



UES™

Preliminary Geotechnical Engineering Report

**Kingman Griffith Industrial Development
SWC S. Apache Road and W. Yucca Drive
Golden Valley, Mohave County, Arizona**

Prepared for:
RealKo, LLC

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June 4, 2024
Project No. 4030.2400043



June 4, 2024

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Attention: Mr. TJ Steinkirchner
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Reference: **Preliminary Geotechnical Engineering Report
Kingman Griffith Industrial Development**
SWC S. Apache Road and W. Yucca Drive
Parcel No. 209-01-155
Golden Valley, Mohave County, Arizona
Project No: 4030.2400043

Nova Geotechnical and Inspection Services, LLC dba UES is pleased to submit this Preliminary Geotechnical Engineering Report for the referenced project. This report includes the results from the field exploration and laboratory testing program, along with preliminary information for use in preparation of the appropriate design and construction documents for this project.

UES appreciates the opportunity to provide this Preliminary Geotechnical Engineering Report and looks forward to continuing participation during the design and construction phases of this project. UES also has great interest in providing construction services, including materials testing and inspection services during the construction of this project and will be glad to meet with you to discuss further how we can be of assistance as the project advances.

If there are questions pertaining to this preliminary report or if UES may be of further service, please contact us at your convenience.

Respectfully,

Nova Geotechnical and Inspection Services, LLC dba UES

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1.0 INTRODUCTION

NOVA Geotechnical and Inspection Services, LLC dba UES, Consultant, has completed a field exploration and preliminary geotechnical evaluation for the Kingman Griffith Industrial Development project. Mr. TJ Steinkirchner, representing RealKo, LLC, authorized UES's services on April 8, 2024, by issuing Professional Services Agreement No. 87744396.1.

The site is located approximately 11 miles south of Kingman, Arizona. The general location of the site is shown in Figure No. 1, Vicinity Map.

The purpose of our services was to provide information and preliminary geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- General geology of the area
- Foundation design and construction
- Retaining wall design and construction
- Floor slab design and construction
- Pavement design and construction
- Earthwork

This report is for the purpose of providing geotechnical engineering and/or testing information and requirements. The scope of our services for this project did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic material in structures, soil, surface water, groundwater, or air, below or around this site.

2.0 PROJECT INFORMATION

It is our understanding that the site consists of vacant parcel approximately 220.65 acres in area and will be used for industrial development. Preliminary site plans shows that seven buildings ranging in size from 108,000 square feet to 1,360,000 square feet are planned. It is assumed the structures will be one and/or two-stories in height, of concrete tilt-up construction with concrete slab-on-grade lower floors and no below grade floors. There will be on-site paved areas. It is further assumed that final grades will generally be at or near existing grades (plus or minus five feet).

3.0 SITE EXPLORATION

The scope of our services for this project included a subsurface exploration program. The subsurface exploration program consisted of drilling 18 borings to depths ranging from approximately 15 to 20 feet below existing site grades. The borings were logged during drilling by a graduate engineer and samples were obtained to aid in material classification and for possible laboratory testing. The approximate locations of the borings are shown in Figure No. 2, Site Map. The locations of the borings were determined in the field by approximating distances from existing features or improvements. The locations of the borings should be considered accurate only to the degree implied by the method used. Results of the borings are presented in the Appendix.

4.0 SITE CONDITIONS

4.1 SURFACE

The site generally consisted of vacant, undeveloped land partially utilized as pasture. The parcel was bound by Apache Road on the east and Yuma Drive on the west. Griffith Road traverses the site, generally running from the southeast to the north-central portion of the parcel. The aforementioned roadway alignments are all two-lane, asphalt paved roads with gravel shoulders. Overhead power lines transversed the site in several locations. Several washes also traverse the site, generally in a northeast to southwest direction. Vegetation consisted of a moderate to thick growth of mesquite and cactus. Cobbles and boulders were scattered over the ground surface nearly everywhere. Overall the topography sloped gently from northeast to southwest.

4.2 SUBSURFACE

Fill was not encountered in all any explorations. However, due to previous grading along roadway alignments, underground utilities and overhead powerline easements, fill could be encountered in other areas of the site beyond our explorations, particularly near property boundaries.

Natural soils at the site generally consisted of alternating layers of medium dense to very dense silty sand with gravel, well-graded sand with gravel, silty gravel with sand and lesser strata of clayey sand with gravel. Some loose soils were also encountered but were typically in the upper 2 feet of the existing site grades. Larger sized materials (cobbles and boulders) were observed at the surface; however, these larger sized materials were not evident within borings. Test pits are recommended to better qualify for larger sized materials. Groundwater was not encountered within the depths explored. The boring logs and laboratory test results presented in the Appendix should be referred to for more detailed information.

Percolation tests were beyond our scope of work. Based on previous experience with similar silty sand soils, we estimate percolation rates on the order of 1.8 to 2.3 minutes per inch.

5.0 GEOLOGIC INFORMATION

The project site lies in the south-central portion of the Sacramento Valley and sits on a broad alluvial fan emanating from the Hualapai Mountains to the east. This location places the site in an area underlain by thick alluvial deposits (hundreds of feet). No mapped Quaternary faults transect the site. The nearest mapped Quaternary (undifferentiated) Fault, Needles-graben fault zone is approximately 20 miles southwest of the site.¹

¹ U.S. Geological Survey, Quaternary fault and fold database for the United States, <https://www.usgs.gov/natural-hazards/earthquake-hazards/faults>.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 GEOTECHNICAL DISCUSSION

Our recommendations are based on the assumption that the soil conditions are similar to those disclosed by the explorations. If variations are noted during construction or if changes are made in the site plan, structural loading, foundation type or floor level, we should be notified so we can supplement our recommendations, as applicable.

Our previous experience with dry, silty sand soils in this area indicates these arid region silty sand soils may be moderately hydro-collapsible. These soils are not suitable for support of foundations, floor slabs or paving in their present state. The upper 3 feet of natural soils or the natural soils within 3 feet below the bottom of foundations, whichever is lower, should be overexcavated and recompacted. The recommendations provided in this report will reduce the potential for movement, but will not eliminate it. For these recommendations to be effective, the recommendations presented in the Drainage and Moisture Protection section of this report must be strictly adhered to.

As previously mentioned, there were numerous cobbles and boulders encountered at the surface but not evident within our borings. The surficial cobbles and boulders should not be used within fill. Within the native soil, any oversized materials (material greater than 12-inches in size) exposed in foundation excavations should be removed within the upper 12 inches of the foundation. Within the fill areas within the building and 5 feet beyond, no oversized material should be placed within the upper 5 feet below final grade or 5 feet below the bottom of foundations, whichever is deeper. In paved areas, oversized material exposed/protruding more than 3 inches from the subgrade surface should be removed before placing any base course material.

6.2 EARTHWORK

6.2.1 General

- All earthwork should be performed in accordance with the guidelines presented in *Chapter 18* of the *2018 IBC*, except where specific recommendations are presented in this report. It is recommended that contractors perform their own reconnaissance of the site. If the contractors have any questions regarding site conditions, site preparation, or recommendations in this report, they should contact a representative of UES.

6.2.2 Site Clearing

- Strip and remove existing vegetation, debris, uncontrolled fill, all loose or disturbed natural soils, and other deleterious materials from proposed building areas, adjacent walks and slabs, and in areas to be paved. Excavations should extend at least 5 feet beyond the areas to be improved in plan view. Uncontrolled fill is defined as any existing fill that was not properly placed, observed and tested.
- All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

- If unexpected fills or abandoned structures/improvements are encountered during site clearing, such features should be removed and the excavation thoroughly cleaned and backfilled. All excavations should be observed by the geotechnical engineer prior to backfill placement.
- All materials derived from the demolition of existing structures/improvements should be removed from the site, and not be allowed for use in any fills. In some cases, existing pavements, if properly broken up, can be used in required fills. The geotechnical engineer should determine the suitability for use based on conditions in the field.

6.2.3 Subgrade Preparation

- Following site clearing activities, areas designated to receive fill, at-grade areas, or those achieved by excavation should be scarified to a depth of at least 8 inches, moisture conditioned and compacted as recommended in Section 6.2.7 *Fill Placement and Compaction* Section of this report.
- Difficulty in achieving the recommended compaction may require drying the near-surface subgrade to a compactable moisture content, removal and replacement. In addition, difficulty in subgrade compaction may be an indication of loose, soft or unstable soil conditions that could require additional excavation. If these conditions exist, additional subgrade stabilization recommendations may be required at the time of construction.
- Recommendations to achieve the recommended compaction can be made during construction and will depend on the conditions encountered in the field and other factors, such as project schedule and prevailing weather conditions.

6.2.4 Excavation

- It is anticipated that excavation of the on-site natural deposits for the proposed project can be accomplished with conventional earthmoving equipment.
- Contractors, especially those excavating for utilities, should satisfy themselves as to the hardness of materials and equipment required.
- Some additional effort may be necessary to extract boulder-sized materials, particularly in deep, narrow excavations such as utility trenches.
- Temporary unsurcharged construction excavations should be sloped or shored. Slopes should not be steeper than 2-to-1 (horizontal to vertical). Slopes may need to be flattened depending on conditions exposed during construction. Exposed slopes should be kept moist (but not saturated) during construction. If there is not enough space for sloped excavations, shoring should be used. Traffic and surcharge loads should be kept back at least 10 feet from the top of the excavation.
- If excavations, including utility trenches, are extended to a depth of more than 20 feet, OSHA requires that the protective system of such excavations be designed by a professional engineer. Excavation, trenching and shoring should be conducted in accordance with the *U.S. Department of Labor Occupational Safety and Health Administration's (OSHA) Excavation and Trenching Standard, Title 29 of the Code of Federal Regulation (CFR), Part 1926.650*. The safety of construction personnel is the responsibility of the contractor.
- Some larger sized materials were encountered in our borings. Due to the relatively small diameter of the boring hole and the samplers, the actual size and quantity of the larger sized materials cannot be adequately evaluated. Within the native soil, any oversized materials (material greater than 12-

inches in size) exposed in foundation excavations should be removed within the upper 24 inches of the foundation. Within the fill areas within the building and 5 feet beyond, no oversized material should be placed within the upper 5 feet below final grade or 5 feet below the bottom of foundations, whichever is deeper. In paved areas, oversized material exposed/protruding more than 3 inches from the subgrade surface should be removed before placing any base course material.

- The oversized material could be removed by screening or by raking the pad area prior to compaction.

6.2.5 Overexcavation

- As previously discussed, the on-site soils are considered moderately hydro-collapsible and become considerably weaker and more compressible with increased moisture content. These soils are not suitable for support of foundations, floor slabs or paving. To provide improved support for foundations, floor slabs, and paving, it will be necessary to overexcavate and recompact the upper natural soils.
- Within the entire building areas and 5 feet beyond the exterior footings and 2 feet beyond interior footings, block and retaining walls, overexcavate and recompact the upper 3 feet of natural soils below the planned finished grade, or natural soils within 3 feet below the bottom of foundations, whichever is lower. In areas to be paved (including adjoining sidewalks, patios, and other concrete slabs) and at least 2 feet beyond in plan view, it will only be necessary to overexcavate and recompact 2 feet of natural soils below existing grade or final subgrade, whichever is lower.
- It is important that the fill material placed in the overexcavated area consist of material having an expansion potential of less than 4 percent and have at least 20 percent of the material passing the No. 200 sieve.
- Within the native soil, any oversized materials (material greater than 12-inches in size) exposed in foundation excavations should be removed within the upper 24 inches of the foundation.
- The oversized material could be removed by excavating and screening or by raking the pad area prior to compaction.

