



April 15, 2015

David Gray
Hillsborough County Sheriff's Office
County Road 39 Firearm Training Center
Lithia, Florida 33547

Re: Skid Pad Assessment
Hillsborough County Sheriff's Department
FGE Project Number 200597

Dear Mr. Gray:

At your request, Florida Geotechnical Engineering, Inc (FGE) completed pavement coring and testing on the Hillsborough County Sheriff's Office skid pad due to concerns with the condition of the asphalt and underlying sub-grade. Based on the site data collected and results of the laboratory testing, Sample LBR-1 did not meet minimum FDOT LBR ratio of 100. All asphalt densities were within FDOT minimum specifications.

FIELD INVESTIGATION

Twelve asphalt core samples were completed to evaluate the bulk density of the asphalt. The core samples were collected from representative areas around the skid pad with areas displaying damage being targeted. The core drilling machine consists of a four inch diamond bit core barrel to recover specimens for laboratory analysis and testing. The core drilling apparatus was equipped with a water spindle to allow water to be introduced inside of the drill stem while operating. The collected samples were immediately placed in an ice chest to maintain a temperature of less than 70° F during transport to the testing facility.

Each of the twelve asphalt core samples was accompanied by a shallow hand auger boring and cone penetrometer sounding to explore contents and relative density of the underlying sub-grade. The sub-grade discovered was visually uniform, with between 6 and 8 inches of light tan limerock road base that was underlain by light grey silty sand with minor rock material sub base. The soil descriptions are based on visual inspection of the hand auger samples, and the soil classifications were performed in general accordance with the Unified Soil Classification System (USCS). The hand auger borings were completed using a stainless steel bucket type auger that

allows samples to be collected and visually classified at approximate 6-inch intervals. Static hand cone penetrometer data was also gathered from the hand auger borings. The hand auger boring logs are provided in **ATTACHMENT B**, and a map of relative sample locations is provided in **ATTACHMENT FIGURES**.

The cone penetrometer consists of a measuring instrument, a probing rod and a cone tip. The penetrometer is pushed perpendicular into the soil and provides a method of assessing soil strength via relative density. The penetrometer is equipped with a 60 degree conical tip and a liquid-filled pressure gauge that reads the cone index value (Q_c). Hand cone penetrometer readings were collected during the hand auger borings to estimate the relative density and/or consistency of the surficial soils. The relative density designations are calculated based on the following equation: $Q_c = 4(N)$, where Q_c is the cone index value and N is the Standard Penetration Test "N" value. The relative density designations are evaluated as follows:

SANDY SOILS		CLAYEY & SILTY SOILS	
'N' Value (Blows per foot)	Relative Density	'N' Value (Blows per foot)	Relative Consistency
0 – 4	Very Loose	0 – 2	Very Soft
4 – 10	Loose	2 – 4	Soft
10 – 30	Medium Dense	4 – 8	Firm
30 – 50	Dense	8 – 15	Stiff
50+	Very Dense	15 – 30	Very Stiff
		30+	Hard

Four (4) sub-grade samples were collected and analyzed to evaluate the limerock bearing ratio (LBR). The four (4) LBR sample locations were chosen by Mr. David Gray at the outer most perimeter of the skid pad to minimize damage. The LBR samples were obtained using a gas powered concrete saw (road saw) with a 12 inch diamond saw blade designed for dry cutting of asphalt. An approximate 2 foot x 2 foot square was cut at each of the corners of the skid pad and stripped back to expose the road base. Approximately 100 lbs of road base material was sampled from each location and replaced with a concrete mix (general ASTM C-387 specifications). The asphalt was patched using a DOT approved asphalt patch.

LABORATORY

As requested, the twelve respected asphalt core samples underwent Bulk Specific Gravity Tests (AASHTO T-166) to determine the bulk specific gravity and bulk density of each sample. The measured thicknesses of the asphalt surfacing ranged from 2 to 2-7/8 inches, the bulk specific gravities ranged from 2.008 to 2.149 G_{mb} , and the bulk densities ranged from 125.3 to 134.1 pounds per cubic foot. The four (4) LBR samples all underwent limerock bearing ratio (LBR) (FM 5-515) tests with accompanied modified proctor maximum dry density (AASHTO T-180). The LBR values in the four samples ranged from 98 to 148. The approximate testing location are illustrated on **Figure 1**, and the complete laboratory report is provided in **Attachment Figures**.

CONCLUSIONS

In regards to the laboratory results, sample LBR-1 had a limerock bearing ratio of 98, not meeting a minimum limerock bearing ratio of 100 as outlined in Section 911 of the Florida Department of Transportation – Standard Specifications for Road and Bridge Construction. Samples LBR-2, LBR-3 and LBR-4 all met the minimum LBR of 100. All twelve of the asphalt core samples met the minimum standards of bulk density outlined in Section 320 of the Florida Department of Transportation – Standard Specifications for Road and Bridge Construction.

Based on the visual observation of the skid pad, it appears to be in relatively fair condition. Generally, there were no visible potholes and only minor low fatigue cracking observed throughout the pad. The most visibly evident flaw was the longitudinal joints between asphalt mats, which appear to be predominantly cold joints. Asphalt cold joints are typically where the hot-mix asphalt has cooled well below 120°F, and are typically not desirable in an application where the traffic may traverse across the mat in any direction. Additionally, cold-joints are more susceptible to raveling as the densities tend to be lower at the edge of the mat and may vary from mat to mat. Also, the low density at cold joints enables the seepage of water into the joint which could oxidize the bituminous material, causing additional damage to the pavement.

GENERAL RECOMMENDATIONS

If resurfacing is desired, we would recommend a minimum road base thickness of 9 inches, and asphalt placement be conducted using hot joints, which produces the most seamless joints and the highest and most uniform density when compared to the semi-hot and cold joints.

David Gray
April 15, 2015
Page 4 of 4

Florida Geotechnical Engineering, Inc.
Limited Skid Pad Assessment
Hillsborough County Sheriff's Office

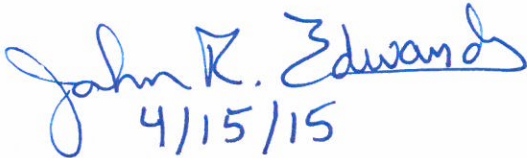
LIMITATIONS

The findings presented herein are based on the exploratory borings at the reference site and our professional judgment. The pavement and subsurface conditions described within this report are accurate with respect to the approximate location and depth of the samples. Because materials types vary with location and depth, subsurface conditions different from those encountered in this exploration may exist. This investigation was performed in accordance with generally accepted standards of practice. No warranty regarding this investigation or the effectiveness of any recommendations is intended, nor should any be inferred.

