

APPENDIX A

TEST PIT No. TP-1

Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index
			<input type="checkbox"/> Percolation Test <input checked="" type="checkbox"/> California Sampler	<input checked="" type="checkbox"/> Split Spoon <input type="checkbox"/> Bulk Sample	<input type="checkbox"/> Ziplock Sample <input type="checkbox"/> Static Water Table										
1		B	Brown Silty SAND (SM) , Moist, Medium Dense. Estimated 80% Coarse to Fine Sand and 20% Non-Plastic Silt. In Place Field Density Test Performed at 1'.				7.4	118.2							
2			Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt. In Place Field Density Test Performed at 2.5'. Slight Caving from 3' - 4'. In Place Field Density Test Performed at 3.5'.			2.0	6.9	113.2							
3		B	Light to Medium Brown Poorly Graded SAND (SP) , Moist, Medium Dense. Estimated 95% Coarse to Fine Sand and 5% Non-Plastic Silt.				5.1	105.9							
4						4.5									
5			Slightly Cemented Below 9'.												
6		B													
7															
8															
9															
10															
11															
12															
13															
14															
Test pit terminated at 14 feet. Test Pits backfilled without compaction verification					14.0										

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Lumos and Associates

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Hillview Geotechnical Report

LOG OF EXPLORATORY TEST PIT

Job Number: 8747.000

PLATE

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TEST PIT No. TP-2

Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index
			Percolation Test	Split Spoon	Ziplock Sample										
1		B	Brown Silty SAND (SM) , Moist, Medium Dense. Estimated 80% Coarse to Fine Sand and 20% Non-Plastic Silt.												
2						2.0									
3		B	Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt.												
4															
5						5.0									
6			Light to Medium Brown Poorly Graded SAND (SP) , Moist, Medium Dense. Estimated 95% Coarse to Fine Sand and 5% Non-Plastic Silt.												
7		B													
8			Evidence of Slight Mottling at 8'.												
9															
10															
11			Slightly Cemented Below 11'.												
12															
13															
14						14.0									
			Test pit terminated at 14 feet. Test Pits backfilled without compaction verification												

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LOG OF EXPLORATORY TEST PIT
 Job Number: 8747.000
 Date: April 2015

PLATE
A-2

TEST PIT No. TP-3

Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index
			Percolation Test	Split Spoon	Ziplock Sample										
1		B	Brown Silty SAND (SM) , Moist, Medium Dense.			4.4	6.5	118.8	NP	NP	1.8	78.4	19.8		
2			In Place Field Density Test Performed at 1'. 2.0												
3		B	Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt.			4.0	108.2								
4			In Place Field Density Test Performed at 2.5'. 8.7												
5			In Place Field Density Test Performed at 3.5'. 11.0												
6															
7		B	Light to Medium Brown Poorly Graded SAND (SP) , Moist, Medium Dense. Estimated 95% Coarse to Fine Sand and 5% Non-Plastic Silt.												
8															
9															
10															
11															
12															
13															
14															
Test pit terminated at 14 feet. Test Pits backfilled without compaction verification															

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LOG OF EXPLORATORY TEST PIT
 Job Number: 8747.000
 Date: April 2015

PLATE
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TEST PIT No. TP-4

Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index	
			<input type="checkbox"/> Percolation Test <input checked="" type="checkbox"/> California Sampler	<input checked="" type="checkbox"/> Split Spoon <input type="checkbox"/> Bulk Sample	<input checked="" type="checkbox"/> Ziplock Sample <input type="checkbox"/> Static Water Table											
1		Z	Brown Silty SAND (SM) , Moist, Medium Dense. Estimated 80% Coarse to Fine Sand and 20% Non-Plastic Silt.													
2						2.0										
3			Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt.													
4																
5																
6																
7																
8																
9																
9.5																
10			Light to Medium Brown Poorly Graded SAND (SP) , Moist, Medium Dense. Estimated 95% Coarse to Fine Sand and 5% Non-Plastic Silt.													
11																
12																
13																
14																
Test pit terminated at 14 feet. Test Pits backfilled without compaction verification																

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LOG OF EXPLORATORY TEST PIT
 Job Number: 8747.000
 Date: April 2015

PLATE
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TEST PIT No. TP-6

Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index
1	B	B	Brown Silty SAND (SM) , Moist, Medium Dense. Estimated 80% Coarse to Fine Sand and 20% Non-Plastic Silt. In Place Field Density Test Performed at 1'.				5.5	105.5							
2			In Place Field Density Test Performed at 2.5'.				4.5	108.6							
3			3.0												
4	B	B	Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt. In Place Field Density Test Performed at 3.5'.				4.1	113.0							
5															
6															
7															
8															
9			9.0												
10			Light to Medium Brown Poorly Graded SAND (SP) , Moist, Medium Dense. Estimated 95% Coarse to Fine Sand and 5% Non-Plastic Silt.												
11		Z													
12															
13															
14			14.0												

Test pit terminated at 14 feet.
 Test Pits backfilled without compaction verification

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LOG OF EXPLORATORY TEST PIT

Job Number: 8747.000

PLATE

A-6

Date: April 2015

TEST PIT No. TP-8


Logged By: **B. Sexton**
 Date Logged: **3-25-2015**
 Drill Type: **Case 590 Backhoe**

