APPENDIX F
Geotechnical Evaluation

October 12, 2018 Project No.: 18-3333-10

Conejo Recreation and Park District
403 West Hillcrest Drive
Thousand Oaks, California 91360

Attn: Mr. Andrew Mooney

Subject: Limited Geotechnical Evaluation Report, Proposed Park Improvements, Conejo Recreation and Park District, Conejo Creek Southwest Park, Paige Lane North of Combes Avenue, City of Thousand Oaks, California

INTRODUCTION

This report contains a summary of our field and laboratory test program and geotechnical recommendations for proposed park improvements at the subject site. The site is an existing vacant field located on the north side of Combes Avenue and the east and west sides of Paige Lane in the City of Thousand Oaks. The site is trapezoidal shaped and extends north of Combes Avenue to where Paige Lane crosses underneath the Moorpark Freeway (23) at the northeast corner of the site and from the Moorpark Freeway on the east to a lined drainage channel on the west and northwest.

Site exploration was conducted on October 2, 2018 and included four shallow hand auger borings at the locations shown on the attached Boring Location Map (Figure 1). Subsurface conditions were observed in the borings and bulk soil samples were also obtained for laboratory analyses. The boring excavations were backfilled with on-site soils at the conclusion of our field exploration.

SUMMARY OF FIELD OBSERVATIONS / SUBSURFACE CONDITIONS

The vacant field contains numerous trees and seasonal weeds and grasses that have been tilled for weed abatement. There is also a walking trail which approximately parallels the alignment of the drainage channel on the west and northwest boundaries of the site. The upper 12 inches of soil were disturbed by the weed abatement. The underlying native soils consist of gray brown sandy clay in a dry and desiccated condition to a depth of approximately 12 inches. Below the desiccated zone, the soils are slightly moist to moist and medium stiff to stiff to a depth of 2 – 3 feet below the ground surface. These soils are also rocky and contained significant amounts of large gravel to cobble size fragments on the west side of Paige Lane. These surface soils are typically underlain by very fine sandy silty in a moist to stiff condition. Layers of gravel were encountered at some of the boring locations.

CONCLUSIONS AND RECOMMENDATIONS

Based on the data collected during the field and laboratory evaluations, our geotechnical experience in the vicinity of the project site, and our understanding of the anticipated construction, the following general conclusions are presented.

- Based on the findings and results of the limited geotechnical evaluation, the site is considered suitable for the proposed construction from a geotechnical standpoint. The anticipated grading and building site will be safe from the potential hazards of land sliding, settlement or slippage. In addition, the anticipated grading and building construction will not affect the geologic stability of adjacent property.

- The site is considered suitable for the proposed construction with regard to support of the proposed

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structures and pavements, provided the recommendations contained in this report are followed.

We anticipate that minor cut and fill grading will be necessary to construct proposed park grades, prepare building pads, and prepare pavement subgrade for the proposed development. The following recommendations should be incorporated into the design, construction and maintenance of proposed park improvements.

Geotechnical Seismic Design

The Site may experience strong ground shaking from seismic events generated on regionally active faults. Seismic ground motion parameters were evaluated using a simplified code based approach and ground motion procedures for seismic design. The simplified code based approach follows the procedures in the 2013 California Building Code (CBC) based on ASCE/SEI 7-10 Section 11.4. The 2013 CBC is based on the 2012 IBC which references the Minimum Design Loads for Buildings and Other Structures (ASCE/SEI 7-10) as indicated under Effective use of the IBC/CBC on page ix of the 2013 CBC.

Seismic ground motion values are initially determined based on site class B (rock) conditions. The values are adjusted to obtain the maximum considered earthquake (MCE) spectral acceleration values for the site based on its site class of D. The seismic design parameters for the Site's coordinates (latitude 34.1891° North and longitude -118.8642° West) were obtained from the USGS web based spectral acceleration response maps and calculator:

<http://earthquake.usgs.gov/designmaps/us/application.php>

Seismic Parameters based on ASCE/SEI 7-10

CHAPTER 16 TABLE/FIGURE NO.	SEISMIC PARAMETER	VALUE PER CA BUILDING CODE
Figure 1613.5 (3)	Short Period Mapped Acceleration (S_s)	1.50g
Figure 1613.5 (4)	Long Period Mapped Acceleration (S_1)	0.60g
Table 1613.5.2	Site Class Definition	D
Table 1613.5.3 (1)	Site Coefficient (F_a)	1.0
Table 1613.5.3 (2)	Site Coefficient (F_v)	1.5
Equation 16-37	$S_{MS} = F_a S_s$	1.50g
Equation 16-38	$S_{M1} = F_v S_1$	0.90g
Equation 16-39	$S_{DS} = 2/3 S_{MS}$	1.00g
Equation 16-40	$S_{D1} = 2/3 S_{M1}$	0.60g

The purpose of the building code earthquake provisions is primarily to safeguard against major structural failures and loss of life, not to limit damage nor maintain function. Therefore, values provided in the building code should be considered minimum design values and should be used with the understanding site acceleration could be higher than addressed by code based parameters. Cracking of walls and possible structural damage should be anticipated in a significant seismic event.

