr	illium at	Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	otes:	
0		C	0	2	4			CM		SII TV SAI	ND	Visual Classific	ation
	X	S	3	3	4			SM	slightly moist		rained, sub		d gravel, predominantly fine to
									soft to moderately firm	J	, , , , , , , , , , , , , , , , , , , ,		
	∇	S	11	7	8								
	Δ												
5	7	S	6	6	5								
	Å												
								SC	slightly moist	CLAYEY S		h	ad average manda as in a with this a to
										medium gr	rained, sub	angular to subrounded	ed gravel, predominantly fine to d sand, weakly cemented
10		S	13	32	50/5"				hard	medium pl	asticity, bro	own	
	X												
15	\bigvee	S	18	27	50/3"								
	Λ												
										Stopped a			
										Sampler r Backfilled	efused at I with drill		
									boundary lines may be gradual.		A = Aug	er Cuttings U = Relatively U	 r: S = Split Spoon Judisturbed Ring D = Disturbed Bulk
	_	_		•					als, Inc.		DEPTH	GROUNI TIME	DWATER DATE
				:				ern Ave			N/A	N/A	N/A
					Iе	mpe,	Arizon	a 8528					

Alpha	a Pro	oject	Numb	oer:			2	0-G-1104	4	Boring No).	B-23	
Proje	ct N	ame	:		T	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Au	guer
Date	s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
		40		a)		CF)		u		Field and	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0		0	4	6	7			SM		SILTY SAI	ND WITH (Visual Classific	ation
	V	S	4	ь	/			SIVI	slightly moist	some fine	grained, su	ubangular to subround	ed gravel, predominantly fine to
	/\								moderately firm to hard	medium gr	ained, sub	angular to subrounded	d sand, nonplastic, brown
		S	4	4	6				nara				
	X	3	4	4	· ·								
	/\												
5	\/	S	11	21	36								
	X									note: incre	ase in grav	vel content below 5'	
										note: incre	ase in san	d content below 10'	
10	\bigvee	S	21	15	14					11010. 111010	aco in can		
	/\												
15	\bigvee	S	22	50/	/5"								
	\triangle									Stopped a	nuger at 14	1'6"	
										Sampler re	efused at	15'5"	
										Backfilled	with drill	cutting	
			-	.		P			1 1	Т		<u> </u>	0.00%
									boundary lines may be gradual.		A = Aug	er Cuttings U = Relatively L	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	a Ge	otech	nical 8	Materi	als, Inc.		חבטדיי	GROUNI	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe,	Arizon	a 85282	2				

Alpha	a Pr	oject	Numb	oer:			2	0-G-1104	4	Boring No.		B-24	
Proje	ct N	lame	:		Tı	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Typ	e:	Hollow Stem Aug	uer
Date	(s) C	omp	lete:				,	1/12/2021		Boring Loc	ation:	See Figure 1 - Si	te Map
æ		ē		t /al)		CF)	(9	- u		Field and D	Orilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0			_							OU TV OAN	D MUTIL	Visual Classifica	ation
	V	S	3	4	6			SM	slightly moist	SILTY SAN			brounded gravel, predominantly
	Λ								moderately firm to	well graded,	, subangu	llar to subrounded sand	d, nonplastic, brown
									hard				
	/	U		22									
	/												
5	\bigvee	S	22	35	50/4"					note: increa	se in fine	s content below 5'	
	$/ \setminus$									note: decrea	ase in gra	vel content below 5'	
					<i>-</i>								
10	X	S	23	50	/5"								
										note: weakly	y cemente	ed below 10'	
					/ 4 !!								
15	X	S	25	50	/4"								
										Stopped au			
										Sampler ref Backfilled v			
												-	
										<u> </u>			
				The strat	tification	lines renra	sent the	annrovimato	boundary lines			Sample Type Key	S = Split Spoon
									may be gradual.		A = Aug	er Cuttings U = Relatively U	ndisturbed Ring D = Disturbed Bulk
									als, Inc.		DEPTH	GROUND TIME	WATER DATE
				2				ern Ave		-	N/A	N/A	N/A
					16	mpe,	Arizon	a 85282					

Alpha	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.	•	B-25	
Proje	ct N	ame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/12/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Orilling No		
0										OL AVEV O	AND	Visual Classific	ation
	X	S	6	10	11			SC	slightly moist		rained, su		ed gravel, predominantly fine to I sand, low medium plasticity,
5	X	S	13	22	39								
3	X	0	13	24	29					note: increa		s content below 5' ed below 5'	
10	X	S	26	50/	/5"								
					/41								
15	X	S	37	50/	4								
										Stopped at Sampler re Backfilled	efused at	15'4"	
										,			
				etween s	oil and r	ock types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U GROUND	ndisturbed Ring D = Disturbed Bulk
					2504	West	South	k Materia ern Ave la 85282		-	DEPTH N/A	TIME N/A	DATE N/A

Alph	a Pro	oject	Numb	er:			2	0-G-11044	4	Boring No.		B-26	
Proje	ct N	lame	:		Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Arizo	ona	Boring Typ	oe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
æ		be		nt 'val)		PCF)	(%)	oil ion		Field and I	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0												Visual Classific	ation
	V	S	2	3	3			SC	slightly moist	CLAYEY S		hangular to subrounde	ed gravel, predominantly well
	Λ								soft to hard				nedium plasticity, brown
									Soft to flard				
	\/	S	3	4	4								
	X												
5		U		26						note: weak	ly cemente	ed below 5°	
	/												
10	X	S	29	50,	/4"					note: increa	ase in fine	s content below 10'	
	<u> </u>												
15	\bigvee	S	22	14	50/5"								
	\triangle												
										Stopped a Sampler re			
										Backfilled			
										T			
									boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings $U = Relatively U$: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	a Ge	otech	nical 8	k Materia	als, Inc.	1		GROUND	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe,	Arizon	a 85282	2		1 W/ F1	19/1	13//1

Alph	a Pro	oject	Num	ber:			2	:0-G-1104	4	Boring No.		B-27	
Proje	ct N	ame	:		Т	rillium a	t Dougla	as Ranch	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Type	e:	Hollow Stem Augue	er
Date	(s) C	omp	lete:					1/12/2021		Boring Loca	ation:	See Figure 1 - Site	Мар
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	rilling No		
0	. /	9	6	7	Q			ec	<u> </u>	CLAYEY SA	MD	Visual Classificati	ion
	X	S	6	7	8			SC	slightly moist moderately firm to hard	trace fine gra	ained, su	bangular to subrounded of the street of the	gravel, predominantly fine to brown
	X	S	8	19	28								
5	X	S	13	27	31					note: weakly		ed below 5' s content below 5'	
10	X	\$	25	50	/5"					Stopped au Sampler ref			
										Backfilled v			
									boundary lines may be gradual.		A = Aug	Sample Type Key: S er Cuttings U = Relatively Undi	S = Split Spoon isturbed Ring D = Disturbed Bulk
									ials, Inc.		DEPTH	GROUNDW TIME	/ATER DATE
				2				ern Ave		-	N/A	N/A	N/A
					16	inpe,	Arizor	na 8528	Z				

Alpha	a Pr	oject	Numl	ber:			2	0-G-1104	14	Boring No.		B-28	
Proje	ct N	lame	:		Т	rillium a	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	zona	Boring Typ	e:	Hollow Stem Aug	uer
Date((s) C	omp	lete:					1/12/2021	1	Boring Loc	ation:	See Figure 1 - Sit	te Map
		a		a) [E		CF)		_ =		Field and D	Orilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0			4		0			CM	1	SILTY SAN	D WITH (Visual Classifica	ation
	X	S	1	2	2			SM	slightly moist	some fine g	rained, su	ubangular to subrounde	ed gravel, predominantly fine to
	١								very soft to very firm	medium gra	ained, sub	angular to subrounded	sand, nonplastic, brown
									-				
	V	S	16	12	13]				
	Λ								-				
_		_	•	40	00					note: clayey	/ sand zor	ne (SC) between 5' to 6	6'
5	V	S	9	16	22				-				
	$/ \setminus$												
				<u> </u>					-				
									-				
]				
10	/	S	7	13	14				-				
	X									note: well gr	raded sar	nd below 10'	
	<u>/ \</u>								-				
									-				
]				
									-				
15	\bigvee	S	4	11	9								
	Λ								1				
	,									Stopped au			
									-	Stopped sa Backfilled v			
									1				
				<u> </u>					-				
									1				
		<u> </u>		<u> </u>									
				The strat	ification	lines repre	esent the	approximate	boundary lines			Sample Type Key:	: S = Split Spoon
									may be gradual.		A = Aug	er Cuttings U = Relatively Ur	ndisturbed Ring D = Disturbed Bulk
									ials, Inc.	-	DEPTH	GROUND TIME	WATER DATE
				:				ern Ave a 8528			N/A	N/A	N/A
					16	nipe,	/ NIIZUI	ia 0J20	· <u>~</u>				

Alph	a Pro	oject	Numl	oer:			2	0-G-1104	4	Boring No.	•	B-29	
Proje	ct N	lame	:		Tı	rillium at	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	zona	Boring Typ	oe:	Hollow Stem Au	guer
Date	(s) C	omp	lete:					1/12/2021		Boring Loc	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and [Orilling No		
0	\ /	S	6	8	9			SM	T	SILTY SAN	ID WITH (Visual Classific	ation
	X	Ū		J	J			Oili	slightly moist	some fine g	grained, su	bangular to subround	ed gravel, predominantly well
	$^{\prime}$								moderately firm to very firm	graded, sub	oangular to	o subrounded sand, no	onplastic, brown
									very mm				
	V	S	9	12	11								
	$/ \setminus$												
5	\ /	S	9	12	15								
	X												
	/ \												
10	\bigvee	S	8	5	5								
	Λ									note: increa	ase in san	d content below 10'	
45		S	6	11	30								
15	X	3	6	11	30								
	ackslash									Stopped at	liner at 1/	!'6"	
										Stopped sa	ampler at	16'	
										Backfilled	with drill	cutting	
						•				-			
									boundary lines may be gradual.		A = Aug	er Cuttings U = Relatively L	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
									als, Inc.		DEPTH	GROUNI TIME	DWATER DATE
				:				ern Ave			N/A	N/A	N/A
					16	mpe,	AHZON	a 8528	۷				

Alpha	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-30	
Proje	ct N	ame	:		Tı	rillium at	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Type	e:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/12/2021		Boring Loc	ation:	See Figure 1 - Si	te Map
		4		æ		CF)				Field and D	rilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0		c	2	2	2			CM	T	SILTY SANI	D WITH (Visual Classific	ation
	V	S	2	2	2			SM	slightly moist	some fine gr	rained, su	bangular to subround	ed gravel, predominantly well
	\triangle								very soft to very firm	graded, sub	angular to	subrounded sand, no	onplastic, brown
	\bigvee	S	2	2	3								
	Λ												
_		S	4	6	7								
5	X	٥	4	О	/					note: increas	se in san	d content below 5'	
	\triangle												
10	/	S	6	6	7								
	X												
								CL		SANDY CLA		ed. subangular to subr	ounded gravel, considerable
										fine to media	um graine	ed, subangular to subre	ounded sand, weakly
15	X	S	16	50/	/5"					cementea, n	neulum p	lasticity, brown	
										Stopped au			
										Sampler ref Backfilled v			
												-	
						<u> </u>			l	<u> </u>			
									boundary lines			Sample Type Key	
			be						may be gradual.		A = Aug	er Cuttings U = Relatively U GROUND	ndisturbed Ring D = Disturbed Bulk
								Materi ern Ave	als, Inc.		DEPTH	TIME	DATE
				2				a 8528			N/A	N/A	N/A
						•							

Alph	a Pr	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-31	
Proje	ct N	lame	:		Tı	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	uer
Date	s) C	omp	lete:					1/12/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and [Orilling No	otes:	
0		0	4	0	-			014		CII TV CAN	ID.	Visual Classifica	ation
	X	S	4	6	7			SM	slightly moist	SILTY SAN trace fine g		bangular to subrounde	ed gravel, predominantly well
	Λ								moderately firm to	graded, sub	oangular to	o subrounded sand, lo	w plasticity, brown
									firm				
	V	S	7	10	11								
	Å												
5		U		23									
								SC		CLAYEY S		ed. subangular to subr	ounded gravel, predominantly
										fine to med	ium graine	ed, subangular to subro	
10		S	10	17	24					plasticity, b	TOWN		
10	X	3	10	17	24								
	/												
15	/	S	18	19	24								
	X	-	-		-								
	/ \									Stopped a	uger at 14	l'6"	
										Stopped sa	ampler at	16'	
										Backfilled	with drill	cutting	
									boundary lines may be gradual.		A = Aug		ndisturbed Ring D = Disturbed Bulk
									als, Inc.	-	DEPTH	GROUND TIME	DATE DATE
				2				ern Ave a 85282			N/A	N/A	N/A
					16	inpe,	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	a 0520	<u></u>				

Alph	a Pr	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-32	
Proje	ect N	ame	:		Ti	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	otes:	
0			_				,			011 777 0 41	VD V4/17/1	Visual Classific	ation
	\bigvee	S	2	2	3			SM	slightly moist	SILTY SAI some fine			ed gravel, predominantly well
	\triangle								soft to firm			subrounded sand, no	
	7	S	3	3	3								
	X												
_			_	_									
5	\bigvee	S	3	3	3								
	\triangle												
	\bigvee	S	13	13	15								
	Ň									note: incre	ase in fine	s content below 7'	
10		S	13	29	34			SC		CLAYEY S	SAND		
	X								slightly moist				ed gravel, predominantly fine to disand, weakly cemented
									hard	medium pl			d dana, weakly comenica
15	X	S	32	50,	/5"								
	\sim									Stopped a			
										Sampler r Backfilled			
												- · · · · · · · · · · · · · · ·	
				The strat	ification	lines renre	sent the a	approximate	boundary lines			Sample Type Key	r: S = Split Spoon
									nay be gradual.		A = Aug	er Cuttings U = Relatively U	Indisturbed Ring D = Disturbed Bulk
									als, Inc.		DEPTH	GROUNI TIME	DWATER DATE
				2				ern Ave a 85282			N/A	N/A	N/A
					10	nipe, i	112011	u 00202	<u>-</u>				

Alph	a Pr	oject	Numb	er:			2	0-G-1104	1	Boring No).	B-33	
Proje	ect N	lame			Tr	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		S	1	2	2			GP		GRAVEL \	MAP HTIN	Visual Classific	ation
	X	3	ı	2	2			GP	slightly moist	considerat	ole medium	to coarse grained, su	bangular to subrounded sand,
	Λ								very soft to firm	predomina brown	ntly fine gr	ained, angular to subr	ounded gravel, nonplastic,
	V	S	4	5	8								
	Λ												
_			40	44	_								
5	V	U	10	11	9					note: incre	ase in san	d content below 5'	
	\triangle												
										OL AVEV C	NAME .		
								SC	slightly moist	trace fine of		bangular to subrounde	ed gravel, predominantly fine to
									hard				d sand, medium plasticity,
10		S	21	25	27					D. G. W. I.			
	X												
	<u>/ \</u>												
								SP-SM	oliabth, m = :=+			ND GRAVEL	
									slightly moist			ມbangular to subround ວ subrounded sand, ກເ	ed gravel, predominantly well onplastic, brown
15	//	S	9	8	9				medium dense				
	X												
										Stopped a			
										Stopped s Backfilled			
							_						
										Т			
									boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings $U = Relatively U$	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	a Ge	otechr	nical 8	Materia	als, Inc.			GROUNE	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe, <i>i</i>	Arizon	a 85282	2			-	·