Total Depth: **14 feet**
 Water Depth: **No groundwater encountered**
 Ground Elev.: **E.G.S. feet ±**

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION			Natural Moisture Content, %	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, % (3" - #4 Sieve)	Sand, % (#4 - #200 Sieve)	Fines, % (< #200 Sieve)	Direct Shear	Expansion Index	
			<input type="checkbox"/> Percolation Test <input checked="" type="checkbox"/> California Sampler	<input checked="" type="checkbox"/> Split Spoon <input type="checkbox"/> Bulk Sample	<input checked="" type="checkbox"/> Ziplock Sample <input type="checkbox"/> Static Water Table											
1		<input checked="" type="checkbox"/>	Brown Silty SAND (SM) , Moist, Medium Dense. Estimated 80% Coarse to Fine Sand and 20% Non-Plastic Silt.													
2																
3					Light Brown Silty SAND (SM) , Slightly Moist, Dense, Moderately Cemented. Estimated 75% Coarse to Fine Sand and 25% Non-Plastic Silt.											
4																
5																
6																
7																
8																
9																
10																
11																
12																
13					Slight Evidence of Mottling at 12.5'. Less Cemented Below 12.5'.											
14																

Test pit terminated at 14 feet.
 Test Pits backfilled without compaction verification

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LOG OF EXPLORATORY TEST PIT

Job Number: 8747.000

Date: April 2015

PLATE

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SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS <small>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</small>	GRAVEL AND GRAVELLY SOILS <small>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</small>	CLEAN GRAVELS <small>(LITTLE OR NO FINES)</small>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS <small>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</small>	CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
FINE GRAINED SOILS <small>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</small>	SILTS AND CLAYS <small>LIQUID LIMIT LESS THAN 50</small>		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS <small>LIQUID LIMIT GREATER THAN 50</small>		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Other Tests	
AN	ANALYTICAL TEST (pH, Soluble Sulfate, and Resistivity)
C	CONSOLIDATION TEST
DS	DIRECT SHEAR TEST
MD	MOISTURE DENSITY CURVE