Site Preparation and Grading

As discussed above, the proposed site development will include minor cut and fill grading and remedial grading to provide suitable building areas for the structure, parking and drive area subgrade and to provide suitable site drainage.

Grading and Earthwork

After stripping and removal of existing surface and subsurface improvements, all building and pavement areas and areas to receive fill should be over-excavated to a depth of at least 2' BGS.

The bottom of the over-excavation areas should be scarified to a depth of 8 inches, moisture conditioned to between optimum and three (3) percent above optimum moisture content and compacted as engineered fill to at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. It should be anticipated for this to be performed in all building and foundation areas and a minimum of 5 feet outside building areas where possible.

The moisture content and density of the compacted soils, footing excavations etc., should be maintained until the placement of concrete. If soft or unstable soils are encountered during excavation or compaction operations, the contractor shall perform remedial grading to achieve a stable subgrade condition. This may include the use of geotextile fabric and rock sections (or other means) to achieve stability at the base of excavation, prior to backfilling. All fills required to bring excavations to final grades should be placed as engineered fill. In addition, all native soils over-excavated should be compacted as engineered fill.

The contractor should be responsible for the disposal of concrete, asphaltic concrete, soil, spoils, etc. (if any) that must be exported from the site. Individuals, facilities, agencies, etc. may require analytical testing and other assessments of these materials to determine if these materials are acceptable. The contractor should be responsible for performing the tests, assessments, etc. to determine the appropriate method of disposal. In addition, the Contractor is responsible for all costs to dispose of these materials in a legal manner.

Vegetation and Debris Removal

Any vegetation, soils containing significant levels of organics, trash or construction debris on the property within the areas of development should be removed prior to the grading operations. Any existing utility or subsurface drainage systems present within the proposed development areas should be removed or abandoned per the approval of the project geotechnical consultant and the California Building Code.

Soil Removal

For planning purposes, we recommend that the removal be extended to a depth of 24" below the bottom of the proposed footings in building areas. For foundations on the existing or proposed ground level, we recommend a removal depth of 3 feet BGS or 24 inches below the bottom of proposed footings, whichever is deeper. In areas of pavement or hardscape, the depth of removal should be 24 inches BGS or a minimum of 12 inches below subgrade elevation, whichever is deeper.

Deeper removals may be necessary where heavy foundation loads are proposed. The structure loadings should be evaluated when available. The removals should be performed in all building and foundation areas and a minimum of 5 feet outside building areas where possible. Soil removals should be re-evaluated when foundation loading and proposed grading plans have been finalized.

The zone of over-excavation and compaction should extend a minimum of 5 feet beyond the exterior building lines where possible or laterally to the edge of the existing improvements which are to remain or property lines.

After the removals are completed as addressed above, the exposed soil should be observed by the project geotechnical consultant to evaluate if additional removals are needed. No fill soils should be placed until the geotechnical observation of removal areas is completed.

Preparation of Fill Area

After removals are performed as addressed above, all areas to receive fill should be processed before placing fill. Processing should consist of surface scarification to a minimum depth of 8 inches, moisture conditioning to slightly above the optimum moisture content, and re-

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compaction to a minimum of 90% of the maximum dry density (90% relative compaction). Optimum moisture content and maximum dry density should be determined per ASTM D 1557.

Fill Placement

On-site materials obtained from excavations may be used as fill soils. Fill soils should be free of all deleterious materials including trash, debris, organic matter, and rocks larger than 6 inches. Fill soils should be placed in thin uniform lifts, brought to slightly above the optimum moisture content, and compacted to a minimum of 90% relative compaction. Sources of import fill if necessary should be approved by the project geotechnical consultant prior to transport of materials to the site.

Temporary Excavations

Temporary shallow excavations made in properly compacted fill or competent natural soils should stand with vertical sides. However, following Occupational Safety and Health Act (OSHA) requirements, vertical excavations deeper than 4 feet should be shored, or sloped.

During construction, the excavation and maintenance of safe and stable slope angles are the responsibility of the contractor. The contractor's work should conform to the requirements of OSHA and should consider the subsurface conditions and method of operation. Surcharge loads should be setback from the top of temporary excavations a horizontal distance equal to the depth of the excavation or 10 feet, whichever is more.

It is the responsibility of the contractor to provide safe working conditions with respect to excavation slope stability. The contractor is responsible for site slope safety, classification of materials for excavation purposes, and maintaining slopes in a safe manner during construction. The grades, classification and height recommendations presented for temporary slopes are for consideration in preparing budget estimates and evaluating construction procedures.

Temporary excavations should be constructed in accordance with CAL OSHA requirements. Temporary cut slopes should not be steeper than 1.5H:1V, and flatter if possible. If excavations cannot meet these criteria, the temporary excavations should be shored.

