Geotechnical Engineering Report
Kiwami on Bell
5327 West Bell Road
Glendale, Arizona
RAMM Project No. G30140

For:
Logos Construction, Inc.
10645 North Tatum Boulevard, Suite 200
Phoenix, Arizona 85028

◆◆◆

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R·A·M·M

Logos Construction, Inc.
10645 North Tatum Boulevard, Suite 200
Phoenix, Arizona 85028

November 22, 2024

Attention: Matt Dowis

Subject: Geotechnical Engineering Report
Kiwami on Bell
5327 West Bell Road
Glendale, Arizona

RAMM Project No. G30140

Attached to this letter is the Geotechnical Engineering Report for the proposed Kiwami on Bell development, to be located in Glendale, Arizona.

The proposed development will consist of a single-story commercial building with underground retention and adjacent paved parking and drives on an undeveloped lot. The results of our field explorations; laboratory testing; and engineering analysis, evaluation and recommendations are presented in the report.

The following is a brief summary of selected recommendations.

A. Foundations:
   - Support on at least 1.5 feet of compacted fill. Zone of recompaction must also extend through any existing fill and/or disturbed soils.
   - Found at least 1.5 feet or 2.0 feet below finished grade.
   - Design for allowable bearing pressure of 2000 psf or 2500 psf, respectively.

B. Site Soil:
   - Use as fill and backfill in all areas of the site.
   - Must be scarified and compacted at moisture content range of optimum to 3 percent above optimum in building and exterior slab areas.

C. Pavement Sections:
   - Auto Parking and Drives – 2.0 inches of asphalt concrete on 6.0 inches of base material, or 5.0 inches of Portland cement concrete.
   - Truck Drives/Fire Lanes – 3.0 inches of asphalt concrete on 6.0 inches of base material; or 7.0 inches of Portland cement concrete.

The attached report was prepared based on project and site data available at this time and was prepared in a manner and to the standards of the local geotechnical engineering practice. Our services did not include evaluations for the presence of hazardous materials; for concrete durability and corrosion potential with respect to site use water sources; for area subsidence resulting from groundwater withdrawal; or for other geologic hazards.

If you have any questions, please do not hesitate to call.

Respectfully submitted,
RICKER • ATKINSON • McBEE • MORMAN & ASSOCIATES, INC.

By: Demetrius L. Rugley, P.E.

Reviewed By: David A. Thomas, P.E.

/dlr

Copies to: Addressee (Matt@logosbuilders.com)

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REPORT

INTRODUCTION

This report presents the results of our geotechnical engineering services for the Kiwami on Bell development, to be located in Glendale, Arizona. The scope of our services included performing a field exploration program, laboratory analysis and geotechnical engineering evaluation, analysis, and recommendations. The geotechnical recommendations presented herein consist of foundation design, site development, material suitability and requirements, on-site pavement thicknesses, and site preparation and grading procedures. We would be pleased to discuss with you any additional recommendations you may require. In addition, we are available to review project specifications and plans for conformance with our recommendations at no charge to you.

This firm should be notified for additional evaluation and recommendations should the building design parameters (location, type, size, structural loads), site use or conditions encountered during construction differ from those presented herein.

PROPOSED CONSTRUCTION

The proposed development will consist of a single-story commercial building with underground retention and adjacent paved parking and drives on an undeveloped lot. It is anticipated that maximum structural loads will be on the order of 1 to 4 kips per linear foot of bearing walls and 10 to 40 kips for columns.

SITE CONDITIONS

The site of the proposed Kiwami on Bell development is located at 5327 West Bell Road in Glendale, Arizona. At the time of our investigation, the site consisted of relatively flat, undeveloped land. An AAA Member services building was located immediately to the southwest of the site and a parking lot was located immediately to the south of the site. It appears that construction of a roadway had begun immediately to the east of the site but remains unfinished. Several dumped fill piles were located in this area as well. Vegetation on site consisted of scattered, sparse growths of desert grass and a single tree along the perimeter of the site.

FIELD EXPLORATIONS

Subsurface conditions at the site were explored by drilling three test borings to depths of 6.0 feet to 10.0 feet (due to auger refusal) in the proposed development areas, as shown on the Site Plan in Appendix A. The test borings were drilled with a CME 55 drill rig using 7-inch diameter, hollow-stem auger. The drilling equipment and crew were provided by Wildcat Drilling, Inc. The test

boring locations were determined in the field by a geotechnical technician from our firm. During the field exploration, representative disturbed and undisturbed samples were obtained, the test borings logged, and soils field classified by our geotechnical technician, who also directed the drill crew. The relatively undisturbed samples were obtained by driving a 3-inch diameter, ring-lined, open-end sampler into the soil with a 140-pound hammer dropping 30 inches. The results of the field explorations are presented on the Test Boring Logs in Appendix A.