Alph	a Pr	oject	Numb	oer:			2	0-G-1104	4	Boring No).	B-34	
Proje	ect N	lame	:		Ti	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/12/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	otes:	
0										OU TV OA	NID	Visual Classific	ation
	V	S	4	4	4			SM	slightly moist	SILTY SAI		ed, subangular to subr	ounded gravel, predominantly
	Λ								soft to firm				ounded sand, nonplastic, brown
	7	U		19									
5	\bigvee	S	3	3	4								
	\triangle												
										note: incre	ase in grav	vel content below 7'	
	7	S	10	13	11					note: fine t	o medium	grained, subangular to	subrounded sand content
	X									below 7'		gramou, oubangulai i	
10		S	9	9	9								
10	X	3	3	3	9								
	\triangle												
15	7	S	7	7	6								
	X												
	\vdash									Stopped a			
										Stopped s Backfilled			
									boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	na Ge	eotechi	nical 8	Materia	als, Inc.		DE0	GROUNE	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	empe,	Arizon	a 85282	2			-	·

Alph	a Pro	oject	Numb	er:			2	0-G-1104	4	Boring No.		B-35	
Proje	ct N	lame			Ti	rillium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/13/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No	otes:	
0						u						Visual Classific	ation
0	\langle	S	2	3	3			SM	slightly moist soft to moderately firm		rained, su	bangular to subrounde	ed gravel, predominantly fine to d sand, nonplastic, brown
5		S	4	11	5								
										note: increa	ase in san	d content below 5'	
15		\$ \$	7	8	7			SP-SM	slightly moist medium dense		rained, su		ed gravel, predominantly fime to
										Stopped a Stopped s Backfilled	ampler at	16'	
			i			<u> </u>		<u> </u>		<u> </u>			
				Alph	a Ge 2504	ock types: eotechi West	nical 8 South	e transition r		-	A = Aug DEPTH N/A	Sample Type Key er Cuttings U = Relatively U GROUND TIME N/A	Indisturbed Ring D = Disturbed Bulk
					16	inhe,	111ZUI	ia 0020	_				

Alph	a Pr	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-36	
Proje	ect N	ame	:		Tı	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/13/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0		c	4	1	2			CM		SILTY SAI	ND	Visual Classific	ation
	X	S	1	1	2			SM	slightly moist very soft to moderately firm	trace fine (grained, su		ed gravel, predominantly fine to d sand, nonplastic, brown
	X	S	3	3	4								
5	X	S	5	6	7					note: incre	ase in san	d content below 5'	
10	X	S	6	7	7			SP-SM	slightly moist medium dense		grained, su		ed gravel, predominantly fime to d sand, nonplastic, brown
15	X	S	7	9	9								
										Stopped a Stopped s Backfilled	sampler at	16'	
									boundary lines				r: S = Split Spoon
			be			**	-		may be gradual.		A = Aug	er Cuttings U = Relatively U	Indisturbed Ring D = Disturbed Bulk DWATER
								iviateria ern Ave	als, Inc. nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe,	Arizon	a 85282	2		IN/A	IN/A	IV/A

Alph	a Pro	oject	Numb	er:			2	20-G-1104	4	Boring No.	•	B-37	
Proje	ct N	ame	:		Tı	rillium at	Dougla	as Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	oe:	Hollow Stem Aug	uer
Date	(s) C	omp	lete:					1/13/2021		Boring Loc	cation:	See Figure 1 - Si	te Map
_		Ф		. (al)		CF)	_	_ =		Field and I	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0										OU TV OAL	ın	Visual Classific	ation
	\bigvee	S	2	2	2			SM	slightly moist	SILTY SAN occasional		ed, subangular to subre	ounded gravel, predominantly
	\triangle								very soft to	fine to med	lium graine	ed, subangular to subro	ounded sand, nonplastic, brown
									moderately firm				
	\bigvee	S	3	4	5								
	X												
5	\bigvee	S	5	6	7					note: increa	ase in san	d content below 5'	
	\triangle									note: increa	ase in grav	vel content below 5'	
				<u> </u>									
10		S	6	7	8			SP-SM		SAND WIT	H SILT		
	X		J					G. G	slightly moist	trace fine g	rained, su		ed gravel, predominantly fime to
	\triangle								medium dense	mealum gra	ained, sub	angular to subrounded	I sand, nonplastic, brown
15	/	S	8	8	10								
	X												
										Stopped a			
										Stopped sa Backfilled			
												-	
										Т			
									boundary lines may be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	: S = Split Spoon ndisturbed Ring D = Disturbed Bulk
				Alph	a Ge	otech	nical 8	& Materi	als, Inc.			GROUND	
					2504	West	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A
					Te	mpe,	Arizor	na 85282	2		1 W/ F1	13// 3	14/1

Alph	a Pr	oject	Numb	er:			2	0-G-11044	4	Boring No	·-	B-38	
Proje	ect N	lame	:		Tı	illium at	Dougla	s Ranch F	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocat	ion:				Buc	keye, Arizo	ona	Boring Typ	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:					1/13/2021		Boring Lo	cation:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No	otes:	
0		0						011		CII TV CAN	ID WITH	Visual Classific	ation
	X	S	1	2	2			SM	slightly moist very soft to firm		grained, ar		gravel, predominantly well onplastic, brown
	/	U		13									
5	X	S	5	5	6								
10	X	S	6	7	9					note: increa	ase in grav	vel content below 10'	
								SP-SM		SAND WIT	'H SII T AI	ND GRAVEL	
								01 -0111	slightly moist medium dense	trace fine g	rained, su	bangular to subrounde	ed gravel, predominantly fime to d sand, nonplastic, brown
15	X	S	7	9	12					Stopped a	uger at 14	l'6"	
										Stopped a Stopped s Backfilled	ampler at	16'	
									boundary lines nay be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
					2504	West	South	Materia ern Ave a 85282	nue	-	DEPTH N/A	GROUND TIME N/A	DWATER DATE N/A

Alph	a Pro	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-39	
Proje	ect N	ame	:		Tr	illium at	Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/13/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
0	\ /	0	2	3	3			CM		SILTY SAI	ND.	Visual Classific	ation
	X	S	2	3	3			SM	slightly moist soft to moderately firm	occasional	fine graine	ed, subangular to subr llar to subrounded san	ounded gravel, predominantly d, nonplastic, brown
	X	S	3	3	3								
5	X	S	6	5	5					note: incre	ase in fine	s content below 5'	
										note: incre	ase in grav	vel content below 7'	
10	X	S	10	13	23			SC	slightly moist very firm		grained, su		ed gravel, predominantly fime to d sand, low plasticity, brown
15	X	S	9	14	24								
										Stopped a Stopped s Backfilled	sampler at	16'	
	<u> </u>									<u> </u>			
									boundary lines may be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
					2504	West	South	Materi ern Ave a 85282			DEPTH N/A	GROUNE TIME N/A	DWATER DATE N/A

Alph	a Pr	oject	Numb	er:			20	0-G-1104	4	Boring No).	B-40	
Proje	ect N	ame	:		Tı	rillium at	Dougla	s Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ect L	ocati	ion:				Bucl	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Aug	guer
Date	(s) C	omp	lete:				,	1/13/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No	otes:	
0		C	2	2	2			CM		SILTY SAI	ND.	Visual Classific	ation
	X	S	2	2	3			SM	slightly moist	trace fine (grained, su	bangular to subrounde subrounded sand, no	ed gravel, predominantly well
									soft to moderately firm	g. a.a.a., a.a.	g	, , , , , , , , , , , , , , , , , , , ,	
	\bigvee	S	3	3	4								
	Δ												
5	7	S	5	6	7					note: incre	ase in grav	vel content below 5'	
	X												
10	V	S	9	14	22			SC	slightly moist		grained, su		ed gravel, predominantly fime to
	\angle								very firm	medium gr	ained, sub	angular to subrounded	d sand, low plasticity, brown
15	7	S	14	16	20								
	X												
										Stopped a			
										Backfilled			
	<u> </u>]			
									boundary lines				y: S = Split Spoon
			b						may be gradual.		A = Aug	er Cuttings U = Relatively L GROUNI	Undisturbed Ring D = Disturbed Bulk
								Materi ern Ave	als, Inc.		DEPTH	TIME	DATE
				4				a 8528			N/A	N/A	N/A
						1 - /		-					

Alpha	a Pro	oject	Num	ber:			2	0-G-1104	4	Boring No.	i	B-41		
Proje	ct N	lame	:		Т	rillium a	Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45		
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Typ	e:	Hollow Stem Aug	guer	
Date	(s) C	omp	lete:					1/13/2021		Boring Loc	ation:	See Figure 1 - Si	ite Map	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	Orilling N			
0	۱,	S	2	2	2			SM	T	SILTY SAN	ID WITH (Visual Classific	ation	
	λ	3						SIVI	slightly moist soft to moderately	considerable	e fine gra	ined, subangular to su	brounded gravel, predominantly ounded sand, nonplastic, brown	
	V	S	3	3	4				firm					
	Δ													
5	_	U		15										
10	X	S	7	11	17					note: decrea	ase in fine	es content below 10'		
15	X	S	6	9	12									
										Stopped au				
										Backfilled v				
				<u> </u>										
				<u> </u>	<u> </u>	<u> </u>				<u> </u>				
									boundary lines may be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk	
									als, Inc.		DEPTH	GROUNE TIME	DWATER DATE	
								ern Ave na 8528			N/A	N/A	N/A	

Alpha	a Pro	oject	Num	ber:			2	:0-G-1104	4	Boring No	o.	B-42	
Proje	ct N	lame	:		Т	rillium a	t Dougla	as Ranch I	Phase I, Village 3	Rig Type:		CME-45	
Proje	ct L	ocat	ion:				Buc	keye, Ariz	cona	Boring Ty	pe:	Hollow Stem Aug	guer
Date((s) C	omp	lete:					1/13/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
				=		Ĕ.				Field and	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
0												Visual Classific	ation
	V	S	2	2	2			SC	slightly moist	trace fine		bangular to subrounde	ed gravel, predominantly fine to
	Λ								very soft to firm				d sand, medium plasticity,
		U		16									
5	\ /	S	4	4	5								
	X		-										
	/ \												
10	7	S	7	13	16								
	X												
	/ \									note: incre	ease in grav	vel content below 10'	
15	7	S	12	14	15								
	X												
											auger at 14		
											sampler at I with drill		
												-	
											I		
									boundary lines may be gradual.		A = Aug		y: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
				Alph	na Ge	eotech	nical 8	& Materi	als, Inc.				DWATER
					2504	West	South	ern Ave	enue		DEPTH N/A	TIME N/A	DATE N/A
					Τe	empe,	Arizor	na 8528	2		7.57		

Alph	Alpha Project Number Project Name: Project Location: Date(s) Complete: Output Output						2	0-G-1104	4	Boring No	о.	B-43		
Proje	ct N	lame	:		Tı	rillium a	t Dougla	s Ranch	Phase I, Village 3	Rig Type:		CME-45		
Proje	ct L	ocat	ion:				Buc	keye, Ariz	ona	Boring Ty	pe:	Hollow Stem Au	guer	
Date	(s) C	omp	lete:					1/13/2021		Boring Lo	cation:	See Figure 1 - S	ite Map	
		ø		т Э		CF)		_ c		Field and	Drilling N	otes:		
Depth (Feet	Sample	Sample Typ		Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks					
0		0						00		CLAVEV	CAND WIT	Visual Classific	ation	
	X	5	1	2	2			SC	slightly moist	some fine	grained, su	ubangular to subround	led gravel, predominantly fine to	
	Λ								very soft to firm	medium g plasticity,	rained, sub brown	angular to subrounde	d sand, low to medium	
		9	3	3	4									
	X	0	<u> </u>	J	7									
	/ \													
5	/	S	4	5	7					note: well	oraded sar	nd between 5' to 6'		
	X									note: wen	gradoù oar	10 001110 10 0		
10	\bigvee	S	9	12	22									
	Λ									note: weal	kly cement	ed below 10'		
												vel content below 10'		
										note. deci	ease III gra	ver content below 10		
15	\bigvee	S	15	29	50/3"									
	\triangle													
											auger at 14 efused at			
											d with drill			
	<u> </u>			<u> </u>	i		ļ	<u> </u>	<u>[</u>	ļ				
									boundary lines may be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	y: S = Split Spoon Jndisturbed Ring D = Disturbed Bulk	
				Alph	na Ge	otech	nical 8	& Materi	als, Inc.		DEET		OWATER	
					2504	West	South	ern Ave	enue		DEPTH N/A	TIME N/A	DATE N/A	
					Te	mpe,	Arizon	na 8528	2					

Alph	a Pr	oject	Number:			2	0-G-1104	4	Boring No.		TP-01		
Proje	ct N	lame	:	Tri	Ilium at	Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310) Backhoe	
Proje	ct L	ocat	ion:			Buc	keye, Ariz	ona	Boring Type	e:	Test Pits		
Date	(s) C	omp	lete:				1/8/2021		Boring Loc	ation:	See Figure 1 - S	Site Map	
			=	1	Ĕ.				Field and D	rilling No	otes:		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks			Visual Classifi	action	
0	\ /	D					SM		SILTY SANI	D	Visual Classifi	cation	
	V						-	slightly moist	ocasional fir	ne grained		ded gravel, predominant ed, nonplastic, brown	ly
	$/ \setminus$												
	μ								Stopped ba	ckhoe at	3'		
Ī									Backfilled v	with spoil	s		
					_								
								boundary lines may be gradual.		A = Auge	er Cuttings U = Relatively	ey: S = Split Spoon Undisturbed Ring D = Disturber	d Bulk
								als, Inc.	-	DEPTH	GROUN TIME	IDWATER DATE	
							ern Ave a 8528			N/A	N/A	N/A	
				16	nipe,	, 111ZUI	ia 0020.	<u>-</u>					

Alpha	a Pro	oject	Number:			20-G-1104	4	Boring No.		TP-02			
Proje	ct N	ame	:	Trillium	at Dougl	as Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe		
Proje	ct L	ocat	ion:		Bu	ickeye, Ariz	ona	Boring Type:		Test Pits			
Date	s) C	omp	lete:			1/8/2021		Boring Location	n:	See Figure 1 - Si	te Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drillin	ng No				
		D				SP-SM		SAND WITH SIL	LT AN	Visual Classific	ation		
5	\bigvee					3F-3M	slightly moist	some fine grained, subangular to subrounded gravel, predominantly medium grained, subangular to subrounded sand, nonplastic, brown					
10								Stopped backhoe at 5' Backfilled with spoils					
							havedon Proce			0			
			between s	oil and rock ty	pes: In-situ,	the transition i	boundary lines may be gradual.	A	\ = Auge	Sample Type Key er Cuttings U = Relatively U GROUND	ndisturbed Ring D = Disturbed Bulk		
				2504 We	st Sout	& Materi hern Ave na 85282	nue	DEF N/		TIME N/A	DATE N/A		