In no case should excavations extend below a 1.5H:1V zone below existing utilities and the bottom of foundations and/or floor slabs which are to remain after construction. Excavations which are required to be advanced below the 1.5H:1V envelope should be shored to support the soils, foundations, and slabs.

Slope gradient estimates provided in this report do not relieve the contractor of the responsibility for excavation safety. In the event that tension cracks or distress to the structure occurs, during or after excavation, the retail tenant should be notified immediately and the contractor should take appropriate actions to minimize further damage or injury.

Grading Standards

All aspects of grading including site preparation, grading and fill placement, keying, and benching should be per the current California Building Code or these recommendations, whichever is more stringent.

Soil Expansiveness

Expansion tests were performed on selected soil samples. Based on these test results, the soils at the site have low expansion potential (21-50 expansion index ranges). We recommend that preliminary designs consider the medium (21-50) range of expansive soils.

Expansive soils contain clay particles that change in volume (shrink or swell) due to a change in the soil moisture content. The amount of volume change depends upon: the soil swell potential; the availability of water; and the restraining pressure on the soil. Swelling occurs

when clay soils become wet due to excessive water. Excessive water can be caused by poor surface drainage, over-irrigation of lawns and planters, and sprinkler or plumbing leaks.

Swelling clay soils can cause distress to construction (generally as uplift). Construction on expansive soil has an inherent risk that should be acknowledged and understood by the property owner. The geotechnical recommendations presented herein are intended to reduce the potential for expansive soil action. However, these recommendations are not intended, nor designed to provide complete and full mitigation of expansive soil conditions. If requested, additional recommendations beyond those herein can be provided to further reduce the risk of expansive soil action. A significant change in the internal soil moisture content can cause soil movement on the order of 1 to 2 inches, depending on the soil expansion range. Therefore, positive drainage should be consistently provided and maintained away from all structures and the drainage should not be changed creating an adverse drainage condition. Landscape watering should be held to a minimum. In addition, irrigation systems should be maintained and any sprinkler or plumbing leaks immediately repaired to avoid saturation of the building and hardscape subgrade soils.

Conventional Foundation Design

General

Foundations for the proposed structures should be supported entirely in certified compacted fill. When detailed foundation plans are prepared, they should be provided to this office for review. Certified compacted fill exposed in the foundation excavations should consist of materials with uniform characteristics regarding density and expansion. If non-uniform conditions are encountered revised foundation recommendations or remedial grading as directed by the project geotechnical consultant may be necessary.

Design Data

The proposed structures may be supported on continuous and isolated footings. The footings embedded in engineered compacted fill may be designed to impose an allowable bearing pressure of 2000 pounds per square foot (psf). These bearing pressures apply for dead plus live loads and may be increased by one-third when considering wind or seismic loads. Continuous and isolated footings should have minimum widths of 12 and 24 inches, respectively. The footings should be embedded a minimum of 18 inches below proposed grade or 18 inches into suitable bearing material, as measured from the lowest adjacent grade, interior or exterior. The above embedments are for footings embedded into materials having an expansion index of less than 90. Steel reinforcement should be per the structural engineer's recommendations, however, minimum continuous footing reinforcement should consist of 2 #4 bars in the top and bottom (total of 4 bars). Shallow footings adjacent to retaining walls should be included in the design of the walls or stepped down below a 2(h):1(v) plane projecting upward from the bottom of the retaining wall footings.

Lateral Resistance

Lateral forces exerted by retained soil or compacted fill may be resisted by passive soil pressure and friction. To develop full passive earth pressure, level ground consisting of engineered compacted fill should extend a distance of at least 3 times the footing depth in front of the footing. The passive soil pressure may be taken as an equivalent fluid pressure of 250 pcf, not to exceed 2500 psf where the footing is on level ground. Friction between the bottom of the footings and soil may be taken as 0.35. Passive resistance and friction may be combined with no reduction.

Settlement

Settlement of the footings embedded in certified compacted fill should be minimal, on the order of ½ to ¾ inch, depending upon the foundation loading and size. The settlements are anticipated to occur rapidly as the foundations are loaded. No long term settlement is

anticipated for properly constructed foundations embedded in the recommended bearing materials.

Footing Excavation

All footings should be cut square and level and cleaned of all slough. Soil excavated from the footing trenches (including utility trenches) should not be spread over any areas of construction, unless properly compacted. The footing excavations should be observed by the project geotechnical consultant before placing reinforcing steel. Soils silted into the footing excavations during the pre-moistening operations should be removed to the required depth before casting the concrete. The footings should be cast as soon as possible to avoid deep desiccation of the footing subsoils.

Pre-moistening

Footing subsoils should be premoistened per the requirements of the project geotechnical consultant. For planning purposes, we recommend subgrade soils should be premoistened to a minimum of 3% over the optimum moisture content for a minimum depth of 24 inches. This office should observe pre-moistening of the subgrade before placement of sand base or concrete.