LABORATORY ANALYSIS

Representative samples obtained during the field exploration were subjected to the following tests in our laboratory.

Type of Test	Type of Sample	Number of Samples Tested
Compression	Undisturbed	1
Swell	Remolded	1
Percent Passing No. 200 Sieve & Atterberg Limits	Representative	3
Moisture Content/Dry Density *	Undisturbed	7
pH & Minimum Resistivity	Representative	1
Soluble Sulfate and Chloride **	Representative	1

* Reported in the Test Boring Logs
** Performed by Motzz Laboratory, Inc.

The results of the laboratory tests are presented in Appendix B.

SUBSURFACE CONDITIONS

The surface and subsurface conditions encountered at the test boring locations were relatively uniform. The results of each test boring are presented in Appendix A in the Test Boring Logs. In general, the surface and near surface soils encountered at the test boring locations and extending to depths of 6.0 feet to 10.0 feet (maximum depths of exploration due to auger refusal) consisted of medium dense clayey sand with trace gravel, medium plasticity fines, and interbedded with sandy clay layers. An increase in gravel was encountered below depths of 5.0 feet to 7.0 feet. Light cementation was encountered below 5.0 feet to 10.0 feet in Test Borings 1 and 2. Light cementation was encountered throughout the entire Test Boring 3. Occasional cobbles were encountered in Test Boring 3 below a depth of 5.0 feet Soil moisture contents were described as slightly damp throughout the depths explored. No groundwater was observed in the test borings during the drilling operations.

DISCUSSIONS OF TEST RESULTS

A remolded sample of the near surface soils from the site exhibited a moderate swell potential following wetting when tested in the laboratory. An undisturbed sample from anticipated foundation grade was found to undergo a slight amount of compression during loading to approximate foundation loads. Upon wetting at approximate foundation loads these soils underwent a considerable amount of additional compression.

FOUNDATION DESIGN RECOMMENDATIONS

Spread Footings:

The proposed building can be supported on shallow spread footings. Due to the collapse potential of the near surface site soils, the footings should be supported on at least 1.5 feet of compacted fill. Footings thus founded may be designed using an allowable bearing pressure of 2000 psf or 2500 psf, provided the bottom of the footings are at least 1.5 feet or 2.0 feet, respectively, below finished grade. The zone of recompaction should also extend through any existing fill and/or disturbed soils. Finished grade is defined as the lowest adjacent finished grade within 5 feet of the perimeter of the building for perimeter footings, and finish floor level for interior footings. Structural loads should not exceed 8 kips per linear foot for walls and 60 kips for columns. The zone of removal should be reviewed by a representative of this firm prior to backfilling to verify that any fill, backfill and/or disturbed soils have been penetrated/removed.

The allowable bearing capacity should be applied to maximum, design dead plus live loads and may be increased by one-third when considering temporary loads such as transient wind or seismic loads. A one-third increase may also be used for toe pressures due to eccentric or lateral loadings, assuming the entire footing bearing surface remains in compression. The weight of the footing concrete below grade may be neglected in dead load computations. The recommended minimum footing widths are 2.0 and 1.33 feet for isolated columns and continuous wall footings, respectively. A Site Class of D will apply to the site per the 2015, 2018 and 2021 International Building Code (IBC). The site class designation is based on our understanding of the soil conditions in the site vicinity and a review of available well holes within the general vicinity of the site. This data was available on ADWR's website and indicated that very stiff to variably dense material exists to depths over 100 feet in the general vicinity of the site.

The estimated total and differential footing settlements for the loading conditions described above are less than ½ inch if soils below footing level remain at or below the construction moisture content. Additional post-construction, differential settlement of equal or possibly greater magnitude could occur if bearing soils become wet after construction. Therefore, continuous footings and stem walls should be reinforced, and masonry walls constructed with properly designed reinforcement and with frequent expansion/contraction joints. Positive drainage away from the perimeter of the buildings is essential to minimize the potential for moisture infiltration into bearing soils. Any long-term saturation of the bearing soils could result in damaging differential settlements.

Lateral Earth Pressures:

The following tabulation presents the recommended lateral earth pressures and base friction values which should be used in the lateral design of footings and retaining walls. The lateral pressures are equivalent fluid pressures for average anticipated conditions.