Please contact us at (813) 248-4720 should you have any questions regarding this report. We greatly appreciate the opportunity to support you with this effort.

Sincerely,

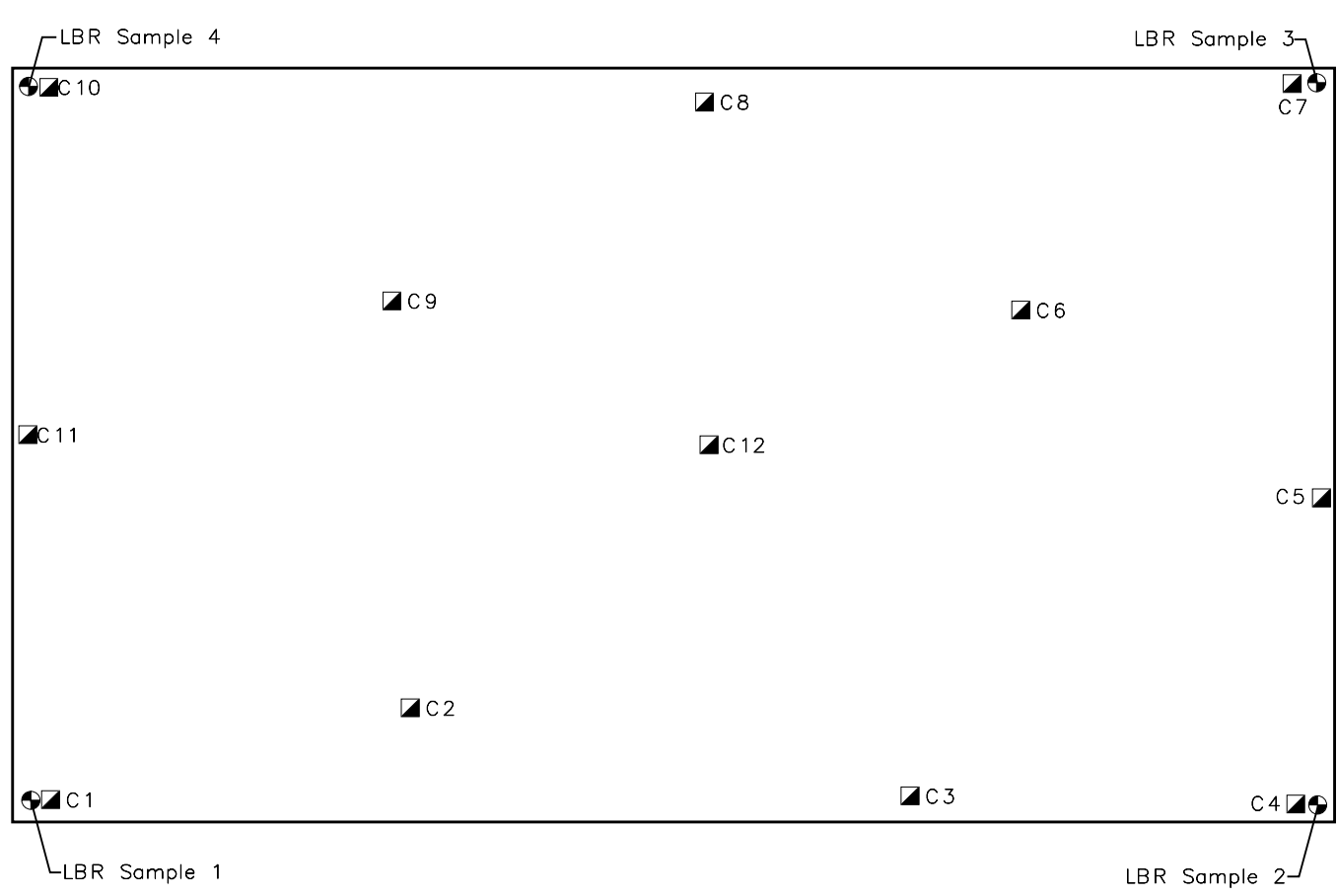
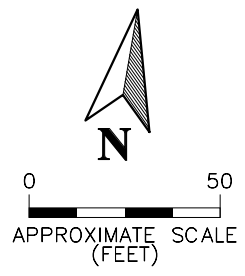
FLORIDA GEOTECHNICAL ENGINEERING, INC.

Handwritten signature of John R. Edwards in blue ink, with the date 4/15/15 written below it.

John R. Edwards, P.E.
Professional Engineer
FL License No. 46584

Attachments(2)

FIGURES



LEGEND

- ⊕ - LBR Sample Location
- ◻ - Hand Cone Penetrometer Location
- ◻ - Hand Auger Location
- ◻ - Core Boring Location

NOTE: TESTING LOCATIONS ARE APPROXIMATE

FIGURE 1
SITE MAP HSCO
SKID PAD
LITHIA, FLORIDA
 Source: 200597



ATTACHMENT A



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

March 26, 2015
File Number 15-51-9050

Mr. Christian Gunn
Florida Geotechnical Engineering, Inc.
PO Box 76006
Tampa, FL 33675-1006

Subject: Asphalt Bulk Specific Gravity (AASHTO T166) and Limerock Bearing Ratio (LBR) (FM 5-515)), Various Projects, Florida

REPORT NUMBER 1

Dear Mr. Gunn:

As requested by you, Ardaman & Associates, Inc. conducted Bulk Specific Gravity Tests (AASHTO T-166) on 12 Asphaltic Concrete Core samples and Limerock Bearing Ratio (LBR) (FM 5-515) tests with Modified Proctor Maximum Dry Density (AASHTO T-180) on four Limerock Base samples delivered to our office on March 23, 2015. The test results are attached in Figure 1, Exhibits 1 through 4 and Table 1.

It has been a pleasure assisting you with this important phase of your project. If there are any questions or when we may be of further service, please contact us.

