

# Geotechnical Investigation



## Scottsdale Storage - APN 215-51-026

Frank Lloyd Wright Boulevard and Northsight Boulevard  
Scottsdale, Arizona  
ProTeX Job No.: 10300



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July 2, 2020

Clear Sky Capital, Inc.  
2398 East Camelback Road, Suite 615  
Phoenix, AZ 85016

Re: **Geotechnical Investigation**

Project: Scottsdale Storage - APN 215-51-026  
Frank Lloyd Wright Boulevard and Northsight Boulevard  
Scottsdale, Arizona

ProTeX Job No.: 10300

Attention: Mr. John Stevenson

At your request, ProTeX has completed a soil investigation for the subject project. The accompanying report includes field observations and laboratory testing supporting our conclusions and recommendations for the proposed development.

Respectfully submitted,  
**ProTeX - the PT Xperts, LLC**



Date Expires: 3/31/2021  
Thomas M. Perkins, P.E.



Date Expires: 3/31/2022  
Delbert A. Rapier, M.S.E., P.E.

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## APPENDICES

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## **Executive Summary**

ProTeX was contracted by Clear Sky Capital, Inc. to provide general information with respect to the engineering characteristics of onsite soils and provide recommendations for foundations and pad preparation for the site referred to as Scottsdale Storage - APN 215-51-026 located at Frank Lloyd Wright Boulevard and Northsight Boulevard in Scottsdale, Arizona.

This firm understands the proposed development will consist of single story self-storage structures imposing relatively light to moderate foundation loads.

Field investigation and laboratory testing indicated that the site consists mainly of sandy silt, silty clayey sand, sandy silty clay, sandy clay and clayey sand with varying amounts of gravel. The expansion potential for site soils when foundation bearing soils are exposed to a moisture increase is anticipated to be very low to low for the surface level soils. Design of structures is subject to expansive soils and post-tensioned or reinforced conventional slab/foundation systems are recommended.

Settlements at the site are anticipated to be within acceptable tolerances provided that pad preparation is performed as specified and no significant changes in moisture content of foundation/floor slab bearing soils occur and proper drainage and irrigation control are maintained. Drainage should be directed away from the structure and off the lot during and after construction and should be maintained for the life of the project. In no case, should long-term ponding be allowed near structures. Proper design and placement of landscape vegetation and irrigation systems should be used so that structural foundation slab bearing soils are not exposed to moisture content fluctuations.

The site is located within an area of regional groundwater withdrawal; however, based on the Earth fissure Maps provided by the Arizona Geological Survey, there is no indication of earth fissures on site or within approximately 2.5 miles of the site.

Based on the findings of the soils investigation, the site is considered suitable to single story storage structures imposing relatively light to moderate foundation loads provided floor and foundation systems are properly designed, soils properly conditioned as specified and proper maintenance of drainage and irrigation systems. All parties should be aware that the site soils are clayey and have a potential for expansion. Fluctuation in moisture content of foundation bearing soils may result in slight movements that may result in cosmetic distress.

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## **1.0 INTRODUCTION**

### **1.1 Scope**

ProTeX was retained by Clear Sky Capital, Inc. to evaluate the surface and subsurface soil conditions. The report contains the findings from the field exploration and laboratory testing, with supporting recommendations for the proposed development.

### **1.2 Proposed Site Development**

It is this firm's understanding the proposed development will consist of single story self-storage structures using masonry and/or steel frame construction imposing relatively light to moderate foundation loads.

### **1.3 Terms and Conditions**

This report was prepared for Clear Sky Capital, Inc. The contents of this report may not be relied upon by any other party without the expressed written permission of ProTeX - the PT Xperts, LLC and the written permission of Clear Sky Capital, Inc. The report presents site conditions at the time of the investigation and for the aforementioned proposed development. The report should be updated prior to construction if a maximum of one year has elapsed from the issued date.



## **2.0 FIELD AND LABORATORY TESTING**

### **2.1 Geotechnical Site Reconnaissance**

The site consists of approximately 3.38 acres of currently undeveloped land. At the time of the field site visit on June 18, 2020 the following site conditions were observed:

- Large Concrete Canal and Utility easement bounds the site to the north
- Underground utilities were located on the eastern side of the property
- Light vegetation coverage of small bushes, trees and weeds
- Surface trash was located at various locations on the property
- General slope and drainage of the site trends toward the south east direction



*Figure 1 - Google Earth Street view from N Pima Road*



## 2.2 Historical Aerial Investigation

The following descriptions and Historical Aerial Photographs were obtained from the Maricopa County (<https://gis.maricopa.gov/GIO/HistoricalAerial/index.html>) and show evidence of former site activities and conditions. Former land use is identified by historical aerial photographs and described based on engineering experience.

Former land use was identified on the property. Former land use included construction staging areas. By December of 1996, the property was used as a staging area during the construction of canal bridges and buildings to the south. Stockpiles were present on site between December of 1998 and December of 2002. Between September of 2011 and December of 2012, a portion of the property to the east was used as a construction staging area.



Figure 3: December 1996 to February 1997



Figure 2: October through December of 2012

## 2.3 Field Investigation

A total of three (3) test holes were completed at the site for the purpose of evaluating subsurface conditions. Test holes were terminated at a nominal depth of 15 feet. At each test hole location, the soils encountered were visually observed, classified, logged and representative samples were obtained where applicable. Refer to the site plan in Appendix B for approximate test hole locations.



## 2.4 Laboratory Testing

Subsequent to the field investigation, soil samples were submitted for laboratory testing. Tests were performed to determine the following:

- Hydro-collapse-** Used to evaluate undisturbed lateral ring confined (obtained from a split-barrel California-type Sampler) one-dimensional vertical soil movement under load (1500 and 3000 psf) to water inundation/saturation in general accordance with the American Society for Testing and Materials (ASTM) Test Method D4546.
- Sieve Analysis and Atterberg Limits-** Used for formal classification of soils in general accordance with the Unified Soil Classification System (USCS) per ASTM Test Method D2487. Sieve analysis is performed in general accordance with ASTM Test Methods D421, D422 and D1140. The Atterberg Limits were determined in general accordance with ASTM Test Method D4318.
- Expansion Index-** To determine the potential expansion of remolded soils based on the Expansion Index Test Method (ASTM D4829).
 