6.2.6 Fill Materials

- On-site soils, minus almost all debris or organic matter, may be used in required fills.
- On-site soils meeting the following criteria, as determined by visual observation by the 3rd party inspector, may be used in required fills:

Sieve Size	Percent Passing
12-inches	100%
6-inches	85-100%
3/4-inches	40-100%

Notes:

1. Material should be free of all debris and organic matter.
2. Material has an expansion index of less than 40.

3. Where materials with less than 70% passing the 3/4-inch sieve (more than 30% retained on 3/4-inch sieve) is used, such materials should be verified to be firm and unyielding by performing proof-rolling and/or probing by the 3rd party inspector.

- In general, material greater than 12 inches in diameter should not be used in fills within 5 feet below the bottom of the footing within building pad areas.
- Fill containing material greater than 6 inches in diameter should not be used in any utility trenches, behind retaining walls or against foundations or grade beams.
- Imported material should be compatible with on-site soils in addition to being suitable for its intended use. All imported materials should be approved by the geotechnical firm providing testing during construction prior to importing. In general, imported soils should be granular and non-expansive or have a maximum expansion index of 20, a maximum solubility of 0.5%, a maximum sulfate content of 0.2%, and a maximum sodium sulfate content of 0.2%. If post-tensioned slabs are used, imported materials shall also have a maximum chloride content of 500mg/Kg.
- Select free draining granular materials should be used as backfill immediately behind retaining walls (6 to 12 inches). As an option, a prefabricated drain may be used and should be installed in accordance with the manufacturer’s recommendations.

6.2.7 Fill Placement and Compaction

- After performing required excavations and overexcavations, the exposed soils should be carefully observed to verify removal of all unsuitable deposits. Exposed soils should then be scarified to a depth of 8 inches, watered as necessary, and compacted as recommended.
- Fill materials should be placed on a horizontal plane unless otherwise accepted by the geotechnical engineer.
- Where the slope ratio of the original ground is steeper than 5 horizontal to 1 vertical, the slope should be benched to create near-level areas for the placement of fill. The maximum allowable height of the bench is 3 feet. Bench excavation should be continued to the top of the existing slope in structural fill areas or the daylight (cut/fill) contact.
- All required fill should be placed in loose lifts, generally not over 8 to 12 inches in thickness.
- The material should be heavily watered.
- Materials should be compacted to the following:

Material	Percent Compaction (ASTM D1557)	Minimum Moisture Content
Fine-grained/lean clays	90 (minimum) 95 (maximum)	optimum moisture content
Granular (including aggregate base)	95 (minimum)	-2 percent of optimum moisture content

Notes:

1. For compaction, fine-grained soils are soils with at least 30 percent passing the No. 200 sieve and/or soils having an expansion index of less than 40.
2. All fill placed deeper than 5 feet below the final grade should be compacted to a minimum of 95 percent at a moisture content of optimum or greater.
3. Street/pavement subgrade and retaining wall backfill only need to be compacted to a minimum of 90 percent.

- Soils should not be allowed to dry out such that cracking occurs during or after grading. Sufficient moisture contents should be maintained, to prevent cracking, at least until foundations, floor slabs, flatwork, and pavements are constructed. Any significantly dried or cracked soils could be wetted until they reach acceptable moisture contents or they could be excavated and replaced with acceptable properly compacted fill.
- Structural fill should be observed and tested as necessary to determine compliance with the compaction requirements presented in this report. In general, one compaction test should be performed for approximately every 500 cubic yards of fill, one for one foot of fill placed, or change in material.

6.3 FOUNDATIONS

Based on the encountered soil conditions, assumed/provided structural loads and our understanding of the project, the proposed structures can be supported on shallow foundations. Preliminary recommendations for the foundations are provided in the section below.

6.3.1 Shallow Foundations

If the grading recommendations presented in the Earthwork section of this report are complied with, the proposed structures may be supported by conventional or post-tensioned type foundations. Any proposed retaining walls or block walls may be established on conventional footings. Foundations should be established on properly compacted fill. Foundation design parameters are summarized below.

Description	Parameter
Preliminary Allowable bearing pressure ^{1,2}	2,500 to 3,000 psf
Minimum width ³	12 inches
Minimum embedment depth ^{3,4}	12 to 18 inches
Anticipated total settlement	Less than 1 inch
Anticipated differential settlement	Less than ½ inch
Notes:	
<ol style="list-style-type: none"> 1. The bearing value may be increased by 750 psf for each additional 12 inches of embedment up to a maximum of 4,000 psf. 2. A one-third increase may be used for wind or seismic loads. 3. Minimum width and embedment depth are for conventional spread footings or the thickened edge of post-tension slab foundations. 4. Below the lowest adjacent final compacted subgrade (generally pad grade before landscaping; exterior footings) or the top of the finished floor slab (interior footings). 	

Settlement of the proposed structures, supported as recommended, should be within acceptable limits as provided above. However, if the hydro-collapsible soils beneath foundations experience an increase in moisture, settlement could occur and cause additional movement of a structure. Therefore, it is important that the recommendations presented in the Drainage and Moisture Protection section of this report be adhered to.

6.4 SITE CLASS

The 2018 International Building Code (IBC) requires that a default Site Class D be assumed for seismic design when soil conditions for the top 100 feet are not known in sufficient detail for determination in accordance with Table 20.3-1 of ASCE Standard 7.

The site is located at approximately the following latitude and longitude:

Latitude	Longitude
35.0360°	-114.1475 °

A search of the USGS Earthquake Hazards Program’s ASCE 7-16 data, as published by the ASCE 7 Hazard Tool (<https://asce7hazardtool.online/>), indicated the following spectral acceleration parameters for the location indicated above and a Site Class D:

Period (s)	MCE _R ground motion (g)	Site-modified spectral acceleration value (g)	Numeric seismic design value (g)	Site amplification factor (g)
0.2	S _S 0.248	S _{MS} 0.397	S _{DS} 0.265	F _a 1.600
1.0	S ₁ 0.108	S _{M1} 0.258	S _{D1} 0.172	F _v 2.384

6.5 LATERAL EARTH PRESSURES AND RETAINING WALLS

For soils above any free water surface, with level backfill and no surcharge loads, we recommend the following equivalent fluid pressures and coefficient of friction:

Soil Parameter	Value
Soil Unit Weight	125 pcf
Internal Angle of Friction	32°
Cohesion	0 psf
Coefficient of Friction	0.39

Loading Condition	Lateral Earth Coefficient		Equivalent Fluid Pressures (pcf)
Horizontal backfill	K ₀	0.50	60
	K _a	0.33	40
	K _p	3.00	360

Notes:

1. The above values do not include factor of safety. The designer should employ an adequate factor of safety.
2. The above values assume no hydrostatic pressure.
3. Active pressure assumes unrestrained (cantilever) wall and assumes no loading from heavy compaction equipment.
4. Passive pressure should not exceed a maximum of 3,000 psf. A one-third increase may be used for wind or seismic loads.

-
5. The passive pressure and the frictional resistance of the soils may be combined without reduction in determining the total lateral resistance.
 6. Passive earth pressures should be considered negligible for block or retaining walls within 5-feet of a descending slope.
-

Any surcharge from adjacent loadings should be added to the retaining wall pressures using the K_a factor for non-restrained walls. K_a and K_0 are presented in the table above. As indicated, the pressures assume that there will be no build-up of hydrostatic pressure. Therefore, if walls are subject to saturated conditions, we recommend weep holes (if practical) and a wall drainage system. The wall drainage may consist of a minimum of 2 cubic feet of drain rock per foot of length of retaining wall wrapped in filter fabric, Mirafi 140N or equivalent, placed at the base of the wall and discharged to an appropriate outlet. Drain rock should consist of clean, uniformly sized gravel, $\frac{3}{4}$ -inch in nominal size. Alternatively, a drainage system including a perforated pipe with a filter sock placed within the drain rock is also acceptable. The structural fill immediately behind retaining walls (6 to 12 inches) should be granular and free draining. The upper 2 feet of backfill should consist of compacted native soils. As an option, a prefabricated drain may be used behind walls. The wall drainage system is an integral part of the retaining wall design. The retaining wall designer is ultimately responsible for the retaining wall design and shall ensure that the above recommended drainage system is compatible with the design of the wall or select a different drainage system at their discretion. All walls below grade should be waterproofed or at least damproofed.

Fill against foundations, grade beams and retaining walls should be properly placed and compacted. Backfill should be mechanically compacted in layers (12 inches maximum thickness); flooding should not be permitted. Backfill within a lateral distance equal to the height of retaining walls should be compacted to at least 90 percent of the maximum dry density obtainable by the ASTM D1557 method. The backfill materials within this zone should consist of none to low expansive soils. If expansive soils are used within this backfill zone, the wall should be designed to resist the additional pressure that the expansive soils may exert. Backfill outside this zone should be compacted as outlined in the Fill Placement and Compaction section of this report. Care should be taken when placing backfill so as not to damage the walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over-compaction may cause excessive lateral earth pressures which could result in wall movements. Retaining walls should not be backfilled until the concrete or masonry has reached adequate strength as specified by the wall designer.

Below-Grade Wall Drainage - The recommendations provided in our report for retaining wall drainage will also be applicable to below-grade walls including the requirement for drainage system. Weep holes may not be practical for below-grade walls (including loading dock walls), however proper drainage should be provided behind the wall. Alternately, the below-grade wall may be designed to resist additional hydrostatic pressure.

Loading Dock Walls – As previously mentioned, weep holes may not be practical for below grade walls (including loading dock walls). To intercept water behind loading dock walls, we recommend a perimeter drain be installed at or slightly below the foundation level. The drain line should be sloped to provide positive gravity drainage to a reliable discharge, a collection chamber, or a sump from where the collected water can be pumped away.

6.6 FLOOR SLABS

If grading recommendations are complied with, concrete floor slabs may be supported on a 4-inch layer of aggregate base (such as ADOT Class 1 or Class 2 aggregate base). If the potential for a damp floor slab is a concern, moisture protection should be provided by a relatively impervious vapor barrier/retarder placed beneath interior slabs. The vapor barrier/retarder should be a Class A vapor barrier at least 10 mils in thickness, meeting the requirements of ASTM E1745, and should conform to and be placed in accordance with the requirements of the project structural engineer or architect. If the concrete is to be placed directly on aggregate base or sand, the aggregate base or sand should be moistened (but not saturated) prior to the placement of concrete.

Recommendations presented by the American Concrete Institute (ACI 302) for slabs-on-grade should be complied with for all concrete placement and curing operations. Improper curing techniques and/or excessive slump (water-cement ratio) could cause excessive drying/shrinkage resulting in random cracking and/or slab curling. Concrete slabs should be allowed to cure adequately before placing vinyl or other moisture sensitive floor coverings.

6.7 DRAINAGE AND MOISTURE PROTECTION

Foundation soils should generally not be allowed to become saturated during or after construction, except when necessary to increase moisture contents prior to construction. Infiltration of water into foundation or utility excavations should be prevented during construction. Utility lines should be properly installed and the backfill properly compacted to avoid possible sources for subsurface saturation.