Sincerely,
ARDAMAN & ASSOCIATES, INC.
Florida Certificate of Authorization No. 5950

B. Chalise 3/26/15

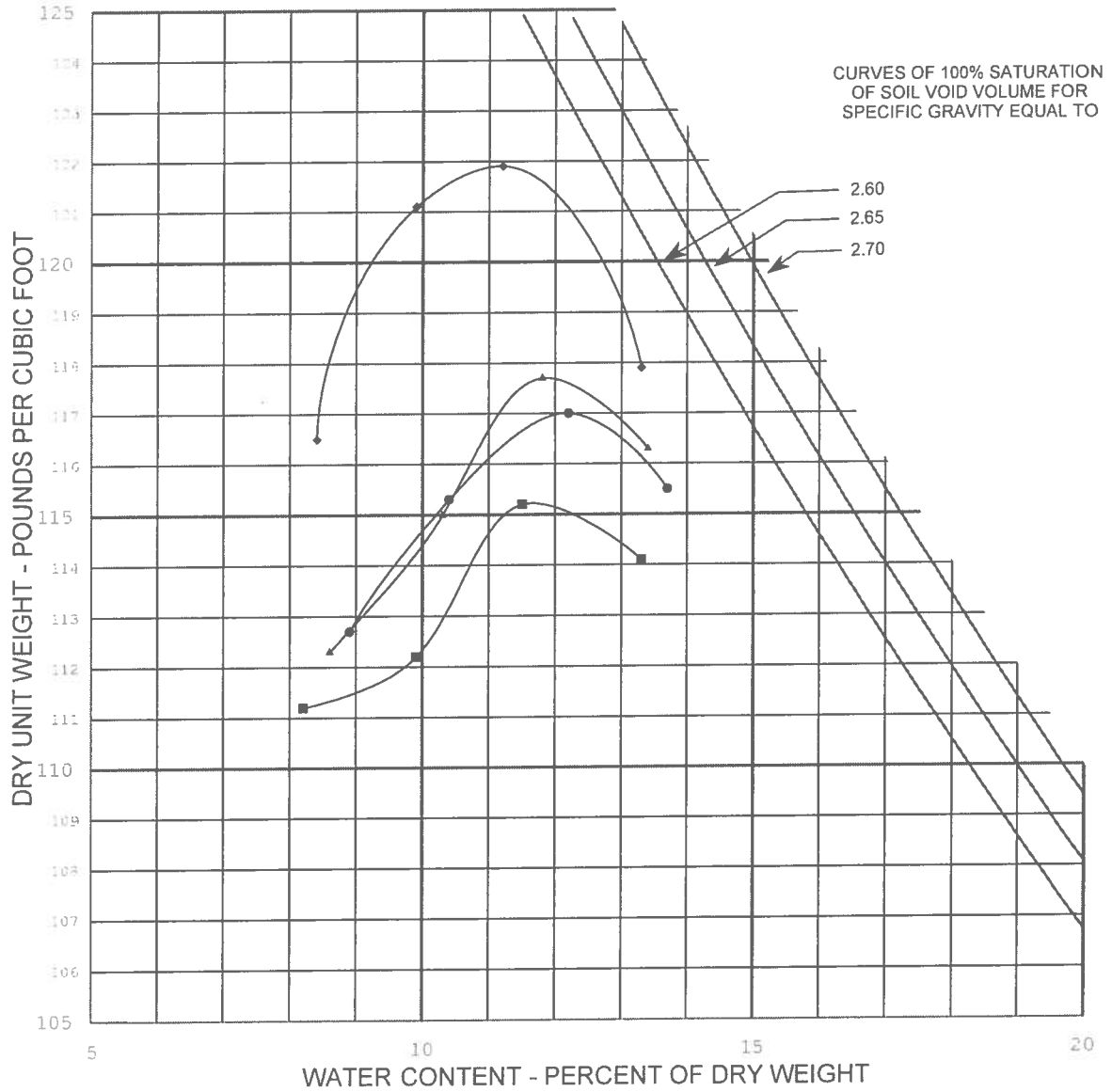
Binod R. Chalise, P.E.
Project Engineer
Florida License No. 66545

R. Barlow
Rick Barlow
Project Manager

BRC/RB:cwv
Enclosures
Client Copies: 2
File Copy: 1
Email: cgunn@fgeotech.com



R:\BARTOW JOBS\2015 JOBS\15-9050 FLORIDA GEOTECHNICAL ENGINEERING, INC., VARIOUS PROJECTS, FL\15-9050 RPT #1.DOCX

MOISTURE - DENSITY RELATIONSHIP



LEGEND

- MDR CURVE #1
- ▲ MDR CURVE #2
- MDR CURVE #3
- ◆ MDR CURVE #4

MDR NO	DATE SAMPLED	TEST METHOD	MAXIMUM DRY DENSITY (PCF)	OPTIMUM WATER CONTENT (%)	LBR	SOIL DESCRIPTION	 Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants		
1	03/17/15	AASHTO T-180	117.1	12.0	115	LIMEROCK BASE - SW CORNER OF HSCO SKID PAD	FLORIDA GEOTECHNICAL ENGINEERING, INC. VARIOUS PROJECTS FLORIDA		
2	03/17/15	AASHTO T-180	117.7	11.8	148	LIMEROCK BASE - NW CORNER OF HSCO SKID PAD			
3	03/17/15	AASHTO T-180	115.2	11.6	98	LIMEROCK BASE - NE CORNER OF HSCO SKID PAD			
4	03/17/15	AASHTO T-180	122.0	11.0	135	LIMEROCK BASE - SE CORNER OF HSCO SKID PAD	DRAWN BY CWV	CHECKED BY RB	DATE 03/26/15
							FILE NO 15-9050	APPROVED BY 	FIGURE NO 1



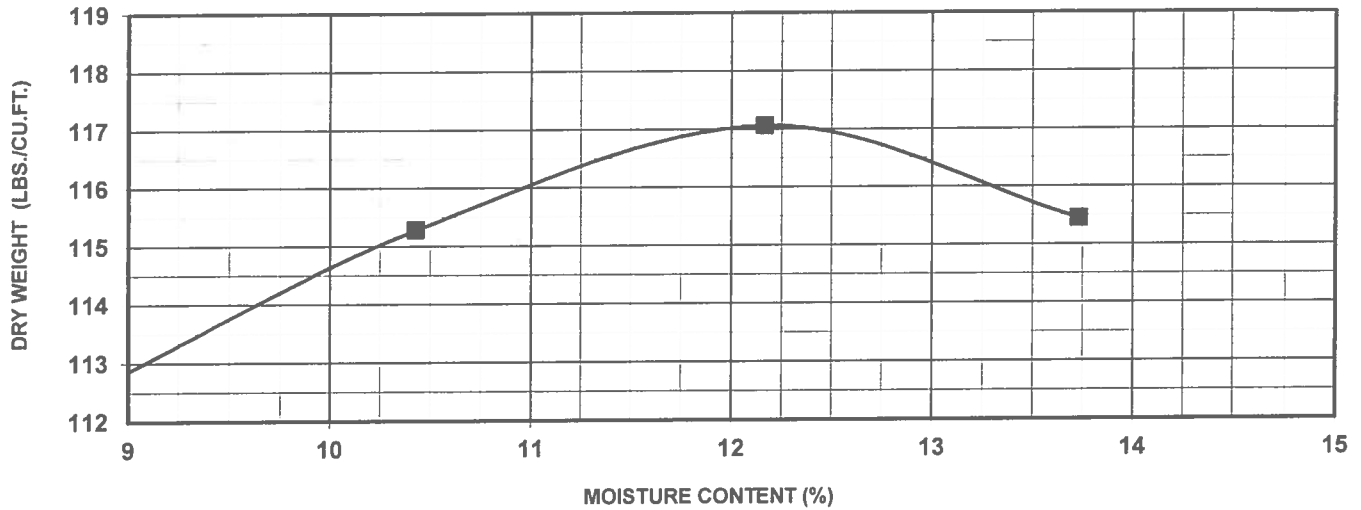
ARDAMAN & ASSOCIATES, INC.
 1525 CENTENNIAL DRIVE
 BARTOW, FLORIDA 33830
 (863) 533-0858, FAX (863) 533-7325



