

GEOTECHNICAL ENGINEERING EVALUATION

**The Pines,
Lots 1 & 2, 70 - 74**

**North of Cortaro Road and West of Interstate 10
Marana, Arizona**

**PATTISON ENGINEERING, LLC
Project Number 15-034**

March 30, 2015
Project Number 15-034

Mr. Sean Rich
Richmond American Homes - Tucson
3091 West Ina Road
Tucson, Arizona 85741



GEOTECHNICAL ENGINEERING EVALUATION

The Pines Lots 1&2, 70-74
North of Cortaro Road and West of Interstate 10
Marana, Arizona

We have completed the geotechnical evaluation for the proposed development in accordance with our Proposal Number 15-P079, dated March 11, 2015. Our project study results are attached.

In our opinion, the site's subsurface soil and other conditions can be improved to reduce potential future settlements provided the designers, contractors, and owners follow the report recommendations. Our site evaluation showed loose clayey fill soils to depths of 20 to 30 feet. The specific soil conditions and recommendations are presented in the report.

We are available for consultation during the various design stages. To provide continuity of geotechnical services, we should perform construction observation and testing.

We thank you for selecting PATTISON ENGINEERING, L.L.C. and look forward to being a member of your team on the remainder of this project. If you have any questions about this report, or require additional consultation, please call us.

Sincerely,

PATTISON ENGINEERING, L.L.C.

Geotechnical, Construction Inspection, and Materials Testing Services



Oleg B. Lysyj, P.E.
Principal

Expires: 03/13/2018

Francisco J. Jacinto, P.E.
Principal

Copies: Addressee (1) e-mail

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INTRODUCTION

This report presents the results of our geotechnical engineering services for The Pines Lots 1, 2, and 70 through 74. The site is in Section 26, Township 12 South, and Range 12 East, of the Gila and Salt River Meridian, Marana, Arizona. The Site Plan in the Appendix shows the location of the site.

We obtained information on site soil conditions, performed field and laboratory testing, and geotechnical engineering analyses. This report presents our conclusions and recommendations regarding the engineering properties of the soils encountered, the causes of the distress, and mitigation recommendations. Specifically, the report addresses the following information:

- ◆ General site and subsurface conditions encountered during our evaluation.
- ◆ Causes for the distress.
- ◆ Recommendations for mitigation

The Appendix contains the results of the field explorations and tests and provides a site plan showing the exploration locations.

Project Information

A geotechnical report was prepared by Terracon for this subdivision (Terracon Project No. 63045525, dated December 8, 2004). Between 2004 and 2010, 11 Addendums had been issued to this report. These addendums primarily address 21 lots at this subdivision where deep uncontrolled fills exist. The original developer of the subdivision, Standard Pacific Homes, chose not to mitigate the deeper existing fills in this area of the subdivision, in which Lots 1 and 2, and 70 through 74, are located.

Subsequently Red Point Development performed substantial removal and recompaction of the existing fills soils within the proposed house pad areas of these lots under Terracon's supervision. This removal and recompaction in this area was performed after roadways and infrastructure were already in place and was limited to building pad footprint areas of the lots.

At this time we have been informed by Richmond American Homes that some ground settlement has occurred in the yard and driveway areas of these lots. We have been requested to review the previous information provided to us by Richmond American Homes and to provide additional evaluation of the soil conditions in the affected areas.

Evaluation and Testing

To obtain information on the conditions at this site and to determine applicable soil properties, we completed an on-site evaluation. The extent of our evaluation and testing programs is described in the following section.

Field Evaluation

Pete Moreno, a Field Specialist with our firm, reviewed the site to obtain information on the general surface conditions. On March 18, 2015, he also observed the drilling of 3 soil borings. The soil borings were drilled to depths of approximately 27 to 31.5 feet.

The site plan shows the approximate exploration locations. The Appendix contains logs of the subsurface conditions encountered at the explorations.

During the field exploration, the subsurface conditions were described and the encountered soils were samples visually classify and logged. We used the Unified Soil Classification System to classify soils. The soil classification symbols appear on the exploration logs and are briefly described in the Appendix.

Laboratory Evaluation

We performed laboratory analyses on soil samples to aid in material classification and estimate pertinent engineering properties of the on-site soils. We performed the tests in general accordance with applicable ASTM standards. The Appendix contains our laboratory test results.

FINDINGS

Site Conditions

The seven developed lots are on the north side of Mountain Stone Pine Way with Lots 1 and 2 being east of the intersection of Douglas Fir Drive and Lots 70 through 74 being west of the intersection of Douglas Fir Drive. Many of the driveway and walkway area have shown significant displacements and settling.