Backfill Pressures:	
Unrestrained walls	35 psf/ft
Restrained walls	55 psf/ft
Passive Pressures:	
Continuous	250 psf/ft
Isolated column footings	350 psf/ft
Coefficient of Base Friction:	
Concrete to soil	0.45
Plastic membrane to soil	0.25

The above equivalent fluid pressures are for vertical walls with horizontal backfills and do not include temporary loads imposed by compaction equipment or permanent loads resulting from backfill swell pressures, hydrostatic pressures or surcharge loads. All retaining walls should contain weep holes to reduce the potential for the buildup of hydrostatic pressures.

SITE DEVELOPMENT RECOMMENDATIONS

Concrete Slab-On-Grade Support:

The near surface soils are medium in plasticity, and when compacted and wetted, exhibit a moderate swell potential. These soils may be used as fill and backfill in all areas of the proposed development provided they are placed and compacted at moisture contents at optimum to 3 percent above optimum in building and exterior slab areas. Interior slabs should be founded on a minimum 4-inch thickness of base material. Exterior slabs should be founded on a prepared subgrade. All

unreinforced slabs-on-grade should be jointed in accordance with ACI (American Concrete Institute) or PCA (Portland Cement Association) guidelines.

Vapor retarders/barriers such as plastic membranes may be required in vapor-sensitive floor covering areas or in humidity-controlled areas. Should plastic vapor retarders/barriers be used, the membrane should be at least 15 mil in thickness, have all seams and penetrations sealed per manufacturer's recommendations and should be placed in accordance with ACI 302.2R.

Surface Drainage:

Most soils will undergo some degree of volume change as the result of wetting. The degree of volume change will depend on the type of soil, swell potential, natural soils structure or degree of compaction (if a fill). These volume changes could result in movements in overlying building and non-structure elements including sidewalks, planters, retaining walls, floor slabs, etc. Therefore, good site and surface drainage away from these elements is required. In addition, water should not be allowed to pond within 10 feet of the building or other elements which are sensitive to movements. The exterior footing excavation backfill must be well compacted to minimize the possibility of moisture infiltration through this zone. All joints in the concrete floor slabs and at walls of the building must be sealed with flexible waterproof joint sealer.

Excavatability:

The excavatability of site materials is difficult to evaluate based only on the exploration equipment used during this design report. Therefore, we recommend that the contractor evaluate the excavatability of site materials by performing test excavations with the size and type of equipment the contractor plans on using at the site. For design purposes the following paragraph presents our best analysis as to the excavatability of site soils.

The near surface and underlying soils to a depth of at least 5.0 feet can probably be removed with conventional excavating equipment. Excavations will be slower and more difficult with increasing depth due to the presence of cementation and occasional cobbles. OSHA requires all excavations over five feet in depth, in which personnel are to enter, be either braced or sloped in accordance with OSHA regulations.

Workability:

Wetting site soils such that moisture contents are at or above optimum could result in some soil pumping under dynamic loadings such as heavy construction equipment driving over the area. In the building areas, some pumping is not detrimental to foundation or floor slabs provided the specified percent compaction is achieved. However, in flexible pavement areas where pumping has occurred, and in building areas where severe pumping has damaged subgrade conditions, the area should be allowed to dry until soils are workable without pumping or the wetted areas removed and replaced with drier site soils.

Concrete Durability:

As part of this investigation, Soluble Sulfates and Chlorides testing of site soils was conducted. The results of the laboratory testing are included in Appendix B. Based on our laboratory test results and 2018, 2021, and 2024 IBC Concrete Durability Requirements, Section 1904, there appears to be a low potential for deterioration to concrete in contact with site soils. This potential is a function of soil type and moisture content, material type and/or composition, water chemistry and other factors. Accordingly, the results of the laboratory testing should be made available to material suppliers and concrete experts for review.

Corrosion Potential:

As part of this investigation laboratory pH and Minimum Resistivity testing of site soils was conducted. The results of the laboratory testing are included in Appendix B. Based on these results and corrosion potential criteria presented in the Arizona Department of Transportation (ADOT) Preliminary Engineering and Design Manual, Figure 203.04-5 and National Association of Corrosion Engineers (NACE) International Corrosion Severity Ratings, there appears to be a high potential for corrosion to buried ferrous metal structures and pipelines. This potential is a function of soil type and moisture content, material type and/or composition, water chemistry and other factors. Accordingly, the results of the laboratory testing should be made available to material suppliers and corrosion experts for review.