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-03		
Proje	ct N	lame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe	
Proje	ct L	ocat	ion:		Bud	ckeye, Ariz	ona	Boring Type) :	Test Pits		
Date	s) C	omp	lete:			1/8/2021		Boring Loca	ation:	See Figure 1 - Si	te Map	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	rilling No			
		D				SP-SM		SAND WITH	I SII T AN	Visual Classific	ation	
5	\bigvee					37-3141	slightly moist	trace fine grained, angular to subrounded gravel, predominantl grained, subangular to subrounded sand, nonplastic, brown				
3												
10	0											
15								Stopped bar Backfilled w				
							boundary lines			Sample Type Key		
							nay be gradual.		A = Aug	er Cuttings U = Relatively U GROUND	ndisturbed Ring D = Disturbed Bulk	
				a Geoteo 2504 We Tempo	st South		nue		DEPTH N/A	TIME N/A	DATE N/A	

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-04		
Proje	ct N	ame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe	
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Type	: :	Test Pits		
Date(s) C	omp	lete:			1/8/2021		Boring Loca	ation:	See Figure 1 - Si	ite Map	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dr	rilling No	otes:		
		1	:			014		OAND WITH	OUT	Visual Classific	ation	
		D				SM	slightly moist		ained, sul	pangular to subrounde subrounded sand, no	ed gravel, predominantly well onplastic, brown	
5								note: increas	se in grav	el content below 5'		
								note: increase in fines content below 8'				
10								note: increase in fines content below 8'				
								Stopped bac				
15								Backfilled w	≀ith spoi∣	ls		
								<u> </u>				
			between s		bes: In-situ, tl	ne transition i	boundary lines may be gradual.			GROUNE	Indisturbed Ring D = Disturbed Bulk	
				2504 We	st South		enue		DEPTH N/A	TIME N/A	DATE N/A	

Alph	a Pr	oject	Number:			2	0-G-1104	4	Boring No		TP-05					
Proje	ect N	lame	:	Tril	lium at	Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 3	10 Backhoe				
Proje	ect L	ocat	ion:			Buc	keye, Ariz	ona	Boring Ty	pe:	Test Pits					
Date	(s) C	omp	lete:				1/8/2021		Boring Lo	cation:	See Figure 1	· Site Map				
			Ê		(F)		_		Field and	Drilling N	otes:					
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks			View l Oleve					
		D	1				SM		SILTY SAN	ND	Visual Classi	fication				
	\bigvee						OIII	slightly moist	trace fine g	rained, su		nded gravel, predominantly fine to ed sand, low plasticity, brown				
									noto: inoro	ooo in oon	d content below E'					
10									note: increase in sand content below 5' note: increase in gravel content below 8' note: reddish brown color below 8' Stopped backhoe at 12' Backfilled with spoils							
15																
	•	-		·!					•							
								boundary lines may be gradual.		A = Aug		Key: S = Split Spoon ly Undisturbed Ring D = Disturbed Bulk				
			Alph	na Ge	otech	nical 8	k Materi	als, Inc.		DEDT		NDWATER				
				2504 \	West	South	ern Ave a 8528	enue		DEPTH N/A	TIME N/A	DATE N/A				
									ļ		+					

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.	•	TP-06	
Proje	ct N	ame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Typ	e:	Test Pits	
Date(s) C	omp	lete:			1/8/2021		Boring Loc	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	Orilling No		
		Ъ				CM	<u> </u>	CII TV CAN	ID	Visual Classific	ation
		D				SM	slightly moist		fine graine		ounded gravel, predominantly ounded sand, nonplastic, brown
5								note: increa	ase in coar	rse sand content below	w 5'
								note: increa	ase in grav	vel content below 8'	
10								note: increase in gravel content below 8' note: reddish brown color below 8'			
								Stopped ba	ackhoe at	: 12'	
15								Backfilled			
											
			between s	soil and rock typ	es: In-situ, tl	he transition i	boundary lines may be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
				na Geoted 2504 Wes Tempe	st South		enue		DEPTH N/A	GROUNE TIME N/A	DATE N/A

Alpha	a Pro	oject	Number:			20	0-G-1104	4	Boring No.		TP-07	
Proje	ct N	ame	•	Trilliu	um at	Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:			Bucl	keye, Ariz	ona	Boring Type	e:	Test Pits	
Date(s) C	omp	lete:				1/8/2021		Boring Loc	ation:	See Figure 1 - Si	ite Map
t)		ЭС	ıt val)		CF)	(%)	ii on		Field and D	Prilling No	otes:	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
											Visual Classific	ation
	\ /	D					SM	slightly moist	SILTY SANI		hangular to subrounds	ed gravel, predominantly fine to
	\setminus / \mid							ongruly moles				d sand, nonplastic, brown
	Y											
	Λ											
	$/\setminus$											
	/ \											
5									note: increas	se in coar	se sand content below	v 5'
			i i									
									note: reddisi	h brown c	olor below 7'	
40												
10									note: increas	se in grav	el content below 10'	
									Stopped ba			
									Backfilled v	with spoi	ls	
15												
								boundary lines nay be gradual.		A = Aua	Sample Type Key er Cuttings U = Relatively U	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
								als, Inc.		9	GROUNE	-
							ern Ave			DEPTH	TIME	DATE
							a 85282		-	N/A	N/A	N/A

Alpha	a Pro	oject	Number:		2	0-G-1104	4	Boring No		TP-08	
Proje	ct N	ame	:	Trillium at	Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:		Buc	keye, Ariz	ona	Boring Ty	pe:	Test Pits	
Date((s) C	omp	lete:			1/8/2021		Boring Lo	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and	Drilling No		
		7	:	: T		CM		SII TV SAN	ND.	Visual Classific	ation
		D				SM	slightly moist		grained, su		ed gravel, predominantly fine to
								medium gr	ained, sub	angular to subrounded	d sand, nonplastic, brown
_								note: increa	ase in san	d content below 5'	
5											
								note: increase in gravel content below 8'			
10								note: reddi:	sh brown c	color below 8'	
10											
								Stopped b Backfilled			
								Baokinica	with open		
15											
				tification lines reposed and rock types					A = Aug		Indisturbed Ring D = Disturbed Bulk
				na Geotech				-	DEPTH	GROUNE TIME	DWATER DATE
			:	2504 West				-	N/A	N/A	N/A
				Tempe,	AHZOF	ia oo∠8.	۷				

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-09	
Proje	ct N	ame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:		Buc	keye, Ariz	ona	Boring Type):	Test Pits	
Date((s) C	omp	lete:			1/8/2021		Boring Loca	ation:	See Figure 1 - Si	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dr	rilling No	otes:	
Ď		Sa	B Bi	Dry [ĕ	Cla Cla					
										Visual Classific	ation
		D				SM	slightly moist	SILTY SAND			ad annual mus de minerall
							Slightly moist				ed gravel, predominantly well edium plasticity, brown
5											
,											
								note: increas	se in grav	el content below 6'	
								note: weakly cemented below 8'			
								note: weakly cemented below 8			
10											
								Stopped bac	ckhoe at	12'	
								Backfilled w			
15											
			<u>;</u> ;	<u> </u>		<u> </u>		1			
				ification lines re soil and rock typ			boundary lines may be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
			Alph	a Geotec	hnical 8	& Materi	als, Inc.		· I	GROUND	
				2504 Wes	st South	ern Ave	enue	<u> </u>	DEPTH N/A	TIME N/A	DATE N/A
				Tempe	e, Arizor	na 8528	2		19/1	14/1	13// 1

Alpha	a Pro	oject	Number:		2	0-G-1104	4	Boring No.	•	TP-10	
Proje	ct N	ame	:	Trillium at	Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:		Buc	keye, Ariz	ona	Boring Typ	e:	Test Pits	
Date((s) C	omp	lete:			1/8/2021		Boring Loc	cation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and C	Orilling No		
		_	i	: I		00		CLAVE CAL	ND	Visual Classific	ation
		D				SC	slightly moist		rained, sub		ed gravel, predominantly fine to d sand, weakly cemented, low
5											
								note: increa	ase in fines	s content below 6'	
									_	vel content below 8'	
10											
								Stopped ba Backfilled			
15											
			i	<u>: </u>	Ţ	1		ļ			
			between s	tification lines repr soil and rock types	s: In-situ, th	ne transition i	may be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively L GROUNE	Indisturbed Ring D = Disturbed Bulk
				na Geotech 2504 West Tempe,	South	ern Ave	enue		DEPTH N/A	TIME N/A	DATE N/A

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-11	
Proje	ct N	ame	•	Trillium a	t Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Type):	Test Pits	
Date	s) C	omp	lete:			1/8/2021		Boring Loca	ition:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dr	rilling No		
		D	į ;			SM		SILTY SAND	WITH G	Visual Classific	ation
5	\bigvee					SIVI	slightly moist	some fine gra	ained, su	bangular to subround	ed gravel, predominantly well eakly cemented, nonplastic,
								note: incraes	e in grav	rel content below 5'	
								note: modera	ately cem	nented below 6'	
10								Backhoe refi Backfilled w			
				ification lines rep soil and rock type					A = Auge		Indisturbed Ring D = Disturbed Bulk
				a Geotech					DEPTH	GROUNI TIME	DWATER DATE
			2	2504 Wes		ern Ave na 85282			N/A	N/A	N/A
				rempe	AHZOF	ia ooz8	<u> </u>				

Alpha	a Pro	oject	Number:			20	0-G-1104	1	Boring No.		TP-12				
Proje	ct N	ame	:	Trilliur	m at [Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe			
Proje	ct L	ocat	ion:			Buck	keye, Ariz	ona	Boring Type:		Test Pits				
Date	s) C	omp	lete:				1/8/2021		Boring Locat	ion:	See Figure 1 - Si	te Map			
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dri	lling No					
		D					SC		CLAVE SAND	`	Visual Classific	ation			
Slightly mo								slightly moist		ned, sul ed, sub		d gravel, predominantly fine to I sand, weakly cemented, low			
3									note: increase	e in fines	s content below 5'				
									note: moderately cemented below 7' Backhoe refused at 8'						
15									Backfilled with spoils						
			The strat	ification lines	s repre	sent the a	pproximate	boundary lines			Sample Type Key				
								nay be gradual.		A = Auge	er Cuttings U = Relatively U	ndisturbed Ring D = Disturbed Bulk			
				2504 W	est S	South				EPTH N/A	TIME N/A	DATE N/A			

Alpha	a Pro	oject	Number:			2	0-G-1104	4	Boring No.	•	TP-13	
Proje	ct N	ame	:	Trilliu	m at l	Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:			Bucl	keye, Ariz	ona	Boring Typ	oe:	Test Pits	
Date((s) C	omp	lete:				1/8/2021		Boring Loc	cation:	See Figure 1 - S	ite Map
t		e e	ıt val)	í	CF)	(9)	:= u		Field and I	Drilling No	otes:	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	:	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
		_	i				CD CM		CAND WIT	LI AND CI	Visual Classific	ation
		D					SP-SM	slightly moist	SAND WIT considerab			brounded gravel, predominantly
									medium to brown	coarse gra	ained, subangular to s	ubrounded sand, nonplastic,
									DIOWII			
5									note: incres	ase in aray	el content below 5'	
									11010. 1110100	acc iii giav	or comein bolow c	
									note: decre	ase in fine	es content below 8'	
10												
-10												
			<u> </u>									
									Stopped b	ackhoe at	12'	
									Backfilled	with spoi	ls	
15												
								boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings U = Relatively U	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
			Alph	na Geote	echr	nical 8	Materia	als, Inc.			GROUNE	
				2504 W					-	DEPTH N/A	TIME N/A	DATE N/A
				Tem	pe, A	Arizon	a 85282	2		111/71	IVA	1 V/C\

Alpha	a Pro	oject	Number:			2	0-G-1104	4	Boring No.		TP-14	
Proje	ct N	ame	:	Trilliu	ım at	Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:			Bucl	keye, Ariz	ona	Boring Type	e:	Test Pits	
Date((s) C	omp	lete:				1/8/2021		Boring Loca	ation:	See Figure 1 - Si	ite Map
		ө	t al)		CF)	•	_ <u>_</u> _		Field and D	rilling No	otes:	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks				
		_	<u> </u>				CM		SILTY SAND		Visual Classific	ation
		D					SM	slightly moist	trace fine gra	ained, sul		ed gravel, predominantly fine to
									medium grai	ined, sub	angular to subrounded	d sand, nonplastic, brown
5									note: increas	se in coar	se sand content below	v 5'
									note: increas	se in grav	rel content below 7'	
							oo g.a.					
10												
									Stopped ba Backfilled v			
									backilled v	vitii spoi	is	
1 <i>E</i>												
15												
									<u> </u>			
									T			
								boundary lines nay be gradual.		A = Aug	Sample Type Key er Cuttings $U = Relatively U$	r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk
			Alnh	na Geot	echr	nical 8	Materi	als, Inc.			GROUNE	
							ern Ave			DEPTH	TIME N/A	DATE N/A
				Tem	pe, <i>i</i>	Arizon	a 85282	2	-	N/A	IN/A	IV/A

Alpha	a Pro	oject	Number:			20	0-G-1104	4	Boring No.		TP-15				
Proje	ct N	ame	:	Trilliu	ım at l	Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe			
Proje	ct L	ocat	ion:			Bucl	keye, Ariz	ona	Boring Type:	:	Test Pits				
Date(s) C	omp	lete:				1/8/2021		Boring Locat	tion:	See Figure 1 - Si	te Map			
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dri	illing No					
		D					CM		SII TV SAND		Visual Classific	ation			
	\bigvee	D					SM	slightly moist	medium grain	ined, sul ied, sub	angular to subrounded	d gravel, predominantly fine to I sand, nonplastic, brown			
5									note: increase	e in coar	se sand content belov	v 5'			
									note: increase in gravel content below 7' note: moderately cemented below 7' Backhoe refused at 8'						
15									Backfilled with spoils						
			<u> </u>	1	<u> </u>				1						
			between s	oil and rock	types:	In-situ, th	e transition r	boundary lines nay be gradual.		A = Auge	Sample Type Key er Cuttings U = Relatively U GROUND	ndisturbed Ring D = Disturbed Bulk			
				2504 W	est S	South	Materia ern Ave a 85282			EPTH N/A	TIME N/A	DATE N/A			

Alpha	a Pro	oject	Number:			20	0-G-1104	4	Boring No.	•	TP-16			
Proje	ct N	lame	:	Trilliu	m at I	Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe		
Proje	ct L	ocat	ion:			Bucl	keye, Ariz	ona	Boring Typ	e:	Test Pits			
Date(s) C	omp	lete:			,	1/14/2021		Boring Loc	cation:	See Figure 1 - Si	te Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	:	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and [Orilling No				
		ר					SC		CLAYE SA	ND	Visual Classific	ation		
	\bigvee	D					SC	slightly moist	trace fine g	rained, su ained, sub	angular to subrounded	ed gravel, predominantly fine to d sand, weakly cemented,		
5														
									note: incraese in gravel content below 8'					
10														
											nented below 10'			
									Stopped backfilled					
15										·				
			between s	oil and rock	types:	In-situ, th		boundary lines nay be gradual.			GROUND	Indisturbed Ring D = Disturbed Bulk		
				2504 W	est S	South	ern Ave	nue		DEPTH N/A	TIME N/A	DATE N/A		
				Tem	pe, A	Arizon	a 85282	2		14/74	19/1	14//		