Conventional Slab on Grade

Subgrade Preparation

The subgrade for all slabs-on-grade should consist of engineered compacted fill for interior or exterior slabs. If disturbed during foundation and utility construction, the subgrade soils should be processed and compacted according to the recommendations of the previous Fill Placement and Compaction section before placement of any aggregate (sand) base. Any loose soils should be removed to firm in-place material, the exposed subgrade processed, and the material replaced as engineered compacted fill as described above.

Design Data

The concrete slabs-on-grade within the building interiors should be a minimum of 4 inches thick. Reinforcement should consist of a minimum of No. 3 bars at 24 inches on centers in both directions or per the structural engineer's design. The slab steel reinforcement should be extended into the foundations to within 3 inches of the footing bottom at 36 inches on center. The slab should be underlain by 4 inches of clean sand.

Concrete mixing, placement, finishing, and curing should be performed per the American Concrete Institute. Guide for Concrete Floor and Slab Construction (ACI 302.1R-04). The concrete slump for a Class 1 Floor is 5 inches in the ACI 302.1R-04 guide. Concrete slump in the Portland Concrete Association Design and Control of Concrete Mixtures bulletin is recommended at 4 inches for reinforced slabs. These published concrete slumps should be considered in the design of the concrete slabs-on-grade. Concrete shrinkage cracks could become excessive if water is added to the concrete above the allowable limit, and proper finishing and curing practices are not followed.

Concrete usually develops cracks. Concrete shrinkage and cracking could become excessive if water is added to the concrete above the allowable limit, or if proper placement, finishing and curing practices are not followed. Placement, finishing and curing should be performed in accordance with Portland Cement Association guidelines. Low slump concrete should be used; if a higher slump is needed for workability, a water reducing agent could be used instead of adding more water.

Premoistening

Slab subsoils should be premoistened per the requirements of the project geotechnical consultant. For planning purposes, we recommend subgrade soils should be premoistened to a minimum of 3% over the optimum moisture content for a minimum depth of 24 inches. This

office should observe pre-moistening of the subgrade before placement of sand base or concrete.

Moisture Vapor Retarder Layer

An appropriate moisture vapor retarder layer should be installed and maintained below the slab to reduce moisture vapor transmission through the slab if specified. Ten-mil plastic sheeting, commonly used as a moisture vapor retarder layer, may not provide the desired reduction in moisture vapor transmission. Therefore, a retarder layer specifically manufactured per ASTM E 1745-97 *Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs* should be considered below the interior concrete slabs on-grade. The class of moisture vapor retarder layer should be strong enough to withstand abrasion during construction. The retarder should be installed per ASTM E1643-98(2005) *Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*.

Perforations through the moisture vapor retarder such as at pipes, conduits, columns, grade beams, and wall footing penetrations should be sealed per the manufacturer's specifications or ASTM E1643-98(2005) *Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs*. Proper construction practices should be followed during construction of the slab on-grade. Repair and seal tears or punctures in the moisture barrier that may result from the construction process prior to concrete placement.

Minimizing shrinkage cracks in the slab-on-grade can further minimize moisture vapor emissions. A properly cured slab utilizing low-slump concrete will reduce the risk of shrinkage cracks in the slab as described herein.

The concrete contractor should be made aware of the moisture vapor retarder and required to protect the layer. Perforations made in the layer by the concrete contractor should be properly sealed prior to concrete placement. In addition, if the concrete is placed directly on top of the layer the concrete contractor should make the necessary changes in the concrete placement and curing. Placing the concrete directly on top of the moisture vapor retarder layer allows the layer to be observed for damage directly prior to concrete placement.

The grade of the project should be kept as high as practical and the interior slabs should be maintained as high as practical above the exterior grades. Drainage should be maintained away from the structures. Washing of the sidewalks adjacent the structures should be minimized and water should not be allowed to pond adjacent the structures. Provide proper drainage and elevation of ground adjacent the slab (that is the ground surface should be at least 6 inches below the wall plate). In addition, the landscaping should not be over watered resulting in excess moisture below the slab

The slabs should be tested for moisture content prior to the selection of the flooring and adhesives. Moisture in the slabs should not exceed the flooring manufacturer's specifications. The concrete surface should be sealed per the manufacturer's specifications if the moisture readings are excessive. It may be necessary to select floor coverings that are applicable to high moisture conditions.

Where cuts are made into the slab for future construction, the moisture vapor retarder layer should be repaired per the manufacturer's recommendation. Information regarding the need to repair the moisture vapor retarder layer and information on the selection of acceptable slab coverings should be conveyed to the project consultants.

Pavement Design

The asphaltic concrete pavement design formulas used were obtained from *The Flexible Pavement Design Guide for California Cities and Counties*. The asphalt concrete pavement designs shown below are based on a subgrade "R" Value of 43 based on recent testing and various traffic indices as indicated in the following table.