PAVEMENT DESIGN RECOMMENDATIONS

Asphalt Concrete:

The following asphalt concrete pavement sections are based on anticipated traffic types and frequencies, site soil conditions, and a 20-year design life. Therefore, any material imported to the

site and placed in pavement areas should have support characteristics the same as or better than the site soils.

	Pavement Section	
Area of Use	Asphalt Concrete	Base Material
Auto Parking and Drives	2.0 inches	6.0 inches
Truck Drives/Fire Lanes	3.0 inches	6.0 inches

These sections are minimal and will require periodic maintenance (seal coats, overlays, or patching) where proper drainage is provided and maintained. Should moisture penetrate to the subgrade soils or ponding occur on or adjacent to the pavement section, a significant reduction in pavement life could occur along with increased maintenance. Therefore, good surface drainage on and adjacent to the pavement is essential to achieving the desired pavement life.

Portland Cement Concrete:

The following Portland cement concrete pavement (PCCP) sections are based on anticipated traffic types and frequencies and site soil conditions. Therefore, any material imported to the site and placed in pavement areas should have support characteristics the same as or better than the site soils.

Area of Use	PCCP Section
Auto Parking and Drives	5.0 inches
Truck Drives/Fire Lanes	7.0 inches

Base material is not required below the PCCP sections; however, if construction occurs during the summer months the base material would help reduce the potential for slab curling and shrinkage cracking. A maximum joint spacing of 12 to 15 feet should not be exceeded in either direction and all joints should be designed to provide load transfer. Joint detail, joint layout, and concrete batching, placing, curing and observation procedures should be in accordance with the recommendations developed by the Portland Cement Association.

MATERIALS SUITABILITY AND REQUIREMENTS

Site Soils:

The surface and near surface soils are medium in plasticity and exhibit moderate swell potentials when compacted and wetted. These soils may be used as fill and backfill in all areas of the proposed development provided these soils are placed and compacted at moisture contents at

optimum to 3 percent above optimum in building and exterior slab areas. All materials should be free of organics, debris, rubble, and material greater than 6 inches in size.

Imported Soils:

Fill required beyond that available from site sources and used to raise the building and exterior slab areas, or for use as retaining wall backfills, should be imported soils meeting the following requirements:

Minimum Passing #4 Sieve ----------30%
Maximum Particle Size ---------- 3 inches
Maximum Swell Potential ---------- 1.5%*

* Based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2 percent below optimum, placed under a surcharge load of 100 psf and wetted.

Imported soils should have a low corrosion potential as determined by a corrosion expert and/or material supplier and should meet ACI 318 negligible sulfate exposure durability requirements for concrete.

Base Material:

Base material used below concrete slabs and pavements should conform to the requirements of Maricopa Association of Governments (MAG) Specifications for Aggregate Base (Section 702).

Asphalt Concrete Pavement:

Asphalt concrete pavement materials should conform to the requirement of MAG Specifications for asphalt concrete (Section 710).

Portland Cement Concrete Pavement:

The Portland cement concrete pavement should have a minimum compressive strength of 4000 psi at 28 days and a maximum slump of 4 inches at the time of placement. The PCCP should conform to the requirements of MAG Specifications for Portland Cement Concrete (Section 725, Class AA).

SITE PREPARATION AND GRADING PROCEDURES

Building and Pavement Areas:

Recommendations presented in the previous sections of this report are based upon the following site preparation and grading procedures. Therefore, all earthwork should be accomplished with

observation and testing by a qualified technician under the direction of a registered geotechnical/ materials engineer. The following apply to the areas within and extending 5 feet beyond the footprint of the building, and in exterior slab and pavement areas.

1. Clear and grub the site by removing and disposing of any vegetation in areas to be developed, any debris and rubble, and any remnants of any former developments.

2. Strip the site of all debris piles, all dumped fill piles, all stockpiles, any backfill zones, any unstable soils, and all wet soils. During stripping observe the surface for evidence of buried debris, vegetation or disturbed materials which will require additional removal. Areas steeper than 5H to 1V should be benched and any depressions widened to accommodate compaction equipment.

3. Prepare the ground surface in at-grade areas, in fill areas and in areas cut to grade by scarifying, moisture conditioning and compacting the exposed surface soils to a depth of 10 inches.

4. In footing areas remove (and stockpile for future use) soils from beneath and 1.5 feet beyond all footings to a minimum depth of 1.5 feet below the bottom of footings. The removal should also extend through any existing fill and/or disturbed soils, if encountered. The exposed surface after removal should be moistened and compacted prior to backfilling.

5. Moisture condition and place all fill and backfill materials required to achieve specified grades. Fill materials should be moisture conditioned, placed, and compacted in horizontal lifts of thicknesses compatible with the compaction equipment being used.