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LEGEND

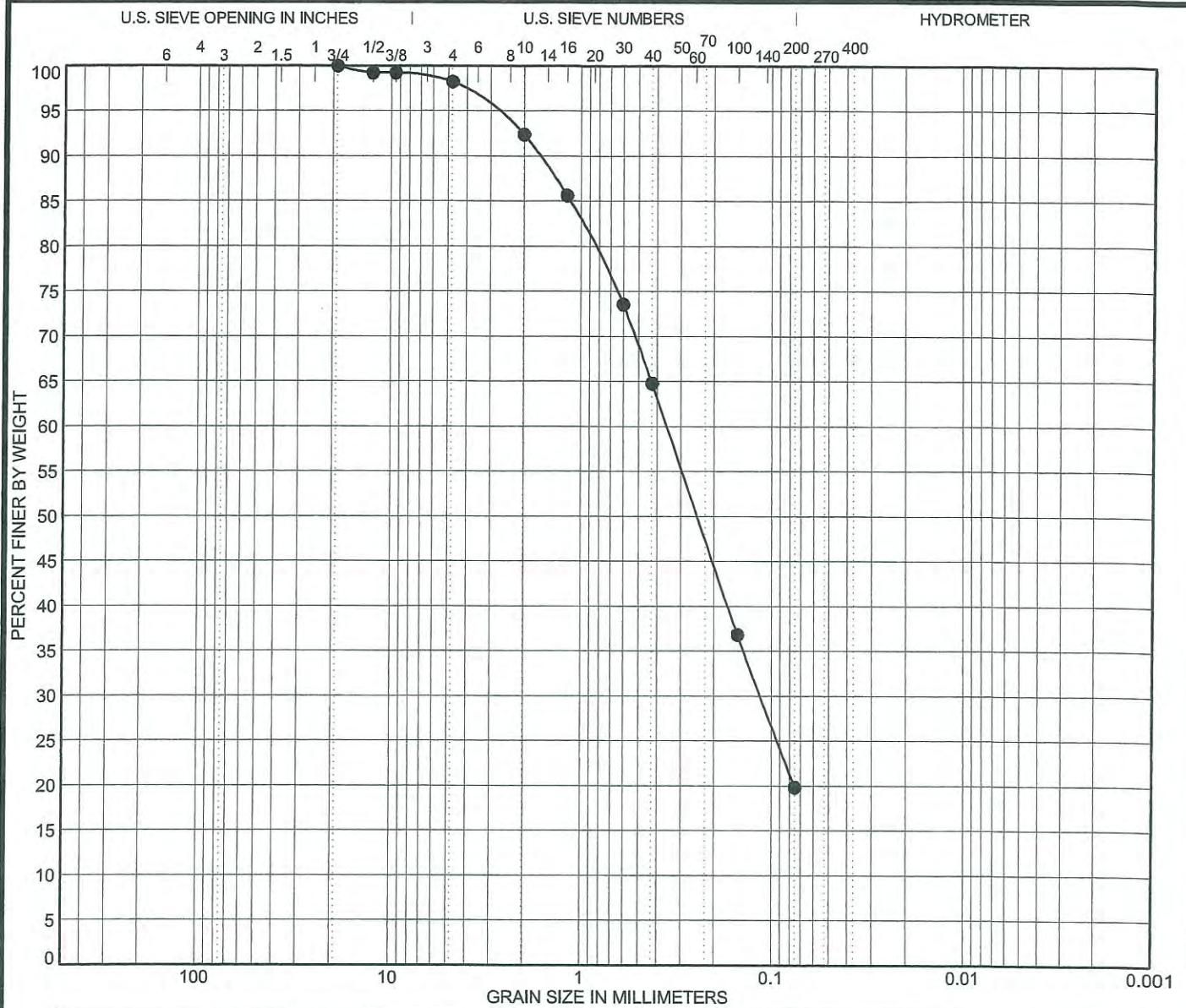
Job Number: 8747.000

Date: April 2017

PLATE

A-9

APPENDIX B



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Date: 4-1-2015	LL	PL	PI	Cc	Cu
● TP-3	Classification	NP	NP	NP		
Depth: 0.5	Silty SAND (SM)					
Sample Location	Test Pit 3 from 0.5' - 1.5'					
USCS	SM					
AASHTO						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-3	19	0.355	0.114		1.8	78.4	19.8	
Depth: 0.5								
Natural Moisture	4.4 %	S.E.		Absorption %				
R-Value	71	Durability Index		Soundness				
Percentage of Wear (500 rev)	%	Specific Gravity		Direct Shear				

LUMOS GRAIN SIZE 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



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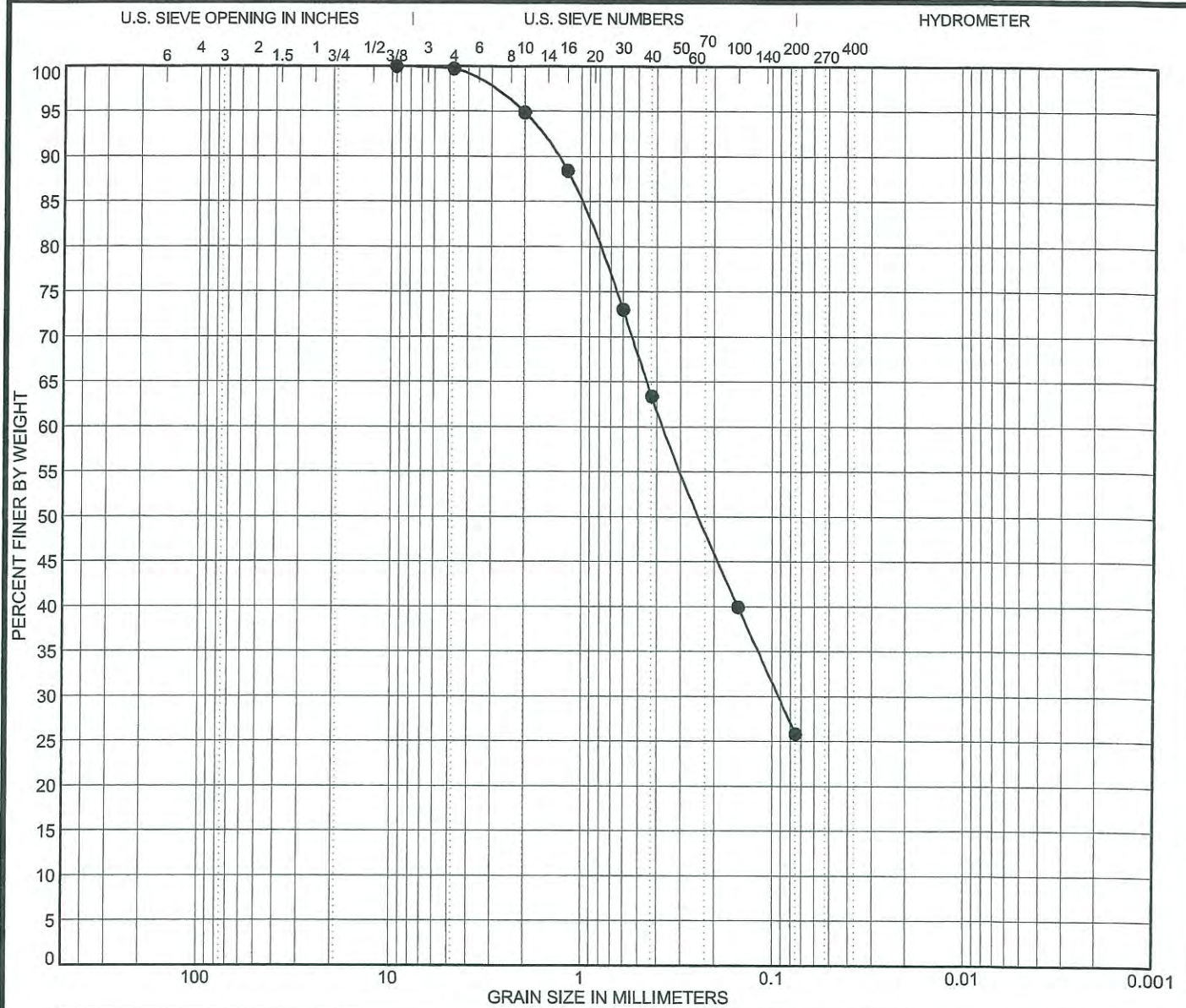
Hillview Geotechnical Report