Assigned R-Value	Recommended Structural Section Asphalt Paving*
4	3" AC / 4" AB / S
5	3" AC / 5" AB / S
6	3" AC / 6" AB / S

*AC = Asphaltic Concrete

*AB = Aggregate Base

*S = Compacted Subgrade (R~43)

Subgrade Preparation

The subgrade soils within areas of proposed paving and beneath proposed curbs and gutters should be moistened to slightly above the optimum moisture content and compacted to a minimum of 90% of the laboratory standard prior to placing aggregate base or concrete.

Aggregate Base Preparation

The aggregate base and subbase (if utilized) materials within areas of proposed paving should be moistened to slightly above the optimum moisture content, placed in lifts no thicker than 6 inches and compacted to a minimum of 95% of the laboratory standard.

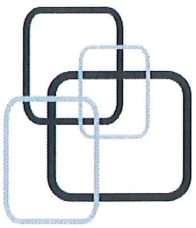
CLOSURE

This report was prepared under the direction of State registered geotechnical engineer. No warranty, express or implied, is made as to conclusions and professional advice included in this report. Independent Solutions disclaim responsibility and liability for problems that may occur if the recommendations presented in this report are not followed. We cannot attest to the presence of concealed adverse soil conditions nor can we anticipate changes in the soil conditions that can result from construction procedures.

The recommendations are based on interpretations of the subsurface conditions determined from the limited subsurface exploration program described herein. The interpretations may differ from actual subsurface conditions, which can vary horizontally and vertically across the site. This office should observe all aspects of field construction addressed in this report. Any person using this report for bidding or construction purposes should perform such independent investigations, as they deem necessary. The work should be performed per the current building code.

We appreciate the opportunity to submit this geotechnical report, and look forward to serving on your design team for the successful completion of this project. Please call if you have any questions regarding items presented in this report or desire any additional information.

Please call if you have questions regarding this report.



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We appreciate this opportunity to be of service and should you have any questions, please do not hesitate to call us.

Sincerely,
Independent Solutions

Randal L. Wendt, GE 2341
Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
RANDAL L. WENDT
No. 2341
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Attachments: Appendix A — Laboratory Results
Figure 1 — Boring Location Map

Distribution: Addressee (4)

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Appendix A – Laboratory Results

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INTRODUCTION

Representative undisturbed soil samples and bulk samples were carefully packaged inthe field and sealed to prevent moisture loss. The samples were then transported to our office for examination and testing assignments. Laboratory tests were performed, by our laboratory and subcontracted laboratory (NV5) on selected representative samples to evaluate the physical properties of the soils affecting foundation design and construction procedures. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

MAXIMUM DENSITY / OPTIMUM MOISTURE

Maximum density/optimum moisture tests (compaction characteristics) were performed on selected samples of the encountered materials. The tests were performed in general accordance with ASTM D 1557 test method. The results are as follows:

BORING NO.	DEPTH (FT)	SOIL DESC	MAX DENSITY (PCF)	OPTIMUM MOISTURE (%)
B-1 thru B-3	1'-3'	Gray Brown Sandy Clay	121.1	10.8

EXPANSION INDEX

Expansion index tests were performed on a bulk sample. The test was performed in accordance with ASTM 4289 to assess the expansion potential of on-site soils. The results of the test are summarized below:

BORING NO.	DEPTH (FT)	SOIL DESC	EXPANSION INDEX
B-1 thru B-3	1'-3'	Gray Brown Sandy Clay	32

ATTERBERG LIMITS

Liquid and plastic limits were determined for selected samples in accordance with ASTM 04318. Results of the Atterberg Limits test are summarized on below.

BORING NO.	DEPTH (FT)	SOIL CLASS	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)
B-1 thru B-3	1'-3'	Clay (CL)	28	18	10

R-VALUE

An "R" Value was conducted on a sample of the typical soil type encountered. The test was conducted under subcontract by Geo-Logic Associates in general accordance with the ASTM D2844/CTM 301. An "R" Value of 43 was determined for the sample tested. Test results are attached.

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Conjeo Creek Southwest Park
Paige Lane, Thousand Oaks, CA