Expansion Index- Expansive Potential Categorization	
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High
- Sulfates and Chlorides-** To determine levels of water soluble sulfate (ARIZ 733) and chloride (ARIZ 736) content, which could negatively impact project steel/concrete.

## Laboratory Test Summary

Location	Depth (ft)	PI	%Passing #200	USCS Soil Class	Expansion Index
B1	0-3	4	56	CL-ML	
B1	6-8	13	63	CL	37
B1	11-13	14	53	CL	
B2	0-3	4	29	SC-SM	2
B3	0-3	NP	51	ML	
B3	6-8	11	42	SC	

See Appendix A for a detailed compilation of the laboratory test results.



### **3.0 GENERAL SITE CONDITIONS**

#### **3.1 Soil Stratigraphy**

Based on the field exploration and laboratory testing, the subsurface profile to the depths explored, consist primarily of sandy silt, silty clayey sand, sandy silty clay, sandy clay and clayey sand of plasticity ranging from non-plastic to low-medium. Refer to the boring logs in Appendix C for a detailed description of the subsurface soil profile.

#### **3.2 Potential for Soil Hydro-Collapse (Settlement Potential)**

Laboratory tests and Blow Counts (N-values) indicate the subsurface soils are loose/soft and susceptible to hydro-collapse at the anticipated foundation load of 1500psf (See the attached laboratory test results and boring logs). The potential for hydro-consolidation of the subsurface soils can be mitigated. Foundation bearing soils should be over-excavated and re-compacted. (See Section 5.0 – Site Preparation).

#### **3.3 Potential for Soil Expansion (Expansion Potential)**

The expansion potential of the native soils, to the depths explored based on ASTM test method D4829, is considered very low to low (Expansion indexes of 2 and 37). Soils selected for testing for expansion potential were those that represented clayey soils with varying plasticity index values to determine the range of expansive potential soils across the site. The Expansion Index values typically tend to be higher with higher plasticity indices. The soils that tested non-plastic are comprised of silts and sands and are considered to have a very low potential for expansion.

#### **3.4 Potential for Corrosion**

Soils were tested for water soluble sulfates and chlorides The International Building Code specifies limits for soluble sulfate levels of 1000ppm. The soils tested yielded results below these levels and do not require any specialized design requirements. The test results are presented in Appendix A.

#### **3.5 Excavation and Workability**

Based on the soil borings, it is anticipated that conventional excavation equipment may be utilized to depths of 15 feet. However, this generalized assessment is not intended to be the sole basis for contractors preparing earthwork bids. Undiscovered shallow bedrock, cemented soils, cobbles, boulders, and weathered/broken bedrock may make excavation more difficult than expected. In

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addition, the relative ease/efficiency of excavation is heavily dependent on operator skill and the type of equipment assigned to the project. Thus, prospective earthwork contractors bidding on this project need to assess site excavation conditions for themselves. Trench shoring, benching, or laying back of excavations greater than 3 feet in depth may be required to satisfy government safety regulations for personnel safety.

**3.6 Earth Fissure Review**

The site is located within an area of regional groundwater withdrawal. Arizona Geological Survey has been commissioned to study earth fissures associated with the groundwater withdrawal. The Earth Fissure Maps provided by the Arizona Geological Survey indicate no known earth fissures on site or within approximately 2.5 miles of the site.

**3.7 Seismic Characteristics**

The subject site is located in an area of low seismic activity. Values have been developed based on knowledge of the local geological conditions, soils encountered during the site investigation of the subsurface soils, and the 2018 International Building Code (IBC). The 2018 IBC references the American Society of Civil Engineers (ASCE) 7-16 standard. Based on knowledge of the geology of the area a 100 feet boring was not advanced.

Site Class	D (Stiff Soil Profile)
Central Latitude	33.63144956°N
Central Longitude	111.89308803° W
S <sub>s</sub> Spectral Acceleration for Short Period	0.219g
S <sub>1</sub> Spectral Acceleration for a 1-Second period	0.073g
F <sub>a</sub> Site Coefficient for Short Period	1.60
F <sub>v</sub> Site Coefficient for a 1-second Period	2.40

**3.8 Liquefaction Potential**

The soil encountered during the site investigation consisted of sandy silt, silty clayey sand, sandy silty clay, sandy clay and clayey sand. Based on the soil types and the low ground motion hazard (relatively low ground acceleration), the potential for liquefaction of the site soils is considered to be negligible.



### 3.9 Flood Plains

ProTeX reviewed the Federal Emergency Management Agency (FEMA) Flood Maps and determined the subject site is not within the 100-year flood zone. The map indicates the subject site is located in a Zone X, which is an area of 0.2% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. The FEMA map reviewed is Map Number 04013C1320L and revision date of October 16, 2013.

### 3.10 Groundwater

ProTeX reviewed the Arizona Department of Water Resources (ADWR), GIS Groundwater Data and referenced monitored wells within the vicinity of the subject site. Wells located within this radius indicated depths of water ranging from 280 to 360 feet below ground surface. Wells were measured using different techniques such as ADWR calibrated electric sounder and steel tape.

### 3.11 Shrinkage

Field and laboratory tests such as blow counts (N-values), in-situ densities, and hydro-collapse testing indicates that during grading, soils will likely be compacted to densities greater than the current density of the native soils. Both site specific testing and experience indicates that there is variability of the site soils subsurface and thus shrinkage across the site will vary such that uniform shrinkage across this site during earthwork operations is unlikely. The shrinkage values provided are based on standard construction techniques and may vary depending on the equipment used and the manner in which the grading is performed.

Depth (ft)	Estimated Shrinkage (%)
0-3	15-25

## 4.0 RECOMMENDATIONS

The recommendations contained herein are based on the findings of the field investigation, laboratory test results and local experience.

### 4.1 Foundations

It is highly recommended that the design of foundations be done under the direction of a registered professional engineer with structural expertise. Reinforced conventional or post-tension foundations

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may be utilized in the design of light to moderately loaded single story storage structures. It is recommended that foundation excavations be inspected prior to placement of concrete to ensure they are free of debris and loose soils.