GRAIN SIZE DISTRIBUTION

Job Number: 8747.000

Date: April 2015

PLATE
B-1.1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Date: 3-31-2015					LL	PL	PI	Cc	Cu
● TP-5	Classification					NP	NP	NP		
Depth: 3.5	Silty SAND (SM)									
Sample Location	Comb. Sample from TP-5 and 6 from 3.5'-4.5'									
USCS	SM									
AASHTO										
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● TP-5	9.5	0.365	0.092		0.3	73.9	25.8			
Depth: 3.5										
Natural Moisture	1.9 %		S.E.		Absorption %					
R-Value			Durability Index		Soundness					
Percentage of Wear (500 rev)	%		Specific Gravity		Direct Shear		34.6			

LUMOS GRAIN SIZE 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



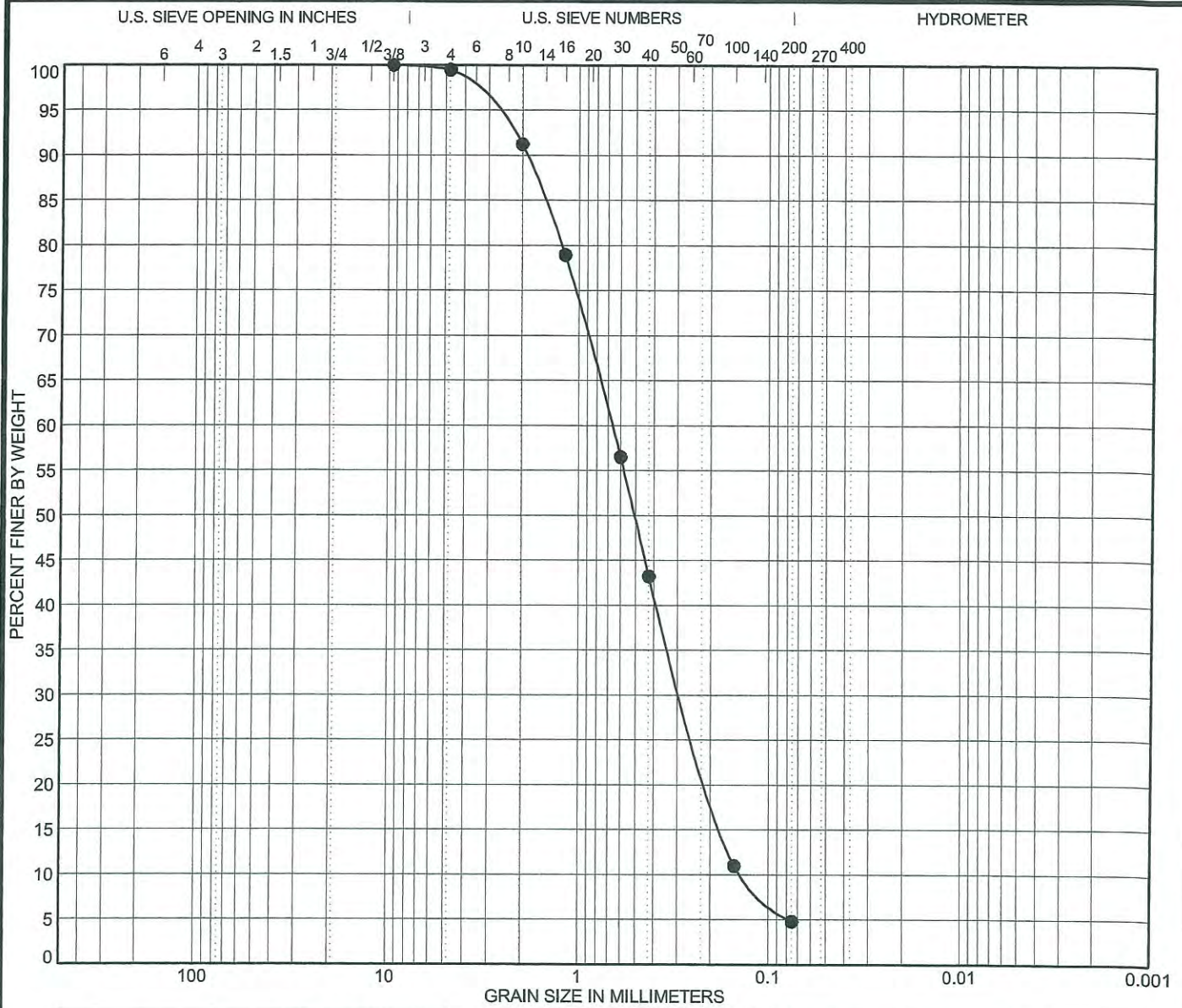
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GRAIN SIZE DISTRIBUTION

Job Number: 8747.000

Date: April 2015

PLATE
B-1.2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Date: 3-31-2015									
●	TP-7	Classification					LL	PL	PI	Cc	Cu
	Depth: 11.5	Poorly Graded SAND (SP)					NP	NP	NP	0.9	5.0
Sample Location		Test Pit 7 from 11.5' - 12.0'									
USCS		SP									
AASHTO											
Specimen Identification											
●	TP-7	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
	Depth: 11.5	9.5	0.666	0.277	0.134	0.5	94.7	4.8			
Natural Moisture		3.9 %		S.E.		Absorption %					
R-Value				Durability Index		Soundness					
Percentage of Wear (500 rev)		%		Specific Gravity		Direct Shear					