Subsurface Conditions

The surface soils to the full depth of exploration consisted of existing loose fills soils to depths of about 20 feet in the area of Lots 1 and 2, and at least 30 feet in the area of Lots 70 through 74. The fill soils consisted of sandy clays and sands with silt and clay with high moisture contents. Native soils below the fills (where encountered) were typically sands and gravels. No free groundwater was encountered in any of the explorations.

Previous Information

From my previous experience with this project, this portion of the subdivision was the property of a sand and gravel mining operation with a materials batch plant. At the time of the original geotechnical investigation the plant had been dismantled and the structures removed with the exception of some remnants of old foundations.

The approximately 21 lot area identified in the original report as having deep loose fills (in which Lots 1, 2, and 70 to 74, are a part of) had a slightly depressed ground surface and tension cracks in the soil in a circular pattern around the margins of this area. This and the soil boring information in this area identified loose and wet fill of fine grained material to depths of at least 27 feet. It was surmised that this area was a wash-out pit for the sand and gravel operation, thereby filled with loose and wet fine material washed off of the aggregate being produced. The tension cracks indicated settlement under the weight of the fill soil's own overburden was actively occurring at that time.

After the original developer decided not to remove and replace or otherwise mitigate this area, infrastructure was constructed but the lots remained undeveloped. Shortly after infrastructure construction settlement issues began to surface affecting portions of the infrastructure. At one location a drainage grade/vault structure in a street location within this area and subsequent excavations showed a significant void beneath the bottom of this concrete vault, on the order of inches. This indicated the settlement and consolidation of this loose fill was still progressing.

At a later date when a subsequent developer took ownership of the property, the existing fills were substantially removed and replaced in a compacted state within the future house pad areas. However, given the existing infrastructure that was in-place and the required construction excavation side slopes, this removal and recompaction was limited the structure areas.

Conclusions

In our opinion, the remaining deep, loose, and wet existing fills have continued to settle. We expect this to be the cause of the settlement and displacement of the flat-work in the front yards of these properties.

RECOMMENDATIONS

General

At this time, complete removal and replacement of the existing fills in these areas is not likely feasible as the resulting excavations could likely imperil the surrounding existing infrastructure further and possibly the existing residences. As an alternative, we recommend in-situ soils stabilization in the affected areas by means of compaction grouting.

Compaction Grouting Recommendations

In lieu of removing all of the existing loose fill and replacing it as compacted fill conventionally compaction grouting could likely help densify the soils. This would likely reduce the potential for additional settlement in this area.

A compaction grouting program including grouting at one-foot (depth) intervals beginning at a depth of 25 feet in the affected areas of Lots 70 through 74 and 15 feet in the area of Lots 1 and 2, terminating five feet below the ground surface to reduce the possibility of damaging private utilities is recommended. The grout should be pumped under peak pressures of about 800 psi (barring pipe lift and pavement lift conditions where lower pressures will be used). Horizontal spacings of 10 feet apart is recommended. A one-sack portland cement per cubic yard of sand grout, having a one-inch slump is recommended.

Grout hole injection spacing greater than 6 feet would not likely ensure the standard minimum required compaction percentage of the fills soils. However, the settlement potential of the backfill would be reduced by the addition of grout even at longer spacings.

Full time inspection must be performed under the supervision of a Pattison Engineering representative. Logs and records of casing driving, grout volumes, grout application pressures, and relevant site conditions must be maintained through this process.

CLOSURE

Additional Services

Field observation and testing during construction, and reviewing the plans and specifications are integral factors in developing and implementing our conclusions and recommendations. Our involvement during construction is important to observe compliance with the design concepts, specifications, or recommendations, and to allow efficient design changes if the subsurface conditions differ from those anticipated. PATTISON ENGINEERING, L.L.C. offers these services and is the most qualified to determine consistency of field conditions with the data used in our analyses. It is the client's responsibility to make this report available, in its entirety, to all design team members, contractors, and owners.

Limitations

The services we performed for this project include professional opinions and judgments based on the data collected. We performed our professional services using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in southern Arizona. We do not intend to provide recommendations that prevent all undesirable effects resulting from structural movements. We intend to provide reasonable solutions to help control effects the soil may have on the structures. We make no other warranty, expressed or implied.

We prepared the report as an aid for the design of the project. This report is not a bidding document and any contractors reviewing it must draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

Our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or air, on or below or around, this site. All conditions documented or observed are strictly for the information of our client. If environmental information is required, we recommend that an environmental assessment be completed which addresses these concerns.