6. Compact subgrade, fill, backfill, subbase fill or base material to the following minimum percent compaction of the ASTM D698 maximum dry density for each lift.

Material	Minimum Percent Compaction
Soil:	
Below foundations and pavement sections	95
Below concrete floor slabs (above footings)	90
Below exterior slabs	90
Base Material:	
Below concrete slabs	95
Below pavement sections	100
Backfill: *	90

* Outside of building, exterior slab, and pavement areas.

7. The moisture content of soil and base materials at the time of compaction should be:

Type	Area of Use	Moisture Content
On-Site	Building, Exterior Slabs	Optimum to optimum plus 3%
On-Site	Pavements	2% below optimum or lower
Imported	Building, Exterior Slabs	Optimum plus or minus 3%
Imported	Pavements	2% below optimum or lower
Base Material	Building and Pavements	Optimum plus or minus 3%

8. Any soils which are disturbed or over excavated by the contractor outside the limits of the plans or specifications should be replaced with materials compacted as specified above. The above compaction requirements will also apply to any disturbance occurring within the construction limits, including but not limited to backfilling of trenches inside and outside of the building pad.

LIMITATIONS

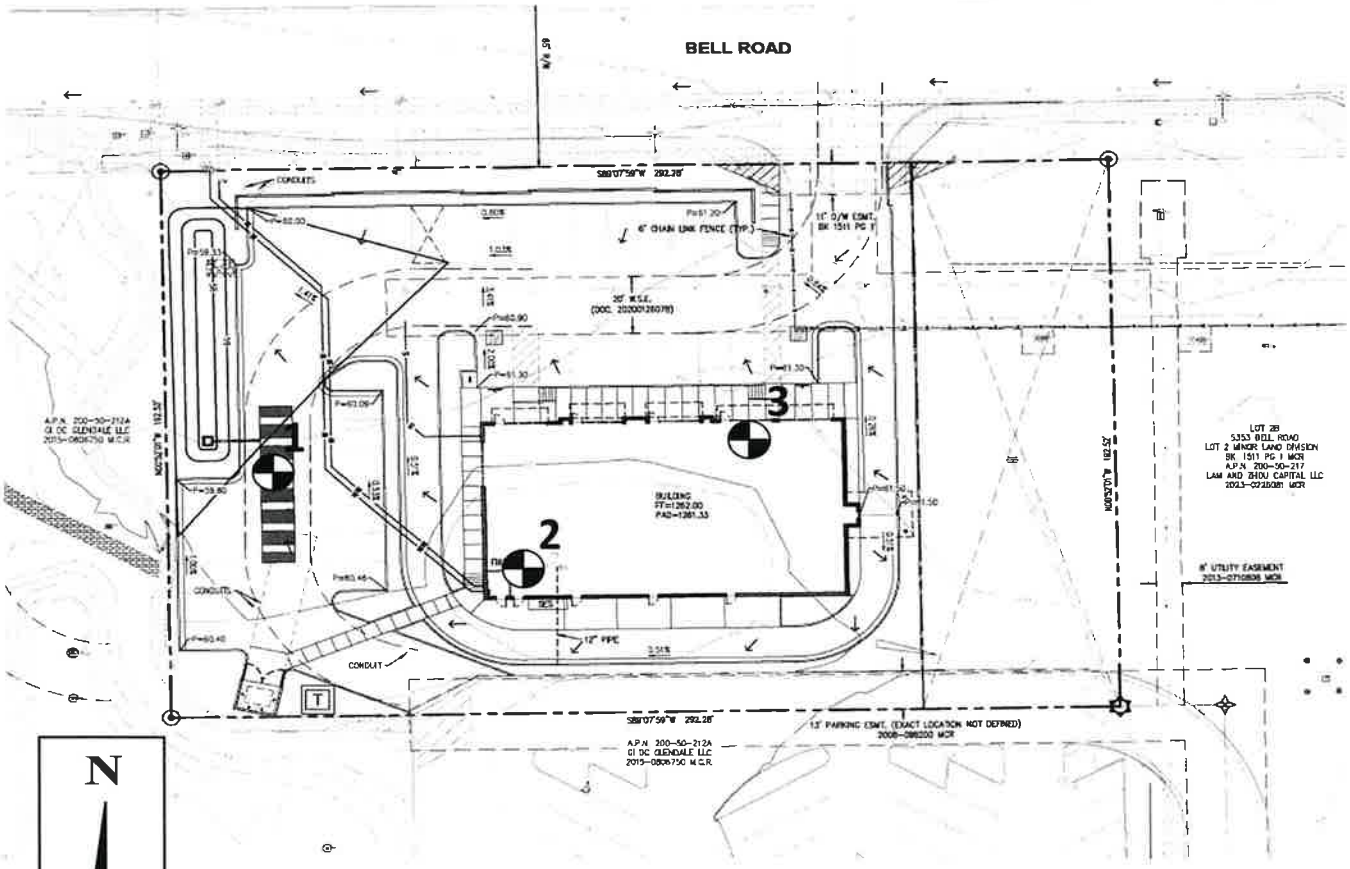
This report is an instrument of service of Ricker, Atkinson, McBee, Morman & Associates, Inc. (RAMM). The report has been prepared for the exclusive use of *Logos Construction, Inc. and their assignees* for the specific application to the *Kiwami on Bell.* RAMM has employed commonly accepted geotechnical engineering procedures, and our opinions and conclusions are made in accordance with generally accepted principles and practices of these professions common to the local area.