Positive drainage away from the buildings should be provided during construction and maintained throughout the life of the buildings. Any downspouts, roof drains or scuppers should discharge into splash blocks or extensions and away from the buildings. Backfill against footings, exterior walls, and in utility trenches should be properly compacted and free of all construction debris to reduce the possibility of moisture infiltration.

As previously indicated the soils are potentially hydro-collapsible. Performance of the foundation system recommended in this report is dependent on the ability to keep moisture from penetrating the soils below foundations and slabs. Therefore, we recommend the following:

- Positive drainage should be maintained away from the buildings. Positive drainage of 5% minimum shall be maintained for areas adjacent to the buildings that are not covered by concrete or asphalt. Areas, where concrete or asphalt abut the buildings should be sloped a minimum of 2% away from the buildings. Positive drainage of 1% minimum shall be maintained for areas adjacent to block walls. Positive drainage should be maintained for 10 feet. If physical obstructions or lot lines prohibit 10 feet of horizontal distance, the slope should be provided to an approved alternate method of drainage.
- No landscaping or sprinklers should be allowed within 10 feet of the buildings or block walls. If landscaping or sprinklers are placed within this area, they should be in sealed planters.
- Landscape watering should be kept to a minimum.

If the above recommendations are not followed there would be an increased risk/potential for increasing moisture below foundations and slabs, resulting in additional movement and distress to structures and slabs.

6.8 PAVEMENT

The pavement area subgrade should be properly prepared as outlined in the Earthwork section of this report before placing any asphalt or base materials. Proper drainage of the paved areas should be provided to increase pavement life. In addition, pavements must be maintained for durability and integrity during their life. Therefore, periodic seal coating, crack sealing, and/or patching may be required.

Asphalt concrete should be obtained from an approved mix design stating the properties, optimum asphalt content, job mix formula, and recommended mixing and placing temperatures. Asphalt and base course materials and compaction should meet the criteria set forth in the 2021 Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction. Subgrade should be compacted to a minimum of 95 percent (ASTM D1557). Field and laboratory testing of asphalt and base materials should be performed to determine whether specified requirements have been met.

The recommended pavement sections should be adequate for the anticipated traffic volumes. However, the soils are potentially hydro-collapsible. Future performance of pavements constructed on these soils will be dependent upon several factors, including maintaining a stable moisture content of the subgrade soils. If the hydro-collapsible soils experience an increase in moisture, distress/cracking and pavement failure may occur.

The performance of the pavement can be enhanced by minimizing excess moisture which can reach the subgrade soils. The following recommendations should be followed, where possible:

- Site grading at a minimum 2% grade away from the pavements unless otherwise required for ADA compliance.
- Compaction of any utility trenches for landscaped areas to the same criteria as the pavement subgrade.
- Landscaped areas should have cutoff walls/moisture barriers adjacent to pavement areas to minimize or prevent moisture migration to subgrade soils.
- Consideration should be given to using "desert" landscaping and/or minimizing watering to help prevent surface runoff.
- Placing compacted backfill against the exterior side of curb and gutter.

6.8.1 On-site Asphalt Pavements

Based on the soil classifications, R-Value test results and assumed traffic volumes, the following minimum preliminary pavement sections are recommended for on-site paved areas:

Traffic area	Asphalt (inches)	Class 1 Base Course (inches)
Automobile Parking	2.5	8.0
Main Corridors and Truck Access	4.0	12.0
Delivery Truck Areas	6.0	18.0

6.8.2 On-site Portland Cement Concrete Pavement

On-site PCC pavement area subgrade should be properly prepared as outlined in the Earthwork section of the report before placing any PCC or base materials. Proper drainage of the paved areas should be provided to increase the pavement life. In addition, pavements must be maintained for durability and integrity during their life.

Based on the soil classifications and assumed traffic volumes, the following minimum preliminary pavement sections are recommended for on-site pavement areas:

Traffic area	Asphalt (inches)	Class 1 Base Course (inches)
Automobile Parking	5.0	6.0
Main Corridors and Truck Access	6.0	6.0
Truck and Loadin Dock Areas	7.0	6.0

Base course materials and compaction should meet the criteria set forth in the 2021 Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction. Field and laboratory testing of base materials should be performed to determine whether specified requirements have been met.

PCC should be placed on a properly prepared subgrade and base course. PCC mixes for use in pavement sections should meet minimum requirements of the 2021 Arizona Department of Transportation (ADOT) Standard Specifications for Road and Bridge Construction.

PCC pavements can be designed with or without steel reinforcement. PCC non-reinforced pavements should be laid out with properly spaced weakened plane control (contraction) joints in both longitudinal and transverse directions. Normal control joints should be laid out in square patterns not to exceed ten to fifteen feet per side, depending on slab thickness. All control joints should be made so the depth of the joint is at least $\frac{1}{2}$ the thickness of the slab. Control joints should be cut as soon as possible following the placement to help control shrinkage cracking.

All structures and features projecting into PCC pavement should be isolated from the pavement with a $\frac{1}{2}$ -inch thick premolded expansion joint material. Transverse expansion joints should be placed at proper intervals to provide expansion/contraction relief. Longitudinal construction joints, such as those that occur at the end of a day concreting operation, should have a load transfer system similar to a longitudinal construction joint. Placement of the joint reinforcement is extremely critical to long-term performance. All joints should be cleaned and sealed with a liquid poured elastomeric material prior to opening to traffic. Properly maintained sealed joints are a key to successful concrete performance and longevity.

PCC should be placed so that proper consolidation is achieved. Sufficient equipment for spreading and consolidating should be available for the scope of the project. The concrete surface should be finished and textured for adequate skid resistance. Surface variations tolerances may be specified in order to assure ride quality of pavements.

Immediately after finished operations and after all bleed water has evaporated, the newly placed concrete should be cured. Curing can be accomplished by spray applying liquid membranes or by covering with burlap

type mats or poly sheeting. Curing should be maintained for a minimum of 7 days. The pavement should be closed to construction traffic until a minimum of 70 percent of the 28-day design strength is achieved.

6.9 CORROSIVITY

Based on test results and *Table 19.3.1.1 of ACI 318-14 Section 19.3*, nine samples of the on-site soils classify as having a “S0” (negligible) sulfate exposure. One sample (B-4@0-5 ft) classifies as “S1” (moderate) sulfate exposure. Please refer to *Table 19.3.2.1 of ACI 318-14* for the requirements for concrete by exposure class. Consideration should be given to providing protection to buried metal pipes or the use of nonmetallic pipes where permitted by local building codes. Non-corrosive backfill, protective coatings and wrappings, sacrificial anodes, or a combination of these methods could be considered. UES personnel are not experts regarding corrosion and/or corrosion protection, and we recommend that a “Corrosion Engineer” be consulted for actual recommendations regarding the necessity and/or method of cathodic protection.

7.0 PLAN REVIEW

UES should be retained to provide a general review of final design plans and specifications so that grading and foundation recommendations may be interpreted and implemented. If any changes to the proposed project are planned, the conclusions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

8.0 CONSTRUCTION ITEMS

UES should also be retained to provide services during excavation, grading, foundation, and construction phases of work. Observation of foundation excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Field and laboratory testing of concrete and soils should be performed to determine whether applicable requirements have been met.

The analyses and preliminary recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the locations of the explorations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

9.0 GEOTECHNICAL RISK AND LIMITATIONS

Our recommendations are based upon the information provided and our assumptions regarding the proposed construction, combined with our analysis of site conditions revealed by the field exploration and laboratory testing programs. We have used prudent engineering and geologic judgment based upon the information provided and the data generated from our investigation. This report has been prepared in substantial compliance, using a degree of care and skill, with generally accepted geotechnical engineering practices that exist in the area of the project at the time the report was prepared. No warranty, either express or implied, is provided.

If the proposed construction is modified or relocated or, if it is found during construction that subsurface conditions differ from those we encountered at our explorations, we should be afforded the opportunity to

review the new information or changed conditions to determine if our conclusions and recommendations must be modified.

We emphasize that this report is applicable only to the proposed construction and the investigated site. This report should not be utilized for construction on any other site. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction techniques to be used on this project. This report is considered valid for the proposed construction for a period of two years following the date of this report. If construction has not started within two years, we must re-evaluate the recommendations in this report and update the report, if necessary.

Kingman, AZ and Vicinity



Legend

★ Approximate Project Site

The presented layers were obtained from various sources including ESRI, USGS, USDA, CCBG GISMO, CCFCD, GIS User Community among others. The GIS information is presented for reference only. No warranties, either expressed or implied, are intended or made. If you have any questions regarding this information, please contact UES.

Universal
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Sciences

PROJECT:

**Kingman Industrial Development
SWC S. Apache Rd. and W. Yucca Dr.
Mohave County, AZ**

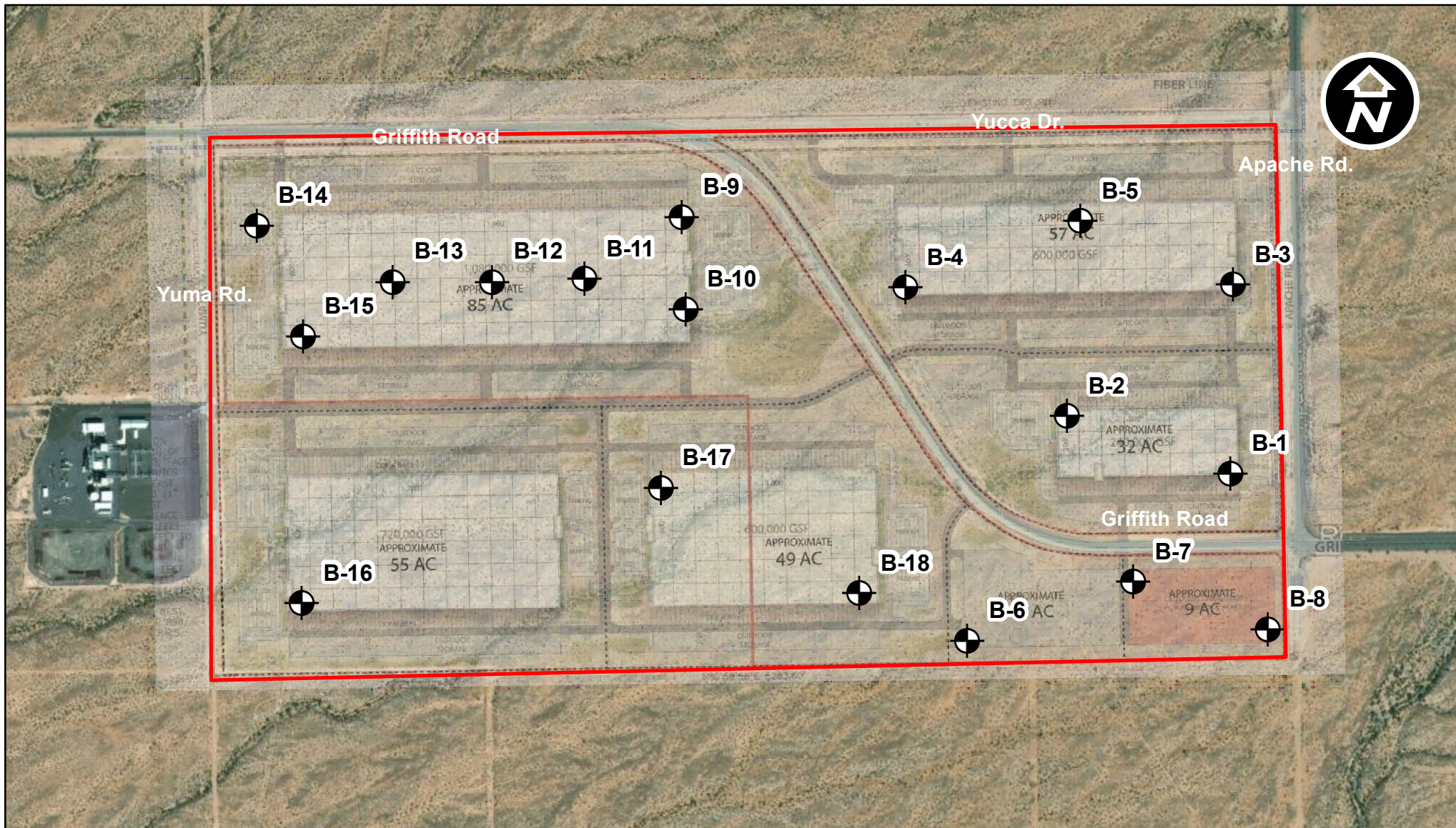
VICINITY MAP

CLIENT:

RealKo, LLC

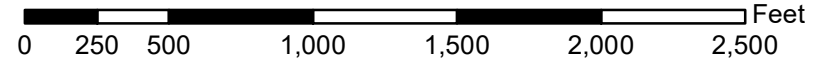
PROJECT NO:
4030.2400043

FIGURE NO:
1



Legend

- Approximate Project Area
- Approximate Boring Location



**Universal
Engineering
Sciences**

PROJECT:
**Kingman Griffith Industrial Development
near Kingman, Arizona**

CLIENT:
RealKo, LLC

SITE MAP

PROJECT NO:
4030.2400043

FIGURE NO:
2

The presented layers were obtained from various sources including ESRI, USGS, USDA, CCBG GISMO, CCFCD, GIS User Community among others. The GIS information is presented for reference only. No warranties, either expressed or implied, are intended or made. If you have any questions regarding this information, please contact UES.



APPENDIX

Site Exploration

The subsurface conditions of the site were explored by drilling 18 borings to depths ranging from approximately 15 to 20 feet below existing site grades. Borings were drilled using a rotary drill rig.

Soils were logged during drilling by a graduate geologist/engineer, and samples were obtained to aid in material classification and for possible laboratory testing. Boring logs are presented on Plates 1 through 18. Sampling was performed using either a standard split spoon sampler (“SPT” in boring logs) or a ring-lined barrel sampler (“R” in boring logs). The SPT and ring-lined sampler was driven in three 6-inch intervals into the substrata with blows from a 140-pound automatic hammer free-falling 30 inches. Penetration resistance (blow counts) was recorded for each 6-inch drive. Blow counts for the final 12 inches of the total 18 inches are presented as blows per foot in boring logs at the respective depths the samples were taken. It should be noted that the blow counts from the R sampler are not equivalent to blow counts from the SPT sampler. Bag/bulk samples (“B” in boring logs) were also collected from the borings for laboratory testing. The soils are generally classified by the Unified Soil Classification System. Plate 19 presents an explanation of material classifications used in this report.

Laboratory Testing

Laboratory testing was performed on selected samples of on-site soils. Tests were performed in general accordance with applicable ASTM or local standards.

Field moisture content and dry density determinations were performed on undisturbed samples. The results of these tests are presented on the boring logs.

Sieve analyses and Atterberg Limits were performed to determine the grain-size distribution and soil classification of representative materials. The test results are presented on Plates 20a through 20f and summarized in the table below.

Sample Location	Material Description	Liquid Limit	Plasticity Index	Passing No. 200
B-2 @ 0-5 ft	Silty Sand with Gravel	NV	NP	22
B-5 @ 10, 15 ft*	Sand w/ Silt and Gravel	NV	NP	9
B-8 @ 0-5 ft	Silty Sand with Gravel	NV	NP	29
B-12 @ 0-5 ft	Silty Sand with Gravel	NV	NP	18
B-16 @ 2.5, 5 ft*	Sand w/ Silt and Gravel	NV	NP	9
B-18 @ 0-5 ft	Clayey Sand with Gravel	27	8	34

*Composite sample

Chemical tests were performed on representative samples. Tests were performed to determine the percent chloride, water-soluble sodium, sulfate and sodium sulfate, as well as the soil solubility. Test results are presented on Plates 21a through 21j.

R-value tests were performed on representative samples. The test results are presented on Plates 22a and 22b and summarized below:








SAMPLE	R-VALUE
Composite B-2 / B-4 @ 0-5 ft	20
Composite B-12 / B-16 @ 0-5 ft	18

BORING LOG B-1

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.5		SPT		74/10"	3				V. Dense
2.4		SPT		50/6"	5				
8.0		SPT		50/3"	10				
2.0		SPT		50/4"	15				
					16				
					17				
					18				
					19				
					20				

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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
--	---

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 2
		PROJECT NO.:	PLATE NO.:
		4030.2400043	1a

BORING LOG B-1

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT		48	20 21	SM		Silty SAND with gravel, light brown to light gray, slightly moist	Dense
Bottom of Boring at 21.5 feet									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE






<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 1b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-2

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.7		B SPT		20	3				Med. Dense
3.6		SPT		84/11"	5				V. Dense
5.6		SPT		50/3"	10				
4.2		SPT		50/5.5	15				


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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
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<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 2
		PROJECT NO.:	PLATE NO.:
		4030.2400043	2a

BORING LOG B-2

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT	██████	50/5.5	20	SM		Silty SAND with gravel, light brown to light gray, slightly moist Bottom of Boring at 20.5 feet	V. Dense






THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 2b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-3

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		SPT		64	3				V. Dense
		SPT		25	5				Med. Dense
		SPT		45	10				Dense
		SPT		50/3"	15				V. Dense
					16				
					17				
					18				
					19				
					20				

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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

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SCIENCES**

NOTES:
Groundwater was not encountered to the depth drilled.

DATE DRILLED: 4/8/2024	PAGE NO: 1 of 2
PROJECT NO.: 4030.2400043	PLATE NO.: 3a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-3

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT	[REDACTED]	38	20 21	SM	[Hatched Pattern]	Silty SAND with gravel, light brown to light gray, slightly moist	Dense
Bottom of Boring at 21.5 feet									






THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
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UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 3b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-4

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft): SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		B SPT		74/12"	3				V. Dense
		SPT		70/10"	6				
		SPT		50/2"	10				
		SPT		50/6"	15				
Bottom of Boring at 15.5 feet									







THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
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		PROJECT NO.:	PLATE NO.:
		4030.2400043	4

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-5

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		SPT		19	3				Med. Dense
		SPT		75/11"	5				V. Dense
		SPT		77/11"	10	SW-SM		SAND with silt and gravel, light brown to light gray, slightly moist, well-graded sand	
		SPT		76/12"	15				
					16			Bottom of Boring at 16 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE






<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 1
		PROJECT NO.:	PLATE NO.:
		4030.2400043	5

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-6

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft): SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
4.6		SPT		50/3"	1				V. Dense
3.0		SPT		74/9"	2				
1.7		SPT		50/4"	3				
3.0		SPT		50/3"	4				
					5				
					6				
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				


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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
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		PROJECT NO.: 4030.2400043	PLATE NO.: 6a

BORING LOG B-6

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
1.8		SPT		66/12"	20 21	SM		Silty SAND with gravel, light brown to light gray, slightly moist	V. Dense
								Bottom of Boring at 21 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.:	PLATE NO.:
4030.2400043	6b		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-7

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
6.1		SPT	[Black bar]	38	0	SM	[Graphic: Silty Sand with gravel]	Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
					1				Dense
4.1		SPT	[Black bar]	11	2		[Graphic: Sandy Silt]	Sandy SILT, trace gravel, light brown to light gray, slightly moist	Stiff
					3				
2.5		SPT	[Black bar]	80/10"	4	ML	[Graphic: Silty Sand with gravel]	Silty SAND with gravel to 3-in; light brown to light gray, slightly moist	V. Dense
					5				
2.2		SPT	[Black bar]	50/4"	6		[Graphic: Silty Sand with gravel]		
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				

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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 2
		PROJECT NO.:	PLATE NO.:
		4030.2400043	7a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-7

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT		31	20 21	ML		Sandy SILT, light brown to light gray, slightly moist	V. stiff
Bottom of Boring at 21.5 feet									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE








UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
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		PROJECT NO.: 4030.2400043	PLATE NO.: 7b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-8

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.6 3.5		B SPT		50/5"	1 2 3			-some gravel	V. Dense
3.6		SPT		42	4 5 6			-with gravel to 2-inches	Dense
1.9		SPT		50/5"	7 8 9 10				V. Dense
					11 12 13	GM		Silty GRAVEL with sand, light brown to light gray, slightly moist	V. Dense
2.5		SPT		80/10"	14 15 16 17 18 19 20	SM		Silty SAND with gravel, light brown to light gray, slightly moist	


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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
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<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 2
		PROJECT NO.:	PLATE NO.:
		4030.2400043	8a

BORING LOG B-8

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT	[REDACTED]	92/9"	20	SM		Silty SAND with gravel, light brown to light gray. slightly moist	V. Dense
								Bottom of Boring at 20.8 feet	








THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 8b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-9

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.3		SPT		38	1				Dense
1.4		SPT		66/10"	2				
					3				
					4				
					5			-gravel to 3-inch diameter in cuttings	V. Dense
					6				
					7				
					8				
					9				
3.1		SPT		76	10				
					11	GM		Silty GRAVEL with sand, light brown to light gray, slightly moist	
					12				
					13				
					14	SM		Silty SAND with gravel, light brown to light gray, dry	
1.6		SPT		55	15				
					16				
Bottom of Boring at 16.5 feet									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/9/2024	1 of 1
		PROJECT NO.: 4030.2400043	PLATE NO.: 9

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-10

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft): SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		SPT		72/12"	1				V. Dense
					2				
		SPT		71/11"	3				
					4				
		SPT		90/11"	5				
					6				
					7				
					8	GM		Silty GRAVEL with sand, light brown to light gray, dry	
					9				
		SPT		90/11"	10	SM		Silty SAND with gravel, light brown to light gray, dry	
					11				
					12	GM		Silty GRAVEL with sand, light brown to light gray, dry	
					13				
					14				
		SPT		50/6"	15				
								Bottom of Boring at 15.5 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/9/2024	1 of 1
		PROJECT NO.: 4030.2400043	PLATE NO.: 10

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-11

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
5.1		SPT		88/10"	0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
					1				
					2				
		SPT			3			-trace gravel	V. Dense
					4				
		SPT		66	5			-some gravel	
					6				
					7				
					8				
2.3		SPT		47	10			-with gravel	Dense
					11				
					12				
					13				
					14				
2.5		SPT		50/4"	15				V. Dense
					15.33			Bottom of Boring at 15.33 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/9/2024	1 of 1
		PROJECT NO.: 4030.2400043	PLATE NO.: 11

BORING LOG B-12

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.






MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		B SPT		50/3"	1				
					2				
		SPT		73/12"	3	SW-SM		SAND with silt and gravel, light brown to light gray, slightly moist	V. Dense
					4				
					5				
		SPT		74/9"	6				
					7				
					8				
					9				
		SPT		76/10"	10	SM		Silty SAND, trace gravel, light brown to light gray, slightly moist	
					11				
					12	GM		Silty GRAVEL with sand, light brown to light gray, dry	
					13				
					14	SM		Silty SAND with gravel, light brown to light gray, slightly moist	
					15				
Bottom of Boring at 15.85 feet									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
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		PROJECT NO.: 4030.2400043	PLATE NO.: 12

BORING LOG B-13

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft): SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		SPT		48	3				Dense
		SPT		58	5				V. Dense
		SPT		91	10				
		SPT		74/10"	15			-increased gravel 12-12.5 ft	
Bottom of Boring at 15.85 feet									






THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED: 4/8/2024	PAGE NO: 1 of 1
		PROJECT NO.:	PLATE NO.:
		4030.2400043	13

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-14

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.2		SPT		42	3				Dense
3.0		SPT		72/12"	5				V. Dense
2.7		SPT		32	10				
3.0		SPT		86/9"	15			Increased gravel 12-12.5 ft Gravel to 2-inches in cuttings	
Bottom of Boring at 16.5 feet									






THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/9/2024	1 of 1
		PROJECT NO.: 4030.2400043	PLATE NO.: 14

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-15

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
		SPT		78	3				V. Dense
		SPT		12	5			-trace gravel	Med. Dense
		SPT		86/10"	10			-with gravel	V. Dense
		SPT		46	15				Dense
					16				
Bottom of Boring at 16.5 feet									






THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/9/2024	1 of 1
		PROJECT NO.: 4030.2400043	PLATE NO.: 15

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-16

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
3.4		B SPT		50/5"	0	SW-SM		SAND with silt and gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
					1				V. Dense
4.3		SPT		33	5	SM		Silty SAND with gravel, light brown to light gray, slightly moist	Dense
					2				
					3				
					4				
		SPT		50/3"	10				
		SPT		50/5"	15				
Bottom of Boring at 15.5 feet									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

UNIVERSAL ENGINEERING SCIENCES	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 1
		PROJECT NO.:	PLATE NO.:
		4030.2400043	16

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-17

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
					0	SM		Silty SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
3.2		SPT		33	1				Dense
2.0		SPT		50/3"	2				
					3				
					4				
					5				
					6			Gravel to 2-inches in cutings	
					7				
					8				
					9				
3.2		SPT		58/12"	10			-some gravel	
					11				
					12			-with gravel	
					13				
					14				
3.2		SPT		50/5"	15				
					16				
					17				
					18				
					19				
					20				


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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
--	---

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED: 4/8/2024	PAGE NO: 1 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 17a

BORING LOG B-17

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
		SPT	[REDACTED]	50/9"	20	SM		Silty SAND with gravel, light brown to light gray, slightly moist	V. Dense
								Bottom of Boring at 20.8 feet	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 17b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-18

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft): SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
2.1		B SPT		87/10"	0	SC		Clayey SAND with gravel; cobbles and boulders at surface, light brown to light gray, dry	Loose
					1				V. Dense
1.5		SPT		67/12"	2				
					3				
		SPT			4				
					5	SM			Silty SAND with gravel, light brown to light gray, dry
		SPT			6	GM		Silty GRAVEL with sand, light brown to light gray, slightly moist	
					7				
3.8		SPT		50/5"	8				
					9	SM			Silty SAND with gravel, light brown to light gray, slightly moist
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				

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THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.	* SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE
--	---

<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	1 of 2
		PROJECT NO.:	PLATE NO.:
		4030.2400043	18a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

BORING LOG B-18

CLIENT: RealKo, LLC	PROJECT: Kingman Griffith Industrial Development
BORING LOCATION: SEE SITE MAP	ELEVATION (ft):
	SITE: SWC S. Apache Rd. and W. Yucca Dr.

MOISTURE CONTENT %	DRY DENSITY PCF	SAMPLE TYPE*	SAMPLE	BLOWS/FT	DEPTH, FT	USCS SYMBOL	GRAPHIC	SOIL DESCRIPTION	CONSISTENCY
3.6		SPT		50/3"	20	SM	[REDACTED]	Silty SAND with gravel, light brown to light gray, slightly moist Bottom of Boring at 20.25 feet	V. Dense

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL AND ROCK TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL. * SAMPLE TYPE: R = RING B = BAG SPT = STANDARD PENETRATION BN = BULL NOSE C = CORE

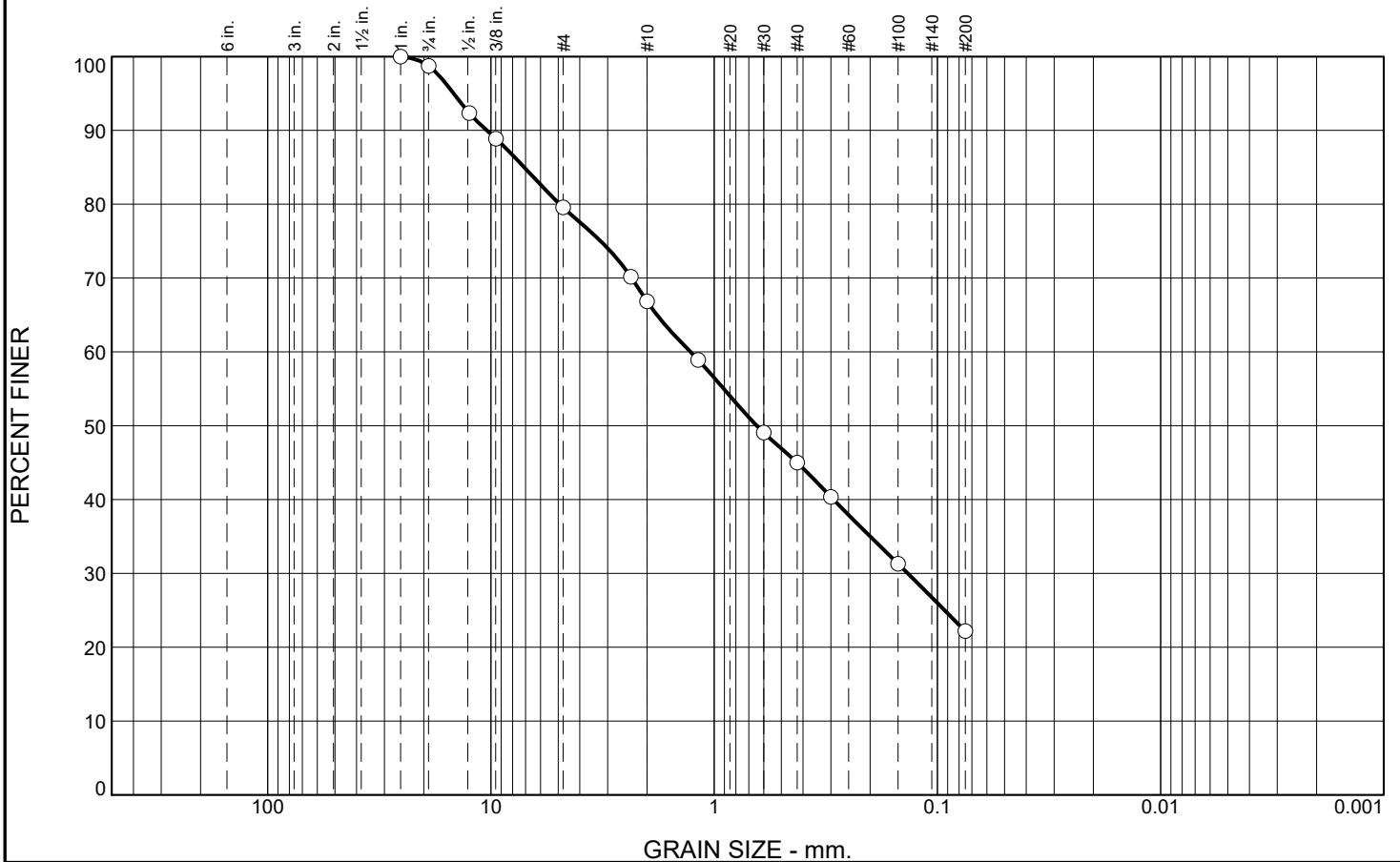
<h2 style="margin: 0;">UNIVERSAL ENGINEERING SCIENCES</h2>	NOTES: Groundwater was not encountered to the depth drilled.	DATE DRILLED:	PAGE NO:
		4/8/2024	2 of 2
		PROJECT NO.: 4030.2400043	PLATE NO.: 18b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER WITH TIME AND AT OTHER LOCATIONS.

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

UNVIERSAL ENGINEERING SCIENCES	CLIENT:	Realko, LLC		Materials Classification	
	PROJECT:	Kingman Griffith Industrial Development Mohave County, AZ			
				4030.2400043	19

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	20	58	22	0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	99		
1/2"	92		
3/8"	89		
#4	80		
#8	70		
#10	67		
#16	59		
#30	49		
#40	45		
#50	40		
#100	31		
#200	22		

Material Description

Silty SAND with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 10.4346 D₈₅= 7.0931 D₆₀= 1.2767
D₅₀= 0.6444 D₃₀= 0.1358 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