Alpha	a Pro	oject	Number:		2	0-G-1104	4	Boring No.		TP-17	
Proje	ct N	ame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Type):	Test Pits	
Date(s) C	omp	lete:			1/14/2021		Boring Loca	ation:	See Figure 1 - Si	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Dr	rilling No		
		D	:			ec		CLAYE SAN	ın.	Visual Classific	ation
		D				SC	slightly moist	occasional fir	ne graine	ed, subangular to subr v to medium plasticity,	ounded gravel, predominantly brown
5											
10								note: modera	ately cem	rel content below 7' nented below 10'	
								Stopped bac Backfilled w			
15									3p311		
								T			
			between s	ification lines resoil and rock typ	es: In-situ, th	ne transition r	may be gradual.			GROUND	Indisturbed Ring D = Disturbed Bulk
				2504 Wes	t South		enue		DEPTH N/A	TIME N/A	DATE N/A

Alpha	a Pro	oject	Number:			20	D-G-11044	1	Boring No.		TP-18				
Proje	ct N	ame	:	Trilliur	m at [Douglas	Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe			
Proje	ct L	ocat	ion:			Buck	keye, Arizo	ona	Boring Type	e:	Test Pits				
Date	s) C	omp	lete:			1	/14/2021		Boring Loca	ation:	See Figure 1 - Si	te Map			
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	rilling No					
		D	1 1				SC		CLAYE SAN	ID WITH	Visual Classific	ation			
slightly moi							SC	slightly moist	some fine gr	ained, su angular to	bangular to subround	ed gravel, predominantly well eakly cemented, medium			
									note: increas	se in fines	s content below 5'				
									note: moderately cemented below 6' Backhoe refused at 8'						
									Backfilled w						
40															
15															
								boundary lines			Sample Type Key				
								nay be gradual.		A = Aug	er Cuttings U = Relatively U GROUNE	Indisturbed Ring D = Disturbed Bulk			
				2504 W	est S	South			1	DEPTH N/A	TIME N/A	DATE N/A			

Alph	a Pr	oject	Number:			2	0-G-1104	4	Boring No).	TP-19				
Proje	ct N	lame	:	Tri	Ilium at	Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 31	0 Backhoe			
Proje	ct L	ocat	ion:			Buc	keye, Ariz	cona	Boring Ty	pe:	Test Pits				
Date	(s) C	omp	lete:				1/14/2021		Boring Lo	cation:	See Figure 1 -	Site Map			
			î		Ű.		_		Field and	Drilling N	otes:				
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)		Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks							
	\ /	D					SM		SILTY SAI	ND	Visual Classif	ication			
	\bigvee						JIII	slightly moist	occasional	fine grain		brounded gravel, predominantly and, nonplastic, brown			
5									note: incre	ase in grav	vel content below 5'				
							SP-SM	slightly moist	SAND WIT						
10								Signly moist							
15									Stopped be Backfilled						
				<u> </u>											
				<u> </u>											
	!		i			ļ	<u> </u>	<u> </u>	!						
								boundary lines may be gradual.		A = Aug	er Cuttings U = Relatively	(ey: S = Split Spoon / Undisturbed Ring D = Disturbed Bulk			
								als, Inc.		DEPTH	GROUN TIME	NDWATER DATE			
							ern Ave na 8528			N/A	N/A	N/A			
											!				

Alpha	a Pro	oject	Number:			20-G-1104	4	Boring No.		TP-20	
Proje	ct N	ame	:	Trillium	at Doug	las Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:		Ві	uckeye, Ariz	ona	Boring Type	e:	Test Pits	
Date	(s) C	omp	lete:			1/14/2021		Boring Loca	ation:	See Figure 1 - S	ite Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and D	rilling No	otes:	
۵		Sa	B (6 i	Drv	Š	_ ⊃ ຮັ					
			<u> </u>							Visual Classific	ation
		D				SM	slightly moist	SILTY SAND		hangular to subrounde	ed gravel, predominantly fine to
											d sand, nonplastic, brown
5											
								note: increas	se in san	d content below 6'	
								note: increas	se in grav	vel content below 7'	
10											
								Stopped ba	ckhoe at	: 12'	
								Backfilled w			
15											
			•			-1	 	+			
							boundary lines may be gradual.		A = Aug		Indisturbed Ring D = Disturbed Bulk
						& Materi		<u> </u>	DEPTH	GROUNI TIME	DWATER DATE
			:			thern Ave			N/A	N/A	N/A
				Temp	e, Arizo	ona 8528	2				

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.	TP-21			
Proje	ct N	lame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:	John Deere 310	Backhoe		
Proje	ct L	ocat	ion:		Bud	keye, Ariz	ona	Boring Type:	Test Pits			
Date	(s) C	omp	lete:			1/14/2021		Boring Location:	See Figure 1 - S	ite Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drilling				
		7	i i			00		CLAVE SAND	Visual Classific	cation		
5	\bigvee	D				SC	slightly moist		ubangular to subrounde	ed gravel, predominantly fine to d sand, weakly cemented, low		
								note: increase in g	ravel content below 5'			
								note: moderately cemented below 6' Backhoe refused at 8'				
								Backfilled with sp				
40												
15												
							boundary lines			y: S = Split Spoon		
							may be gradual.	A = /	<u> </u>	Undisturbed Ring D = Disturbed Bulk DWATER		
				a Geoteo 2504 We Tempo	st South		nue	DEPTI N/A		DATE N/A		

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-22			
Proje	ct N	ame	:	Trillium a	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe		
Proje	ct L	ocat	ion:		Buc	keye, Ariz	ona	Boring Type:		Test Pits			
Date	(s) C	omp	lete:			1/14/2021		Boring Location):	See Figure 1 - Si	ite Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drilling	g No				
		7				80		CLAVE SAND W	/ITU	Visual Classific	ation		
		D				SC	slightly moist	CLAYE SAND W some fine grained, medium grained, to medium plastic	d, ar sub	ngular to subrounded g angular to subrounded	gravel, predominantly fine to d sand, weakly cemented, low		
5													
								note: moderately cemented below 7'					
10													
15								Backfilled with s					
			The etrot	ification lines rep	present the	annrovimata	houndary lines	<u> </u>		Sample Type Key	r: S = Split Speep		
			between s	oil and rock type	es: In-situ, th	ne transition i	may be gradual.	A =	= Aug		Indisturbed Ring D = Disturbed Bulk		
				a Geotect 2504 Wes Tempe	t South		enue	DEPT N/A		TIME N/A	DATE N/A		

Alpha	Ilpha Project Number:						D-G-1104	4	Boring No.	TP-23	
Proje	ct N	ame	:	Trilliun	n at D	ouglas	Ranch -	Phase I, Village 3	Rig Type:	John Deere 310 Backhoe	
Proje	ct L	ocat	ion:			Buck	keye, Ariz	ona	Boring Type:	Test Pits	
Date	(s) C	omp	lete:			1	/14/2021		Boring Location:	See Figure 1 - Site Map	
		σ.	al)	Ú	5		_		Field and Drilling N	otes:	
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Ory Doneity (BCE)	th friends from	Moisture (%)	Unified Soil Classification	Remarks			
		D					SC		CLAYE SAND	Visual Classification	
		D					3C	slightly moist	occasional fine grain	ed, subangular to subrounded g	
										ed, subangular to subrounded sa edium plasticity, brown	and, weakly
										yaram piaanany, arami	
5											
									note: moderately ce	mented below 7'	
									Backhoe refused a	: 9'	
10									Backfilled with spo		
15											
									•		
The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual.									A = Au	Sample Type Key: S = Split S ger Cuttings U = Relatively Undisturbed F	
Alpha Geotechnical & Materials, Inc.							Materia	als, Inc.		GROUNDWATER	DATE
2504 West Southern Avenue							ern Ave	nue	DEPTH N/A	TIME N/A	DATE N/A
Tempe, Arizona 85282							a 85282	2	14/73		

Alpha	a Pro	oject	Number:			20-G-1104	14	Boring No.	TP-24				
Proje	ct N	ame	:	Trillium	at Doug	las Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe		
Proje	ct L	ocat	ion:		В	uckeye, Ariz	zona	Boring Type:		Test Pits			
Date	s) C	omp	lete:			1/14/202	1	Boring Location:		See Figure 1 - Si	te Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drilling	g No				
		7				80	1	CLAVE SAND WI	ITU	Visual Classific	ation		
	\bigvee	D				SC	slightly moist	medium grained, medium plasticity,	d, su sub , bro	ibangular to subround angular to subrounded own	ed gravel, predominantly fine to disand, weakly cemented,		
5								note: increase in (
								note: reddish brov	ease in sand content below 5' dish brown sand color below 7' derately cemented below 8'				
								Backhoe refused					
15								Backfilled with s	БРОІ	is .			
			The strat	ification lines r	represent ti	ne approximate	boundary lines			Sample Type Key			
			between s	oil and rock ty	pes: In-situ	ı, the transition	may be gradual.	A =	: Aug		Indisturbed Ring D = Disturbed Bulk		
				2504 We	st Sou	l & Mater thern Ave ona 8528	enue	DEPT N/A		TIME N/A	DATE N/A		

Alpha	a Pro	oject	Number:		2	20-G-1104	4	Boring No.		TP-25	
Proje	ct N	ame	:	Trillium	at Dougla	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe
Proje	ct L	ocat	ion:		Buc	keye, Ariz	ona	Boring Type:		Test Pits	
Date(s) C	omp	lete:			1/14/2021		Boring Location	n:	See Figure 1 - Si	te Map
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and Drillin	ng No		
		-	: :					OLAVE GAND		Visual Classific	ation
		D				SC	slightly moist	fine to medium g	graine	ed, subangular to subred, subangular to subredium plasticity, brown	ounded gravel, predominantly ounded sand, weakly
5								note: moderately cemented below 7'			
10								Backhoe refuse Backfilled with			
15								Dackinied with	Spor		
			The strat	ification lines re	epresent the	approximate	boundary lines			Sample Type Key	: S = Split Spoon
			between s	oil and rock typ	es: In-situ, tl	ne transition r	may be gradual.	A =	= Aug		ndisturbed Ring D = Disturbed Bulk
				a Geoted 2504 Wes Tempe	st South		nue	DEP N/A		TIME N/A	DATE N/A

Alpha	a Pro	oject	Number:		2	0-G-1104	4	Boring No		TP-26				
Proje	ct N	ame	:	Trillium at	Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe			
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Typ	ре:	Test Pits				
Date(s) C	omp	lete:			1/14/2021		Boring Lo	cation:	See Figure 1 - S	ite Map			
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF)	Moisture (%)	Unified Soil Classification	Remarks	Field and I	Drilling No					
		D				SM		SILTY SAN	ND WITH (Visual Classific	ation			
	\bigvee					OIVI	slightly moist	some fine of medium gra	some fine grained, subangular to subrounded gravel, predominantly fine to medium grained, subangular to subrounded sand, weakly cemenetd, nonplastic, brown					
5								note: increa	rease in gravel content below 6'					
						SP-SM	ali alathu as ai at			ND GRAVEL				
10							slightly moist			Dangular to subround Disubrounded, nonplas	ed gravel, predominantly well stic, brown			
								Stopped b Backfilled						
15								Васкинес	with spoi	is				
			between s	ification lines reprooil and rock types	: In-situ, th	ne transition i	may be gradual.		A = Aug		r: S = Split Spoon Indisturbed Ring D = Disturbed Bulk DWATER			
Alpha Geotechnical & Materials, Inc. 2504 West Southern Avenue									DEPTH	TIME	DATE			
				Tempe,				-	N/A	N/A	N/A			

Alpha	a Pro	oject	Number:		2	0-G-1104	4	Boring No.		TP-27			
Proje	ct N	ame	:	Trillium a	t Douglas	s Ranch -	Phase I, Village 3	Rig Type:		John Deere 310	Backhoe		
Proje	ct L	ocati	ion:		Buc	keye, Ariz	ona	Boring Typ	e:	Test Pits			
Date(s) C	omp	lete:			1/14/2021		Boring Loc	ation:	See Figure 1 - Si	ite Map		
Depth (Feet)	Sample	Sample Type	Blow Count (6 inch Interval)	Dry Density (PCF) Moisture (%) Unified Soil Classification system		Remarks	Field and D	Field and Drilling Notes:					
		D	:			SM.		Visual Classification SILTY SAND					
	slightly moist				SM	slightly moist	occasional fine grained, subangular to subrounded gravel, predominantly fine grained sand, nonplastic, brown						
5													
10								note: increase in sand content below 8' note: increase in gravel content below 8'					
15								Stopped backhoe at 12' Backfilled with spoils					
The stratification lines represent the approximate boundary lines between soil and rock types: In-situ, the transition may be gradual. Alpha Geotechnical & Materials, Inc. 2504 West Southern Avenue									A = Aug	Sample Type Key er Cuttings U = Relatively U GROUNE TIME N/A	Indisturbed Ring D = Disturbed Bulk		
Tempe, Arizona 85282													

APPENDIX B Laboratory Test Results

Table B-1 - Summary of Laboratory Test Results

Boring Number	Depth	(# ₁)	USCS/Group Symbol ² (ASTM D2487)	Percent Fines (minus No. 200) (ASTM C136/C117)	Percent Sand (Retained Between the No. 4 and No. 200	Percent Gravel (Retained Above No. 4 Sieve)	Liquid Limit (ASTM D4318)	Plasticity Index (ASTM D4318)	In-Place Dry Density (pcf³) (ASTM D2937)	Moisture Content (%4) (ASTM D2216)	Swell Potential (% ⁴) (ASTM D4546)	Expansion Index (ASTM D4829)	Consolidation (ASTM D2435)	Maximum Dry Density (pcf³) (ASTM D698A)	Optimum Moisture Content (% ⁴) (ASTM D698A)	Soluble Sulfates (ppm ⁵) ARIZ 733	Chlorides (ppm ⁵) (ARIZ 736)	Resistivity (Ohm-cm ⁶) (ARIZ 236)	pH (ARIZ 236)
Bori	Begin	End	US S (AS)	Per (min (ASTN	Per (F Betwe	Perc (Reta No	Lic (AS	Plas (AS	In- Der (AS	Moist (AS	Swe (AS	Expa (AS	Cor (AS	May Der (AS	Optim Co (AS	Solu	v) ວ	(A	(∀
B-01	0.0	4.5	SC	25	50	25	41	16			2.4			119.3	11.1	<3	101		
B-02	0.0	4.5	SM	36	55	9	21	3											
B-03	0.0	4.5	SM	23	64	13	33	8				1				<3	114		
B-07	0.0	4.5	SM	21	50	29	31	1				3				183	253	682	8.2
B-09	0.0	4.5	SC	15	56	29	30	10			0.3	0		116.9	10.1	860	340		
B-09	2.5	3.5							109.6	7.4			5.3						
B-11	0.0	4.5	SM	25	58	17	37	5				5				942	809		
B-13	0.0	4.5	SM	38	47	15	30	7	100.5			3				208	300		
B-13	2.5	3.5	014	0.0					102.5	6.3			6.3	1100	44.0				
B-16	0.0	4.5	SM	32	55	13	45	7				1		119.0	11.3	5	203		
B-19	0.0	4.5	SC	46	42	12	36	15	117.5	0.7		4	0.5						
B-19 B-21	2.5 0.0	3.5 4.5	ML	61	36	3	27	4	117.5	3.7		0	2.5			9	304	1,500	8.6
B-21	2.5	3.5	IVIL	61	36	3	21	4	104.8	3.2		U				9	304	1,500	0.0
B-21	0.0	4.5	SM	16	54	30	NV	NP	104.6	3.2		0				287	164		
B-24	0.0	4.5	SC	36	51	13	47	20				7				549	893		
B-26	4.5	5.5	30	30	31	13	47	20	113.6	3.8			3.8			343	093		
B-31	0.0	4.5	SM	38	54	8	30	5	113.0	3.0			3.0						
B-31	4.5	5.5	OIVI	- 30	34	0	30	<u> </u>	110.9	3.3			1.7						
B-33	0.0	4.5	GP	4.5	44	52	NV	NP	110.5	5.5			1.7						
B-34	2.5	3.5	Oi	7.0		UZ.	147	141	112.2	3.2									
B-35	0.0	4.5	SM	28	61	11	NV	NP	112.2	0.2				122.9	9.8				
B-35	4.5	5.5	<u> </u>		· · ·				119.9	2.1			3.4		0.0				
B-38	0.0	4.5	SM	28	55	17	NV	NP											
B-38	2.5	3.5	_						108.5	2.5			2.5						
B-42	0.0	4.5	SC	31	56	13	33	12		_		0				223	185	1,295	8.6
B-42	2.5	3.5							107.7	4.1			3.6					,	
TP-01	0.0	5.0	SM	13	80	7	NV	NP											
TP-02	0.0	5.0	SP-SM	8.8	71	20	NV	NP											
TP-03	0.0	5.0	SP-SM	5.4	87	8	NV	NP											
TP-05	0.0	5.0	SM	35	57	8	26	4											
TP-07	0.0	5.0	SM	21	67	12	NV	NP											
TP-09	0.0	5.0	SM	39	49	12	33	6											
TP-11	0.0	5.0	SM	30	53	17	NV	NP				4				4	43		
TP-13	0.0	5.0	SP-SM	5.9	61	33	NV	NP											
TP-15	0.0	5.0	SM	22	67	11	NV	NP									0.5-		
TP-16	0.0	5.0	SC	41	47	12	37	14				10			40.	548	357		
TP-18	0.0	5.0	SC	30	48	22	42	17				5		115.4	13.7	424	573	0.455	
TP-24	0.0	5.0	SC	14	70	16	35	13 ND				0		110.6	12.0	5	118	2,455	8.7
TP-26	0.0	5.0	SM	20	57	23	NV	NP	440.7	4.0				110.6	13.0	207	047	4 400	
	_	Mandari	Average	26	57	17 10			110.7 5.4	4.0 1.7				117.4	11.5	327 320	317	1,483 735	8.5 0.2
	5	otandard	Deviation Minimum	13 4.5	11 36		NV	NP	102.5	2.1	0.3	0	1.7	4.2 110.6	1.6	320 4	254	735 682	8.2
				4.5 61	87	3 52	47	NP 20	119.9	7.4	2.4	10	6.3	122.9	9.8 13.7	942	43 893	2,455	8.2 8.7
			Maximum Count	30	30	30	30	30	119.9	10	2.4	15	6.3 8	6	13.7	15	893 15	2,455 4	8. <i>1</i>
Notes:			Count								_				ŭ			-	