Project No.: 18-3333-10

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-02

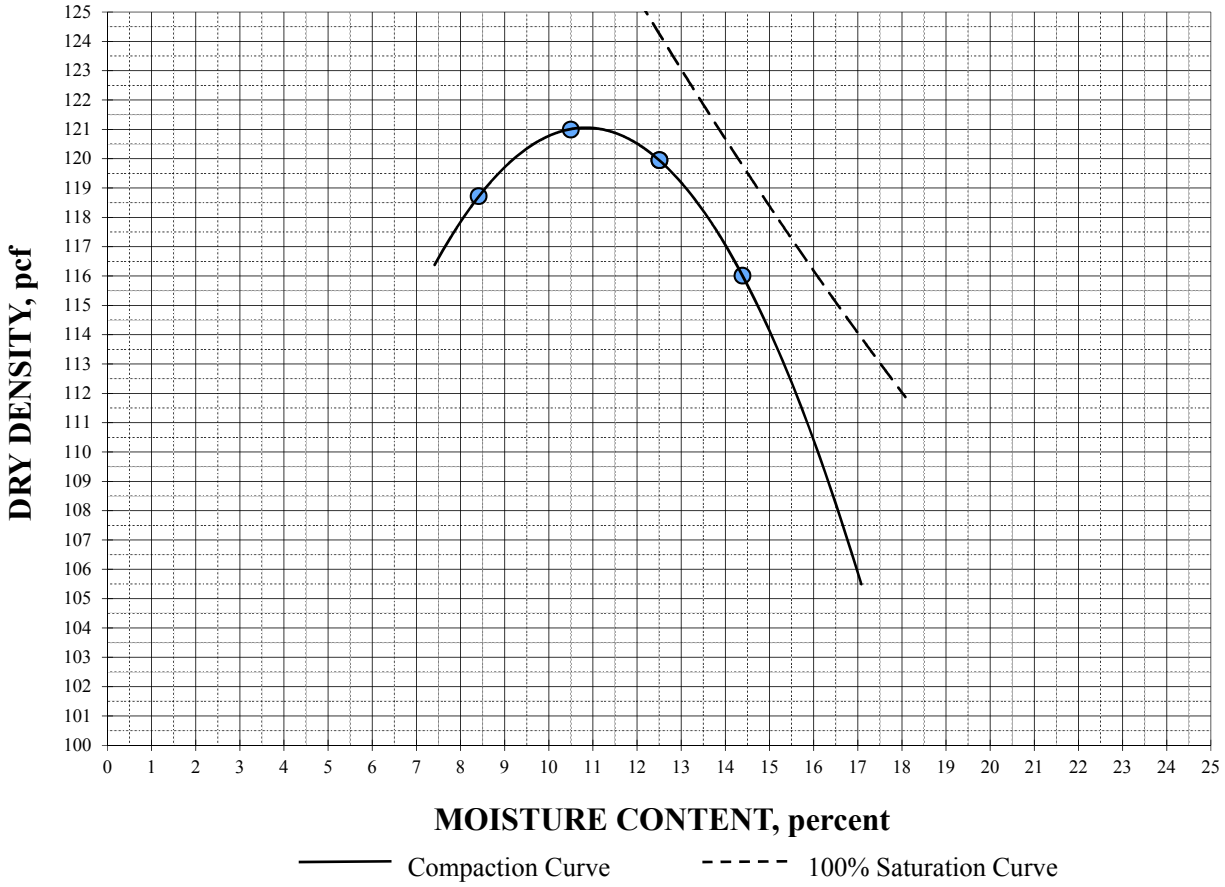
PROCEDURE USED: A
PREPARATION METHOD: Dry
RAMMER TYPE: Manual
SPECIFIC GRAVITY: 2.65 (assumed)

Date: October 4, 2018
Lab Number: 810021
Description: Dark Brown Silt with Sand (ML)

SIEVE DATA:

Sieve Size	% Retained
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 121.1 pcf
OPTIMUM MOISTURE: 10.8%