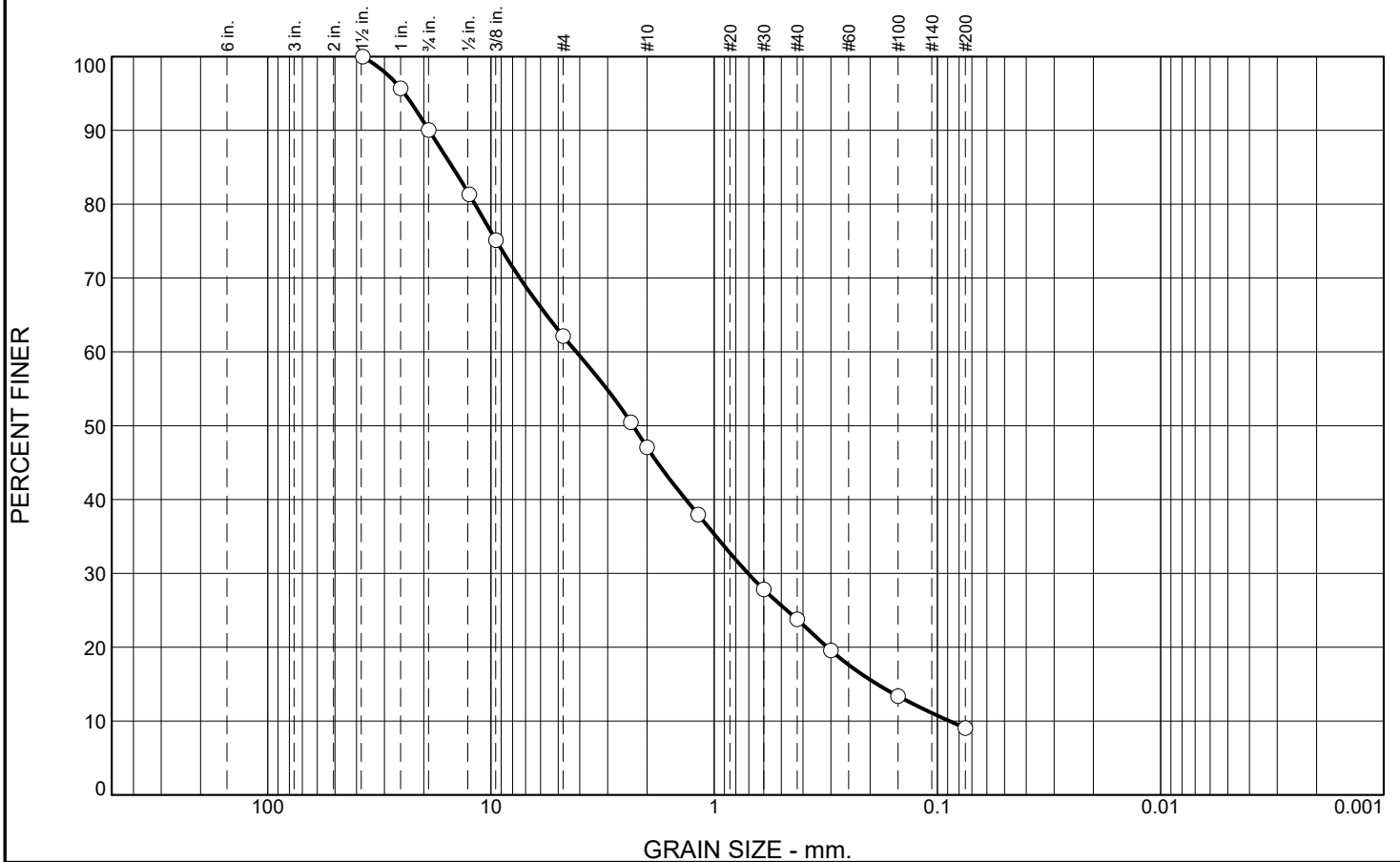
* (no specification provided)

Source of Sample: B-2 Depth: 0-5 ft Date: 4/12/2024

Universal Engineering Sciences	Client: RealKo, LLC
Las Vegas, Nevada	Project: Kingman Griffith Industrial Development
	Project No: 4030.2400043
	Plate 20a

Tested By: DP Checked By: LM

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	38	53	9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	96		
3/4"	90		
1/2"	81		
3/8"	75		
#4	62		
#8	50		
#10	47		
#16	38		
#30	28		
#40	24		
#50	20		
#100	13		
#200	9		

Material Description

SAND with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 18.9506 D₈₅= 14.8531 D₆₀= 4.1485
D₅₀= 2.3071 D₃₀= 0.7055 D₁₅= 0.1864
D₁₀= 0.0882 C_u= 47.01 C_c= 1.36

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

Well-graded sand
*Composite Sample 10 ft and 15 ft

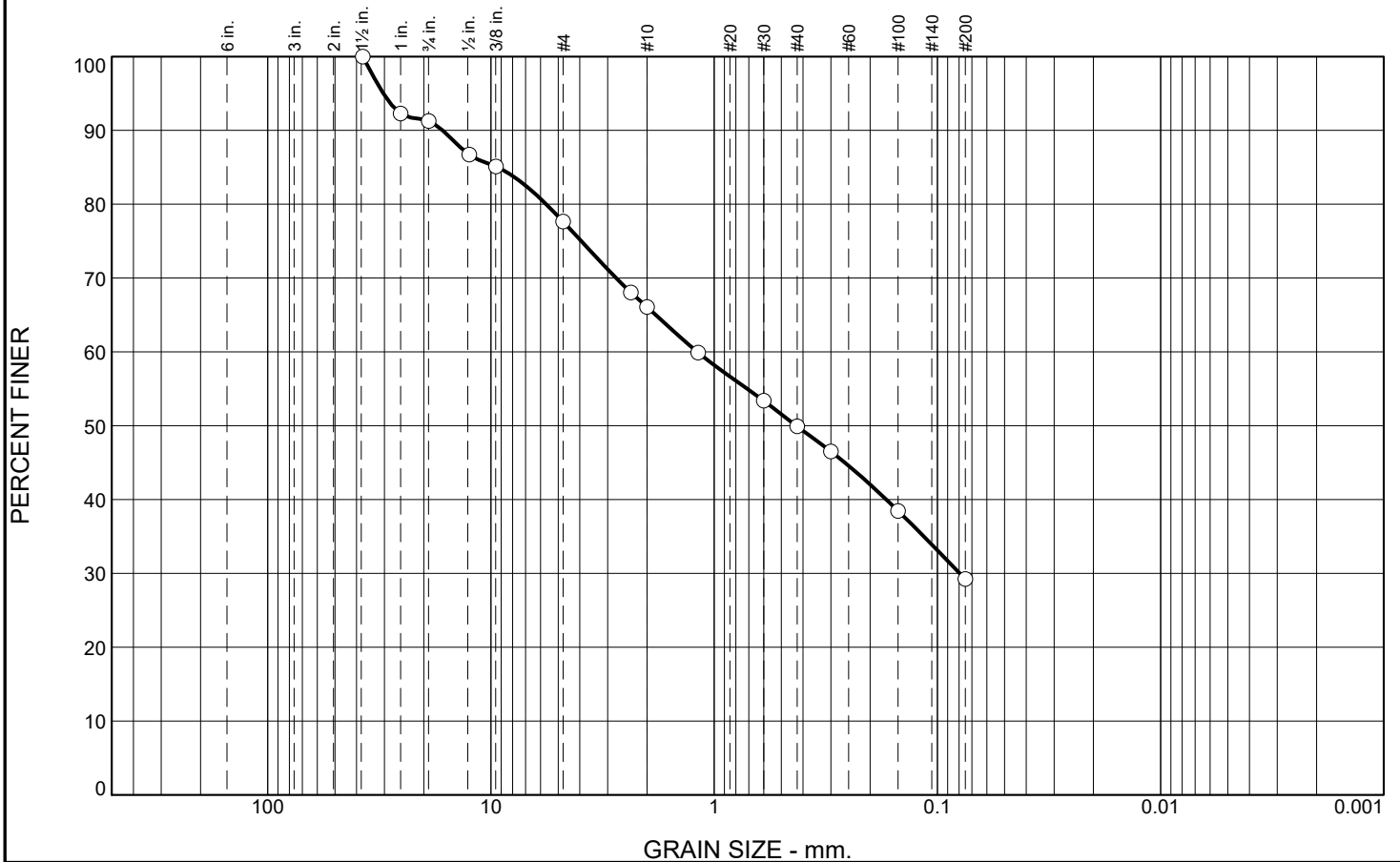
* (no specification provided)

Source of Sample: B-5 **Depth:** *10.0 ft and 15 ft **Date:** 4/15/2024

Universal Engineering Sciences Las Vegas, Nevada	Client: RealKo, LLC Project: Kingman Griffith Industrial Development Project No: 4030.2400043 Plate 20b
---	---

Tested By: DP **Checked By:** LM

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	22	49	29	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	92		
3/4"	91		
1/2"	87		
3/8"	85		
#4	78		
#8	68		
#10	66		
#16	60		
#30	53		
#40	50		
#50	47		
#100	38		
#200	29		

Material Description

Silty SAND with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 16.4743 D₈₅= 9.3370 D₆₀= 1.1912
D₅₀= 0.4287 D₃₀= 0.0793 D₁₅=
D₁₀= C_u= C_c=

Classification

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

Remarks

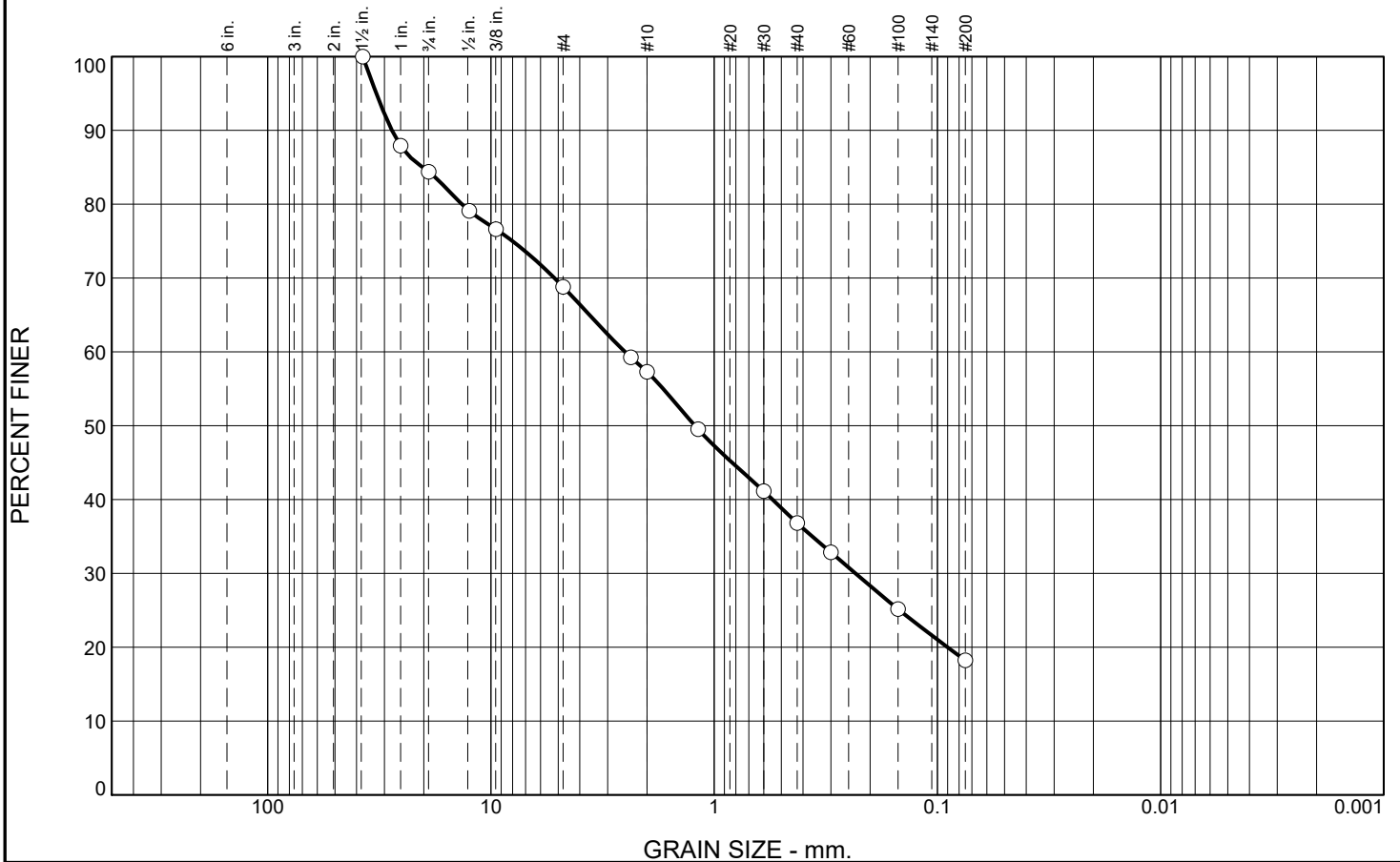
* (no specification provided)