**4.1.1 Reinforced Conventional Foundation System**

Shallow foundations systems should bear a minimum of 1.5 feet below lowest adjacent grade. Due to the properties of the native soils as indicated by laboratory testing, it is recommended that foundations bear on 1.5 feet of approved controlled compacted fill. Controlled compacted fill may consist of approved material that is placed or areas that are scarified, moisture processed and re-compacted. The following table provides allowable bearing capacities for the site.

Allowable Bearing Capacity for Shallow Depth Conventional Foundation Systems:

*Footing Depth (ft.)	Bearing Stratum	Allowable Soil Bearing Capacity
1.5	1.5 feet of Controlled Compacted Fill	1500 psf

*\*Depth to base of perimeter footings is measured from the lowest adjacent finished grade elevation within 5 feet of edge of footing. Depth to base of interior footings measured from top of floor slab.*

Foundation widths should meet building code minimums and should not be larger than 7 feet and 4 feet, for spread and continuous foundations, respectively.

The recommended foundation bearing pressures should be considered allowable maximums for dead plus design live loads and may be increased by one-third when considering total loads including transient wind or seismic forces. The weight of the foundation concrete below grade may be neglected in dead load computations.

Lightly loaded interior walls imposing a load of 800 plf or less may bear on a 12 inch thick and 12 inch wide thickened floor slab section. Loads exceeding 800 plf should be supported on a foundation independent of the floor slab. It is suggested that thickened sections be reinforced, and control joints be used to allow some deflection and thereby minimize the potential for slab cracking.

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Foundation excavations should be inspected so that they are free of loose soil that may have blown or sloughed into the excavations and ensure that the footings will bear upon firm native undisturbed soils or engineered fill.

The stem walls should be well reinforced to distribute stresses caused by possible non-uniform bearing capacity and/or minor differential foundation movements. It is recommended that stem walls and footings be reinforced. **The structural engineer should design the footings and stems for the expansive site soil conditions with differential movement on the order of 0.5 inches.**

Preparation of the site to raise or lower the building pad should be done in accordance to the Section 5 - Site Preparation.

Interior slabs on grade should bear directly on 4 inches of Aggregate Base Course (ABC). The concrete slabs should consist of a minimum thickness of 5 inches and be reinforced to account for site soil conditions.

#### **4.1.2 Post-tension Slab-on-Grade Foundation System**

For the purpose of the post-tension slab design an allowable bearing capacity of 1250psf is assigned. The post-tensioned foundation system should bear on a minimum of 1.0 feet of controlled compacted fill. The following design parameters are assigned for use in the structural design of the foundation systems.

*Soil Subgrade Modulus (Ks)(for compacted fill):* 150pci

*Edge Moisture Variation (Em):*

*Edge Lift Condition:* 4.8 feet

*Center Lift Condition:* 9.0 feet

*Maximum Differential Soil Movement (Ym):*

*Edge Lift Condition:* 0.5 inches

*Center Lift Condition* 0.2 inches

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#### 4.2 Exterior Slab-on-Grade

Exterior slabs on grade should bear directly on grade and contain a minimum of 5.0 sacks of Portland cement per cubic yard with a minimum thickness of 5 inches. A minimum of 6 inches of subgrade should be scarified moisture processed and compacted to the specifications in the earthwork section of this report.

#### 4.3 Lateral Loadings

The design of retaining walls for the site should be designed to retain the lateral loads applied by the site soils. The following values are provided in Equivalent Fluid Pressures for unrestrained, restrained and passive resistance.

Lateral Equivalent Fluid Pressures for Backfill:	
*Unrestrained Walls	35 pcf
*Restrained Walls	50 pcf
Passive Resistance	373 pcf
Coefficient of Base Friction:	0.50

*\*The backfill pressures stated do not include temporary forces imposed during compaction of the backfill, swelling pressures developed by over-compacted clayey backfill soils, hydrostatic pressures from inundation of backfills, and/or surcharge loads. Walls should be suitably braced during backfilling to prevent damage and deflection.*

Design of below grade structures should account for or prevent potential hydrostatic buildup. In addition, any below grade structure penetrations to facilitate drainage may allow piping of soil and water if not addressed properly in the design of the structure.

#### 4.4 Drainage

***Establishment and long-term maintenance of proper lot post-construction surface drainage is critical.*** Because of the potential for an adverse effect on structures, it is highly recommended that moisture infiltration and fluctuation of bearing soils for structural foundation/floor be minimized. Roof runoff should be collected and discharged away from the structures. Drainage of surface water away from the structures should be provided during construction and maintained by the owner throughout the life of the structure. In no case, should long-term ponding be allowed near structures.

In landscape areas, it is suggested that, where possible, finished slopes extend a minimum of 10 feet horizontally from building walls and have a minimum vertical fall of 6 inches. Backfill against

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footings, exterior walls and in utility trenches should be compacted to minimize the possibility of moisture infiltration through loose soil.

Drainage and moisture infiltration should be considered during landscaping design and placement to ensure foundation and slab bearing soils are not exposed to moisture infiltration or moisture content fluctuation. Distance from structures to vegetative plants, planters, irrigation lines or landscape borders should not be less than 3 feet. Trees should be placed at a distance of 8 feet or more. Landscape irrigation schedules should be adjusted for climatic changes to minimize moisture content fluctuation of foundation bearing soils.

**4.5 Slope Stability**

Stability of cut and fill slopes are dependent on soil properties such as density, cohesion, moisture content, etc. Site specific laboratory testing and experience indicates that these properties can vary significantly across the site. Temporary slopes for installation of underground utilities or structures should follow OSHA guidelines. A minimum slope of 2.5:1 horizontal to vertical may be utilized for design of cut slopes and compacted fill slopes. The slope recommendation does not consider safety for fall dangers.

**4.6 Pavement Section Recommendations**

The pavement recommendations have been prepared in accordance with City of Phoenix requirements. The design for parking and traffic areas is based on surface soil properties and local engineering experience.