Notes: ft = feet

[&]quot; % = percent (ASTM D2487).

" bet = leet (ASTM D2487).

" pcf = pounds per cubic foot
" % = percent

ppm = parts per million
ohm-cm = ohm-centimeters

APPENDIX B LABORATORY TESTING

LABORATORY TESTS

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

Sieve Analysis

Sieve analyses were performed to evaluate the gradation characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C136/C117 and D2487.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Additionally, test results were correlated to published data to evaluate the shrink/swell potential of near-surface site soils. Tests were performed in general accordance with ASTM Test Method D4318.

Moisture-Density Relationship

The test results are used to determine the maximum dry density from the peak point of the compaction curve and its corresponding moisture content, also known as the optimum moisture. Additionally, test results are used to determine earthwork factors. Tests were performed in general accordance with ASTM Test Method D698.

In-Place Density and Moisture Content

The test results are used to determine the in-place density and water content of soil samples. Tests were performed in general accordance with ASTM Test Method D2937.

Expansion Index

Expansion index tests were performed on bulk soil samples to evaluate the expansion potential of the site soils. Test procedures were in general accordance with ASTM Test Method D4829.

One-Dimensional Consolidation

A one-dimensional consolidation test was performed on a ring samples to evaluate consolidation potential of the site soil. Test procedure was in general accordance with ASTM Test Method D 2435.

Swell

Swell tests were performed on remolded bulk soil samples to evaluate the swell potential of the subgrade soils. Test procedures were in general accordance with ASTM Test Method D4546.

Sulfate Content

Sulfate content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 733.

Chloride Content

Chloride content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 736.

pH and Resistivity

pH and resistivity tests were performed on the bulk soil sample to evaluate the site soil corrosion potential. Test procedure was in general accordance with Arizona Test Method 236.

Alpha Geotechnical & Materials, Inc.

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-01 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43627

 Sample Date:
 01/11/21

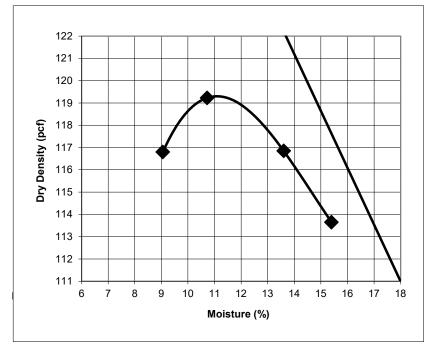
 Sampled by:
 AA

Laboratory Compaction Characteristics of Soils Using Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A) Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

ONE DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS, 144 PSF SURCHARGE (ASTM D-4546)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
119.3	1911
11.1	11.1



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	100
1 1/4 in / 32 mm	100
1 in / 25 mm	100
3/4 in / 19 mm	97
1/2 in / 12.5 mm	92
3/8 in / 9.5 mm	87
1/4 in / 6.4 mm	80
#4, 4.75mm	75
#8, 2.36mm	64
#10, 2.00mm	61
#16, 1.18mm	52
#30, 0.60mm	42
#40, .425mm	39
#50, .300mm	35
#100, .150mm	30
#200, .075mm	25
LL: PI:	41 16
% Swell:	2.4
USCS: AASHTO:	SC A-2-7(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.65 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Alpha Geotechnical & Materials, Inc.

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-02 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43628

 Sample Date:
 01/11/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 21 4 in / 100mm 100 PL: 18 3 in / 75mm 100 PI: 3 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SM 98 1/2 in / 12.5 mm 97 AASHTO: A-4(0) 3/8 in / 9.5 mm 95 1/4 in / 6.4 mm 93 #4, 4.75mm 91 #8, 2.36mm 83 #10, 2.00mm 81 #16, 1.18mm 72 #30, 0.60mm 60 #40, .425mm 55 #50, .300mm 50 #100, .150mm 43 #200, .075mm 36

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-03 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43629

 Sample Date:
 01/11/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 33 4 in / 100mm 100 PL: 25 3 in / 75mm 100 PI: 8 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 1 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SM 99 1/2 in / 12.5 mm 98 AASHTO: A-2-4(0) 3/8 in / 9.5 mm 96 1/4 in / 6.4 mm 92 #4, 4.75mm 87 #8, 2.36mm 74 #10, 2.00mm 70 #16, 1.18mm 59 #30, 0.60mm 45 #40, .425mm 40 #50, .300mm 36 #100, .150mm 29 #200, .075mm 23

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-07 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43630

 Sample Date:
 01/11/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 31 4 in / 100mm 100 PL: 30 3 in / 75mm 100 PI: 1 2 in / 50mm 100 1 1/2 in / 37.5mm 3 98 EI: 1 1/4 in / 32 mm 95 1 in / 25 mm 93 3/4 in / 19 mm 89 USCS: SM 1/2 in / 12.5 mm 85 AASHTO: A-1-b(0) 3/8 in / 9.5 mm 81 1/4 in / 6.4 mm 75 #4, 4.75mm 71 #8, 2.36mm 58 #10, 2.00mm 55 #16, 1.18mm 47 #30, 0.60mm 39 #40, .425mm 36 #50, .300mm 33 #100, .150mm 28 #200, .075mm 21

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-09 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43631

 Sample Date:
 01/11/21

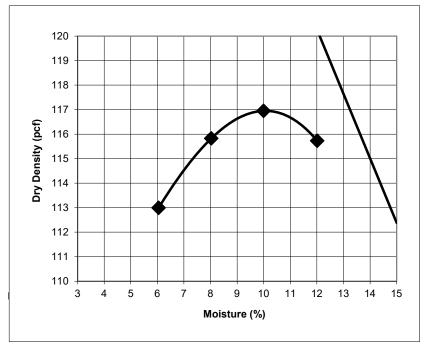
 Sampled by:
 AA

Laboratory Compaction Characteristics of Soils Using
Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A)
Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117)
Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)
Expansion Index of Soils (ASTM D 4829)

ONE DIMENSIONAL SWELL OR SETTLEMENT POTENTIAL OF COHESIVE SOILS, 144 PSF SURCHARGE (ASTM D-4546)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
116.9	1873
10.1	10.1



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	100
1 1/4 in / 32 mm	100
1 in / 25 mm	98
3/4 in / 19 mm	94
1/2 in / 12.5 mm	88
3/8 in / 9.5 mm	84
1/4 in / 6.4 mm	77
#4, 4.75mm	71
#8, 2.36mm	58
#10, 2.00mm	55
#16, 1.18mm	45
#30, 0.60mm	34
#40, .425mm	29
#50, .300mm	25
#100, .150mm	19
#200, .075mm	15
LL: PI: EI: % Swell:	30 10 0 0.3
USCS: AASHTO:	SC A-2-4(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.5 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-11 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43632

 Sample Date:
 01/11/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 37 4 in / 100mm 100 PL: 32 3 in / 75mm 100 PI: 5 2 in / 50mm 100 1 1/2 in / 37.5mm 5 99 EI: 1 1/4 in / 32 mm 99 1 in / 25 mm 99 3/4 in / 19 mm USCS: SM 98 1/2 in / 12.5 mm 96 AASHTO: A-1-b(0) 3/8 in / 9.5 mm 94 1/4 in / 6.4 mm 88 #4, 4.75mm 83 #8, 2.36mm 68 #10, 2.00mm 65 #16, 1.18mm 55 #30, 0.60mm 44 #40, .425mm 41 #50, .300mm 37 #100, .150mm 32 #200, .075mm 25

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-13 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43633

 Sample Date:
 01/11/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 30 4 in / 100mm 100 PL: 23 3 in / 75mm 100 PI: 7 2 in / 50mm 100 1 1/2 in / 37.5mm 3 98 EI: 1 1/4 in / 32 mm 98 1 in / 25 mm 98 3/4 in / 19 mm 97 USCS: SM 1/2 in / 12.5 mm 95 AASHTO: A-4(0) 3/8 in / 9.5 mm 93 1/4 in / 6.4 mm 89 #4, 4.75mm 85 #8, 2.36mm 77 #10, 2.00mm 75 #16, 1.18mm 67 #30, 0.60mm 58 #40, .425mm 55 #50, .300mm 51 #100, .150mm 45 #200, .075mm 38

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-16 @ 0' - 4.5'

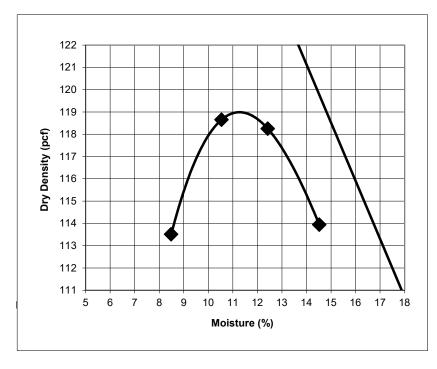
Proposed Use: Pads

Project Number: 20-G-11044
Sample Number: 43634
Sample Date: 01/11/21
Sampled by: AA

Laboratory Compaction Characteristics of Soils Using
Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A)
Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117)
Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)
Expansion Index of Soils (ASTM D 4829)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
119.0	1906
11.3	11.3



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	99
1 1/4 in / 32 mm	98
1 in / 25 mm	98
3/4 in / 19 mm	97
1/2 in / 12.5 mm	97
3/8 in / 9.5 mm	95
1/4 in / 6.4 mm	91
#4, 4.75mm	87
#8, 2.36mm	78
#10, 2.00mm	75
#16, 1.18mm	67
#30, 0.60mm	56
#40, .425mm	52
#50, .300mm	48
#100, .150mm	41
#200, .075mm	32
LL:	45
PI:	7
El:	1
USCS: AASHTO:	SM A-2-5(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.65 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-19 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43635

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 36 4 in / 100mm 100 PL: 21 3 in / 75mm 100 PI: 15 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 4 1 1/4 in / 32 mm 100 1 in / 25 mm 99 3/4 in / 19 mm USCS: SC 99 1/2 in / 12.5 mm 97 AASHTO: A-6(4) 3/8 in / 9.5 mm 95 1/4 in / 6.4 mm 91 #4, 4.75mm 88 #8, 2.36mm 81 #10, 2.00mm 79 #16, 1.18mm 73 #30, 0.60mm 66 #40, .425mm 63 #50, .300mm 60 #100, .150mm 54 #200, .075mm 46

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-21 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43636

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 27 4 in / 100mm 100 PL: 23 3 in / 75mm 100 PI: 4 2 in / 50mm 100 1 1/2 in / 37.5mm 100 0 EI: 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm 100 USCS: ML1/2 in / 12.5 mm 100 AASHTO: A-4(1) 3/8 in / 9.5 mm 99 1/4 in / 6.4 mm 98 #4, 4.75mm 97 #8, 2.36mm 93 #10, 2.00mm 92 #16, 1.18mm 88 #30, 0.60mm 82 #40, .425mm 79 #50, .300mm 77 #100, .150mm 71 #200, .075mm 61

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-24 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43637

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 0 99 EI: 1 1/4 in / 32 mm 99 1 in / 25 mm 97 3/4 in / 19 mm USCS: SM 94 1/2 in / 12.5 mm 89 AASHTO: A-1-b(0) 3/8 in / 9.5 mm 84 1/4 in / 6.4 mm 75 #4, 4.75mm 70 #8, 2.36mm 59 #10, 2.00mm 56 #16, 1.18mm 48 #30, 0.60mm 37 #40, .425mm 33 #50, .300mm 29 #100, .150mm 23 #200, .075mm 16

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-26 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43638

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 47 4 in / 100mm 100 PL: 27 3 in / 75mm 100 PI: 20 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 7 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SC 99 1/2 in / 12.5 mm 97 AASHTO: A-7-6(2) 3/8 in / 9.5 mm 95 1/4 in / 6.4 mm 91 #4, 4.75mm 87 #8, 2.36mm 78 #10, 2.00mm 75 #16, 1.18mm 66 #30, 0.60mm 56 #40, .425mm 53 #50, .300mm 49 #100, .150mm 43 #200, .075mm 36

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-31 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43639

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 30 4 in / 100mm 100 PL: 25 3 in / 75mm 100 PI: 5 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm 100 USCS: SM 1/2 in / 12.5 mm 99 AASHTO: A-4(0) 3/8 in / 9.5 mm 98 1/4 in / 6.4 mm 95 #4, 4.75mm 92 #8, 2.36mm 82 #10, 2.00mm 80 #16, 1.18mm 72 #30, 0.60mm 62 #40, .425mm 59 #50, .300mm 55 #100, .150mm 48 #200, .075mm 38

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-33 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43640