Source of Sample: B-8 **Depth:** 0-5 ft **Date:** 4/14/2024

Universal Engineering Sciences	Client: RealKo, LLC
Las Vegas, Nevada	Project: Kingman Griffith Industrial Development
	Project No: 4030.2400043 Plate 20c

Tested By: DP **Checked By:** LM

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	31	51	18	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	88		
3/4"	84		
1/2"	79		
3/8"	77		
#4	69		
#8	59		
#10	57		
#16	50		
#30	41		
#40	37		
#50	33		
#100	25		
#200	18		

Material Description

Silty SAND with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 27.7922 D₈₅= 20.1948 D₆₀= 2.5061
D₅₀= 1.2198 D₃₀= 0.2327 D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

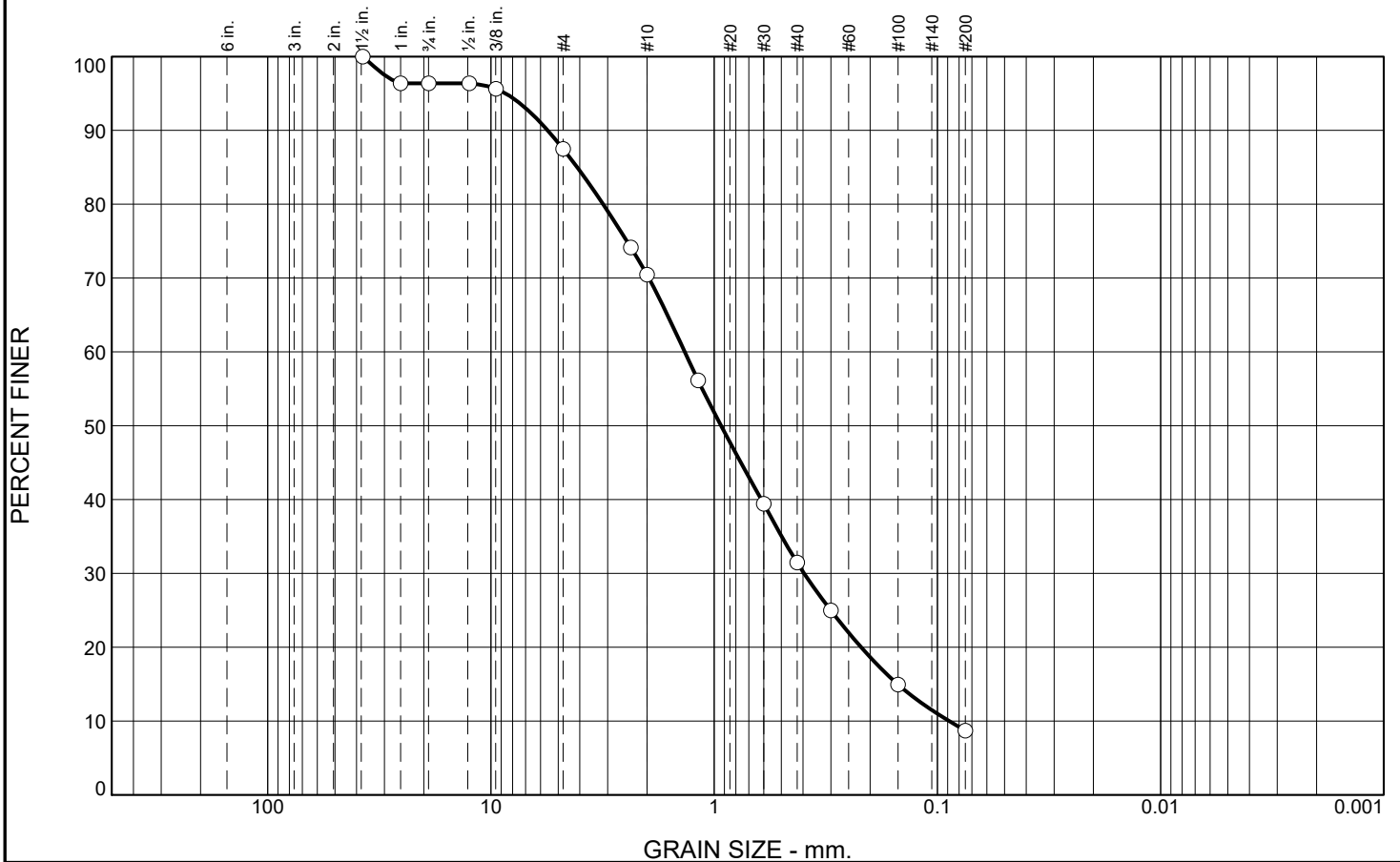
* (no specification provided)

Source of Sample: B-12 Depth: 0-5 ft Date: 4/14/2024

Universal Engineering Sciences Las Vegas, Nevada	Client: RealKo, LLC Project: Kingman Griffith Industrial Development Project No: 4030.2400043 Plate 20d
--	--

Tested By: DP Checked By: LM

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	13	78	9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	96		
3/4"	96		
1/2"	96		
3/8"	96		
#4	87		
#8	74		
#10	70		
#16	56		
#30	39		
#40	31		
#50	25		
#100	15		
#200	9		

Material Description

SAND with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 5.5728 D₈₅= 4.1098 D₆₀= 1.3556
D₅₀= 0.9318 D₃₀= 0.3958 D₁₅= 0.1509
D₁₀= 0.0886 C_u= 15.30 C_c= 1.30

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

*Composite Sample 2.5 ft and 5 ft

* (no specification provided)

Source of Sample: B-16 **Depth:** *2.5 ft and 5 ft

Date: 4/14/2024

Universal Engineering Sciences

Las Vegas, Nevada

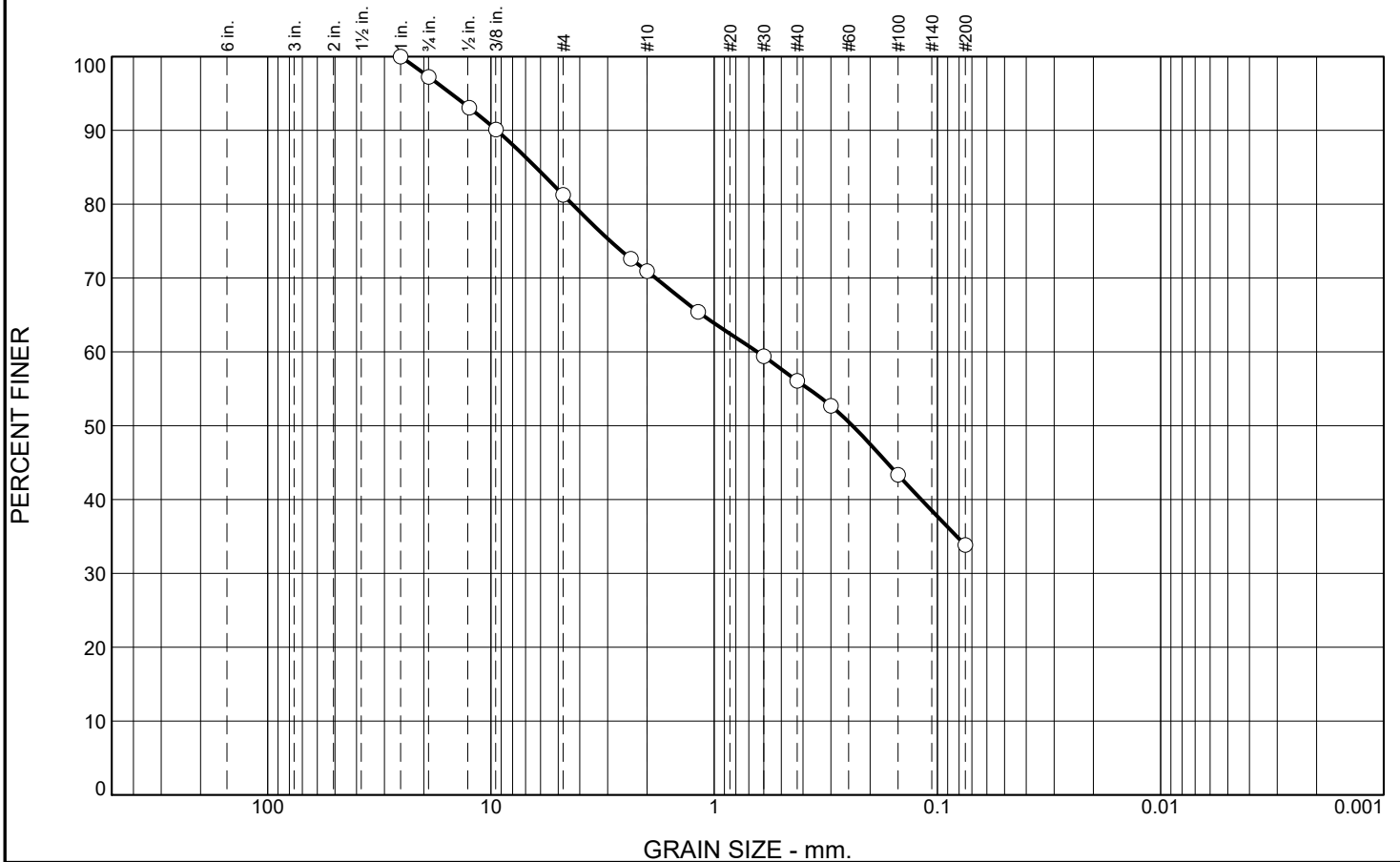
Client: RealKo, LLC
Project: Kingman Griffith Industrial Development

Project No: 4030.2400043 **Plate 20e**

Tested By: DP

Checked By: LM

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0	19	47	34	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	97		
1/2"	93		
3/8"	90		
#4	81		
#8	73		
#10	71		
#16	65		
#30	59		
#40	56		
#50	53		
#100	43		
#200	34		

Material Description

Clayey SAND with gravel

Atterberg Limits

PL= 19 LL= 27 PI= 8

Coefficients

D₉₀= 9.4110 D₈₅= 6.2920 D₆₀= 0.6401
D₅₀= 0.2402 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

* (no specification provided)

Source of Sample: B-18 Depth: 0-5 ft Date: 4/18/2024

<p>Universal Engineering Sciences</p> <p style="text-align: center;">Las Vegas, Nevada</p>	<p>Client: RealKo, LLC</p> <p>Project: Kingman Griffith Industrial Development</p> <p>Project No: 4030.2400043</p> <p style="text-align: right;">Plate 21f</p>
--	--

Tested By: DP Checked By: LM



4480 West Hacienda Ave, Suite 104
 Las Vegas, NV 89118
 (702) 873-3478

SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
 2600 Grand Blvd., Suite 700
 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B2 @ 0'-5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.01		
Soluble Sulfate, 4500 E, %	0.03		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.03		
Solubility, AWWA 2540 C, %	0.05		
Chloride, 4500 CL B, mg/kg	26.3		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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(702) 873-3478

SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
2600 Grand Blvd., Suite 700
Kansas City, MO 64108

REPORT DATE: 4/16/2024
PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
Sample Loc.: B3 @ 2.5'
Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.01		
Soluble Sulfate, 4500 E, %	0.02		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.02		
Solubility, AWWA 2540 C, %	0.05		
Chloride, 4500 CL B, mg/kg	76.1		

Comments:

Reviewed By: John Sloan
For: John Sloan
Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
 2600 Grand Blvd., Suite 700
 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B4 @ 0'-5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.03		
Soluble Sulfate, 4500 E, %	0.10		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.08		
Solubility, AWWA 2540 C, %	0.32		
Chloride, 4500 CL B, mg/kg	138.3		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
 2600 Grand Blvd., Suite 700
 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B5 @ 5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	<0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.01		
Chloride, 4500 CL B, mg/kg	26.6		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

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REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B8 @ 0'-5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.01		
Soluble Sulfate, 4500 E, %	<0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.04		
Chloride, 4500 CL B, mg/kg	20.9		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
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REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B10 @ 2.5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.03		
Soluble Sulfate, 4500 E, %	<0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.01		
Solubility, AWWA 2540 C, %	0.17		
Chloride, 4500 CL B, mg/kg	426.9		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
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 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B12 @ 0'-5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	<0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.02		
Chloride, 4500 CL B, mg/kg	13.9		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
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 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B13 @ 2.5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.02		
Soluble Sulfate, 4500 E, %	0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.02		
Solubility, AWWA 2540 C, %	0.08		
Chloride, 4500 CL B, mg/kg	347.5		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
 2600 Grand Blvd., Suite 700
 Kansas City, MO 64108

REPORT DATE: 4/16/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B16@ 0'-5'
 Sample Description:

CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	<0.01		
Soluble Sulfate, 4500 E, %	<0.01		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	<0.01		
Solubility, AWWA 2540 C, %	0.02		
Chloride, 4500 CL B, mg/kg	27.7		

Comments:

Reviewed By: John Sloan
 For: John Sloan
 Chemistry Laboratory Director



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SUMMARY OF SOIL AND AGGREGATE TEST RESULTS

CLIENT: RealKo, LLC
 2600 Grand Blvd., Suite 700
 Kansas City, NV 64108

REPORT DATE: 4/19/2024
 PROJECT: Kingman Griffith Industrial Development

PROJECT NO.: 4030.2400043.0000

Tested By: J. Sloan
 Sample Loc.: B18 @ 0'-5'
 Sample Description:

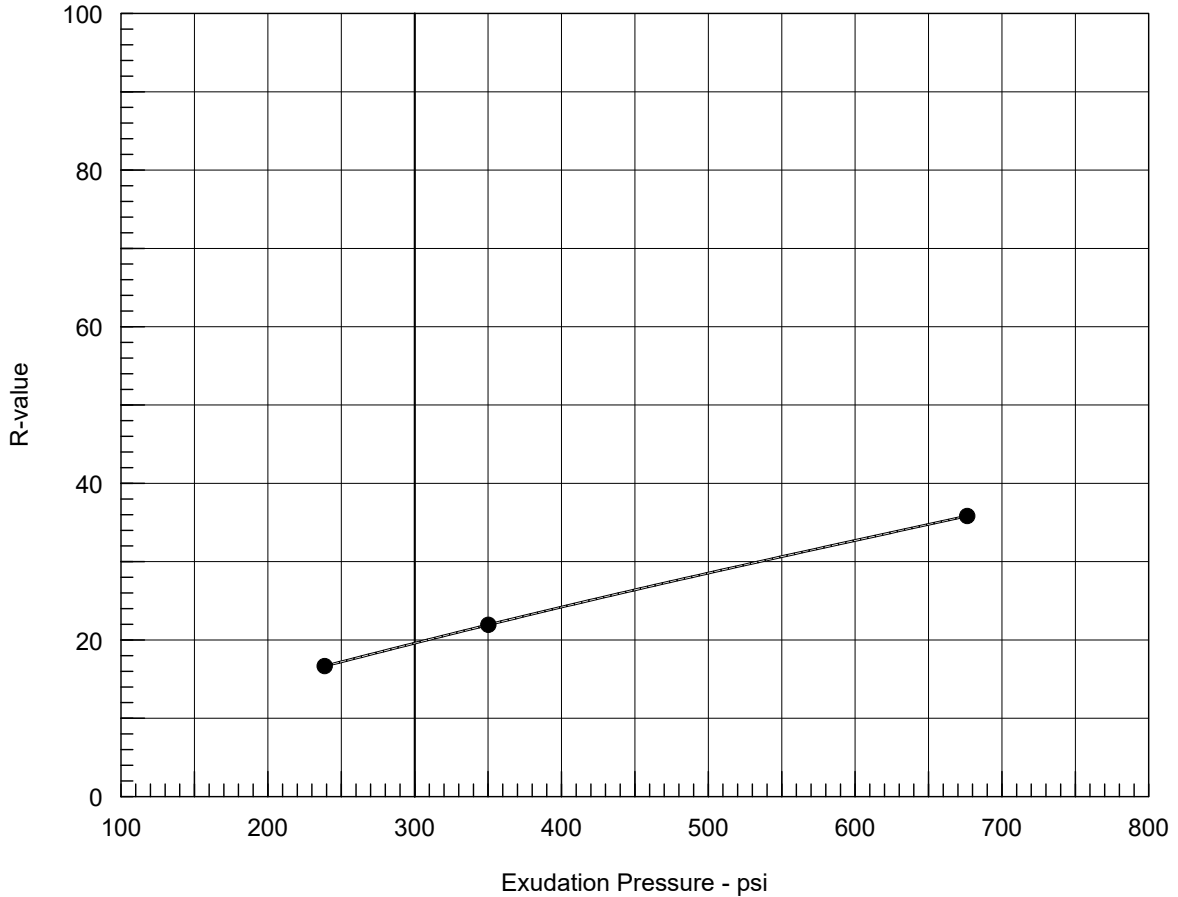
CHEMICAL LABORATORY TEST RESULTS

<u>Laboratory Test</u>	<u>Results</u>	<u>Spec's.</u>	<u>Pass/Fail</u>
Soluble Sodium, ASTM D2791, %	0.01		
Soluble Sulfate, 4500 E, %	0.03		
Soluble Sodium Sulfate, AWWA SM3500 & SM 4500 by Calc., %	0.03		
Solubility, AWWA 2540 C, %	0.15		
Chloride, 4500 CL B, mg/kg	72.0		

Comments:

Reviewed By: John Sloan
 For John Sloan
 Chemistry Laboratory Director

R-VALUE TEST REPORT



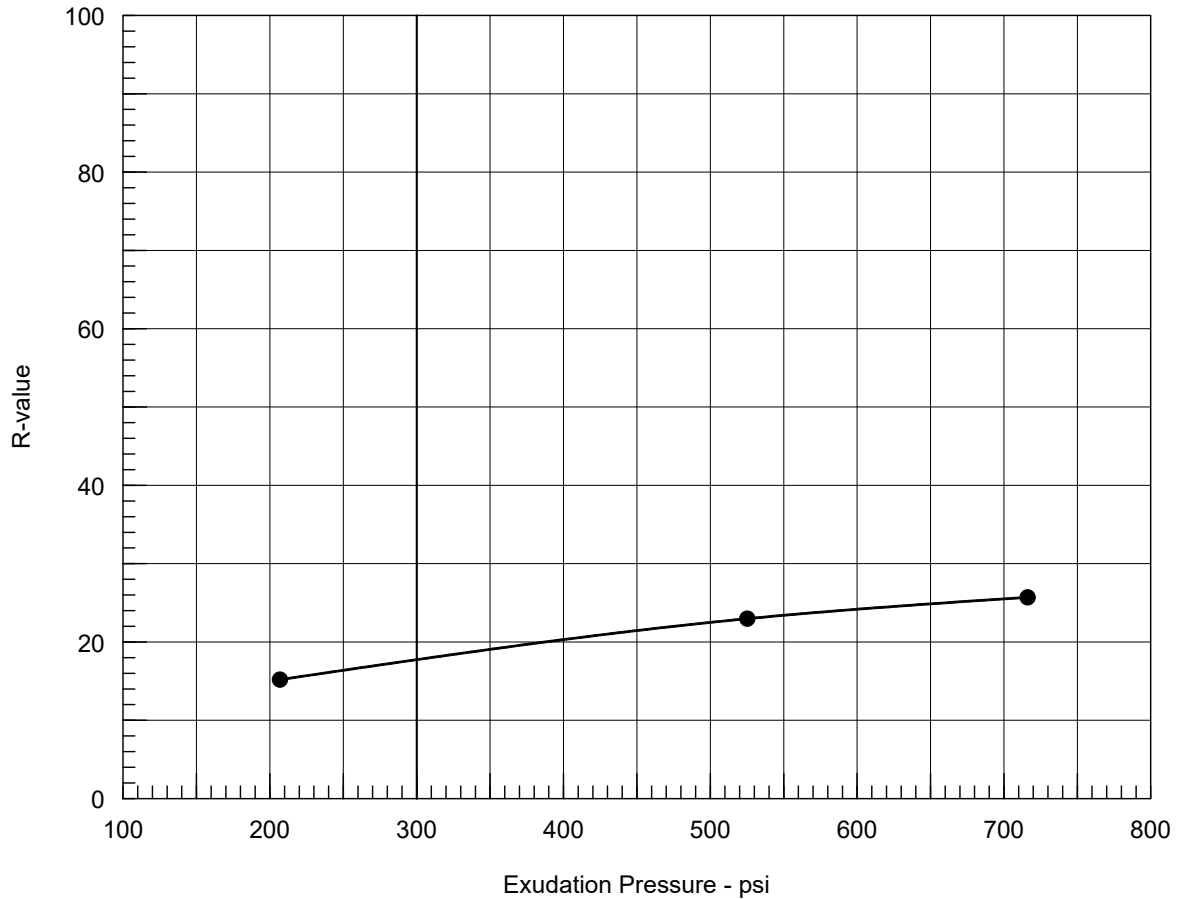
Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	150	132.8	8.2	0.00	85	2.50	676	35.8	35.8
2	100	129.5	8.7	0.00	113	2.50	350	21.9	21.9
3	100	129.8	9.3	0.00	125	2.50	239	16.7	16.7

Test Results	Material Description
<p>R-value at 300 psi exudation pressure = 19.6</p>	<p>Silty SAND with gravel</p>
<p>Project No.: 4030.2400043 Project: Kingman Griffith Industrial Development Source of Sample: B-2/B-4* Depth: 0-5 ft Date: 4/19/2024</p>	<p>Tested by: DP Checked by: LM Remarks: *Composite Sample B-2, B-4 @ 0-5 ft</p>
<p>R-VALUE TEST REPORT</p> <h2 style="margin: 0;">Universal Engineering Sciences</h2>	

Figure 22a

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	170	127.5	8.8	0.00	108	2.60	716	24.1	25.7
2	100	123.1	9.4	0.00	113	2.70	525	20.2	23.0
3	100	125.3	10.2	0.00	125	2.70	207	13.5	15.2

Test Results	Material Description
<p>R-value at 300 psi exudation pressure = 17.7</p>	<p>Silty SAND with gravel</p>
<p>Project No.: 4030.2400043 Project: Kingman Griffith Industrial Development Source of Sample: *B-12/B-16 Depth: 0-5 ft Date: 4/19/2024</p>	<p>Tested by: DP Checked by: LM Remarks: *Composite Sample B-12/B-16 @ 0-5 ft</p>
<p>R-VALUE TEST REPORT</p>	
<h1 style="margin: 0;">Universal Engineering Sciences</h1>	

Figure 22b