**Recommendations for pavement sections utilizing Asphaltic Concrete (AC) Pavement:**

Street Classification	AC (inches)	ABC (inches)
Parking Bays and Light Traffic Areas	2.0	6.0
Heavy Traffic Areas	2.5	6.0

**Recommendations for pavement sections utilizing Portland Cement Concrete Pavement (PCCP):**

Pavement Type	PCCP (inches)	ABC (inches)
Drive Areas, Parking, Storage Areas and Dumpster Approach	6.0	-

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Care should be taken with regard to grading, placement of landscape vegetation and irrigation systems to minimize moisture infiltration in subgrade soils below pavement sections. In addition, the use of monolithic curb/sidewalk combination placement and soil cement of subgrade soils may be considered for long-term performance.

Pavement materials and placement should conform to Maricopa Association of Governments (M.A.G.) specifications. In no case should pavement surfacing be placed on unstable wet subgrade and/or aggregate base course.

## **5.0 SITE PREPARATION**

The following recommendations are presented for site grading. *It is recommended that a ProTeX geotechnical engineer's representative observe and test the earthwork and foundation portions of this project to ensure compliance with this Soil Investigation report.*

Prior to placement of fill a representative of ProTeX should observe the clearing process. Clearing will include removal of (including but not necessarily limited to):

- Surface trash and site vegetation
- Abandoned utilities

The areas cleared should be inspected prior to and during scarification for evidence of organic material or loose areas that may require additional removal or processing.

**Due to loose/soft conditions, the surface soils should be over-excavated a minimum depth of 1.0 foot below existing grade, 1.5 feet below conventional foundations, or 1.0 foot below post-tension slab-on-grade foundations, whichever is deeper.** It is recommended that the over-excavation extend across the entire building pad and to a minimum lateral distance of five feet beyond foundation edges.

After clearing and over-excavation, **the exposed soils should be scarified a minimum of 8 inches, moisture conditioned and compacted.** The surface should be free from ruts, or other uneven features that would tend to prevent uniform compaction by the equipment used.

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Sloping areas steeper than 5:1 (horizontal: vertical) should be benched to reduce the potential for slippage between slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

Fill material should be free of organics, vegetative matter, deleterious or foreign material, rocks, and lumps having a diameter of more than 6 inches. Native soils may be used as fill material provided; they are compacted as specified. If imported fill material is required, it should be approved very low expansive potential soils.

Fill material should be placed in layers, that when compacted, do not exceed 6 inches. Each layer should then be placed evenly and thoroughly mix during spreading to ensure uniformity of moisture throughout each layer. Each fill layer should be compacted to specified density and moisture content.

Compaction equipment should be able to compact the fill to the specified density. Compaction of each layer should be continuous over its entire area and the compaction equipment should make sufficient passes to ensure that density has been obtained.

Soil compaction is recommended to the following densities and moisture contents as determined in accordance with ASTM D-698, AASHTO T-99 or applicable equivalent:

<b>Compaction Specifications for Post-Tension and Conventional Foundations</b>		
<b>Material</b>	<b>Compaction</b>	<b>Percent Moisture</b>
Below Conventional Interior Floors	90% Min	Optimum to +4
Below Conventional Foundation Level and Post-Tension Slab-on-Grade	95 % Min	Optimum to +4
Fills at Depths 5 to 10 Feet Below Finish Grade	98% Min	-2 to +2 of Optimum
Fills at Depths 10 Feet or Greater Below Finish Grade	100% Min	-2 to +2 of Optimum
Pavement Areas	Per MAG	Per MAG

A ProTeX geotechnical engineer's representative should observe the grading operations to verify that all cut and fill areas are in accordance with the specifications. This office should be notified prior to earthwork operations so that appropriate observation and materials testing can be provided.

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When work is interrupted by heavy rains, fill operations should not be resumed until the geotechnical engineer's representative indicates that the moisture content and density of the previously placed fill are as specified.

**If building pads are altered or portions excavated as a part of construction activities, fill soils should be compacted as specified. If pads are not built on for an extended period of time, reconditioning of build pads may be required. Should this be the case, a representative of ProTeX should evaluate the pads for further recommendations.**

## **6.0 CLOSURE**

### **6.1 Limitations**

The recommendations contained in this report are based on the assumption that the subsurface conditions do not deviate appreciably from those disclosed by the test holes. Should unusual material or conditions be encountered during construction, the ProTeX geotechnical engineer should be notified to make supplemental recommendations should this be required. This report is issued with the understanding that it is the responsibility of the owner to see that its provisions are carried out or brought to the attention of those concerned.

The scope of services for this project does not include any environmental assessment of the site or identification of contaminated or hazardous materials or conditions.

The findings of this report are considered valid as of the present date. However, changes in the conditions of the site can occur with the passage of time, whether due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.



## 6.2 Recommended Additional Services

The recommendations provided in this report are based on the assumption that a testing plan will be implemented with an adequate schedule of testing to ensure that the construction process meets the recommendations/specifications presented in this report. The testing and observation should be performed under the direction of the ProTeX Geotechnical Engineer/representative and should include, but not necessarily be limited to the following:

1. Observe and document that the existing surface and subsurface structures, vegetation and abandoned utilities are removed from the site as required in the earthwork section.
2. Approve and document that fill material used as engineered fill in building and pavement areas meets the specifications.
3. After clearing the site; monitor the over excavation, scarification and removal of any soft/loose conditions down to firm native soils.
4. Monitor and test placement of fill soils in building and pavement locations to verify and document conformance with project specifications.