LUMOS GRAIN SIZE 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



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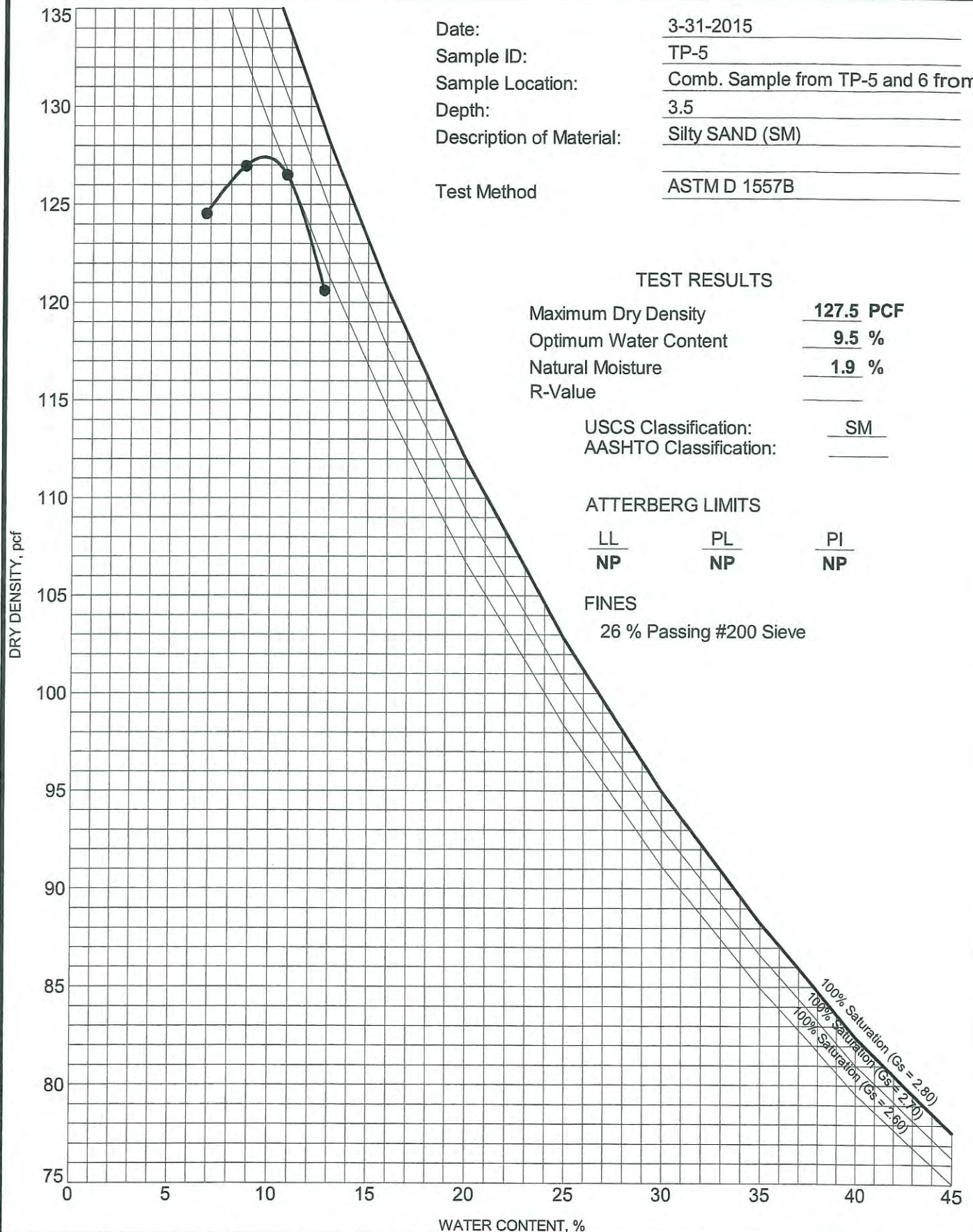
GRAIN SIZE DISTRIBUTION

Job Number: 8747.000

Date: April 2015

**PLATE
B-1.3**

Date: 3-31-2015
 Sample ID: TP-5
 Sample Location: Comb. Sample from TP-5 and 6 from 3.5
 Depth: 3.5
 Description of Material: Silty SAND (SM)
 Test Method: ASTM D 1557B