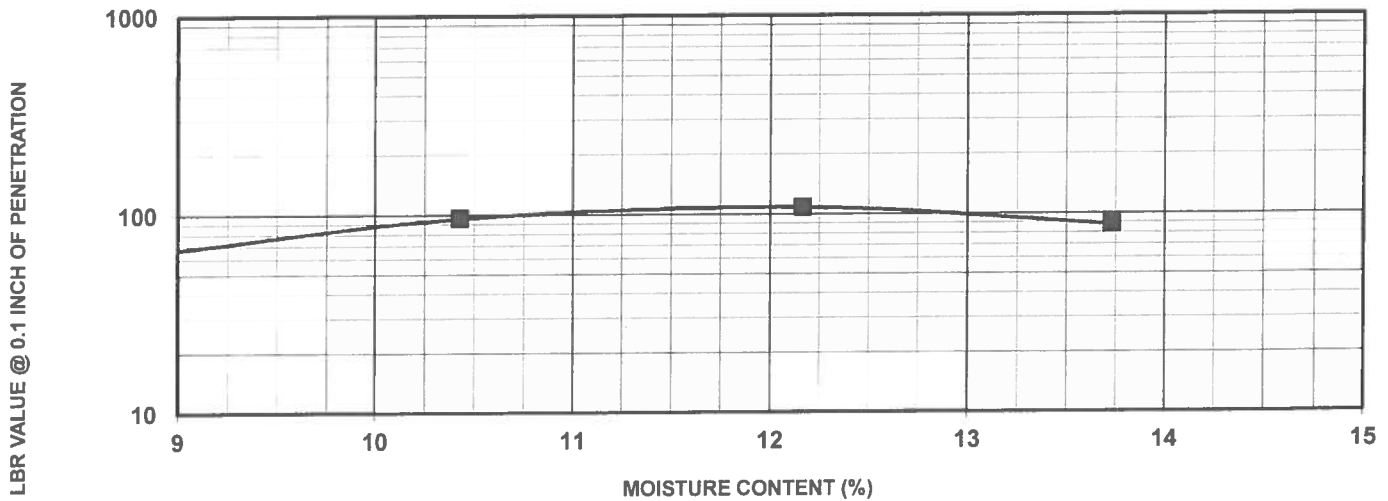
Project Name: VARIOUS PROJECTS
 Project Location: FLORIDA
 File Number: 15-51-9050
 Client Name: FLORIDA GEOTECHNICAL ENGINEERING, INC.
 Lab Number: _____

Date Sampled: 3/17/2015
 Sampled By: CLIENT
 Date Tested: 3/23/2015
 Tested By: J. PURVIS

MOISTURE-DENSITY RELATIONSHIP



MOISTURE-LBR RELATIONSHIP



Maximum Dry Density: 117.1 **pcf**
 Optimum Moisture Content: 12.0 **percent**
 Maximum LBR Value: 115

Soil Description: **LIMEROCK BASE**
 Sample Location: **SW CORNER OF HSCO SKID PAD**

EXHIBIT 1



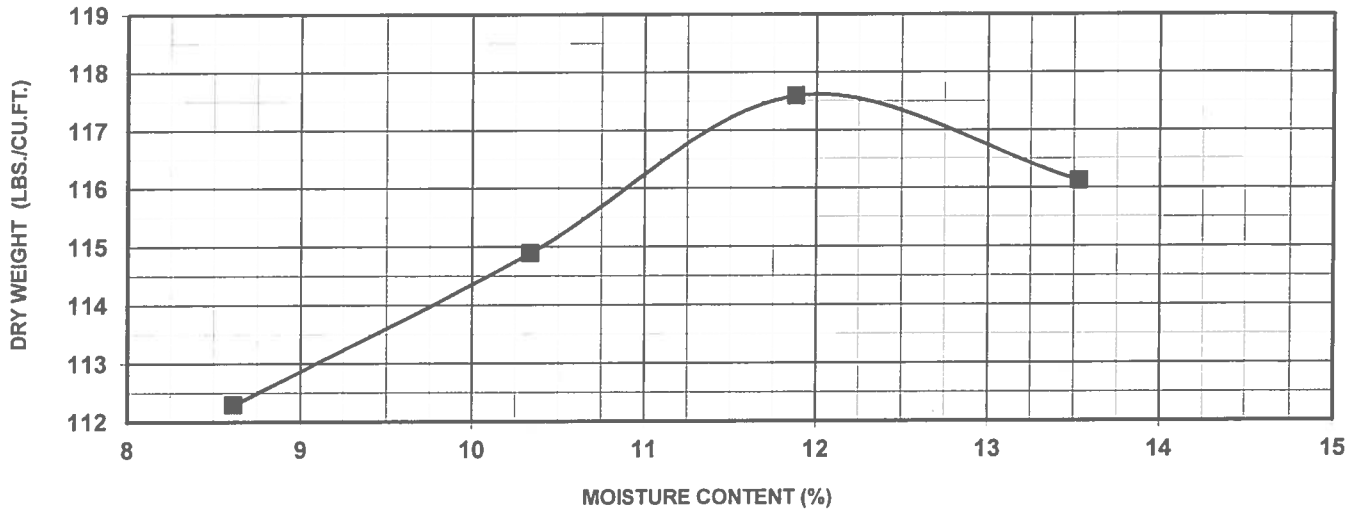
ARDAMAN & ASSOCIATES, INC.
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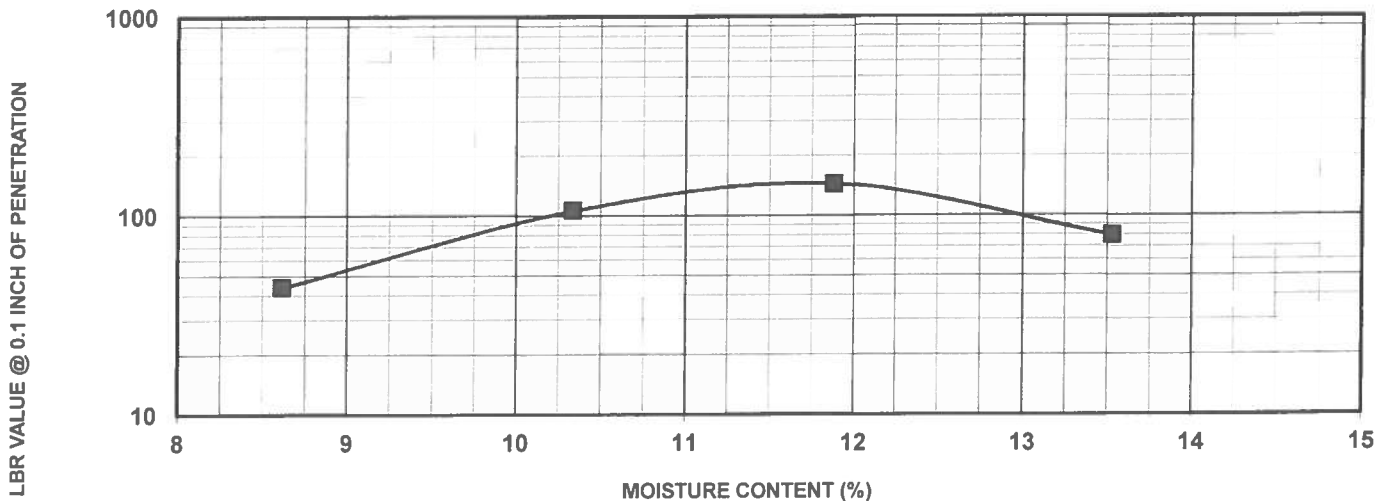
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File Number: 15-51-9050
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Lab Number: _____