# Appendix A

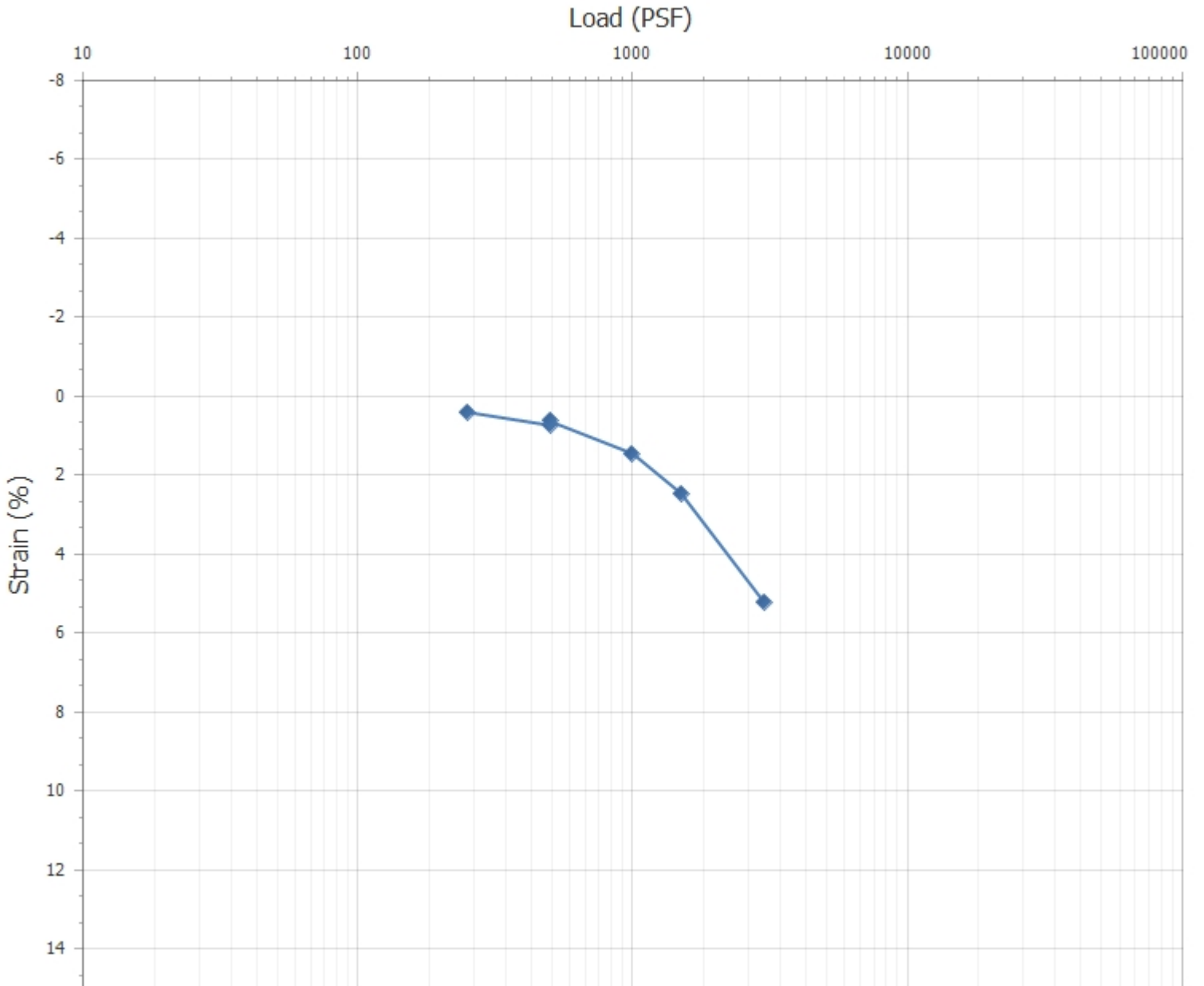


ProTeX the PT Xperts LLC  
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## Consolidation

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B1 (Ring 1.5')

ProTeX Job No: 10300  
 ProTeX Lab No: 203994 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy



Source: B1 - Ring 1.5'

Moisture Content: 6.6 %

Sample Type: Undisturbed

Dry Unit Weight: 106.6 lb/ft³

Load at Saturation: 500 PSF

Remarks:

Reviewed By: jgrossarth

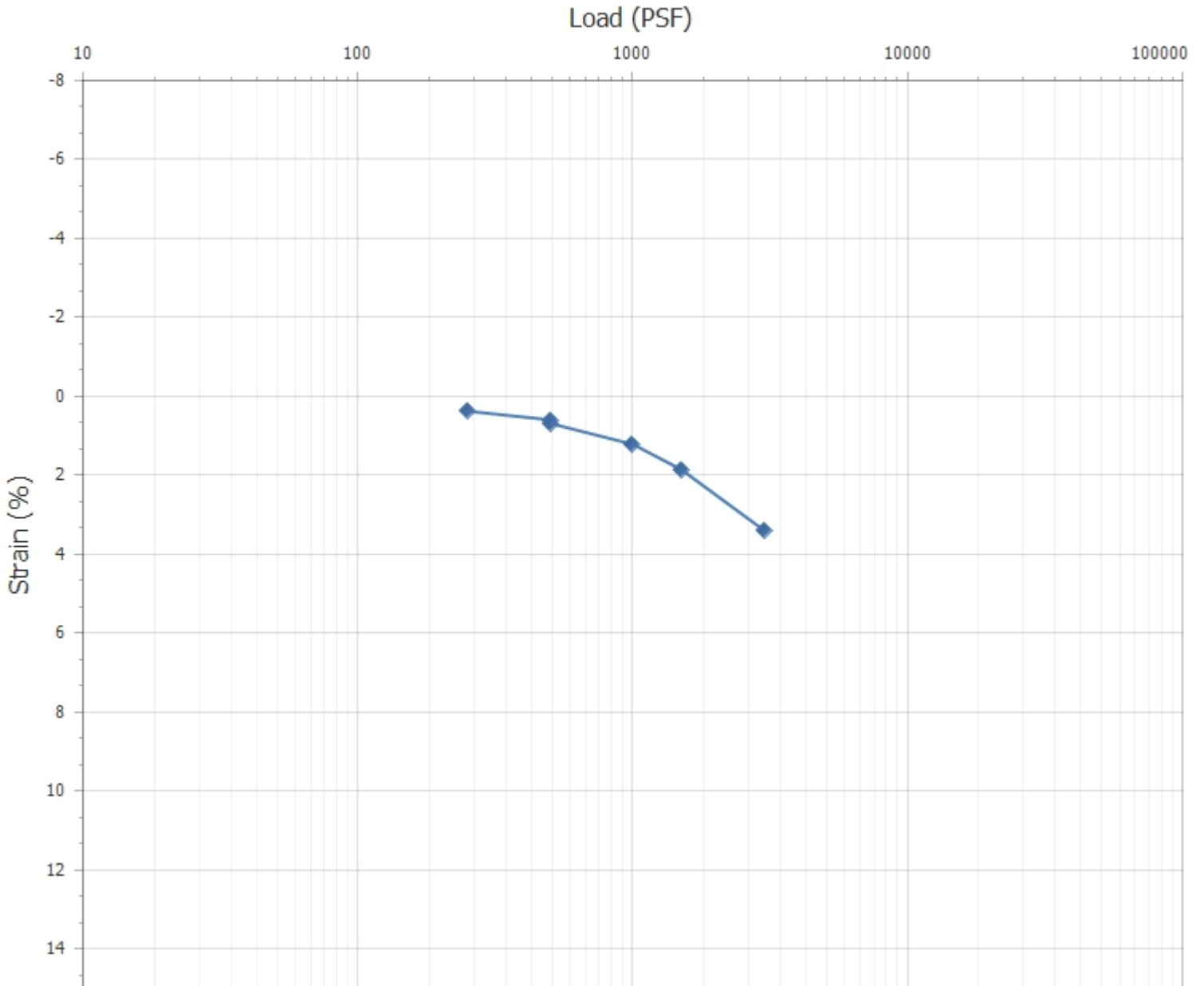


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## Consolidation

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B3 (Ring 1.5')

ProTeX Job No: 10300  
 ProTeX Lab No: 203997 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy



Source: B3 - Ring 1.5'

Moisture Content: 5.2 %

Sample Type: Undisturbed

Dry Unit Weight: 107.7 lb/ft³

Load at Saturation: 500 PSF

Remarks:

Reviewed By: jgrossarth



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## Soils Summary

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B1 (0-3')

ProTeX Job No: 10300  
 ProTeX Lab No: 203988 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	<b>23</b>
Plastic Limit	<b>19</b>
Plasticity Index	<b>4</b>

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	<b>NA</b>

Percent Swell of Soil	
% Swell	<b>NV</b>
Notes:	

pH and Resistivity	
pH Reading:	<b>NA</b>
Resistivity (ohms-cm)	<b>NA</b>

AASHTO T272	
Moisture Density (Proctor)	
Max. Dry Density	<b>122.4</b>
Opt. Moisture %	<b>11.7</b>
Corr. Max. Dry Density	<b>125.8</b>
Corr. Opt. Moisture %	<b>10.5</b>
% Rock	<b>11</b>

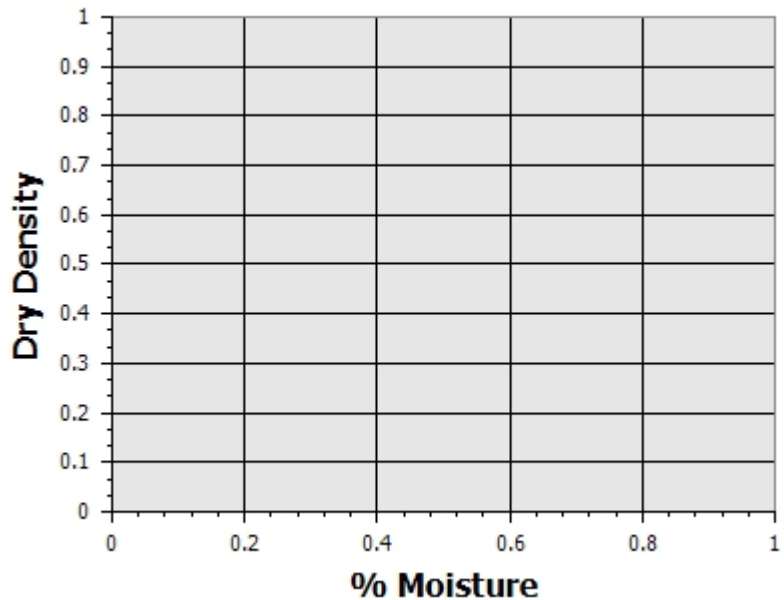
Class: Sandy silty clay

Symbol: CL-ML

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	94		
#4	89		
#10	81		
#40	69		
#100	62		
#200	56		

### Moisture Vs. Density



Remarks:

Reviewed By:

*Jayde Moloney*  
 Jayde Moloney



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## Soils Summary

Client:	Clear Sky Capital, Inc	ProTeX Job No:	10300
Project Name:	Loop 101 and Frank Lloyd Wright Blvd	ProTeX Lab No:	203989 - Phoenix
Job Name:	Scottsdale Storage Site	Date Received:	6/18/2020
Material:	Geo (Native)	Sampled By:	Amos McCurdy
Material Supplier:	-	Date Sampled:	6/18/2020
Sample Location:	B1 (6-8')	Submitted By:	Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	<b>30</b>
Plastic Limit	<b>17</b>
Plasticity Index	<b>13</b>

ASTM D4829		
Expansion Index, (EI)	Potential Expansion	Expansion Index  EI = <span style="border: 1px solid black; padding: 5px;">37</span>
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	<b>NV</b>
Notes:	

pH and Resistivity	
pH Reading:	<b>NA</b>
Resistivity (ohms-cm)	<b>NA</b>

Moisture Density (Proctor)	
Max. Dry Density	<b>NV</b>
Opt. Moisture %	<b>NV</b>
Corr. Max. Dry Density	<b>NV</b>
Corr. Opt. Moisture %	<b>NV</b>
% Rock	<b>3</b>

Class: Sandy lean clay  
 Symbol: CL

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	97		
#10	88		
#40	76		
#100	69		
#200	63		

Remarks:

Reviewed By:

Jerald W Grossarth

8-ZN-2021  
6/9/2021



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## Soils Summary

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B1 (11-13')

ProTeX Job No: 10300  
 ProTeX Lab No: 203990 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	<b>34</b>
Plastic Limit	<b>20</b>
Plasticity Index	<b>14</b>

Expansion Index, (EI)	Potential Expansion
0 - 20	Very Low
21 - 51	Low
52 - 90	Medium
91 - 130	High
> 130	Very High

Expansion Index	
EI =	<b>NA</b>

Percent Swell of Soil	
% Swell	<b>NV</b>
Notes:	

pH and Resistivity	
pH Reading:	<b>NA</b>
Resistivity (ohms-cm)	<b>NA</b>

Moisture Density (Proctor)	
Max. Dry Density	<b>NV</b>
Opt. Moisture %	<b>NV</b>
Corr. Max. Dry Density	<b>NV</b>
Corr. Opt. Moisture %	<b>NV</b>
% Rock	<b>7</b>