LUMOS COMPACTION 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



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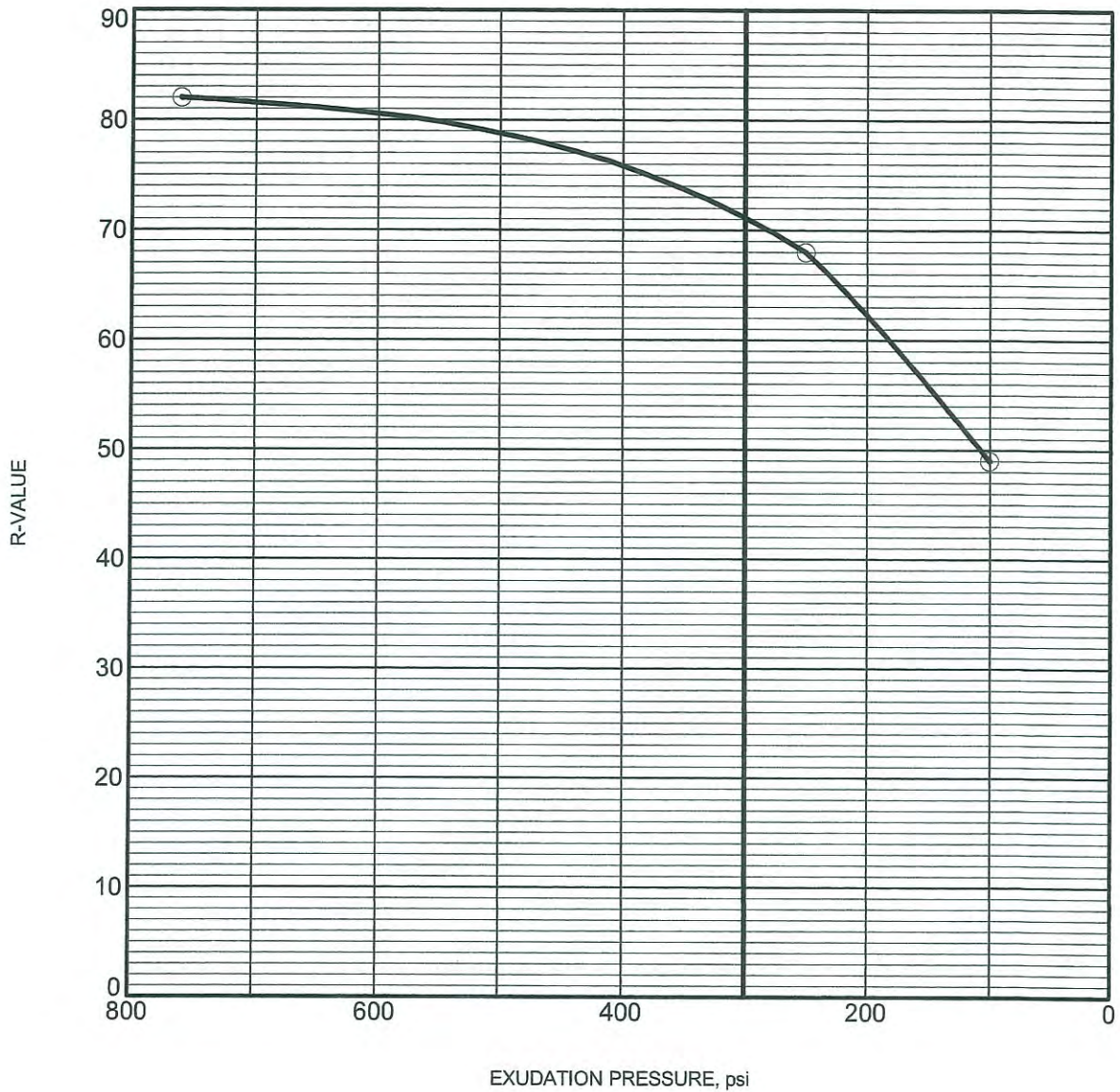
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MOISTURE-DENSITY CURVE

Job Number: 8747.000

Date: April 2015

PLATE
B-3



Test Data

Specimen No.	Water Content (%)	Dry Density (pcf)	Expansion (psf)	Exudation (psi)	Test R-Value*
1	7.9	128.0	0.0	760.0	82.0
2	9.5	127.6	0.0	250.0	68.0
3	11.4	123.3	0.0	100.0	49.0

* Reported values have been corrected for sample height, where required.