The contents of this report are valid as of the date of preparation. However, changes in the condition of the site can occur over time as a result of either natural processes or human activity. In addition, advancements in the practice of geotechnical engineering, engineering geology and hydrogeology and changes in applicable practice codes may affect the validity of this report. The report's contents may not be relied upon by any other party without the express written permission of RAMM.

Although not anticipated at this site, we should note that our investigation did not include the evaluation or assessment of any potential environmental hazards or groundwater contamination that may be present. RAMM makes no warranty, either expressed or implied.

APPENDIX A
FIELD EXPLORATIONS

R·A·M·M



Kiwami on Bell
5327 West Bell Road
Glendale, Arizona

Test Boring Location

Not To Scale

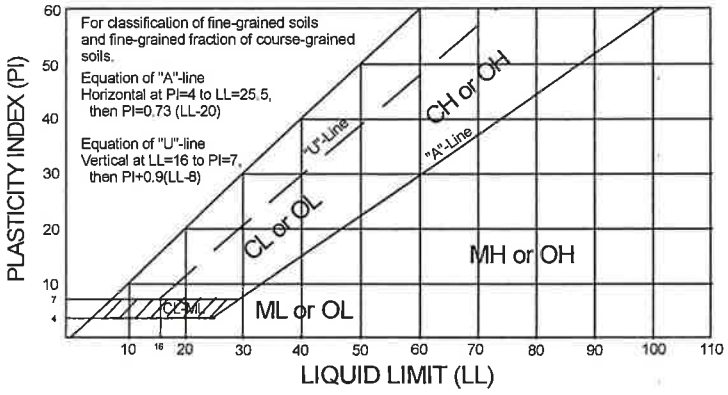
SITE PLAN

LEGEND

CLASSIFICATION OF SOILS

ASTM Designation: D2487-11
(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests					Soil Classification: Group Symbol	Soil Classification: Name
COARSE-GRAINED SOILS More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines	Cu >4 and 1 <Cc <3		GW	Well graded gravel
			Cu<4 and/or 1>Cc>3		GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	Fines classify as ML or MH		GM	Silty gravel
			Fines classify as CL or CH		GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu >6 and 1 <Cc <3		SW	Well-graded sand
			Cu<6 and/or 1>Cc>3		SP	Poorly graded sand
		Sands with Fines More than 12% fines	Fines classify as ML or MH		SM	Silty sand
			Fines classify as CL or CH		SC	Clayey sand
FINE-GRAINED SOILS 50% or more passes the No. 200 Sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI>7 and plots on or above "A" line		CL	Lean clay
			PI<4 or plots below "A" line		ML	Silt
		Organic	Liquid Limit - oven dried / Liquid limit - not dried	<0.75	OL	Organic clay / Organic silt
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line		CH	Fat clay
			PI plots below "A" line		MH	Elastic silt
		Organic	Liquid limit - oven dried / Liquid limit - not dried	<0.75	OH	Organic clay / Organic silt
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor				PT	Peat