Date Sampled: 3/17/2015
Sampled By: CLIENT
Date Tested: 3/23/2015
Tested By: J. PURVIS

MOISTURE-DENSITY RELATIONSHIP



MOISTURE-LBR RELATIONSHIP



Maximum Dry Density: 117.7 pcf
Optimum Moisture Content: 11.8 percent
Maximum LBR Value: 148

Soil Description: LIMEROCK BASE
Sample Location: NW CORNER OF HSCO SKID PAD

EXHIBIT 2



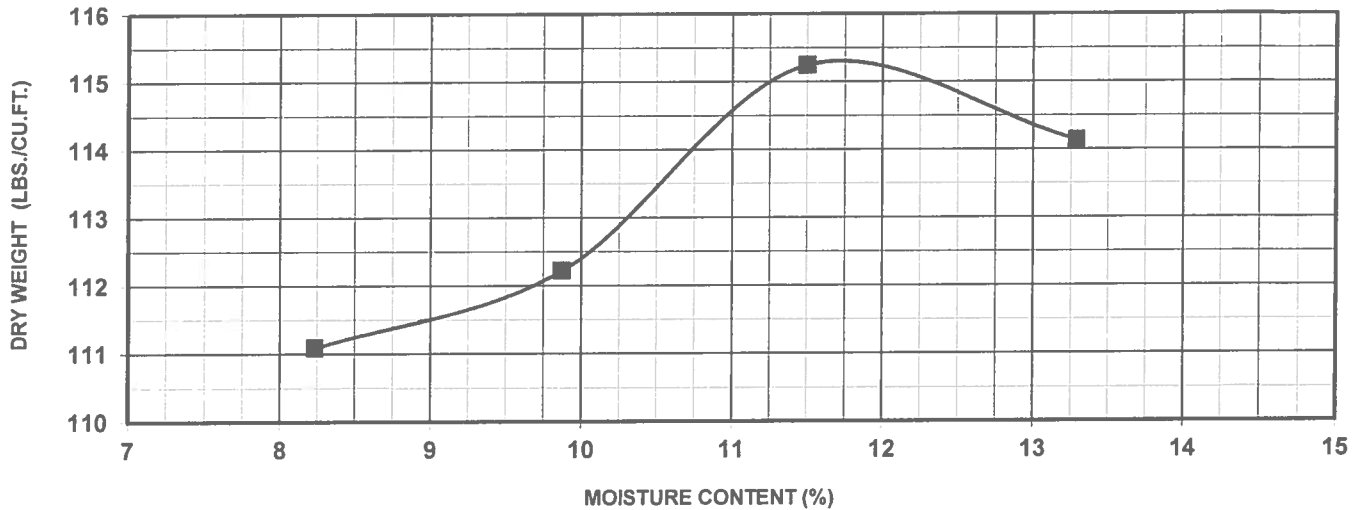
ARDAMAN & ASSOCIATES, INC.
1525 CENTENNIAL DRIVE
BARTOW, FLORIDA 33830
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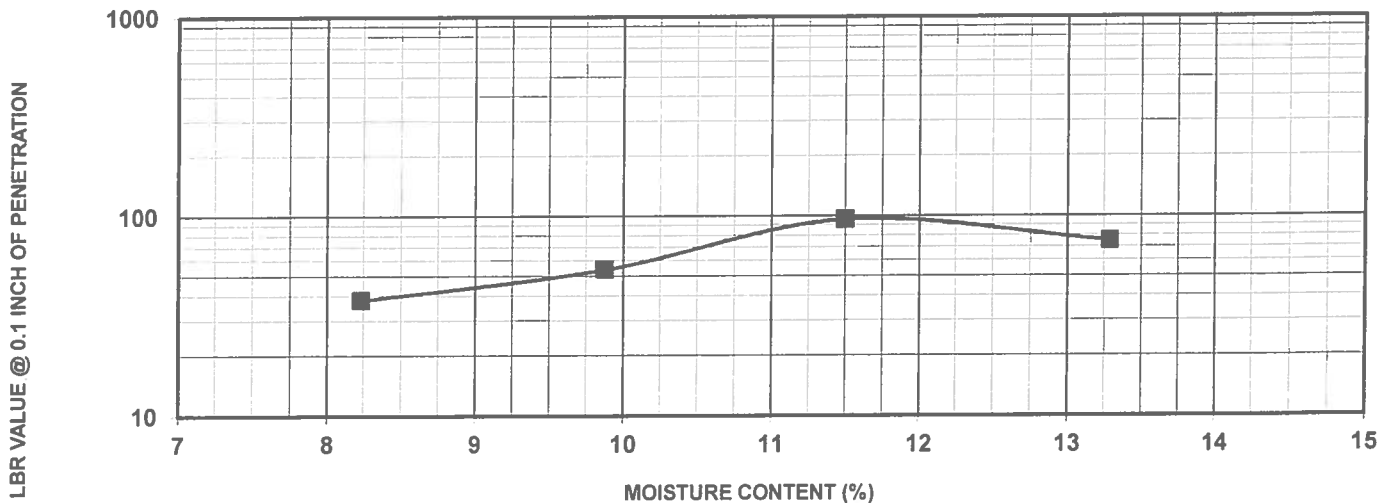
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Project Location: FLORIDA
File Number: 15-51-9050
Client Name: FLORIDA GEOTECHNICAL ENGINEERING, INC.
Lab Number: _____