Test Result

Specimen Identification	Classification	R-Value
TP-3	Silty SAND (SM)	71

R VALUE 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



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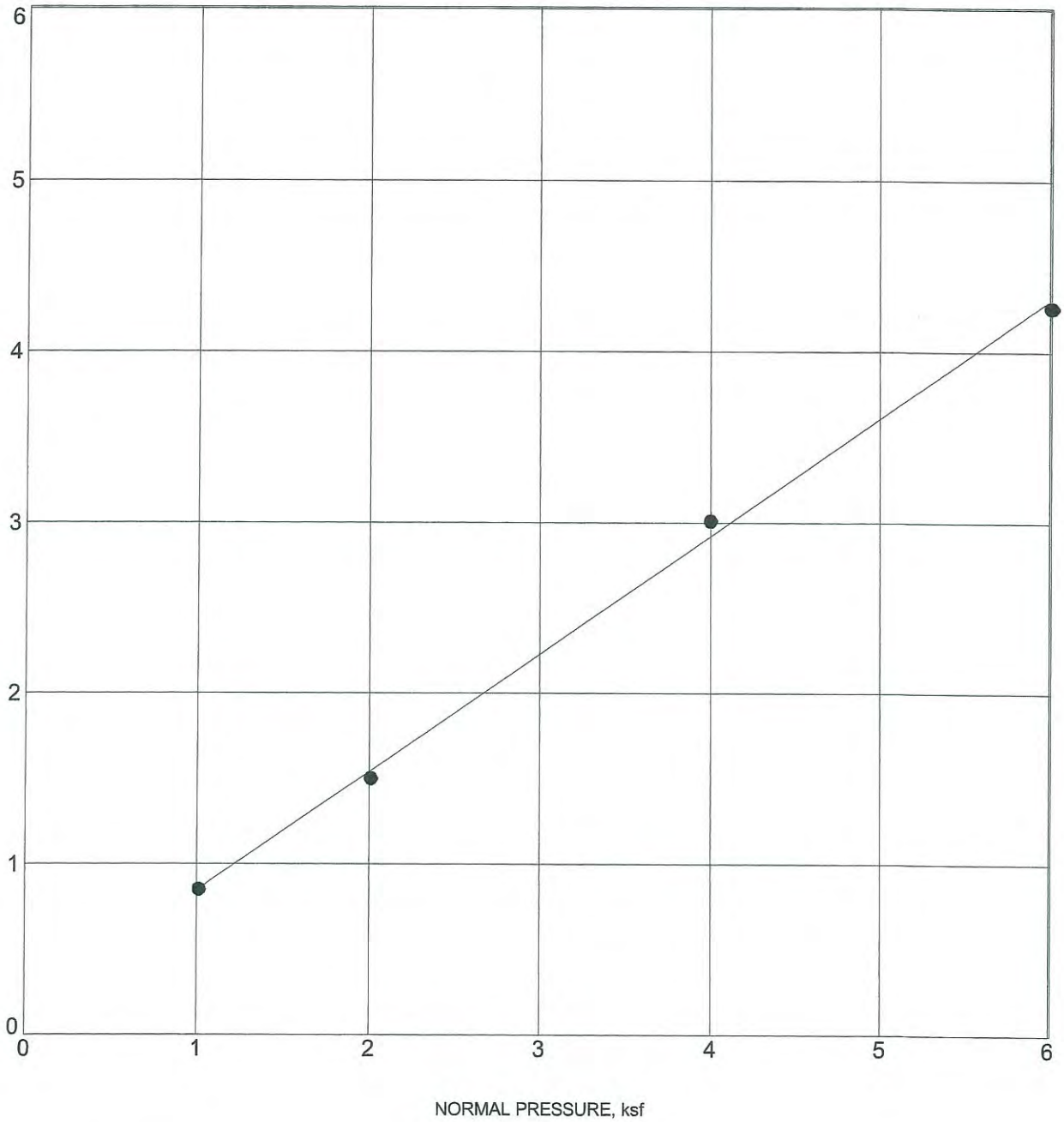
RESISTANCE VALUE TEST

Job Number: 8747.000

Date: April 2015

PLATE
B-4

SHEAR STRENGTH, ksf



LUMOS DIRECT SHEAR 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15

Specimen Identification	Classification	γ_d	MC%	c	ϕ
● TP-5 3.5	Silty SAND (SM)	128	10	0.15	34.6



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Hillview Geotechnical Report
DIRECT SHEAR TEST

Job Number: 8747.000

Date: April 2015

PLATE
B-5

LABORATORY REPORT

DATE: March 31, 2015

LABORATORY NO: R15-0142

CLIENT: Lumos and Associates
 800 E. College Pkwy
 Carson City, NV 89706

PAGE: 1 of 1

CLIENT PROJECT: 8747.000

PO# 8747.000/MTB

Sampled By: Client
Date Sampled: ---
Time Sampled: ---

Submitted By: Client
Date Received: 03/30/15
Time Received: Overnight

Report Attention:
Sample ID: TP-5 3.5'-4.5'

Test	Result	Unit	MRL	Method	Date	Analyst
Sodium	0.01	%	0.01	ASTM D2791A	03/31/15	LB
Sulfate	0.01	%	0.01	SM4500I	03/31/15	LB
Sodium Sulfate	0.01	%	0.01	Calculation	03/31/15	LB
Chloride	16.83	mg/kg	10	SM4500CID	03/31/15	LB
pH	7.60	S.U.	---	EPA9045D	03/30/15	LB
Resistivity	9.809	$\Omega \cdot \text{cm}$	---	AASHTO T288	03/30/15	LB

EPA Flags: None

 Note: Soil Analysis was completed at SSAL-Reno (Reno, NV).
 Please direct any questions to the Reno office at 775-825-1127

Note: The results for each constituent denote the percentage (%) for that particular element which is soluble in a 1:5 (soil to water) extraction ratio and corrected for dilution

REVIEWED BY:

 signing for
 John Sloan
 Laboratory Director
 EPA: NV00930 (SSAL-Las Vegas)
 EPA: NV00931 (SSAL-Reno)

 3638 East Sunset Road, Suite 100 • Las Vegas, NV 89120 • Tel: 702-873-4478 Fax: 702-873-7967
 4587 Longley Lane, No. 2 • Reno, NV 89502 • Tel: 775-825-1127 Fax: 775-825-1167
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SOLUBLE SULFATE

Job Number: 8747.000

Date: April 2015

PLATE
B-6

APPENDIX C

Job # 8747.000
Client: Divinni NV, LLC
Description: Pavement Calculations
By: B. Sexton

R-Value for structural fill specification = 45
R-Value for Gravel (Type II, Class B) = 70

T.I. = 5.5
 $G_f = 2.32$
 $GE = 0.0032(TI)(100-R)$
 $t_{layer} = GE/G_f$

$GE_{AC} = 0.0032(5.5)(100-70) = 0.53'$
 $t_{AC} = .53/(2.32)*(12'') = 2.7'' \Rightarrow$ **use 3" asphalt**
 $t_{AC(actual)} = (3)(2.32)/12'' = .58'$

$GE_{AB} = 0.0032(5)(100-45) = 0.97'$
 $t_{AB} = (0.97-.58)(12'')/1.1 = 4.3'' \Rightarrow$ **use 6" aggregate base**

Therefore, use 3" of Asphalt Concrete (AC) underlain by a minimum of 6" of Aggregate Base.

