

May 3, 2016

Pelican Association Management, LLC
8733 Siegen Lane, Suite 338
Baton Rouge, Louisiana 70810
Phone: (225) 300-8689

Attn: Mr. Daniel Camp, CMCA

Re: Geotechnical Engineering Report
Roadway Infrastructure Evaluation
The Landings of Cross Gates
Slidell, Louisiana
SE Project No. G16-017

Dear Mr. Camp:

Stratum Engineering, LLC (SE) has completed an evaluation of the existing roadways for The Landings of Cross Gates Subdivision located off of Crawford Landing Road in Slidell, Louisiana. The purpose of this study was to verify the pavement and base thickness along the existing roadways and assess their compliance with St. Tammany Parish requirements for inclusion into the Parish Roadway System. The exploration was accomplished in general accordance with SE Proposal No. G16-026, dated February 22, 2016.

Project & Site Description

The Landings of Cross Gates Subdivision is located northeast of Slidell, Louisiana near the Pearl River and Interstate 10 Welcome Center. The development is situated on the north side of Crawford Landing Road encompassing about 70 acres of single family residential lots. The existing infrastructure consists of approximately 8,230 linear feet of concrete paved roadways which include Landings Boulevard, Gum Bayou Lane, Dockside Drive, Wood Duck Lane, Gator Cove, Pin Tail Court, and River Landing Drive. All of the roadways are 2-lane rigid pavement residential streets and are approximately 24 feet wide. An additional phase of the development, which was not included in this study, is currently under construction at the east end of the subdivision.

Detailed traffic information was not available to us. However, based on plans provided to us, the roadways provide access to over 125 residential lots. The roadway section was intended to consist of about 6 inches of concrete pavement underlain by 10 inches of cement treated base.

Field Exploration & Laboratory Testing

In order to assess the condition of the roadways, seventeen (17) cores were cut through the existing pavement at about 500 foot intervals. Borings were hand augered at the core locations to a depth of 3 feet below the existing ground surface.

The field exploration included a reconnaissance of the project site, augering soil borings, and recovering disturbed soil samples of the base and subbase material. Groundwater encountered in the test borings, if any, was also measured and recorded. The borings were located in the field by an SE representative. The approximate locations of the borings are indicated on the boring location diagram included in the Appendix of this report, which is created from an aerial image of the development.

Dynamic cone penetration (DCP) tests were also conducted to supplement the hand augered soil borings and provide *in situ* strength estimates of the subgrade soils.

The DCP tests were performed with a single mass hammer weighing 10.1 pounds. The sliding hammer falls a distance of 22.6 inches before striking an anvil which delivers energy to the cone mounted at the end of a drive rod. The cone has a base diameter of 0.790 inch with a 60° apex angle. The number of hammer blows is recorded for every approximate 2 inches of penetration. The data is presented as the DCP Index, or ratio of penetration depth to hammer blows. The DCP Index is then correlated to various strength properties including California Bearing Ratio (CBR) and bearing capacity. The DCP tests were accomplished in general accordance with ASTM D6951 Standard Procedures.

In addition to the field exploration, a supplemental laboratory testing program was conducted to evaluate pertinent engineering characteristics of the subsurface materials necessary in analyzing the behavior of the pavement system. The laboratory testing program included supplementary visual classification and water content tests on all of the soil samples. In addition, selected samples were subjected to percent passing the #200 sieve. Compressive strength testing was also conducted on selected concrete cores obtained from the existing roadways to evaluate the strength of the in-place concrete pavement. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Groundwater Conditions

Groundwater was not encountered during the augering operations. However, it should be noted that groundwater levels will fluctuate with seasonal variations in rainfall, extended periods of drought and the water level in nearby Lake Pontchartrain. In addition, perched water may be encountered in isolated zones of the overburden material.

Pavement Evaluation

Seventeen (17) roadway cores were obtained from the development infrastructure to verify the pavement and underlying base thicknesses for compliance with St. Tammany Parish requirements. A summary of the pavement thickness at the core locations is tabulated below:

EXISTING PAVEMENT SECTION			
Core #	Location	Concrete Thickness	Base Type and Thickness
P-1	Dockside Drive	5 ½"	8" Cement Treated Base underlain by ±36 inches of silty sand
P-2	Dockside Drive	5 ¾"	8" Cement Treated Base
P-3	Dockside Drive	6"	8" Cement Treated Base
P-4	Dockside Drive	6 ¾"	10" Cement Treated Base
P-5	Dockside Drive	5"	11 ¾" Cement Treated Base
P-6	Dockside Drive	5 ½"	10 ½" Cement Treated Base underlain by ±36 inches of poorly graded sand
P-7	Dockside Drive	6 ½"	7" Cement Treated Base underlain by ±36 inches of silty to clayey sand
P-8	River Landing Drive	7"	±36 inches of poorly graded sand
P-9	River Landing Drive	6 ½"	±36 inches of silty sand
P-10	Wood Duck Lane	6"	±36 inches of silty to poorly graded sand
P-11	Pin Tail Court	6"	±36 inches of silty sand
P-12	Gator Cove Lane	6 ½"	10 ½" Cement Treated Base underlain by ±36 inches of clayey to poorly graded sand
P-13	Wood Duck Lane	7 ¼"	7" Cement Treated Base
P-14	Wood Duck Lane	6"	8" Cement Treated Base
P-15	Gum Bayou Lane	5 ¾"	11" Cement Treated Base
P-16	Gum Bayou Lane	6 ¾"	10" Cement Treated Base
P-17	Landings Boulevard	7"	±36 inches of silty sand