 Sample Date:
 01/12/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 98 1 1/4 in / 32 mm 98 1 in / 25 mm 97 3/4 in / 19 mm USCS: GP 94 1/2 in / 12.5 mm 84 AASHTO: A-1-a(1) 3/8 in / 9.5 mm 73 1/4 in / 6.4 mm 54 #4, 4.75mm 48 #8, 2.36mm 32 #10, 2.00mm 28 #16, 1.18mm 20 #30, 0.60mm 14 #40, .425mm 11 #50, .300mm 9 #100, .150mm 6

4.5

Reviewed by: JV

#200, .075mm

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-35 @ 0' - 4.5'

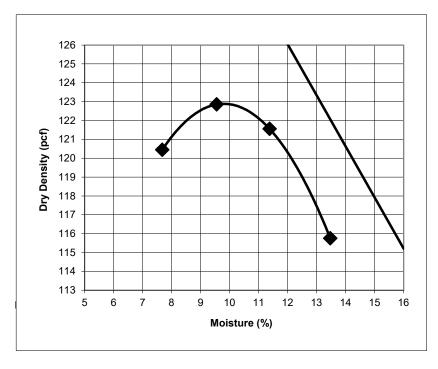
Proposed Use: Pads

Project Number: 20-G-11044
Sample Number: 43641
Sample Date: 01/13/21
Sampled by: AA

Laboratory Compaction Characteristics of Soils Using Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A) Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
122.9	1968
9.8	9.8



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	100
1 1/4 in / 32 mm	100
1 in / 25 mm	100
3/4 in / 19 mm	99
1/2 in / 12.5 mm	98
3/8 in / 9.5 mm	96
1/4 in / 6.4 mm	92
#4, 4.75mm	89
#8, 2.36mm	80
#10, 2.00mm	77
#16, 1.18mm	67
#30, 0.60mm	54
#40, .425mm	49
#50, .300mm	44
#100, .150mm	36
#200, .075mm	28
LL: PI:	NV NP
USCS:	SM

USCS: SM AASHTO: A-2-4(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.65 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-38 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43642

 Sample Date:
 01/13/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 99 3/4 in / 19 mm USCS: SM 98 1/2 in / 12.5 mm 95 AASHTO: A-2-4(0) 3/8 in / 9.5 mm 92 1/4 in / 6.4 mm 87 #4, 4.75mm 83 #8, 2.36mm 74 #10, 2.00mm 72 #16, 1.18mm 64 #30, 0.60mm 54 #40, .425mm 49 #50, .300mm 44 #100, .150mm 36

28

Reviewed by: JV	
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#200, .075mm

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: B-42 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43643

 Sample Date:
 01/13/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 33 4 in / 100mm 100 PL: 21 3 in / 75mm 100 PI: 12 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 0 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SC 99 1/2 in / 12.5 mm 97 AASHTO: A-2-6(0) 3/8 in / 9.5 mm 95 1/4 in / 6.4 mm 90 #4, 4.75mm 87 #8, 2.36mm 76 #10, 2.00mm 73 #16, 1.18mm 64 #30, 0.60mm 52 #40, .425mm 48 #50, .300mm 44 #100, .150mm 37 #200, .075mm 31

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-01 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43644

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SM 99 1/2 in / 12.5 mm 98 AASHTO: A-1-b(0) 3/8 in / 9.5 mm 97 1/4 in / 6.4 mm 95 #4, 4.75mm 93 #8, 2.36mm 84 #10, 2.00mm 81 #16, 1.18mm 66 #30, 0.60mm 43 #40, .425mm 34 #50, .300mm 27 #100, .150mm 19 #200, .075mm 13

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: TP-02 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43645

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 98 3/4 in / 19 mm USCS: SP-SM 97 1/2 in / 12.5 mm 94 AASHTO: A-1-b(1) 3/8 in / 9.5 mm 91 1/4 in / 6.4 mm 85 #4, 4.75mm 80 #8, 2.36mm 64 #10, 2.00mm 59 #16, 1.18mm 44 #30, 0.60mm 29 #40, .425mm 24 #50, .300mm 19

13

8.8

Reviewed by: JV

#100, .150mm

#200, .075mm

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-03 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43646

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm 100 USCS: SP-SM 1/2 in / 12.5 mm 98 AASHTO: A-1-b(1) 3/8 in / 9.5 mm 96 1/4 in / 6.4 mm 94 #4, 4.75mm 92 #8, 2.36mm 81 #10, 2.00mm 76 #16, 1.18mm 58 #30, 0.60mm 31 #40, .425mm 21 #50, .300mm 14 #100, .150mm 8

5.4

Reviewed by: JV

#200, .075mm

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-05 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43647

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 26 4 in / 100mm 100 PL: 22 3 in / 75mm 100 PI: 4 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SM 99 1/2 in / 12.5 mm 98 AASHTO: A-2-4(0) 3/8 in / 9.5 mm 97 1/4 in / 6.4 mm 94 #4, 4.75mm 92 #8, 2.36mm 85 #10, 2.00mm 82 #16, 1.18mm 74 #30, 0.60mm 62 #40, .425mm 58 #50, .300mm 54 #100, .150mm 46 #200, .075mm 35

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: TP-07 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43648

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 99 3/4 in / 19 mm USCS: SM 97 1/2 in / 12.5 mm 95 AASHTO: A-1-b(0) 3/8 in / 9.5 mm 92 1/4 in / 6.4 mm 90 #4, 4.75mm 88 #8, 2.36mm 77 #10, 2.00mm 74 #16, 1.18mm 63 #30, 0.60mm 48 #40, .425mm 42 #50, .300mm 37 #100, .150mm 29 #200, .075mm 21

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-09 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43649

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 33 4 in / 100mm 100 PL: 27 3 in / 75mm 100 PI: 6 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 100 3/4 in / 19 mm USCS: SM 97 1/2 in / 12.5 mm 94 AASHTO: A-4(0) 3/8 in / 9.5 mm 93 1/4 in / 6.4 mm 90 #4, 4.75mm 88 #8, 2.36mm 80 #10, 2.00mm 77 #16, 1.18mm 71 #30, 0.60mm 62 #40, .425mm 59 #50, .300mm 55 #100, .150mm 48 #200, .075mm 39

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-11 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43650

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 4 1 1/4 in / 32 mm 99 1 in / 25 mm 98 3/4 in / 19 mm USCS: SM 95 1/2 in / 12.5 mm 91 AASHTO: A-2-4(0) 3/8 in / 9.5 mm 89 1/4 in / 6.4 mm 86 #4, 4.75mm 83 #8, 2.36mm 72 #10, 2.00mm 62 #16, 1.18mm 58 #30, 0.60mm 55 #40, .425mm 52 #50, .300mm 48 #100, .150mm 40 #200, .075mm 30

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-13 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43651

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 96 3/4 in / 19 mm USCS: SP-SM 95 1/2 in / 12.5 mm 87 AASHTO: A-1-a(1) 3/8 in / 9.5 mm 82 1/4 in / 6.4 mm 73 #4, 4.75mm 67 #8, 2.36mm 50 #10, 2.00mm 46 #16, 1.18mm 34 #30, 0.60mm 21 #40, .425mm 17 #50, .300mm 13 #100, .150mm 8 #200, .075mm 5.9

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: TP-15 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43652

 Sample Date:
 01/08/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: NV 4 in / 100mm 100 3 in / 75mm 100 PI: NP 2 in / 50mm 100 1 1/2 in / 37.5mm 100 1 1/4 in / 32 mm 100 1 in / 25 mm 98 3/4 in / 19 mm USCS: SM 97 1/2 in / 12.5 mm 95 AASHTO: A-2-4(0) 3/8 in / 9.5 mm 94 1/4 in / 6.4 mm 91 #4, 4.75mm 89 #8, 2.36mm 83 #10, 2.00mm 81 #16, 1.18mm 72 #30, 0.60mm 59 #40, .425mm 52 #50, .300mm 45 #100, .150mm 33 #200, .075mm 22

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil Sample Source: TP-16 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43653

 Sample Date:
 01/14/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 37 4 in / 100mm 100 PL: 23 3 in / 75mm 100 PI: 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 10 1 1/4 in / 32 mm 99 1 in / 25 mm 98 3/4 in / 19 mm 97 USCS: SC 1/2 in / 12.5 mm 95 AASHTO: A-6(2) 3/8 in / 9.5 mm 93 1/4 in / 6.4 mm 91 #4, 4.75mm 88 #8, 2.36mm 83 #10, 2.00mm 80 #16, 1.18mm 74 #30, 0.60mm 65 #40, .425mm 61 #50, .300mm 58 #100, .150mm 52 #200, .075mm 41

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-18 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43654

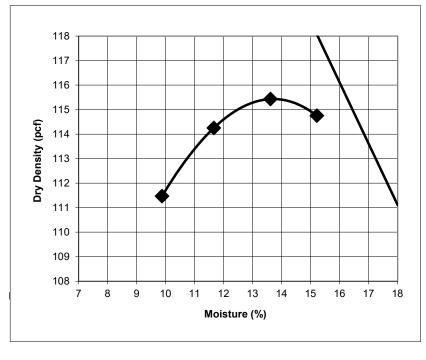
 Sample Date:
 01/14/21

 Sampled by:
 AA

Laboratory Compaction Characteristics of Soils Using
Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A)
Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117)
Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)
Expansion Index of Soils (ASTM D 4829)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
115.4	1849
13.7	13.7



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	100
1 1/4 in / 32 mm	100
1 in / 25 mm	99
3/4 in / 19 mm	97
1/2 in / 12.5 mm	93
3/8 in / 9.5 mm	89
1/4 in / 6.4 mm	82
#4, 4.75mm	78
#8, 2.36mm	66
#10, 2.00mm	63
#16, 1.18mm	55
#30, 0.60mm	47
#40, .425mm	44
#50, .300mm	42
#100, .150mm	37
#200, .075mm	30
LL: PI:	42 17
El:	5
USCS: AASHTO:	SC A-2-7(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.65 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material: Native Soil
Sample Source: TP-24 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43655

 Sample Date:
 01/14/21

 Sampled by:
 AA

Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep) Expansion Index of Soils (ASTM D 4829)

Mechanical Analysis Atterberg Limits Sieve Size % Passing 6 in / 152mm 100 LL: 35 4 in / 100mm 100 PL: 22 3 in / 75mm 100 PI: 13 2 in / 50mm 100 1 1/2 in / 37.5mm 100 EI: 0 1 1/4 in / 32 mm 99 1 in / 25 mm 97 3/4 in / 19 mm USCS: SC 95 1/2 in / 12.5 mm 92 AASHTO: A-2-6(0) 3/8 in / 9.5 mm 90 1/4 in / 6.4 mm 86 #4, 4.75mm 84 #8, 2.36mm 70 #10, 2.00mm 67 #16, 1.18mm 55 #30, 0.60mm 39 #40, .425mm 32 #50, .300mm 26 #100, .150mm 20 #200, .075mm 14

Reviewed by: JV	
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Project: Trillium at Douglas Ranch Phase 1 Village 3
Location: Sun Valley Parkway and Cactus Road

Material:Native SoilSample Source:TP-26 @ 0' - 5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43656

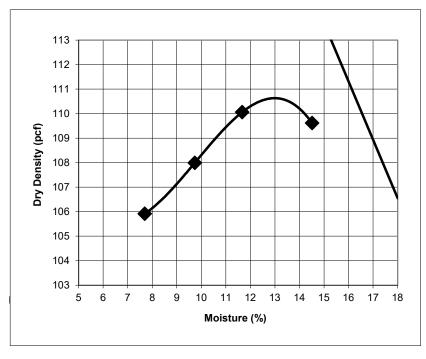
 Sample Date:
 01/14/21

 Sampled by:
 AA

Laboratory Compaction Characteristics of Soils Using Standard Efforts (12,400ft-lb-ft/cu.ft) (ASTMD698A) Sieve Analysis of Fine and Coarse Aggregates (ASTM C136/C117) Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318) (Dry Prep)

Maximum Dry Density: Optimum Moisture (%):

English	Metric
(pcf)	(kg/cu.m)
110.6	1772
13.0	13.0



Sieve Size	Percent Passing
6 in / 152mm	100
4 in / 100mm	100
3 in / 75mm	100
2 in / 50mm	100
1 1/2 in / 37.5mm	98
1 1/4 in / 32 mm	98
1 in / 25 mm	96
3/4 in / 19 mm	93
1/2 in / 12.5 mm	89
3/8 in / 9.5 mm	86
1/4 in / 6.4 mm	80
#4, 4.75mm	77
#8, 2.36mm	68
#10, 2.00mm	66
#16, 1.18mm	57
#30, 0.60mm	44
#40, .425mm	39
#50, .300mm	34
#100, .150mm	27
#200, .075mm	20
LL: PI:	NV NP
USCS:	SM

AASHTO:

A-1-b(0)

Notes:

- The Zero Air Void Curve Represents a Specific Gravity of 2.5 assumed for the -#4 Material.
- This is a Summarized Report of the Referenced Procedures and Does Not Include All Reporting Requirements. Additional Data Can be Provided at Clients Request.

Reviewed by: JV

Project:	Village 2 Community Core	Project Number:	20-G-11044
Project Location:	Sun Valley Parkway and Cactus Road		
Client:	TW Purchase LLC and JF Purchase, LLC	Sample Number:	See Below
Material:	Native	Date Sampled:	1/11/21
Sample Source:	See Below		
Material:	Native	•	

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937)

		Moisture						
		Wet Wt.	Dry Wt.	Moist.	#	Wet Wt.+ Rings	Wt.of Rings	Dry Density
Sample Number	Boring	(g)	(g)	Content	Of Rings	(g)	(g)	(pcf)
43657	Boring B-09 @ 2.5'-3.5'	711.0	662.1	7.4%	5	932.8	221.8	109.6
43658	Boring B-13 @ 2.5'-3.5'	658.1	619.0	6.3%	5	878.2	220.1	102.5
43659	Boring B-19 @ 2.5'-3.5'	735.4	709.3	3.7%	5	963.0	227.6	117.5
43661	Boring B-26 @ 2.5'-3.5'	712.3	685.9	3.8%	5	938.0	225.7	113.6
43662	Boring B-31 @ 2.5'-3.5'	692.3	669.9	3.3%	5	915.3	223.0	110.9
43664	Boring B-35 @ 2.5'-3.5'	738.9	723.9	2.1%	5	958.4	219.5	119.9

Reviewed by:	JV

	Al	ipiia Geoleciii	ilicai & ivia	iteriais, ii	IC.			
Project: Project Location:	Village 2 Community Core Sun Valley Parkway and Cactus Road					Project Number:		20-G-11044
Client:	TW Purchase LLC and JF Purchase, LLC			Sample Number:			See Below	
Material:	Native					Date Sampled:		1/11/21
Sample Source:	See Below					·		
			isture		,,		144 (5)	
		Wet Wt.	Dry Wt.	Moist.	#	Wet Wt.+ Rings	Wt.of Rings	Dry Density
Sample Number	Boring	(g)	(g)	Content	Of Rings	(g)	(g)	(pcf)
43660	Boring B-21 @ 2.5'-3.5'	783.7	759.3	3.2%	6	1048.8	265.1	104.8
43663	Boring B-34 @ 2.5'-3.5'	830.8	813.3	2.2%	6	1100.7	269.9	112.2

655.1

650.6

2.5%

4.1%

5

5

895.4

903.3

224.2

226.1

108.5

107.7

671.2

677.2

Reviewed by:	JV

43665

43666

Boring B-38 @ 2.5'-3.5'

Boring B-42 @ 2.5'-3.5'

Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

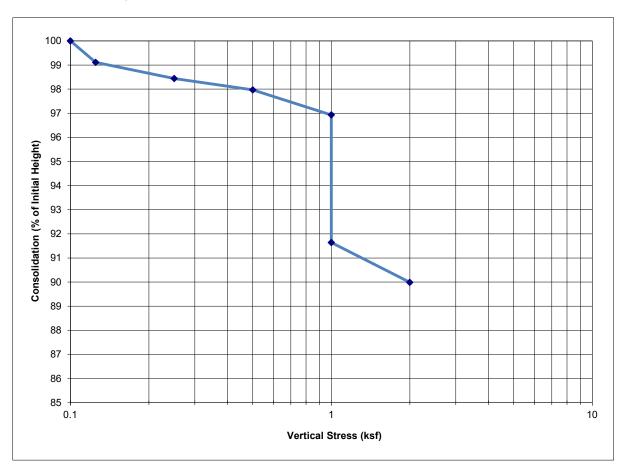
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43657Material:NativeDate Sampled:01/11/21

Sample Source: Boring B-09 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.14
Initial Moisture Content	6.6%	Final Moisture Content	19.3%
Initial Dry Density(pcf)	95.8	FInal Dry Density(pcf)	106.4
Initial Degree of Saturation	24%	FInal Degree of Saturation	93%
Initial Void Ratio	0.7	Final Void Ratio	0.6
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

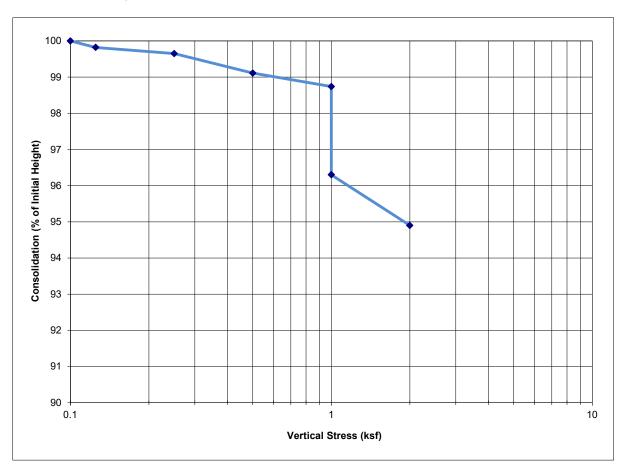
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43659Material:NativeDate Sampled:01/12/21

Sample Source: Native Boring B-19 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.37
Initial Moisture Content	4.4%	Final Moisture Content	18.7%
Initial Dry Density(pcf)	106.0	FInal Dry Density(pcf)	111.6
Initial Degree of Saturation	21%	Final Degree of Saturation	103%
Initial Void Ratio	0.6	Final Void Ratio	0.5
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Reviewed by: JV

Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

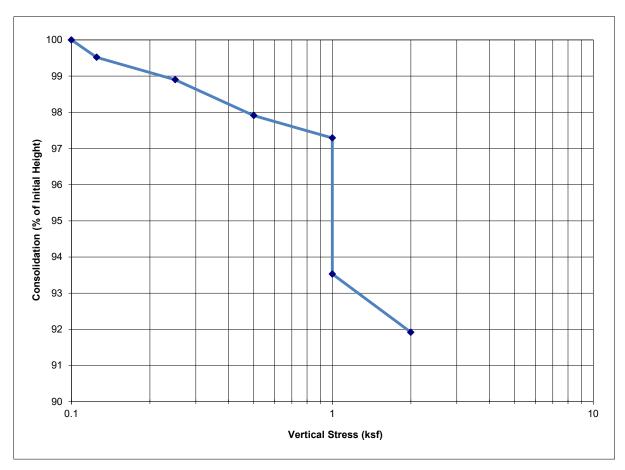
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43661Material:NativeDate Sampled:01/12/21

Material: Native
Sample Source: Boring B-26 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.23
Initial Moisture Content	3.9%	Final Moisture Content	17.4%
Initial Dry Density(pcf)	104.4	Final Dry Density(pcf)	113.5
Initial Degree of Saturation	18%	FInal Degree of Saturation	101%
Initial Void Ratio	0.6	Final Void Ratio	0.5
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

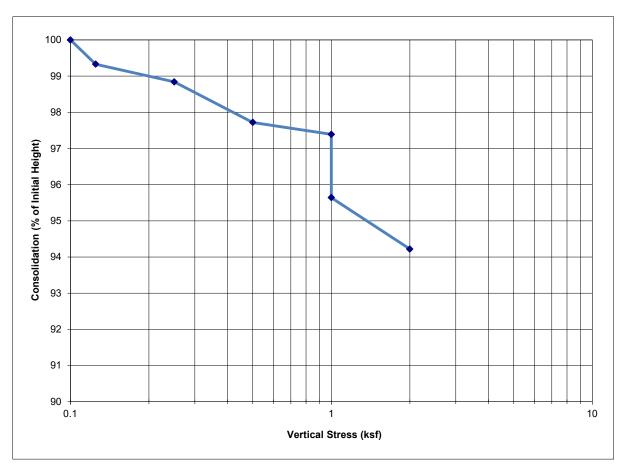
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43662Material:NativeDate Sampled:01/12/21

Sample Source: Boring B-31 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.34
Initial Moisture Content	6.0%	Final Moisture Content	25.7%
Initial Dry Density(pcf)	99.3	FInal Dry Density(pcf)	105.3
Initial Degree of Saturation	24%	FInal Degree of Saturation	119%
Initial Void Ratio	0.7	Final Void Ratio	0.6
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

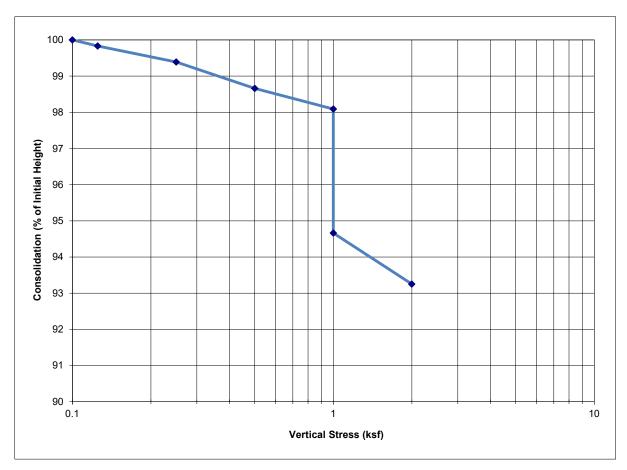
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43664Material:NativeDate Sampled:01/13/21

Sample Source: Boring B-35 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.29
Initial Moisture Content	2.9%	Final Moisture Content	17.2%
Initial Dry Density(pcf)	101.3	Final Dry Density(pcf)	108.6
Initial Degree of Saturation	12%	FInal Degree of Saturation	87%
Initial Void Ratio	0.6	Final Void Ratio	0.5
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

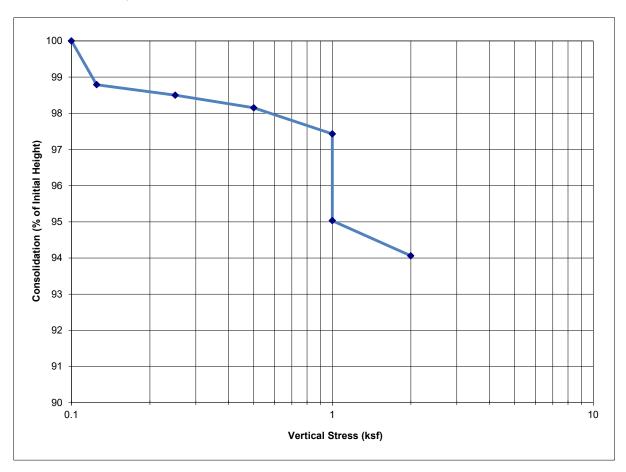
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43665Material:NativeDate Sampled:01/13/21

Sample Source: Boring B-38 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.33
Initial Moisture Content	2.3%	Final Moisture Content	14.6%
Initial Dry Density(pcf)	107.4	FInal Dry Density(pcf)	114.1
Initial Degree of Saturation	11%	FInal Degree of Saturation	86%
Initial Void Ratio	0.5	Final Void Ratio	0.4
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Project: Village 2 Community Core **Project Number:** 20-G-11044

Project Location: Sun Valley Parkway and Cactus Road

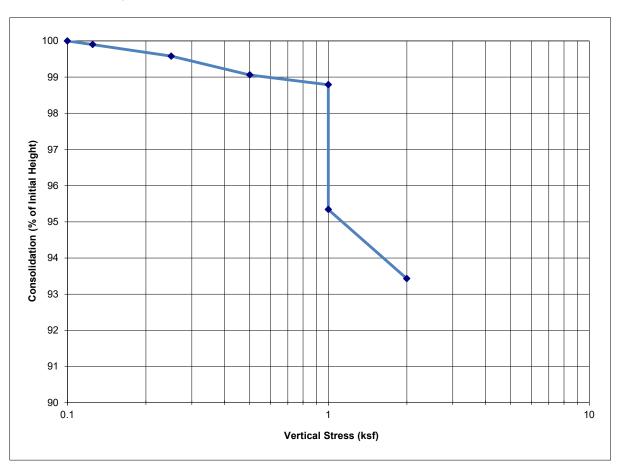
Client:TW Purchase LLC and JF Purchase, LLCSample Number:43666Material:NativeDate Sampled:01/13/21

Sample Source: Boring B-42 @ 2.5'-3.5'

Sample Prep: Insitu

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.30
Initial Moisture Content	3.9%	Final Moisture Content	17.6%
Initial Dry Density(pcf)	105.9	FInal Dry Density(pcf)	113.3
Initial Degree of Saturation	18%	Final Degree of Saturation	101%
Initial Void Ratio	0.6	Final Void Ratio	0.5
Estimated Specific Gravity	2.65	Saturated at	1 ksf



Reviewed by: _____JV

Project: Trillium at Douglas Ranch Phase 1 Village 3 **Project Number:** 20-G-11044 Location: Sun Valley Parkway and Cactus Road Sample Number: 43630 Sample Date: 1/11/2021 Material: Native Soil Sample Source: B-07 @ 0' - 4.5' Sampled by: AA

pH & Resistivity (AZ 236)

Resistivity pH (Ohm-cm)

Pads

Proposed Use:

682 8.21

Reviewed by: JV

Project:Trillium at Douglas Ranch Phase 1 Village 3ProjectLocation:Sun Valley Parkway and Cactus RoadSampMaterial:Native SoilSamp

Sample Source: B-21 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43636

 Sample Date:
 1/12/2021

 Sampled by:
 AA

pH & Resistivity (AZ 236)

Resistivity pH (Ohm-cm)

1500 8.6

Reviewed by: JV

Project:Trillium at Douglas Ranch Phase 1 Village 3ProjLocation:Sun Valley Parkway and Cactus RoadSamMaterial:Native SoilSam

Sample Source: B-42 @ 0' - 4.5'

Proposed Use: Pads

 Project Number:
 20-G-11044

 Sample Number:
 43643

 Sample Date:
 1/13/2021

 Sampled by:
 AA

pH & Resistivity (AZ 236)

Resistivity pH (Ohm-cm)

1295 8.58

Reviewed by: JV



Laboratory Analysis Report

Alpha Geotechnical and Materials Juan Valenciano 2504 W. Southern Ave Tempe, AZ 85282 Project: 20-G-11044

Date Received: 1/19/2021

Date Reported: 1/21/2021

PO Number: 20-G-11044

Lab Number: 935266-1	43627	B-01 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	< 3	ppm	
Chloride		ARIZ 736b	101	ppm	
Lab Number: 935266-2	43629	B-03 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	< 3	ppm	
Chloride		ARIZ 736b	114	ppm	
Lab Number: 935266-3	43630	B-07 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	183	ppm	
Chloride		ARIZ 736b	253	ppm	
Lab Number: 935266-4	43631	B-09 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	860	ppm	
Chloride		ARIZ 736b	340	ppm	
Lab Number: 935266-5	43632	B-11 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	942	ppm	
Chloride		ARIZ 736b	809	ppm	
Lab Number: 935266-6	43633	B-13 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	208	ppm	
Chloride		ARIZ 736b	300	ppm	



Laboratory Analysis Report

Alpha Geotechnical and Materials Juan Valenciano 2504 W. Southern Ave Tempe, AZ 85282 Project: 20-G-11044

Date Received: 1/19/2021

Date Reported: 1/21/2021

PO Number: 20-G-11044

Lab Number: 935266-7	43634	B-16 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	5	ppm	_
Chloride		ARIZ 736b	203	ppm	
Lab Number: 935266-8	43636	B-21 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	9	ppm	
Chloride		ARIZ 736b	304	ppm	
Lab Number: 935266-9	43637	B-24 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	287	ppm	
Chloride		ARIZ 736b	164	ppm	
Lab Number: 935266-10	43638	B-26 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	549	ppm	
Chloride		ARIZ 736b	893	ppm	
Lab Number: 935266-11	43643	B-42 (0'-4.5')			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	223	ppm	
Chloride		ARIZ 736b	185	ppm	
Lab Number: 935266-12	43650	TP-11 (0'-5.0)			
Test Parameter		Method	Result	Units	Levels
Sulfate		ARIZ 733b	4	ppm	
Chloride		ARIZ 736b	43	ppm	



Laboratory Analysis Report

Alpha Geotechnical and Materials Juan Valenciano 2504 W. Southern Ave Tempe, AZ 85282 Project: 20-G-11044

Date Received: 1/19/2021

Date Reported: 1/21/2021

PO Number: 20-G-11044

Lab Number: 935266-13	43653	TP-16 (0'-5.0')				
Test Parameter		Method	Result	Units	Levels	
Sulfate		ARIZ 733b	548	ppm		
Chloride		ARIZ 736b	357	ppm		
Lab Number: 935266-14	43654	TP-18 (0'-5.0')				
Test Parameter		Method	Result	Units	Levels	
Sulfate		ARIZ 733b	424	ppm		
Chloride		ARIZ 736b	573	ppm		
Lab Number: 935266-15	43655	TP-24 (0'-5.0')				
Test Parameter		Method	Result	Units	Levels	
Sulfate		ARIZ 733b	5	ppm		
Chloride		ARIZ 736b	118	ppm		

APPENDIX C Pavement Design

Calculate Equivalent Single Axle Loads (ESALs)

Average Daily Traffic based on Traffic Counts	ADT =	1,000
Traffic Count Year	Year =	2021
First Design Year	Year =	2021
Estimated Average Daily Traffic in first design year (two-way)	ADT =	1,000
Percent Trucks ≥ Class 4 [Load Equivalent Factor = 1.2]	% Heavy Trucks =	2%
Cars [Load Equivalent Factor = 0.0008]	% Cars =	98%
Initial two-way daily 18-kip ESALs	$W_{0(2-18)} =$	25
Annual growth rate as a percent	g =	0%
Number of years in analysis period	n =	20
Overall Growth Factor	OGF =	20.19
Two way 18-kip ESALs for the analysis period	W ₂₋₁₈ =	182,652

Number of Lanes	#=	2
Directional distribution factor	D _D =	50%
Lane distribution factor	D _L =	0.90
Cumulative 18-kip ESALs for design lane	W ₁₈ =	82,194