LUMOS PAVEMENT DESIGN 8747.000 HILLVIEW.GPJ US LAB.GDT 4/1/15



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PAVEMENT DESIGN

Job Number: 8747.000

Date: April 2015

PLATE
C-1

APPENDIX D

USGS Design Maps Summary Report

User-Specified Input

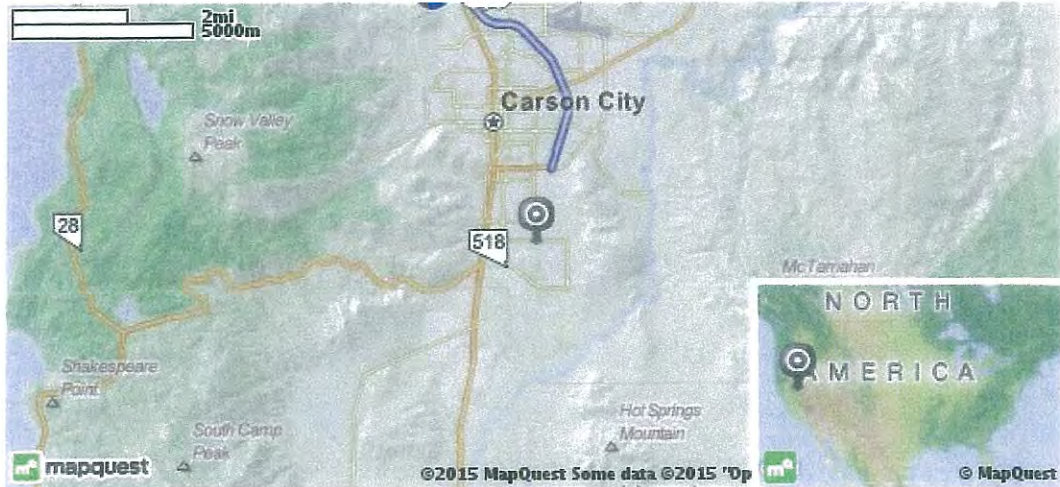
Report Title Hillview
Wed April 1, 2015 20:47:37 UTC

Building Code Reference Document 2012 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 39.1267°N, 119.7505°W

Site Soil Classification Site Class D - "Stiff Soil"

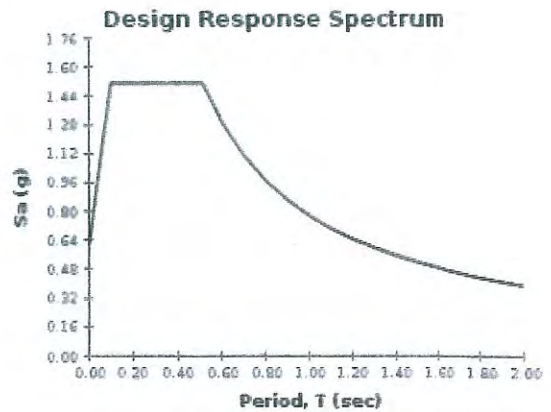
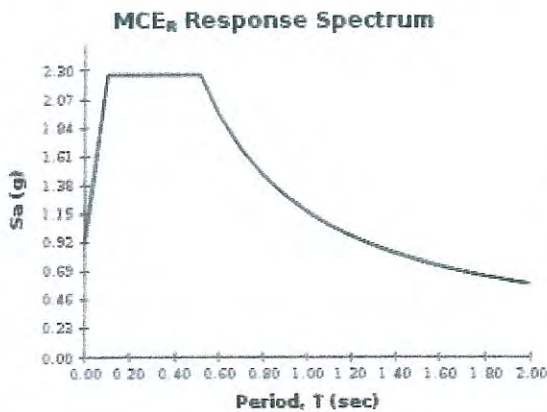
Risk Category I/II/III



USGS-Provided Output

$S_s = 2.265 \text{ g}$ $S_{HS} = 2.265 \text{ g}$ $S_{Ds} = 1.510 \text{ g}$
 $S_1 = 0.777 \text{ g}$ $S_{H1} = 1.165 \text{ g}$ $S_{D1} = 0.777 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.



<http://ehp3-earthquake.wr.usgs.gov/designmaps/us/summary.php?template=minimal&latitu...> 4/1/2015



Lumos and Associates
800 E College Parkway
Carson City, NV 89706
(775) 883-7077
Fax:

Hillview Geotechnical Report

DESIGN RESPONSE SPECTRUM

Job Number: 8747.000

Date: April 2015

PLATE
D-1