Considering the approximate pavement age of 10 to 15 years, the pavement generally appears to be in good condition with only minimal cracking noted during our field investigation. Based on the pavement cores, the rigid pavement consists of 5 to 7 ¼ inches of concrete underlain by about 7 to 11 ¾ inches of cement treated base material or at least 36 inches of sandy base material. Compressive strength testing was also conducted on six (6) selected cores from across the development. Based on the test results, the compressive strength of the existing concrete pavement ranged from 6,500 psi to 7,990 psi with an average compressive strength of 7,130 psi.

Based on the minimum requirements outlined in Section 40-032.04, Subsection 3, Part 2 of the St. Tammany Parish Code of Ordinances, lightly travelled subdivision streets shall have a minimum rigid pavement section of six (6) inches of Portland cement concrete underlain by either 12 inches of A-3 or better base material over a proofrolled stable subgrade. Eight (8) inches of cement treated subgrade soil (if suitable) may be used as an alternative base material.

Consequently, the thickness of the existing roadways meets the St. Tammany Parish requirements at all but five (5) locations (P-1, P-2, P-5, P-6, and P-15). At these five (5) locations the rigid pavement is slightly below the required minimum of six (6) inches. Taking into consideration the combination of cement treated base material and compacted granular fill encountered across the development, the combined base materials should be adequate to offset the slight deficiency (1 inch or less) in the concrete pavement thickness at all of the locations in question with the exception of location P-2. However, based on our evaluation of the overall pavement section including the layer coefficients of the various material types and the average compressive strength of the existing concrete, it is our opinion that the subdivision roadways in question may be considered equivalent to the minimum roadway sections required by St. Tammany Parish. Despite of SE's evaluation and opinion of the roadway sections, the decision to accept or reject the roadways will ultimately be made by the St. Tammany Parish Engineering Department.

Limitations

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

The evaluation was completed using the available information obtained by SE and design details furnished by Pelican Association Management, LLC. This letter report has been prepared for the exclusive use of Pelican Association Management, LLC for the roadway infrastructure evaluation completed for The Landings of Cross Gates Subdivision in Slidell, Louisiana.

We appreciate the opportunity to perform this pavement evaluation. If you should have any questions, please do not hesitate to call.

Respectfully submitted,
STRATUM ENGINEERING, LLC



William "Dean" McInnis, P.E.
Project Manager



Tony Y. Maroun, P.E.
Principal

WDM/TYM:wdm

Appendix: Boring Location Plan
Boring Logs
Key to Terms and Symbols Used on Logs

APPENDIX



⊕ = BORING LOCATION



BORING LOCATION PLAN

GEOTECHNICAL ENGINEERING SERVICES
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA



LOG OF BORING P-1
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5 ½" Concrete / 8" Cement Treated Base	29					16		NP	37
			Tan Silty Sand						10			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-2
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5 ¾" concrete / 8" Cement Treated Base	21					21			
			Tannish gray Lean Clay						20	30	13	
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-3
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" Concrete / 8" Cement Treated Base	20					25			
			Tannish gray Lean Clay						24			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-4
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 ¾" Concrete / 10" Cement Treated Base	24					21	28	12	
			Tannish gray Sandy Lean Clay						19			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-5
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5" Concrete / 11 3/4" Cement Treated Base	27					20			
			Reddish tan Lean Clay with sand						19	39	21	77
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-6
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5 ½" Concrete / 10 ½" Cement Treated Base	20					9			
			Tan Poorly Graded Sand						6			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-7
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: DOCKSIDE DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N ₆₀ *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 1/2" Concrete / 7" Cement Treated Base	8					17			37
			Tan Silty Sand									
			Reddish tan Clayey Sand						13			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N₆₀ is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-8
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: RIVER LANDING DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			7" Concrete	29					11			
			Tan Poorly Graded Sand						9		NP	
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-9
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: RIVER LANDING DRIVE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 1/2" Concrete	23					22			
			Gray Silty Sand						11			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-10
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: WOOD DUCK LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" Concrete	19					19		NP	
			Tan Silty Sand									
			Tan Poorly Graded Sand						10			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-11
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: PIN TAIL COURT

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" Concrete	14					13			
			Reddish tan Silty Sand						9		NP	27
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-12
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: GATOR COVE LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 1/2" Concrete / 10 1/2" Cement Treated Base	32					15	26	12	45
			Reddish tan Clayey Sand									
			Tan Poorly Graded Sand						10			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-13
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: WOOD DUCK LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			7 ¼" Concrete / 7" Cement Treated Base	33					20	24	7	64
			Reddish tan Silty Sandy Clay						19			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet
 DATE: 4/13/2016

GROUNDWATER: Dry Upon Completion of Augering

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-14
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: WOOD DUCK LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6" Concrete / 8" Cement Treated Base	8					15			
			Tannish gray Silty Clay						20	19	5	
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-15
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: GUM BAYOU LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5 ¾" Concrete / 11" Cement Treated Base	17					20			
			Tannish gray Lean Clay						23			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-16
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: GUM BAYOU LANE

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 ¾" Concrete / 10" Cement Treated Base	25					21	29	13	
			Tannish gray Lean Clay						21			
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.