We based our recommendations on the assumption the soil and groundwater conditions across the site are similar to those encountered at the exploration locations. The extent and nature of

subsurface soil and groundwater variations may not be evident until construction. If conditions encountered during construction appear to differ from those described in this report, we should be consulted to assess the impact and provide supplemental recommendations. Our evaluation and report does not include the effects, if any, of underlying geologic hazards or regional groundwater withdrawal and we express no opinion regarding their effects on surface movement.

APPENDIX

Site and Exploration Location Plan



 BORING LOCATION

Method of Soil Classification

Coarse Grained Scale
(50% retained on #200 sieve)

CLASSIFICATION	U.S. Standard Sieve Size
BOULDERS	Above 12"
COBBLES	12" to 3"
GRAVEL	3" to No. 4
<i>Coarse</i>	3" to 3/4"
<i>Fine</i>	3/4" to No. 4
SAND	No. 4 to No. 200
<i>Coarse</i>	No. 4 to No. 10
<i>Medium</i>	No. 10 to No. 40
<i>Fine</i>	No. 40 – No. 200
SILT & CLAY	Below No. 200

ADJECTIVE
trace 0-10
some 10-20
with 20-30
“-y” or “-ey” 30-50
P = poorly graded
W = well graded

P.I.
< 1 non-plastic
1-10 low plasticity
11-25 medium plasticity
> 25 high plasticity

Major Divisions	Subdivisions	USCS Symbol		Typical Names
Coarse-grained soils (More than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	GW	Less than 5% fines*	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Less than 5% fines*	Poorly graded gravels or gravelly sands, little or no fines
		GM	More than 12% fines*	Silty gravels, gravel-sand-silt mixtures
		GC	More than 12% fines*	Clayey gravels, gravel-sand-clay mixtures
	Sands (50% or more of coarse fraction passes No. 4 sieve)	SW	Less than 5% fines*	Well-graded sands or gravelly sands, little or no fines
		SP	Less than 5% fines*	Poorly graded sands or gravelly sands, little or no fines
		SM	More than 12% fines*	Silty sands, sand-silt mixtures
		SC	More than 12% fines*	Clayey sands, sand-clay mixtures
Fine-grained soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	ML	Inorganic soil	Inorganic silts, rock flour, silts of low plasticity
		CL	Inorganic soil	Inorganic clays of low plasticity, gravelly clays, sandy clays, etc.
		OL	Organic soil	Organic silts and organic clays of low plasticity
	Silts and Clays (Liquid limit 50 or more)	MH	Inorganic soil	Inorganic silts, micaceous silts, silts of high plasticity
		CH	Inorganic soil	Inorganic highly plastic clays, fat clays, silty clays, etc.
		OH	Organic soil	Organic silts and organic clays of high plasticity
Peat	Highly Organic	PT		Peat and other highly organic soils

Boring Log Notes

The number shown in **Boring No.** refers to the approximate location of the same number shown on the **Site Plan** as positioned in the field by pacing from property lines and/or existing features.

The number shown in **Blows/6"** refers to the number of blows of a 140-pound weight dropped 30 inches, required to advance the sampler. **H** in **Sample Type** is a hand sample from the auger cuttings. **RS** in **Sample Type** is a 2.42-inch-inside-diameter ring sampler. Refusal to penetration for the ring sampler is considered more than 50 blows per foot. **SS** in **Sample Type** is a 2.0-inch-outside-diameter split-spoon sampler. This sampler is used to perform the Standard Penetration Test (SPT) ASTM D1586. Refusal to penetration is considered to be one of the following items: 1. A total of 50 blows has been applied during any one of the three 6-inch increments; 2. A total of 100 blows has been applied; 3. There is no observed advance of the sampler during application of 10 successive blows of the hammer.

USCS Code refers to the soil type as defined by the **Unified Soil Classification System**. The soils were visually classified in the field and, where appropriate, classifications were modified by visual examination of samples in the laboratory and by appropriate test.

These notes and boring logs are intended for use in conjunction with the purposes of our services defined in the text. Boring log data should not be construed as part of the construction plans or as defining construction conditions.

Boring logs depict our interpretations of subsurface conditions at the locations and on the date(s) shown. Variations in subsurface conditions and soil characteristics may occur between borings. Groundwater levels may fluctuate due to seasonal variations and other factors.

In general, terms and symbols on the boring logs conform with "**Standard Definitions of Terms and Symbols Relating to Soil and Rock Mechanics**" (ASTM D653).