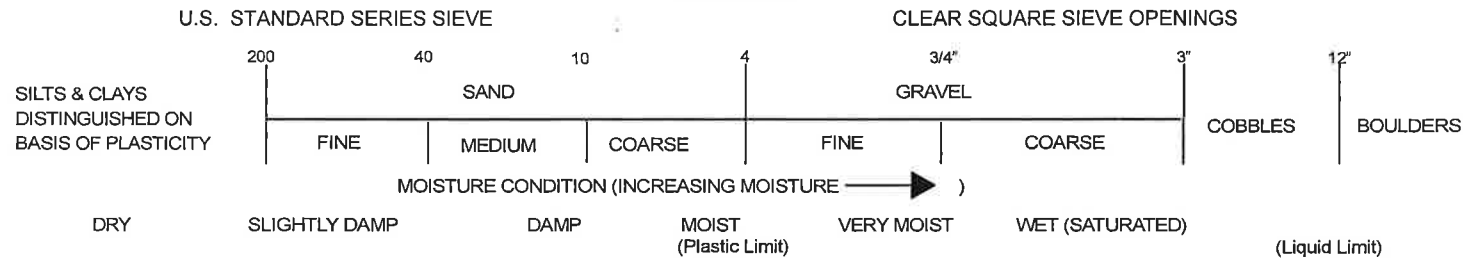
TEST BORING LOG DEFINITIONS

Blows per foot using 140 pound hammer with 30 inch free-fall.

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content %	Unified Classification	Description

C = Continuous Penetration Resistance (2 inch diameter rod)
N = Standard Penetration Resistance (ASTM D1586)
R = Penetration Resistance (3 inch diameter ring line sampler)

GRAIN SIZES



CONSISTENCY CORRELATION		RELATIVE DENSITY CORRELATION	
CLAYS & SILTS	BLOWS/FOOT*	SANDS & GRAVELS	BLOWS/FOOT*
VERY SOFT	0-2	VERY LOOSE	0-4
SOFT	2-4	LOOSE	4-10
FIRM	4-8	MEDIUM DENSE	10-30
STIFF	8-16	DENSE	30-50
VERY STIFF	16-32	VERY DENSE	OVER 50
HARD	OVER 32		

*Number of blows of 140 lb hammer falling 30" to drive a 2" O.D. (1-3/8" I.D.) split-spoon sampler (ASTM D1586).

TEST BORING LOG

Project: Kiwami on Bell, Glendale, Arizona Test Boring: 1

Elevation: Not Determined Datum: --- Date: 10/23/24

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
						SC /CL	Clayey Sand, Trace Gravel; brown, slightly damp, medium dense, medium plasticity fines, interbedded with sandy clay layers.
		19	R	102	5		
5							
		22	R	103	4		
							Increase in gravel below 7.0 feet.
10							Light cementation below 10.0 feet.
		50/10"	R	111	5		Refusal to auger penetration at 10.0 feet. No groundwater observed.
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Kiwami on Bell, Glendale, Arizona Test Boring: 2

Elevation: Not Determined Datum: --- Date: 10/23/24

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		23	R	103	4	SC /CL	Clayey Sand, Trace Gravel; brown, slightly damp, medium dense, medium plasticity fines, interbedded with sandy clay layers.
5		50/7"	R	111	4		Increase in gravel and light cementation below 5.0 feet.
							Refusal to auger penetration at 6.0 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Kiwami on Bell, Glendale, Arizona Test Boring: 3

Elevation: Not Determined Datum: --- Date: 10/23/24

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		50/11"	R	106	4	SC /CL	Clayey Sand, Trace Gravel; brown, slightly damp, medium dense, medium plasticity fines, interbedded with sandy clay layers, light cementation.
5		50/6"	R	100	6		Increase in gravel and occasional cobbles below 5.0 feet.
							Refusal to auger penetration at 6.0 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