Date Sampled: 3/17/2015
Sampled By: CLIENT
Date Tested: 3/25/2015
Tested By: J. PURVIS

MOISTURE-DENSITY RELATIONSHIP



MOISTURE-LBR RELATIONSHIP



Maximum Dry Density: 115.2 pcf
Optimum Moisture Content: 11.6 percent
Maximum LBR Value: 98

Soil Description: LIMEROCK BASE
Sample Location: NE CORNER OF HSCO SKID PAD

EXHIBIT 3



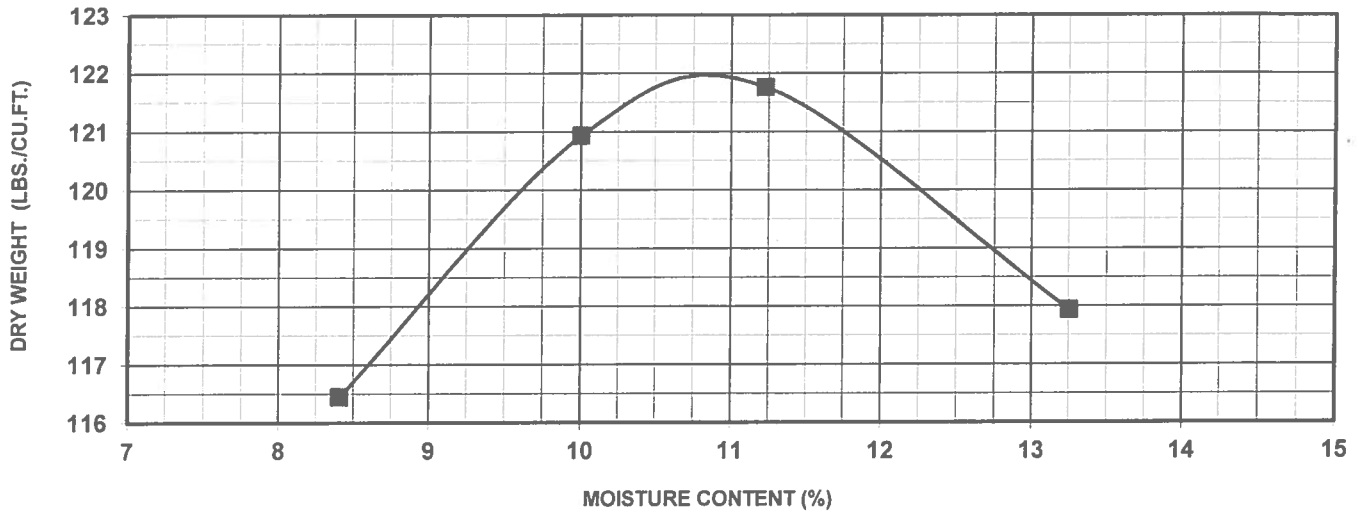
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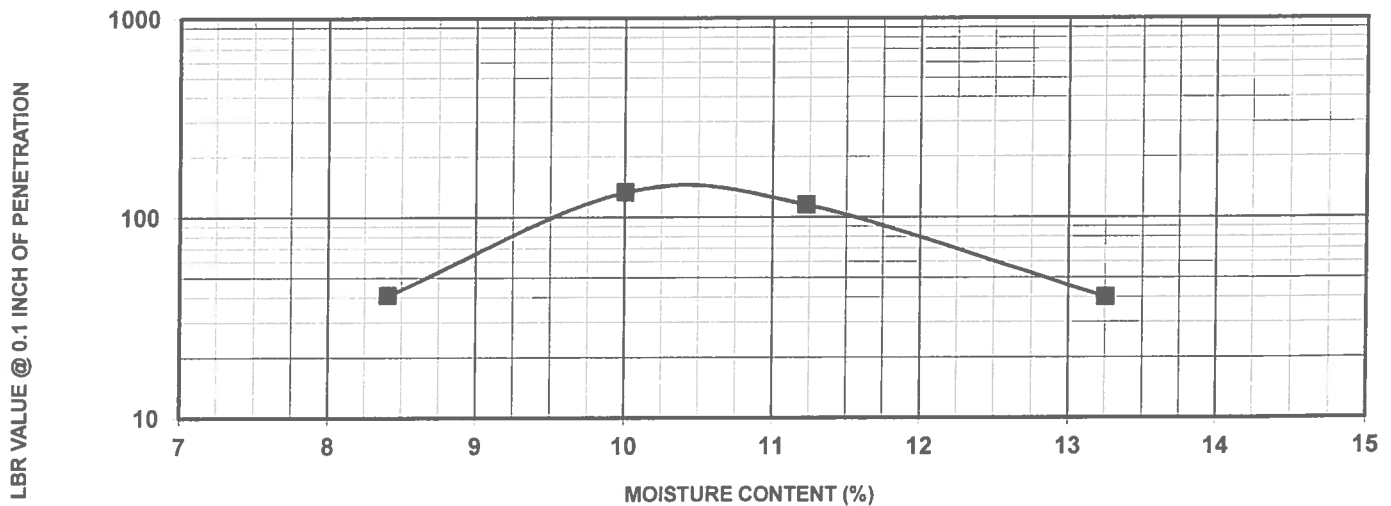
Project Name: VARIOUS PROJECTS
 Project Location: FLORIDA
 File Number: 15-51-9050
 Client Name: FLORIDA GEOTECHNICAL ENGINEERING, INC.
 Lab Number: _____

Date Sampled: 3/17/2015
 Sampled By: CLIENT
 Date Tested: 3/25/2015
 Tested By: J. PURVIS

MOISTURE-DENSITY RELATIONSHIP



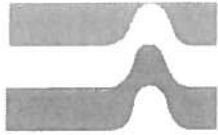
MOISTURE-LBR RELATIONSHIP



Maximum Dry Density: 122.0 pcf
 Optimum Moisture Content: 11.0 percent
 Maximum LBR Value: 135

Soil Description: LIMEROCK BASE
 Sample Location: SE CORNER OF HSCO SKID PAD

EXHIBIT 4



Ardaman & Associates, Inc.