Laboratory Test Results

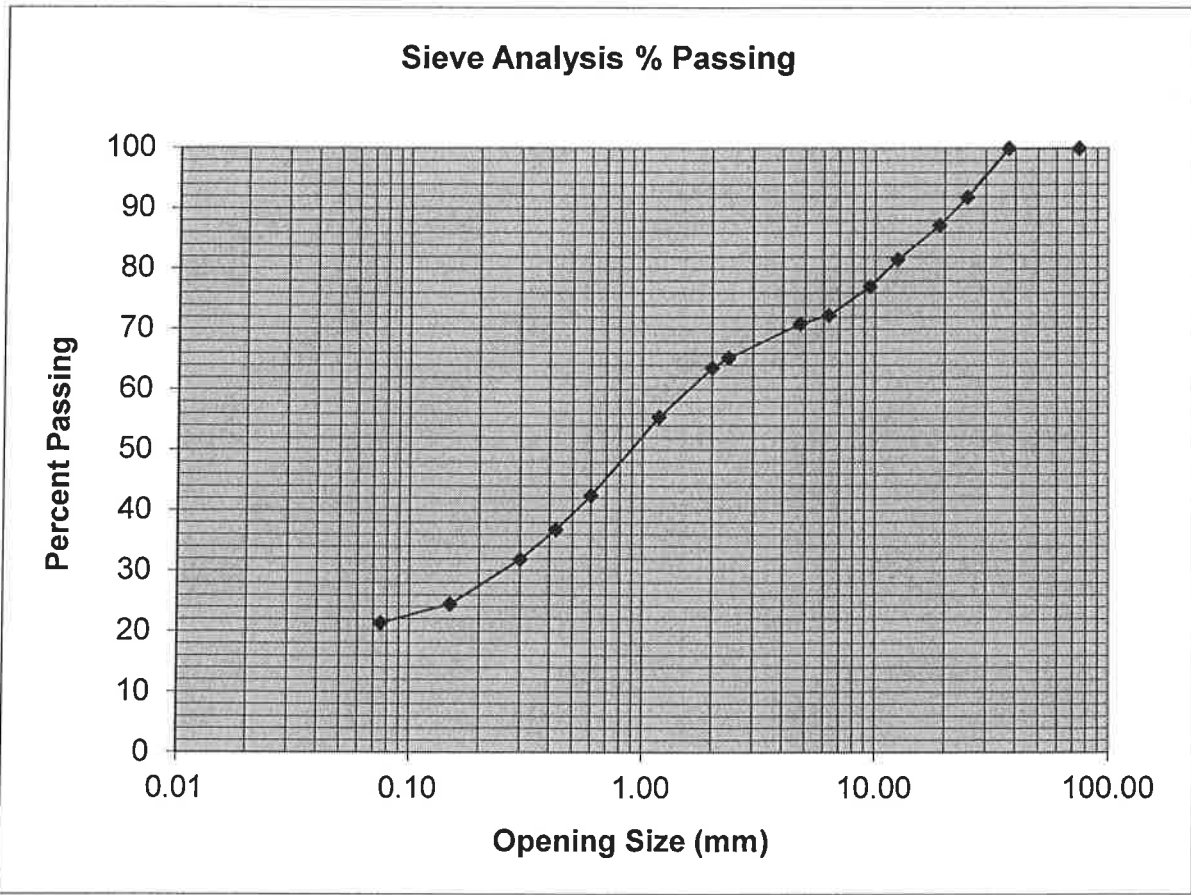
BORING NO.	DEPTH (FT)	PLASTICITY		% PASSING #200 SIEVE	SOIL CLASS	IN-SITU DRY DENSITY (PCF)	IN-SITU MOISTURE CONTENT (%)
		LL	PI				
B-1	0-1.5	28	9	32	SC		
B-1	1.5-2.5				SC-SM	116	13.6
B-1	15-16				CL	99	14.7
B-2	20-21				CL	105	16.8
B-2	0-1.5	22	5	21	SC-SM		
B-2	5-6				SC-SM	101	11.0
B-2	25-26				SC-SM	112	8.9
B-3	10-11				SC-SM	112	19.9

Sieve Analyses

Size	Size (mm)	%Passing
3"	75.000	100
1 1/2"	37.500	100
1"	25.000	92
3/4"	19.000	87
1/2"	12.500	82
3/8"	9.500	77
1/4"	6.300	72
#4	4.750	71
#8	2.360	65
#10	2.000	64
#16	1.180	55
#30	0.600	42
#40	0.425	37
#50	0.300	32
#100	0.150	24
#200	0.075	21.4

Project Name:
 Job Number:
 Sample I.D.:

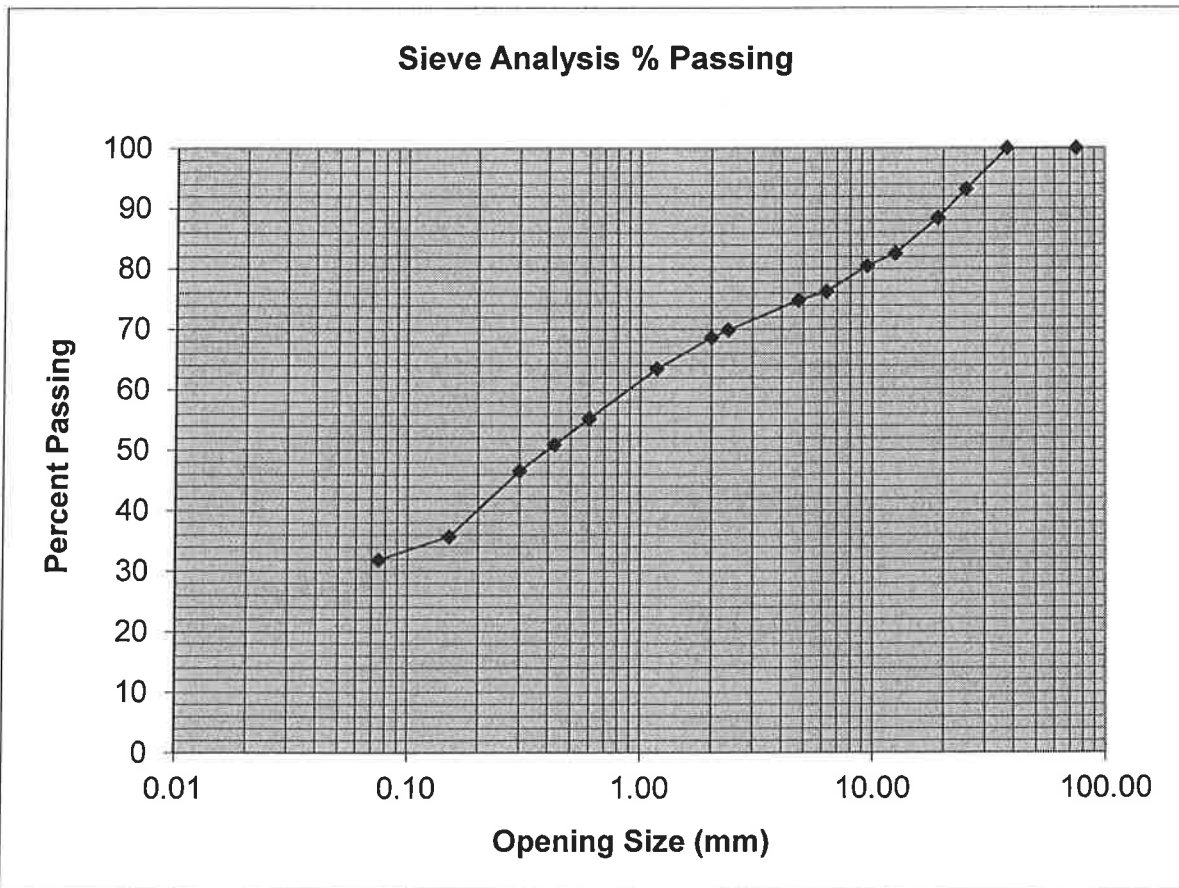
The Pines
15-034
B2 0-1.5



Size	Size (mm)	%Passing
3"	75.000	100
1 1/2"	37.500	100
1"	25.000	93
3/4"	19.000	88
1/2"	12.500	83
3/8"	9.500	80
1/4"	6.300	76
#4	4.750	75
#8	2.360	70
#10	2.000	69
#16	1.180	63
#30	0.600	55
#40	0.425	51
#50	0.300	47
#100	0.150	36
#200	0.075	31.9

Project Name:
 Job Number:
 Sample I.D.:

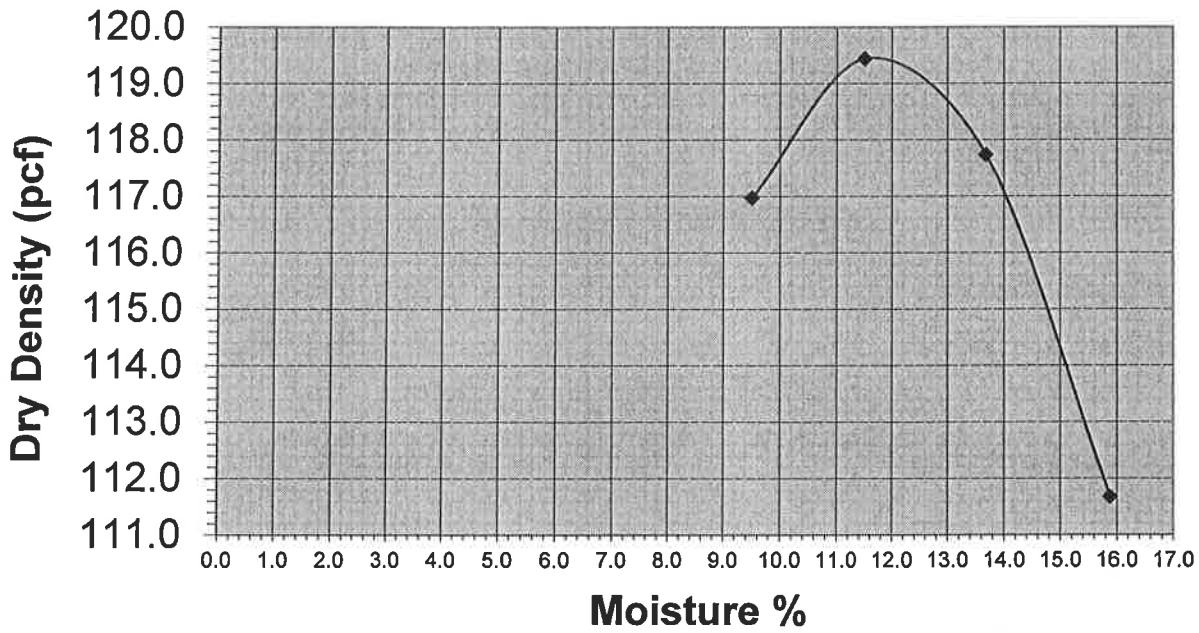
The Pines
15-034
B1 0-1.5



A-Method Proctor Calcs (check mold wt)

	1	1	2	3
wt soil+ mold (gm)	6082	6159	6169	6102
wt mold (gm)	4145	4145	4145	4145
wt soil (gm)	1937	2014	2024	1957
wet soil	265	252	241	197
dry soil	242	226	212	170
% H2O	9.5	11.5	13.7	15.9
wet density (pcf)	128.1	133.2	133.8	129.4
dry density (pcf)	117.0	119.4	117.7	111.7

A-Proctor ASTM (D698A)



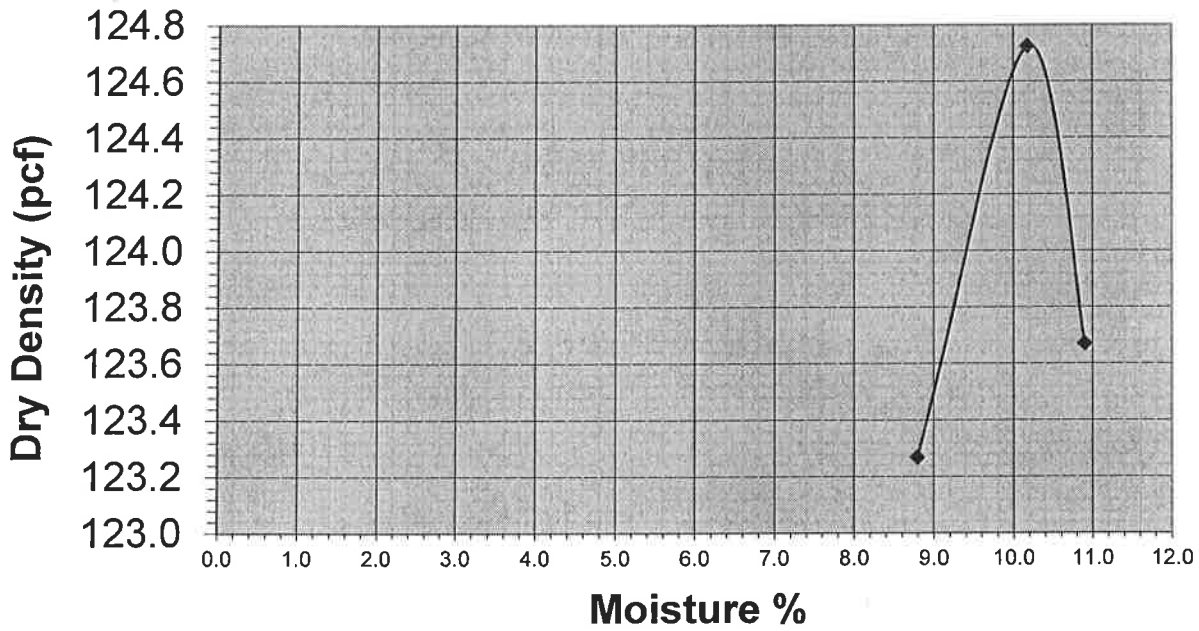
Sample I.D.	B-1 0-1.5
Job	15-034

Max. Dry Density, pcf	119.4
Opt. % Moisture	11.5

A-Method Proctor Calcs (check mold wt)