APPENDIX B
LABORATORY ANALYSIS

LABORATORY TEST RESULTS

Date: 18-Nov-24

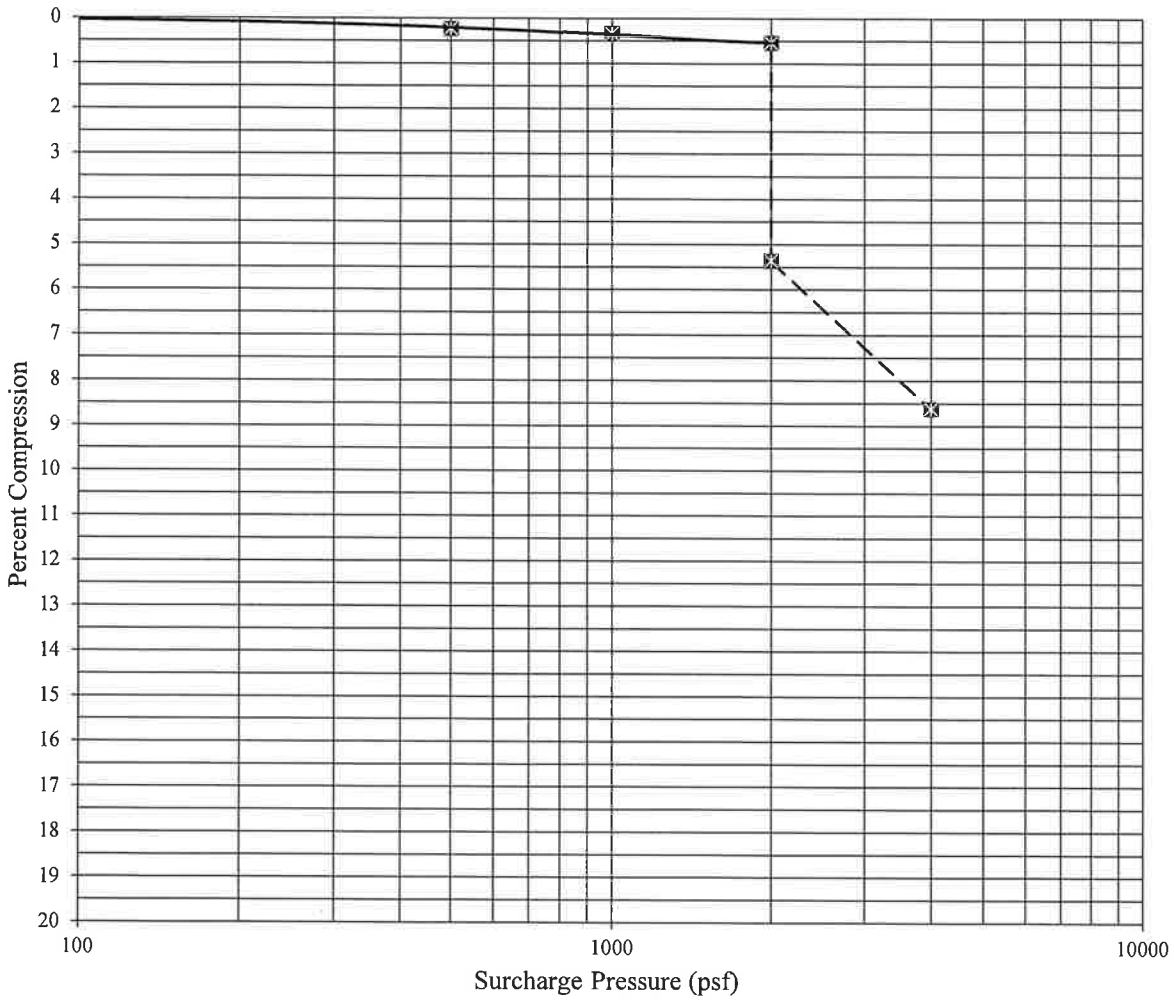
SAMPLE SOURCE: 1 @ 1.5'-2.5'

TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Olson

RESULTS:

Dry Density (pcf): 102 Moisture Content (%): 5



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 18-Nov-24

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Passing No. 200 Sieve, Atterberg Limits, Percent Expansion (ASTM D1140, D4318, D4546)

SAMPLED BY: RAMM/Olson

RESULTS:

Sample Source	Percent Retained No. 4 Sieve	Percent Passing No. 200 Sieve	Liquid Limit	Plasticity Index	Percent Expansion*	Remolded Dry Density (pcf)	Remolded Moisture Content (%)
1 @ 0'-3'	6	49	31	14	2.1	114	10
2 @ 0'-3'	4	50	25	8			
3 @ 0'-3'	2	49	30	14			

* Based upon sample remolded to 95% of the estimated maximum dry density at 2% below the estimated optimum moisture content, with a surcharge pressure of 100 psf.

LABORATORY TEST RESULTS

Date: 18-Nov-24

SAMPLE SOURCE: As noted below

TESTING PERFORMED: pH, Minimum Resistivity (ADOT 236a)

SAMPLED BY: RAMM/Olson

RESULTS:

Sample Source	pH	Minimum Resistivity (ohm-cm)
1 @ 5'-10'	8.2	1036

MOTZZ LABORATORY, INC.

Report: 953217
Reported: 11/10/2024
Received: 11/6/2024
PO: G30140

Laboratory Analysis Report

Ricker-Atkinson-McBee-Morman
Shawn Morman
2105 South Hardy Drive, Suite 13
Tempe, AZ 85282-1924

Project: G30140

Lab Number	Sample ID
953217-1	1 (0-3)

Test Parameter

Test	*Method*	*Result*	*Units*
Sulfate	ARIZ 733b	19	ppm
Chloride	ARIZ 736b	64	ppm

Sulfate 0.0019%; Chloride 0.0064%