Geotechnical Environmental and
Materials Consultants

TABLE 1

ASPHALT BULK SPECIFIC GRAVITY			
AASHTO T166			
File No.: 15-51-9050		Project Name: Florida Geotechnical Engineering., Inc.	
Date Sampled: Unknown		Sampled By: Kent Gutowski	
Date Tested: 3/25/2015		Tested By: Johnny Purvis	
ASPHALTIC CONCRETE CORE NO.	THICKNESS (Inches)	BULK SPECIFIC GRAVITY (G _{mb})	BULK DENSITY (PCF)
C1	2	2.017	125.9
C2	2-1/4	2.008	125.3
C3	2-1/2	2.042	127.4
C4	2	2.117	132.1
C5	2-1/4	2.113	131.9
C6	2-7/8	2.149	134.1
C7	2-5/8	2.134	133.2
C8	2-1/4	2.101	131.1
C9	2-1/4	2.086	130.2
C10	2-1/4	2.095	130.7
C11	2-1/4	2.145	133.8
C12	2-1/2	2.141	133.6


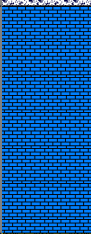


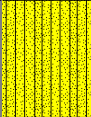


ATTACHMENT B

Boring: C-4	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
114		LIMESTONE Dense, light tan road base.			40											
	0.5				40											
114	1.0	SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.			40											
	1.5															
	2.0															
	2.5															
	3.0															

SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-1	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
114		LIMESTONE Dense, light tan road base.			40											
	0.5				40											
		SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
	1.0				40											
	1.5															
	2.0															
	2.5															
	3.0															


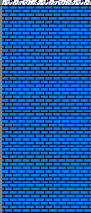


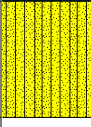


SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-10	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
		LIMESTONE Dense, light tan road base.			40											
	0.5				40											
114		SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
	1.0				40											
	1.5															
	2.0															
	2.5															
	3.0															

SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-11	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
		Asphalt Very dense, dark grey.														
115		LIMESTONE Dense, light tan road base.			40											
	0.5				40											
114		SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
	1.0				40											
	1.5															
	2.0															
	2.5															
	3.0															


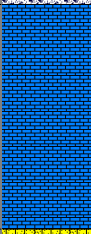





SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-12	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
		LIMESTONE Dense, light tan road base.			40											•
	0.5				40											•
114		SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
	1.0				40											•
	1.5															
	2.0															
	2.5															
	3.0															

SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-2	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)								
						5	10	15	20	25	30	35		
115	0.0	Land Surface												
115		Asphalt Very dense, dark grey.												
114		LIMESTONE Dense, light tan road base.			40									
	0.5				40									
			SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.											
	1.0				40									
	1.5													
	2.0													
	2.5													
	3.0													


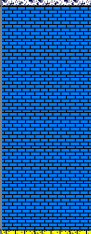





SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-3	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)								
						5	10	15	20	25	30	35		
115	0.0	Land Surface												
115		Asphalt Very dense, dark grey.												
114		LIMESTONE Dense, light tan road base.			40									•
	0.5				40									•
	1.0	SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.												
					40									•
	1.5													
	2.0													
	2.5													
	3.0													

SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-5	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
		LIMESTONE Dense, light tan road base.			40											
	0.5				40											
114		SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
	1.0				40											
	1.5															
	2.0															
	2.5															
	3.0															

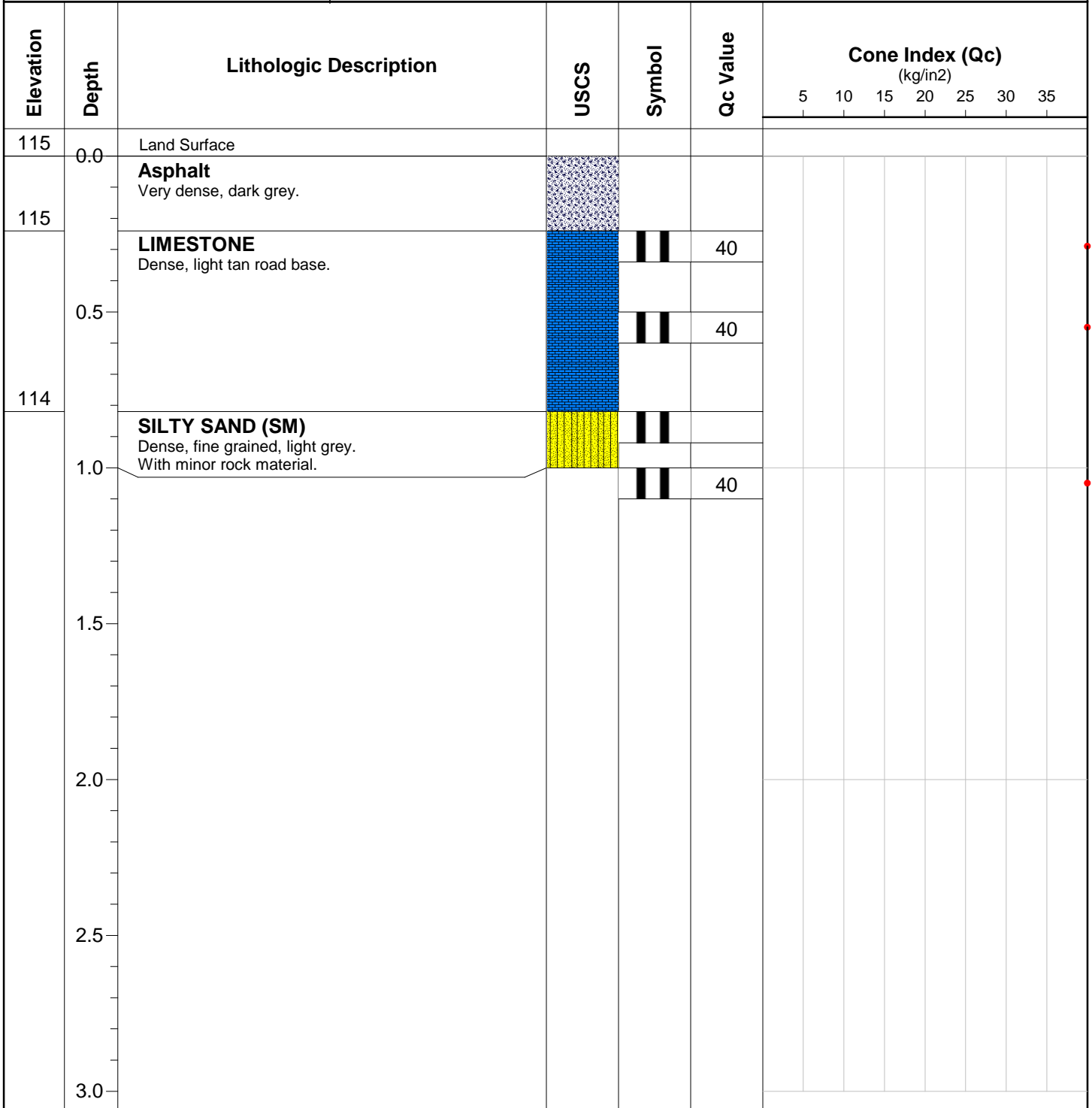
SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-6	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
114		LIMESTONE Dense, light tan road base.			40											•
	0.5				40											•
	1.0	SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
					40											•
	1.5															
	2.0															
	2.5															
	3.0															