Class: Sandy lean clay  
 Symbol: CL

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	100		
#4	93		
#10	80		
#40	67		
#100	59		
#200	53		

Remarks:

Reviewed By:

Jayde Moloney

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## Soils Summary

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B2 (0-3')

ProTeX Job No: 10300  
 ProTeX Lab No: 203991 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	<b>22</b>
Plastic Limit	<b>18</b>
Plasticity Index	<b>4</b>

ASTM D4829		
Expansion Index, (EI)	Potential Expansion	Expansion Index  EI = <span style="border: 1px solid black; padding: 5px;">2</span>
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	<b>NV</b>
Notes:	

pH and Resistivity	
pH Reading:	<b>NA</b>
Resistivity (ohms-cm)	<b>NA</b>

Moisture Density (Proctor)	
Max. Dry Density	<b>NV</b>
Opt. Moisture %	<b>NV</b>
Corr. Max. Dry Density	<b>NV</b>
Corr. Opt. Moisture %	<b>NV</b>
% Rock	<b>17</b>

Class: Silty, clayey sand with gravel

Symbol: SC-SM

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	99		
#4	83		
#10	63		
#40	41		
#100	34		
#200	29		

Remarks:

Reviewed By:

Jayde Moloney

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6/9/2021



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## Soils Summary

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B3 (0-3')

ProTeX Job No: 10300  
 ProTeX Lab No: 203992 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	NV
Plastic Limit	NP
Plasticity Index	NP

Expansion Index, (EI)	Potential Expansion	Expansion Index
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

EI =	NA
------	----

Percent Swell of Soil	
% Swell	NV
Notes:	

pH and Resistivity	
pH Reading:	NA
Resistivity (ohms-cm)	NA

Moisture Density (Proctor)	
Max. Dry Density	NV
Opt. Moisture %	NV
Corr. Max. Dry Density	NV
Corr. Opt. Moisture %	NV
% Rock	8

Class: Sandy silt  
 Symbol: ML

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	96		
#4	92		
#10	83		
#40	70		
#100	61		
#200	51		

Remarks:

Reviewed By:

Jayde Moloney

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## Soils Summary

Client: Clear Sky Capital, Inc  
 Project Name: Loop 101 and Frank Lloyd Wright Blvd  
 Job Name: Scottsdale Storage Site  
 Material: Geo (Native)  
 Material Supplier: -  
 Sample Location: B3 (6-8')

ProTeX Job No: 10300  
 ProTeX Lab No: 203993 - Phoenix  
 Date Received: 6/18/2020  
 Sampled By: Amos McCurdy  
 Date Sampled: 6/18/2020  
 Submitted By: Amos McCurdy

ASTM D4318	
Plasticity Index	
Liquid Limit	<b>24</b>
Plastic Limit	<b>13</b>
Plasticity Index	<b>11</b>

Expansion Index, (EI)	Potential Expansion	Expansion Index
0 - 20	Very Low	
21 - 51	Low	
52 - 90	Medium	
91 - 130	High	
> 130	Very High	

Percent Swell of Soil	
% Swell	<b>NV</b>
Notes:	

pH and Resistivity	
pH Reading:	<b>NA</b>
Resistivity (ohms-cm)	<b>NA</b>

Moisture Density (Proctor)	
Max. Dry Density	<b>NV</b>
Opt. Moisture %	<b>NV</b>
Corr. Max. Dry Density	<b>NV</b>
Corr. Opt. Moisture %	<b>NV</b>
% Rock	<b>15</b>

Class: Clayey sand  
 Symbol: SC

\* = out of specification

ASTM D1140 / D422			
Sieve	% Pass	Specs	*
1"	100		
1/2"	96		
#4	85		
#10	71		
#40	55		
#100	48		
#200	42		

Remarks:

Reviewed By:

Jayde Moloney

8-ZN-2021

6/9/2021



## Summary of Laboratory Test Results Potential for Corrosion

Client: Clear Sky Capital, Inc Builder: Clear Sky Capital, Inc Project Name: Loop 101 and Frank Lloyd Wright Blvd  
Job Name: Scottsdale Storage Site Job ID #: 10300

ProTeX Lab#	Location	Depth	Material Type	Sample Date	Sulfate (SO4) (ppm)	Chloride (CL) (ppm)	Soluble Salts (ppm)	Minimum Resistivity (ohms-cm)	pH	Oxidation- Reduction Potential of Water (mV)
203988	B1	0-3'	Geo	6/18/2020	27	1				
203992	B3	0-3'	Geo	6/18/2020	26	7				


# Appendix B



N Pima Rd

E Frank Lloyd Wright Blvd

Legend:

 Approximate Boring Location



## Site Plan

Scale: N.T.S.

Drawn by: MSK

Date: 06/29/2020

**Scottsdale Storage – APN 215-51-026**  
 Frank Lloyd Wright Boulevard and Northsight Boulevard  
 Scottsdale, Arizona



ProTeX Job No.: 10300

# Appendix C



# LOG OF BORING No. B1

**PROJECT:** Scottsdale Storage - APN 215-51-026 **PROJECT NO.:** 10300  
**CLIENT:** Clear Sky Capital, Inc.  
**PROJECT LOCATION:** Frank Lloyd Wright Boulevard and Northsight Boulevard  
**LOCATION:** See Site Plan **ELEVATION:**  
**DRILLER:** D&S Drilling **LOGGED BY:** AM  
**DRILLING METHOD:** 6" Flight Auger **DATE:** 6/18/2020  
**DEPTH TO - WATER> INITIAL:**  $\nabla$  **AFTER 24 HOURS:**  $\nabla$  **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	TEST RESULTS	
					Plastic Limit	Liquid Limit
0	(CL-ML) Sandy Silty Clay some Gravel, low plasticity, brown, damp		203988	56	Water Content - ●	Penetration -
2.5				R 5 7		
5						
6.8	(CL) Sandy Clay, low-medium plasticity, brown, damp		203989	63		
7.5	Soil transitions to light brown					
10	Soil transitions to trace Gravel					
12.5			203990	53		
15	Boring terminated at 15 ft.					
17.5						