LOG OF BORING P-17
ROADWAY INFRASTRUCTURE EVALUATION
THE LANDINGS OF CROSS GATES
SLIDELL, LOUISIANA

TYPE OF BORING: HAND AUGER

LOCATION: LANDINGS BOULEVARD

PROJECT NO.: G16-017

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N _{cd} *	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENETROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			7" Concrete	25					22			
			Tannish gray Silty Sand						22		NP	33
5			Boring Terminated at 3 Feet									
10												
15												
20												
25												
30												
35												
40												
45												
50												

DEPTH OF BORING: 3 Feet

GROUNDWATER: Dry Upon Completion of Augering

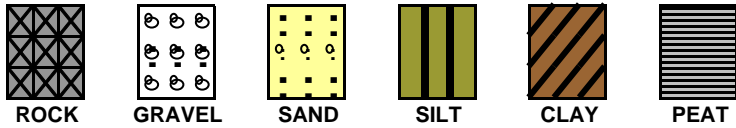
DATE: 4/13/2016

*N_{cd} is the sum of blows necessary to advance the Dynamic Cone Penetrometer (DCP) 300 mm (12 in) into the subsurface material.

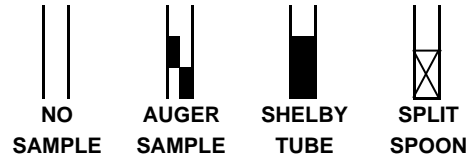


KEY TO TERMS AND SYMBOLS USED ON LOGS

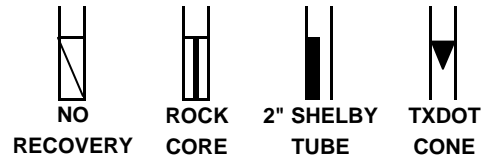
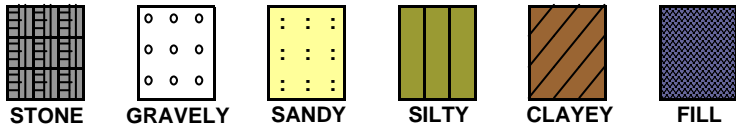
SOIL TYPE



SAMPLER TYPE



MODIFIERS



UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

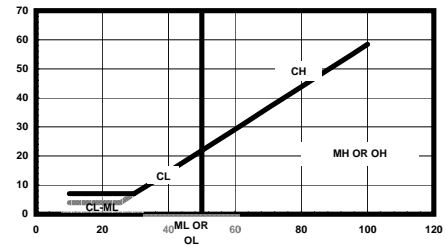
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL & GRAVELLY SOILS	CLEAN GRAVEL (LITTLE OR NO FINES)	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
		POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES		GP	
	LESS THAN 50% PASSING NO. 4 SIEVE	W/ APPRECIABLE FINES	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES	GM	
			CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	GC	
	50% PASSING NO. 200 SIEVE	SANDS	CLEAN SANDS (LITTLE FINES)	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			POORLY GRADED SANDS, GRAVELY SAND (L-FINES)	SP	
	MORE THAN 50% PASSING NO. 4 SIEVE	SANDS WITH APPRECIABLE FINES	SILTY SANDS, SAND-SILT MIXTURES	SM	
			CLAYEY SANDS, SAND-CLAY MIXTURES	SC	
	FINE GRAINED SOILS	SILTS AND CLAYS	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR	ML	SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY		CL
ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI			OL		
50% PASSING NO. 200 SIEVE		SILTS AND CLAYS	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	MH	
LIQUID LIMIT LESS THAN 50	INORGANIC CLAYS OF HIGH PLASTICITY	CH	FAT CLAYS		
LIQUID LIMIT GREATER THAN 50	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT		OH		
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	
UNCLASSIFIED FILL MATERIALS			ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES		

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT ²
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

- HP - HAND PENETROMETER
- TV - TORVANE
- MV - MINIATURE VANE
- UC - UNCONFINED COMPRESSION TEST
- UU - UNCONSOLIDATED UNDRAINED TRIAXIAL
- CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS



CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

	6"	3"	3/4"	4	10	40	200		
BOUL- -DERS	COBBLES	GRAVEL		SAND			SILT	CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE			
	152	76.2	19.1	4.76	2.0	0.42	0.075		0.002
GRAIN SIZE IN MM									