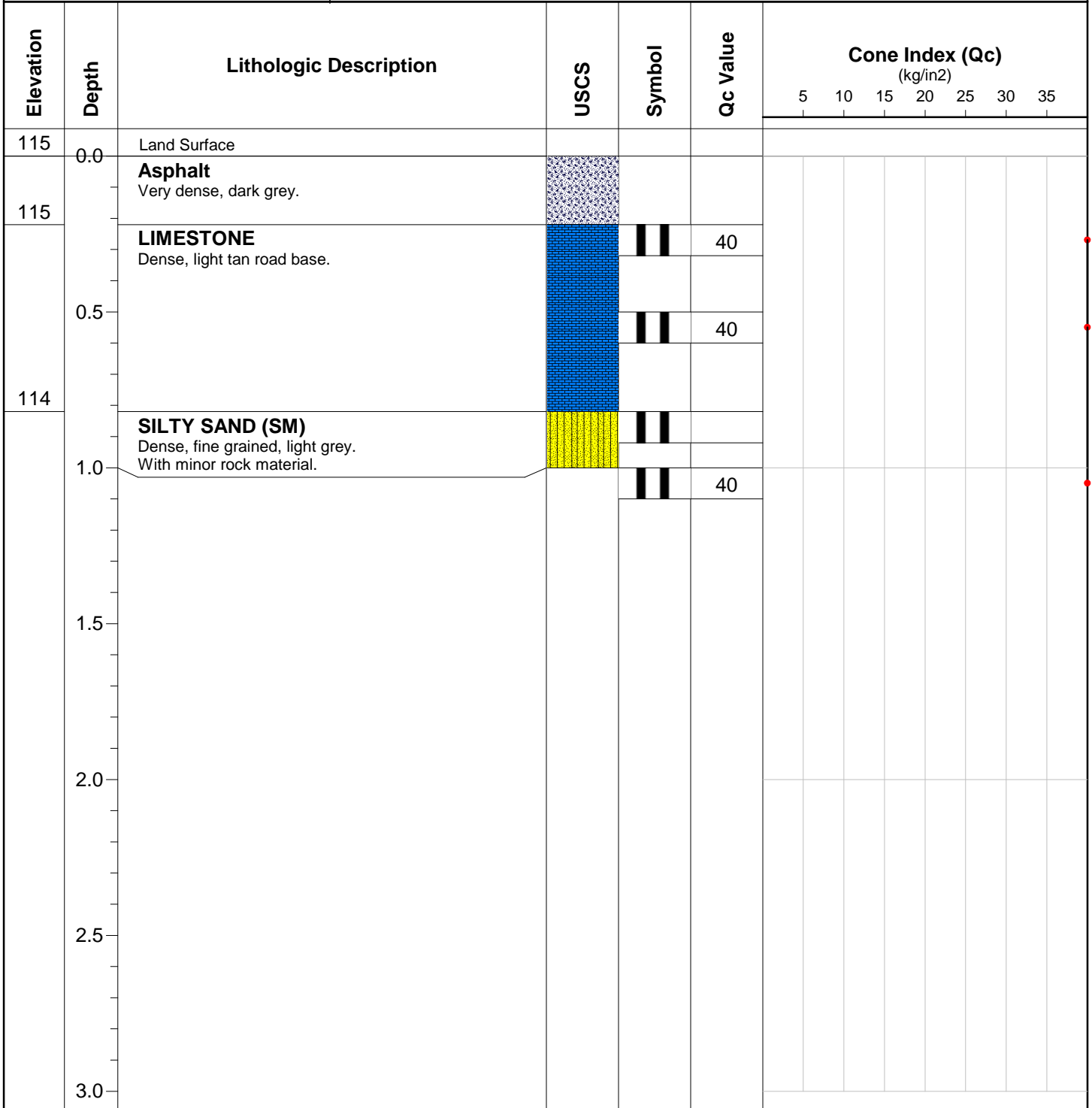
SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-7	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	



SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-8	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	



SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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Boring: C-9	Project: HCSO Skid Pad	
Date: 3/17/15	Ground Elevation: 115 ft	
Drilling Method: ASTM D-5361	Supervisor: K. Gutowski	
Water Level: Not Encountered	Location: See Map	

Elevation	Depth	Lithologic Description	USCS	Symbol	Qc Value	Cone Index (Qc) (kg/in ²)										
						5	10	15	20	25	30	35				
115	0.0	Land Surface														
115		Asphalt Very dense, dark grey.														
114		LIMESTONE Dense, light tan road base.			40											•
	0.5				40											•
	1.0	SILTY SAND (SM) Dense, fine grained, light grey. With minor rock material.														
					40											•
	1.5															
	2.0															
	2.5															
	3.0															

SOIL DENSITY N = 0 - 4 Very Loose N = 4 - 10 Loose N = 10 - 30 Medium Dense N = 30 - 50 Dense N = +50 Very Dense	SOIL CONSISTENCY N = 0 - 2 Very Soft N = +30 Hard N = 2 - 4 Soft N = 4 - 8 Firm N = 8 - 15 Stiff N = 15 - 30 Very Stiff	ACRONYMS HA - Hand Auger LOC - Loss of Circulation WOR - Weight of Rod WOH - Weight of Hammer
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