# LOG OF BORING No. B2

**PROJECT:** Scottsdale Storage - APN 215-51-026      **PROJECT NO.:** 10300  
**CLIENT:** Clear Sky Capital, Inc.  
**PROJECT LOCATION:** Frank Lloyd Wright Boulevard and Northsight Boulevard  
**LOCATION:** See Site Plan      **ELEVATION:** \_\_\_\_\_  
**DRILLER:** D&S Drilling      **LOGGED BY:** AM  
**DRILLING METHOD:** 6" Flight Auger      **DATE:** 6/18/2020  
**DEPTH TO - WATER> INITIAL:** ∇ \_\_\_\_\_ **AFTER 24 HOURS:** ∇ \_\_\_\_\_ **CAVING> C:** \_\_\_\_\_

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(SC-SM) Silty Clayey Sand with Gravel, low plasticity, brown, damp		0399	29			
2.5				56			
5	Soil transitions to light brown			69			
7.5							
10							
12.5							
15	Boring terminated at 15 ft.						
17.5							



# LOG OF BORING No. B3

**PROJECT:** Scottsdale Storage - APN 215-51-026 **PROJECT NO.:** 10300  
**CLIENT:** Clear Sky Capital, Inc.  
**PROJECT LOCATION:** Frank Lloyd Wright Boulevard and Northsight Boulevard  
**LOCATION:** See Site Plan **ELEVATION:**  
**DRILLER:** D&S Drilling **LOGGED BY:** AM  
**DRILLING METHOD:** 6" Flight Auger **DATE:** 6/18/2020  
**DEPTH TO - WATER> INITIAL:**  $\nabla$  **AFTER 24 HOURS:**  $\nabla$  **CAVING>** C

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Sample No.	Blow Counts	% < #200	TEST RESULTS	
						Plastic Limit	Liquid Limit
0	(ML) Sandy Silt trace Gravel, non-plastic, brown, damp		203992	51			
2.5				R 3 4			
5				R 7 10			
6.8	(SC) Clayey Sand some Gravel, low-medium plasticity, brown, damp		203993	42			
7.5							
10	Soil transitions to light brown						
12.5							
15	Boring terminated at 15 ft.						
17.5							

# Appendix D

# Key To Soil Symbols and Classifications

## Common Strata Symbols

	High plasticity clay (CH -- C)		Well graded gravel with clay (GW-GC -- 830)
	Inorganic silts and clays (CH-MH -- MC)		Well graded gravel with silt (GW-GM -- 83Z)
	Low plasticity clay (CL -- O)		Well graded gravel/clayey gravel (GW-GP -- 83G)
	Low-high plasticity clays (CL-CH -- CO)		Well graded gravel and sand (GW-SW -- 83D)
	Silty low plasticity clay (CL-ML -- CZ)		Elastic silt (MH -- M)
	Fill (FILL -- F)		Silt (ML -- Z)
	Clayey gravel (GC -- O8)		High plasticity organic clays (OH -- 5)
	Clayey sand and gravel (GC-SC -- DO8)		Low plasticity organic silts (OL -- 4)
	Silty gravel (GM -- Z8)		Basalt (or generic rock) (ROCK -- )
	Silty clayey gravel (GM-GC -- ZO8)		Clayey sand (SC -- DO)
	Silty sand and gravel (GM-SM -- O8)		Silty sand (SM -- O)
	Poorly graded gravel (GP -- G)		Poorly graded clayey silty sand (SC-SM -- :ZO)
	Poorly graded gravel with clay (GP-GC -- DGO3)		Poorly graded silty fine sand (SM-ML -- :Z)
	Poorly graded gravel with silt (GP-GM -- DGZ3)		Poorly graded sand (SP -- :)
	Poorly graded gravel and sand (GP-SP -- :G)		Poorly graded sand with clay (SP-SC -- :R)
	Well graded gravel (GW -- 83)		Poorly graded sand with silt (SP-SM -- :=)
	Well graded sand (SW -- D)		Well graded sand with gravel (SW -- D9)
	Well graded sand with clay (SW-SC -- DR)		Silty sand with gravel (SM -- O9)
	Well graded sand with silt (SW-SM -- D=)		Clayey sand with gravel (SC -- DO9)

## Relative Density of Cohesionless Soils (blows/ft)

Very Loose	0 to 4
Loose	5 to 10
Medium	11 to 30
Dense	31 to 50
Very Dense	over 50

## Relative Degree of Plasticity (PI)

Non-Plastic	0
Low	1 to 7
Low-Medium	8 to 14
Medium	15 to 21
Medium-High	22 to 28
High	29 to 35
Very High	Over 35

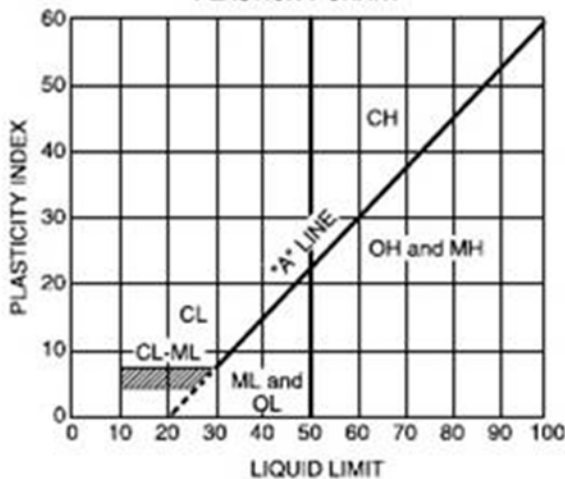
## Relative Proportions (%)

Trace	5 to 10
Some	10 to 15
With	15 to 35
And	35 to 50

## Particle Size Identification (Diameter)

Boulder	8.0" or Larger
Cobbles	3.0" to 8.0"
Coarse Gravel	0.75" to 3.0"
Fine Gravel	5.0 mm to 3.0"
Coarse Sand	2.0 mm to 5.0 mm
Medium Sand	0.4 mm to 2.0 mm
Fine Sand	0.07 mm to 0.4 mm
Silt	0.002 mm to 0.07 mm
Clay	Less Than 0.002

PLASTICITY CHART



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