EXPANSION INDEX - UBC 18-2 & ASTM D 4829-88

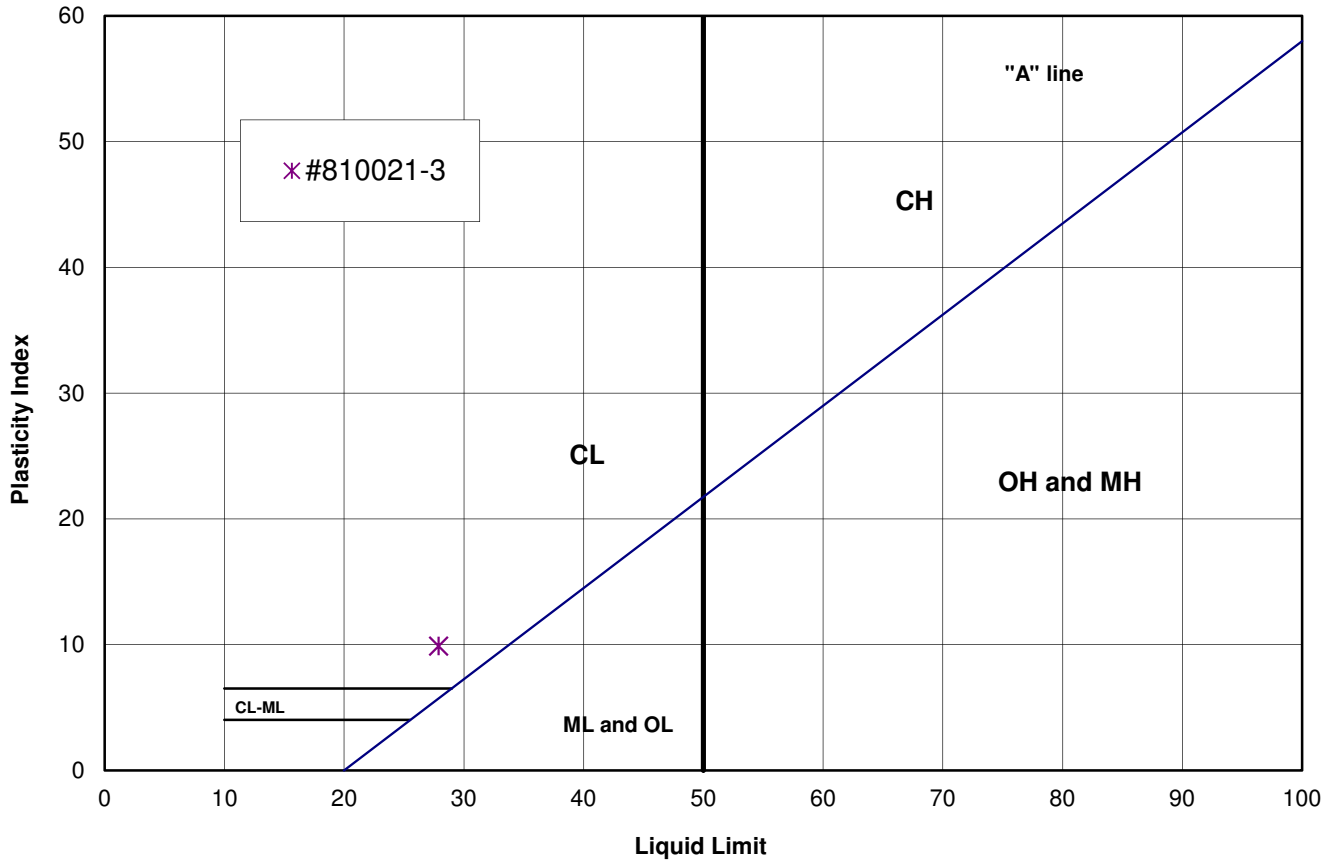
PROJECT Independent Solutions # 18-3333-10 JOB NO. SO17-1238

Sample	Lab ID 810021-2		By	LD	Sample			By	
Sta. No.					Sta. No.				
Soil Type	Brown, F.M.Clayey Sand				Soil Type				
Date	Time	Dial Reading	Wet+Tare	605	Date		Dial Reading	Wet+Tare	
10/8/2018	16:20	0.4111	Tare	218.1				Tare	
		H2O	Net Weight	386.9				Net Weight	
10/9/2018	10:00	0.3795	% Water	11				% Water	
			Dry Dens.	105.6				Dry Dens.	
			% Max					% Max	
			Wet+Tare	649.2				Wet+Tare	
			Tare	218.1				Tare	
			Net Weight	431.1				Net Weight	
INDEX	32	3.2%	% Water	23.7	**INDEX**			% Water	

Sample			By		Sample			By	
Sta. No.					Sta. No.				
Soil Type					Soil Type				
Date		Dial Reading	Wet+Tare		Date		Dial Reading	Wet+Tare	
			Tare					Tare	
			Net Weight					Net Weight	
			% Water					% Water	
			Dry Dens.					Dry Dens.	
			% Max					% Max	
			Wet+Tare					Wet+Tare	
			Tare					Tare	
			Net Weight					Net Weight	
INDEX			% Water		**INDEX**			% Water	

Geo-Logic ASSOCIATES

PLASTICITY INDEX _ ASTM D4318



Sample	Depth	LL	PL	PI	USCS	Material Description
#810021-3		28	18	10	CL	

Job Name: Independent Solutions # 18-3333-10 Date: 10/9/18

Job No.: SO17-1238-00

Geo-Logic ASSOCIATES

'R' VALUE CA 301

Client: Independent Solutions Date: 10/9/18 By: LD

Client's Job No.: 18-3333-10 Sample : Lab ID # 810021-4

GLA Reference: SO17-1238-00 Soil Type: Brown, Clayey Sand

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	**250**	**120**	**200**	
Initial Moisture Content	%	**6.2**	**6.2**	**6.2**	
Water Added	ml	**70**	**90**	**105**	
Moisture at Compaction	%	12.4	14.2	15.5	
Sample & Mold Weight	gms	**3188**	**3178**	**3141**	
Mold Weight	gms	**2104**	**2105**	**2101**	
Net Sample Weight	gms	1084	1073	1040	
Sample Height	in.	**2.448**	**2.51**	**2.46**	
Dry Density	pcf	119.4	113.5	110.9	
Pressure	lbs	**9400**	**4350**	**1990**	
Exudation Pressure	psi	748	346	158	
Expansion Dial	x 0.0001	**85**	**40**	**5**	
Expansion Pressure	psf	368	173	22	
Ph at 1000lbs	psi	**20**	**27**	**39**	
Ph at 2000lbs	psi	**40**	**58**	**83**	
Displacement	turns	**3.69**	**4.04**	**4.19**	
R' Value		67	52	36	
Corrected 'R' Value		**67**	**52**	**36**	