	1	2	3
wt soil+ mold (gm)	6173	6221	6219
wt mold (gm)	445	445	445
wt soil (gm)	2028	2078	2074
wet soil	235	249	295
dry soil	216	226	266
% H2O	8.8	10.2	10.9
wet density (pcf)	134.1	137.4	137.2
dry density (pcf)	123.3	124.7	123.7

A-Proctor AASHTO T-99



Sample I.D.	B-2 0-1.5
Job	15-034

Max. Dry Density, pcf	124.7
Opt. % Moisture	10.2

Boring Logs

PATTISON ENGINEERING, LLC

*Geotechnical Engineering
Construction Inspection
Materials Testing*

BORING NUMBER

B-1

SHEET 1 OF 2

Client: Richmond American Homes - Tucson

Project: The Pines Lots 1, 2, 70-74

Location of Boring:

Location: North of Cortaro Road and West of Interstate 10 Marana, AZ

SEE SITE PLAN

SAMPLE TYPE	BLOWS PER 6"	INCHES DRIVEN/ INCHES RECOVERED	BULLNOSE BLOWS/FT	DEPTH (FEET)	USCS CODE	Elevation: Datum:		DRY DENSITY (PCF)	MOISTURE (%)
						Logged By: PM	Date: 3/18/15		
Subsurface Conditions or Remarks:						Slight slope			
DESCRIPTION OF SUBSURFACE CONDITIONS									
H				0	SC	Fill: CLAYEY SAND; with gravel, dark brown, damp, loose, low plasticity			
RS	6	12/12		1	SC-SM	Fill: SILTY, CLAYEY SAND; dark brown, slightly moist, loose, low plasticity		116	13.6
	7		2						
			3						
			4						
RS	5	12/0		5	SC	Trace cobbles			
	4		6						
H				7	SC	Fill: CLAYEY SAND; dark brown, slightly moist, medium plasticity			
			8						
			9						
			10						
RS	1	1/0		10	SC	Very loose			
	1		11						
			12						
			13						
RS	1	12/12		14	SC	Increase in sand, gravel, and moisture		99	14.7
	2		15						
			16						
			17						
RS	1	12/12		18	SC-SM	Fill: SILTY, CLAYEY SAND; dark brown, damp, very loose, low plasticity		105	16.8
	2		19						
			20						
			21						
RS	2	12/12		22	SC				
	3		23						
			24						
			25						
				26					
				27					
				28					
				29					
				30					

Sample Type Key:
 SS = Split Spoon
 RS = Ring Sample
 H = Hand Sample

Drilling Equipment:
 CME 75 equipped with 6-5/8" OD x 3-1/4" ID
 hollow stem, continuous-flight auger

<h1 style="margin: 0;">PATTISON ENGINEERING, LLC</h1>	<p><i>Geotechnical Engineering Construction Inspection Materials Testing</i></p>	<p>BORING NUMBER B-1 SHEET 2 OF 2</p>
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Client: Richmond American Homes - Tucson	
Project: The Pines Lots 1, 2, 70-74	Location of Boring: SEE SITE PLAN
Location: North of Cortaro Road and West of Interstate 10 Marana, AZ	

SAMPLE TYPE	BLOWS PER 6"	INCHES DRIVEN/ INCHES RECOVD	BULLNOSE BLOWS/FT	DEPTH (FEET)	USCS CODE	Elevation:	Datum:	DRY DENSITY (PCF)	MOISTURE (%)
						Logged By: PM	Date: 3/18/15		
Subsurface Conditions or Remarks: Slight slope									
DESCRIPTION OF SUBSURFACE CONDITIONS									
RS	2	12/12		30					
	5			31					
<i>BOTTOM OF HOLE AT 31 FEET No Free Water Encountered</i>									
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					
				41					
				42					
				43					
				44					
				45					
				46					
				47					
				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60					

<p>Sample Type Key: SS = Split Spoon RS = Ring Sample H = Hand Sample</p>	<p>Drilling Equipment: CME 75 equipped with 6-5/8" OD x 3-1/4" ID hollow stem, continuous-flight auger</p>
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PATTISON ENGINEERING, LLC

*Geotechnical Engineering
Construction Inspection
Materials Testing*

BORING NUMBER

B-2

SHEET 1 OF 2

Client: Richmond American Homes - Tucson

Project: The Pines Lots 1, 2, 70-74

Location of Boring:

Location: North of Cortaro Road and West of Interstate 10 Marana, AZ

SEE SITE PLAN

SAMPLE TYPE	BLOWS PER 6"	INCHES DRIVEN/ INCHES RECOVD	BULLNOSE BLOWS/FT	DEPTH (FEET)	USCS CODE	Elevation:	Datum:	DRY DENSITY (PCF)	MOISTURE (%)
						Logged By: PM	Date: 3/18/15		
						Subsurface Conditions or Remarks: Slight slope			
						DESCRIPTION OF SUBSURFACE CONDITIONS			
H				0	SC-SM	Fill: SILTY, CLAYEY SAND; with gravel, dark brown, damp, very loose, low plasticity			
RS	1 2	12/12		1 2		Possible pipe encountered			
RS	3 7	12/12		3 4 5 6		Loose, slightly moist		101	11.0
RS	1 3	12/12		7 8 9 10 11		Very loose			
RS	3 4	12/12		12 13 14 15 16		Increase in silt, loose			
RS	4 9	12/12		17 18 19 20 21				105	16.8
RS	6 8	12/12		22 23 24 25 26		Increase in sand, decrease in moisture		113	8.9
				27 28 29 30					

Sample Type Key:
 SS = Split Spoon
 RS = Ring Sample
 H = Hand Sample

Drilling Equipment:
 CME 75 equipped with 6-5/8" OD x 3-1/4" ID
 hollow stem, continuous-flight auger

PATTISON ENGINEERING, LLC

*Geotechnical Engineering
Construction Inspection
Materials Testing*

BORING NUMBER

B-2

SHEET 2 OF 2

Client: Richmond American Homes - Tucson

Project: The Pines Lots 1, 2, 70-74

Location of Boring:

Location: North of Cortaro Road and West of Interstate 10 Marana, AZ

SEE SITE PLAN

SAMPLE TYPE	BLOWS PER 6"	INCHES DRIVEN/ INCHES RECOVD	BULLNOSE BLOWS/FT	DEPTH (FEET)	USCS CODE	Elevation:	Datum:	DRY DENSITY (PCF)	MOISTURE (%)
						Logged By: PM	Date: 3/18/15		
						Subsurface Conditions or Remarks: Slight slope			
						DESCRIPTION OF SUBSURFACE CONDITIONS			
RS	4	12/12		30		Increase in gravel, decrease in silt			
	5			31		<i>BOTTOM OF HOLE AT 31 FEET No Free Water Encountered</i>			
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					
				41					
				42					
				43					
				44					
				45					
				46					
				47					
				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60					

Sample Type Key:
 SS = Split Spoon
 RS = Ring Sample
 H = Hand Sample

Drilling Equipment:
 CME 75 equipped with 6-5/8" OD x 3-1/4" ID
 hollow stem, continuous-flight auger

<h1 style="margin: 0;">PATTISON ENGINEERING, LLC</h1>	<p><i>Geotechnical Engineering Construction Inspection Materials Testing</i></p>	<p>BORING NUMBER B-3</p>
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Client: Richmond American Homes - Tucson

Project: The Pines Lots 1, 2, 70-74

Location: North of Cortaro Road and West of Interstate 10 Marana, AZ

Location of Boring:
SEE SITE PLAN

SAMPLE TYPE	BLOWS PER 6"	INCHES DRIVEN/ INCHES RECOVD	BULLNOSE BLOWS/FT	DEPTH (FEET)	USCS CODE	Elevation:	Datum:	Dry Density (PCF)	MOISTURE (%)
						Logged By: PM	Date: 3/18/15		
						Subsurface Conditions or Remarks: Slight slope			
						DESCRIPTION OF SUBSURFACE CONDITIONS			
H				0	SC-SM	Fill: SILTY, CLAYEY SAND; trace gravel, dark brown, damp, loose, low plasticity		105	16.8
RS	4	12/12		1		Increase in moisture			
	11			2					
				3					
				4					
RS	11	12/12		5		Medium dense			
	13			6					
				7					
				8					
RS	5	12/12		10		Moist			
	11			11					
				12					
				13					
RS	9	12/12		15		Trace cobbles			
	13			16					
				17					
				18					
				19					
RS	10	12/12		20	SP	SAND; with gravel, brown, damp, medium dense, non-plastic			
	25			21					
				22					
				23					
				24					
RS	19	12/12		25		Increase in gravel			
	19			26					
				27					
						AUGER REFUSAL AT 27 FEET <i>No Free Water Encountered</i>			
				28					
				29					
				30					

<p>Sample Type Key: SS = Split Spoon RS = Ring Sample H = Hand Sample</p>	<p>Drilling Equipment CME 75 Drill Rig equipped with 6-5/8" OD x 3-1/4" ID hollow-stem, continuous-flight auger</p>
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