Design Year	Start Year	End Year	Annual ESALs	Cumulative ESALs
1	2021	2022	4,071	4,071
2	2022	2023	4,075	8,146
3	2023	2024	4,079	12,225
4	2024	2025	4,083	16,308
5	2025	2026	4,087	20,395
6	2026	2027	4,091	24,486
7	2027	2028	4,095	28,581
8	2028	2029	4,099	32,680
9	2029	2030	4,103	36,784
10	2030	2031	4,108	40,891
11	2031	2032	4,112	45,003
12	2032	2033	4,116	49,119
13	2033	2034	4,120	53,239
14	2034	2035	4,124	57,363
15	2035	2036	4,128	61,491
16	2036	2037	4,132	65,623
17	2037	2038	4,136	69,760
18	2038	2039	4,141	73,900
19	2039	2040	4,145	78,045
20	2040	2041	4,149	82,194

Roadway Functional Classification

Residential (Local)

Effective Roadbed Soil Resilient Modulus (Subgrade Support)

R-Test Values

Corre	lated	R-Va	ılues

Plasticity Index	% Passing No. 200	Correlated R-Value	Plasticity Index	% Passing No. 200	Correlated R-Value
16	31	28	9	37	40
9	38	40	0	16	94
11	40	34	0	10	102
11	43	33	0	14	97
10	23	45	0	8	105
9	18	51	0	14	97
9	20	50	0	23	86
0	14	97	0	17	93
12	41	32	0	12	99
10	23	45	3	33	62

Total R-Value Tests

Mean of R-value tests

Std. Dev of R Value Tests

Total Correlated R- Value Tests 30

Mean of Correlated R-Value tests 43

Std. Dev of correlated R-Value Tests 28.19

Mean R-Value 43
Design R-Value 26
Seasonal Variation Factor 1.00

Calculated Resilient Modulus (M_R) Design Resilient Modulus 15,479 15,479

pounds per square inch (psi) psi [Maximum M_R 26,000 psi]

Reliability

Level of Reliability	80%
Standard Normal Random Variable (Z _R)	-0.841
Overall Standard Deviation (S ₀)	0.45

Performance Criteria (Serviceability)

Initial Serviceability (P_0)	4.2
Terminal Serviceabilty (P_t)	2
Change in Serviceability (APSI)	2.2

Traffic Loading

Equivalent Single Axle Loads 82,194
(from ESAL calculation)

Performance Criteria (Serviceability)

Strucutral Number (SN) 1.58

	Coefficients			
Material Type	Material	Drainage	Thickness	Structural Number
Asphalt Rubber AC	0.42	1.00		
Asphalt Concrete (AC)	0.42	1.00	2	0.84
Cement Treated Base (CTB)	0.28	1.00		
Aggregate Base (AB)	0.12	1.00	7	0.84
MAG Select	0.11	1.00		
Stabilized Subgrade**	0.16	1.00		
	Design Structural Number			1.68
	Required Structural Number			1.58

^{**}The coefficient for stabilized subgrade is to be determined using a non-soaked 7-day compressive strength, using ASTM D1633 Method A, and the following formula: ai = 0.15+0.0001*(CSCLS).

CSCLS = Compressive strength of cement or lime stabilized subgrade (psi).

Lane distribution factor

Cumulative 18-kip ESALs for design lane

Calculate Equivalent Single Axle Loads (ESALs)

Average Daily Traffic based on Traffic Counts	ADT =	2,500
Traffic Count Year	Year =	2021
First Design Year	Year =	2021
Estimated Average Daily Traffic in first design year (two-way)	ADT =	2,500
Percent Trucks ≥ Class 4 [Load Equivalent Factor = 1.2]	% Heavy Trucks =	2%
Cars [Load Equivalent Factor = 0.0008]	% Cars =	99%
Initial two-way daily 18-kip ESALs	W ₀₍₂₋₁₈₎ =	47
Annual growth rate as a percent	g =	0%
Number of years in analysis period	n =	20
Overall Growth Factor	OGF =	20.19
Two way 18-kip ESALs for the analysis period	W ₂₋₁₈ =	346,158
Number of Lanes	# =	2
Directional distribution factor	D _D =	50%

D_L=

W₁₈ =

0.90

155,771

Design Year	Start Year	End Year	Annual ESALs	Cumulative ESALs
1	2021	2022	7,715	7,715
2	2022	2023	7,723	15,437
3	2023	2024	7,730	23,168
4	2024	2025	7,738	30,906
5	2025	2026	7,746	38,651
6	2026	2027	7,753	46,405
7	2027	2028	7,761	54,166
8	2028	2029	7,769	61,935
9	2029	2030	7,777	69,712
10	2030	2031	7,785	77,496
11	2031	2032	7,792	85,289
12	2032	2033	7,800	93,089
13	2033	2034	7,808	100,897
14	2034	2035	7,816	108,712
15	2035	2036	7,824	116,536
16	2036	2037	7,831	124,367
17	2037	2038	7,839	132,206
18	2038	2039	7,847	140,053
19	2039	2040	7,855	147,908
20	2040	2041	7,863	155,771

% Passing No.

200

Plasticity

Index

Roadway Functional Classification Collectors

Effective Roadbed Soil Resilient Modulus (Subgrade Support)

R-Test Values

16	31	28	9	37	40
9	38	40	0	16	94
11	40	34	0	10	102
11	43	33	0	14	97
10	23	45	0	8	105
9	18	51	0	14	97
9	20	50	0	23	86
0	14	97	0	17	93
12	41	32	0	12	99
10	23	45	3	33	62

Correlated R-Values

Plasticity

Index

Correlated

R-Value

Total R-Value Tests

Mean of R-value tests

Std. Dev of R Value Tests

Total Correlated R- Value Tests	
Mean of Correlated R-Value tests	
Std. Dev of correlated R-Value Tests	28.19

Mean R-Value	43
Design R-Value	26
Seasonal Variation Factor	1.00

% Passing No.

200

Correlated

R-Value

Calculated Resilient Modulus (M_R)

Design Resilient Modulus

15,479	pour
15,479	psi [

pounds per square inch (psi)
psi [Maximum M_R 26,000 psi]

Reliability

Level of Reliability	90%
Standard Normal Random Variable (Z _R)	-1.282
Overall Standard Deviation (S_0)	0.45

Performance Cri	teria (Serv	iceability)
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Initial Serviceability (P ₀)	4.4
Terminal Serviceabilty (Pt)	2.3
Change in Serviceability (APSI)	2.1

Traffic Loading

Equivalent Single Axle Loads 155,771 (from ESAL calculation)

Performance Criteria (Serviceability)

Strucutral Number (SN) 1.91

	Coeff	Coefficients		
Material Type	Material	Drainage	Thickness	Structural Number
Asphalt Rubber AC	0.42	1.00		
Asphalt Concrete (AC)	0.42	1.00	3	1.26
Cement Treated Base (CTB)	0.28	1.00		
Aggregate Base (AB)	0.12	1.00	6	0.72
MAG Select	0.11	1.00		
Stabilized Subgrade**	0.16	1.00		
		Design Stru	1.98	
	Required Structural Number			1.91

^{**}The coefficient for stabilized subgrade is to be determined using a non-soaked 7-day compressive strength, using ASTM D1633 Method A, and the following formula: ai = 0.15+0.0001*(CSCLS).

CSCLS = Compressive strength of cement or lime stabilized subgrade (psi).

Cumulative 18-kip ESALs for design lane

Calculate Equivalent Single Axle Loads (ESALs)

Average Daily Traffic based on Traffic Counts	ADT =	7,500
Traffic Count Year	Year =	2019
First Design Year	Year =	2022
Estimated Average Daily Traffic in first design year (two-way)	ADT =	7,959
Percent Trucks ≥ Class 4 [Load Equivalent Factor = 1.2]	% Heavy Trucks =	3%
Cars [Load Equivalent Factor = 0.0008]	% Cars =	97%
Initial two-way daily 18-kip ESALs	W ₀₍₂₋₁₈₎ =	293
Annual growth rate as a percent	g =	2%
Number of years in analysis period	n =	20
Overall Growth Factor	OGF =	24.30
Two way 18-kip ESALs for the analysis period	W ₂₋₁₈ =	2,595,843
Number of Lanes	# =	2
Directional distribution factor	D _D =	50%
Lane distribution factor	D ₁ =	0.90

1,168,129

Design Year	Start Year	End Year	Annual ESALs	Cumulative ESALs
1	2022	2023	48,076	48,076
2	2023	2024	49,038	97,114
3	2024	2025	50,019	147,133
4	2025	2026	51,019	198,152
5	2026	2027	52,039	250,191
6	2027	2028	53,080	303,272
7	2028	2029	54,142	357,413
8	2029	2030	55,225	412,638
9	2030	2031	56,329	468,967
10	2031	2032	57,456	526,423
11	2032	2033	58,605	585,028
12	2033	2034	59,777	644,805
13	2034	2035	60,972	705,777
14	2035	2036	62,192	767,969
15	2036	2037	63,436	831,405
16	2037	2038	64,704	896,109
17	2038	2039	65,999	962,108
18	2039	2040	67,319	1,029,426
19	2040	2041	68,665	1,098,091
20	2041	2042	70,038	1,168,129

Roadway Functional Classification

Arterials & Industrial

Effective Roadbed Soil Resilient Modulus (Subgrade Support)

R-Test Values

Correlated	R-values
Correlated	Dlacticity

Plasticity Index	% Passing No. 200	Correlated R-Value	Plasticity Index	% Passing No. 200	Correlated R-Value
16	31	28	9	37	40
9	38	40	0	16	94
11	40	34	0	10	102
11	43	33	0	14	97
10	23	45	0	8	105
9	18	51	0	14	97
9	20	50	0	23	86
0	14	97	0	17	93
12	41	32	0	12	99
10	23	45	3	33	62

Total R-Value Tests	0
Mean of R-value tests	
Std. Dev of R Value Tests	

Total Correlated R- Value Tests	30
Mean of Correlated R-Value tests	43
Std. Dev of correlated R-Value Tests	28.19

Mean R-Value	43
Design R-Value	26
Seasonal Variation Factor	1.00

Calculated Resilient Modulus (M _R)
Design Resilient Modulus

15,479	pounds per square inch (psi)
15,479	psi [Maximum M _R 26,000 psi]

Reliability

Level of Reliability	95%
Standard Normal Random Variable (Z_R)	
Overall Standard Deviation (S_0)	0.45

Performance Criteria (Serviceability)

Initial Serviceability (P ₀)	4.5
Terminal Serviceabilty (Pt)	2.5
Change in Serviceability (APSI)	2

Traffic Loading

Equivalent Single Axle Loads 1,168,129 (from ESAL calculation)

Performance Criteria (Serviceability)

Strucutral Number (SN)

2.82

	Coefficients			
Material Type	Material	Drainage	Thickness	Structural Number
Asphalt Rubber AC	0.42	1.00		
Asphalt Concrete (AC)	0.42	1.00	4	1.68
Cement Treated Base (CTB)	0.28	1.00		
Aggregate Base (AB)	0.12	1.00	10	1.2
MAG Select	0.11	1.00		
Stabilized Subgrade**	0.16	1.00		
	Design Structural Number		2.88	
	Required Structural Number		2.82	

^{**}The coefficient for stabilized subgrade is to be determined using a non-soaked 7-day compressive strength, using ASTM D1633 Method A, and the following formula: ai = 0.15+0.0001*(CSCLS). CSCLS = Compressive strength of cement or lime stabilized subgrade (psi).

Calculate Equivalent Single Axle Loads (ESALs)

Average Daily Traffic based on Traffic Counts	ADT =	7,748
Traffic Count Year	Year =	2019
First Design Year	Year =	2022
Estimated Average Daily Traffic in first design year (two-way)	ADT =	8,222
Percent Trucks ≥ Class 4 [Load Equivalent Factor = 1.2]	% Heavy Trucks =	3%
Cars [Load Equivalent Factor = 0.0008]	% Cars =	97%
Initial two-way daily 18-kip ESALs	W ₀₍₂₋₁₈₎ =	302
Annual growth rate as a percent	g =	2%
Number of years in analysis period	n =	20
Overall Growth Factor	OGF =	24.30
Two way 18-kip ESALs for the analysis period	W ₂₋₁₈ =	2,681,679
Number of Lanes	# =	2
Directional distribution factor	D _D =	50%
Lane distribution factor	D _L =	0.90
Cumulative 18-kip ESALs for design lane	W ₁₈ =	1,206,755

Design Year	Start Year	End Year	Annual ESALs	Cumulative ESALs
1	2022	2023	49,666	49,666
2	2023	2024	50,659	100,326
3	2024	2025	51,673	151,998
4	2025	2026	52,706	204,704
5	2026	2027	53,760	258,464
6	2027	2028	54,835	313,300
7	2028	2029	55,932	369,232
8	2029	2030	57,051	426,283
9	2030	2031	58,192	484,474
10	2031	2032	59,356	543,830
11	2032	2033	60,543	604,373
12	2033	2034	61,754	666,126
13	2034	2035	62,989	729,115
14	2035	2036	64,248	793,363
15	2036	2037	65,533	858,896
16	2037	2038	66,844	925,740
17	2038	2039	68,181	993,921
18	2039	2040	69,545	1,063,466
19	2040	2041	70,935	1,134,401
20	2041	2042	72,354	1,206,755

Roadway Functional Classification

Highways and Parkways

Effective Roadbed Soil Resilient Modulus (Subgrade Support)

R-Test Values

Total R-Value Tests	0
Mean of R-value tests	
Std. Dev of R Value Tests	

Correlated R-Values

Plasticity	% Passing No.	Correlated	Plasticity	% Passing No.	Correlated
Index	200	R-Value	Index	200	R-Value
16	31	28	9	37	40
9	38	40	0	16	94
11	40	34	0	10	102
11	43	33	0	14	97
10	23	45	0	8	105
9	18	51	0	14	97
9	20	50	0	23	86
0	14	97	0	17	93
12	41	32	0	12	99
10	23	45	3	33	62

Total Correlated R- Value Tests	
Mean of Correlated R-Value tests	43
Std. Dev of correlated R-Value Tests	28.19

Mean R-Value	43
Design R-Value	26
Seasonal Variation Factor	1.00

Calculated Resilient Modulus (M_R)

Design Resilient Modulus

15,479	p
15,479	p

pounds per square inch (psi) psi [Maximum M_R 26,000 psi]

Reliability

Level of Reliability	95%
Standard Normal Random Variable (Z_R)	
Overall Standard Deviation (S_0)	0.45

Traffic	l nadino

Equivalent Single Axle Loads 1,206,755 (from ESAL calculation)

Performance Criteria (Serviceability)

Initial Serviceability (P ₀)	4.6
Terminal Serviceabilty (P_t)	2.7
Change in Serviceability (ΔPSI)	1.9

Performance Criteria (Serviceability)

Strucutral Number (SN) 2.85

	Coefficients]	
Material Type	Material	Drainage	Thickness	Structural Number
Asphalt Rubber AC	0.42	1.00		
Asphalt Concrete (AC)	0.42	1.00	4	1.68
Cement Treated Base (CTB)	0.28	1.00		
Aggregate Base (AB)	0.12	1.00	10	1.2
MAG Select	0.11	1.00		
Stabilized Subgrade**	0.16	1.00		
	Design Structural Number			2.88
	Required Structural Number			2.85

^{**}The coefficient for stabilized subgrade is to be determined using a non-soaked 7-day compressive strength, using ASTM D1633 Method A, and the following formula: ai = 0.15+0.0001*(CSCLS). CSCLS = Compressive strength of cement or lime stabilized subgrade (psi).