FINAL 'R' VALUE	
By Exudation Pressure (@ 300 psi):	**49**
By Epansion Pressure :	**43**
TI = 5	

Geo-Logic ASSOCIATES

WHITECLIFF ROAD

PAIGE LANE

PAIGE LANE

COMBES AVENUE

B-1

B-2

B-3

B-4

CONEJO CREEK SOUTHWEST PARK

CONCEPT PLAN

THOUSAND OAKS, CA.

0' 20' 40' 80' 120'

SCALE 1" = 40'

AUGUST 22, 2018

Playground Perspective

KEY

1. Existing Tree(s) to Remain
2. Existing Multi-Use Path
3. Existing Conejo Creek Channel
4. Existing Utilities
5. Vegetated Swale with On-Site Retention
6. Porous Asphalt Parking Lot (1 ADA, 8 Standard Spaces)
7. Crosswalk
8. Porous Asphalt Pedestrian Path
9. Native Earth Equestrian Trail with Scored Concrete Crossing
10. Restroom - Single Occupancy with Drinking Fountain and Bottle Filling Station
11. Chumash Creek Themed Playground
12. Picnic Shade Structure
13. "Optional" Picnic Shade Structure
14. Backstop
15. Multi-Use Court
16. Sand Volleyball
17. Multi-Use Lawn
18. Fitness Node (6 Total)
19. Boardwalk
20. Vehicle Gate
21. Future Corral
22. Park Sign (Primary)
23. Park Sign (Secondary)
24. Picnic Area
25. Native/Drought Tolerant Landscape Planting
26. Bike Racks
27. Perimeter Fencing
28. Culvert

BORING LOCATION MAP
Figure 1

CRPD - Conejo Creek
Southwest Park
Project No. 18-3333-10

EXPLANATION

● **Approximate Location of Hand Auger Boring**

Conejo Recreation & Park District

rrm design group

October 31, 2018 Project No.: 18-3333-02

Conejo Recreation and Park District
403 West Hillcrest Drive
Thousand Oaks, California 91360

Attn: Mr. Andrew Mooney

Subject: Addendum Geotechnical Letter, Additional Findings and Opinions, Proposed Park Improvements, Conejo Recreation and Park District, Conejo Creek Southwest Park, Paige Lane North of Combes Avenue, City of Thousand Oaks, California

Reference: California Department of Conservation, 2000, Seismic Hazard Zone Report for the Thousand Oaks 7.5-Minute Quadrangle, Ventura and Los Angeles Counties, California, Seismic Hazard Zone Report 042.

Independent Solutions, October 12, 2018, Limited Geotechnical Evaluation Report, Proposed Park Improvements, Conejo Recreation and Park District, Conejo Creek Southwest Park, Paige Lane North of Combes Avenue, City of Thousand Oaks, California, Project No. 18-3333-01.

The following additional findings and opinions is provided as input for the preparation of a Mitigated Negative Declaration for the proposed development. The additional findings and opinions were requested to address the liquefaction potential for the site.

Liquefaction

A detailed liquefaction evaluation for the site was not conducted as part of the scope of work for the referenced Limited Geotechnical Evaluation Report.

General

Liquefaction can occur when saturated loose granular soils are subjected to excessive ground vibrations. During liquefaction, excessive pore pressure increases cause these soils to lose strength. This may result in mobilization of the soil, causing total or differential settlements, lateral spreading, and/or surface manifestations such as loss of bearing capacity, artesian water flow, and sand boils.

Ground Water

Groundwater was not encountered in our recent limited subsurface exploration. Based on data presented in the *Seismic Hazard Report 042 for the Thousand Oaks 7.5-Minute Quadrangle, Ventura and Los Angeles Counties, California* (CDC 2000), the depth to historically high groundwater in the vicinity of the site is as shallow as 10 feet.

Liquefaction Potential

Based on our review of geotechnical data for the site, the site is within a liquefaction hazard zone, however, it is our opinion that the potential for liquefaction is low due to the clayey nature of the alluvial soils at the site (based on previous experience in the Conejo Creek Park and lab testing of near surface samples). In addition, based on the proposed development (park, paving, flatwork, playground equipment, prefab structure) and remedial grading recommended in

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the referenced report, settlement due to liquefaction at the site will have a limited effect on proposed site improvements.

All other previous recommendations from the referenced report remain applicable and should be incorporated into the design, construction and maintenance of proposed site improvements.

We appreciate this opportunity to be of service and should you have any questions, please do not hesitate to call us.

Sincerely,
Independent Solutions

Randal L. Wendt, GE 2341
Senior Geotechnical Engineer

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