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5 August 2009

General Maintenance Corporation  
2516 Connecticut Avenue  
Kenner, Louisiana 70062

Attention Mr. Steve Allen

Gentlemen:

Geotechnical Investigation  
Proposed Canopy  
2035 Gentilly Boulevard  
New Orleans, Louisiana  
Eustis Engineering Project No. 20686

Transmitted are two copies (one bound and one unbound) of our engineering report covering a geotechnical investigation for the subject project. One copy is being forwarded to Dammon Engineering, Inc., Slidell, Louisiana, to the attention of Mr. Chuck Dammon. Electronic copies are also being transmitted to you and Mr. Dammon.

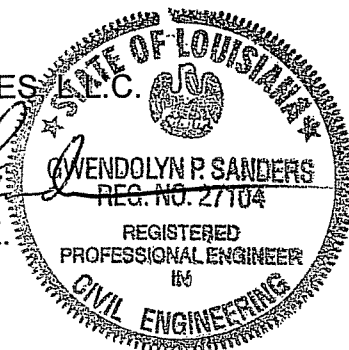
Thank you for asking us to perform these services.

Yours very truly,

EUSTIS ENGINEERING SERVICES, L.L.C.

  
GWENDOLYN P. SANDERS, P.E.

M. K. Morales:aln/jkd



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GEOTECHNICAL INVESTIGATION  
PROPOSED CANOPY  
2035 GENTILLY BOULEVARD  
NEW ORLEANS, LOUISIANA  
EUSTIS ENGINEERING PROJECT NO. 20686

FOR  
GENERAL MAINTENANCE CORPORATION  
KENNER, LOUISIANA

DAMMON ENGINEERING, INC.  
SLIDELL, LOUISIANA

By  
Eustis Engineering Services, L.L.C.  
Metairie, Louisiana

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5 AUGUST 2009

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GEOTECHNICAL INVESTIGATION  
PROPOSED CANOPY  
2035 GENTILLY BOULEVARD  
NEW ORLEANS, LOUISIANA  
EUSTIS ENGINEERING PROJECT NO. 20686

INTRODUCTION

1. This report contains the results of a geotechnical investigation performed for the proposed canopy to be constructed at the Shell gas station located at 2035 Gentilly Boulevard in New Orleans, Louisiana. The work was performed in general accordance with the scope of work outlined in Eustis Engineering Services, L.L.C.'s proposal dated 12 June 2009. Authorization to proceed with the investigation was given by Mr. Fred Weber of General Maintenance Corporation. Dammon Engineering, Inc., is the structural engineer for the project.
  
2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of General Maintenance Corporation and Dammon Engineering for specific application to the subject site. In the event of any changes in the nature, design, or location of the proposed canopy, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified and verified in writing. Should these data be used by anyone other than General Maintenance Corporation and Dammon Engineering, the user should contact Eustis Engineering for interpretation of data and to secure other information which may be pertinent to the project.
  
3. Note the analyses and recommendations contained in this report are based, in part, on data obtained from the soil boring. The individual log of the boring is considered

representative of subsurface conditions at the location of the boring on the date completed. No warranty is given that the log of the boring is representative of subsurface conditions at other locations or times. The nature and extent of variations in subsurface conditions away from the boring location may not become evident until construction. If such variations then appear, it will be necessary to reevaluate the recommendations contained in this report.

### SCOPE

4. The scope of the investigation included the drilling of one undisturbed sample type soil test boring to determine subsoil conditions and stratification, and to obtain samples of the various strata encountered. Soil mechanics laboratory tests, performed on samples obtained from the boring, were used to evaluate the physical properties of the various substrata. Based on the soil boring and laboratory tests, analyses were made to determine estimates of allowable soil bearing values, allowable pile load capacities, and settlement. Recommendations were also developed for site preparation, placement and compaction of fill, and foundation construction procedures.
5. Eustis Engineering's scope of work does not include the investigation or detection of the presence of any biological pollutants in or around the subject site. The term "biological pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, viruses, and the byproducts of any such biological organisms.

### SOIL BORING

6. One undisturbed soil test boring was drilled on 14 July 2009 at the approximate location shown on Figure 1. The boring was drilled to a depth of 60 feet below the existing ground surface. A detailed descriptive log of the boring is shown in both tabular and graphical form in the Appendix. The undisturbed boring was made using

a truck mounted rotary type drill rig. Upon completion of drilling operations, the boring was backfilled in accordance with current regulatory requirements and pavement patched.

7. Undisturbed samples of cohesive or semi-cohesive subsoils were obtained at close intervals or changes in strata using a 3-in. diameter thinwall Shelby tube sampling barrel. The samples were immediately extruded from the sampling barrel, inspected, and visually classified by Eustis Engineering's soil technician. Pocket penetrometer tests were performed on the soil samples to give a general indication of their shear strength or consistency. The results of these tests is shown on the boring log under the column heading "PP." Representative samples were placed in moisture proof containers and sealed for preservation.

#### LABORATORY TESTS

8. Soil mechanics laboratory tests, consisting of natural water content, unit weight, unconfined compression shear (UC), and unconsolidated undrained triaxial compression shear (OB), were performed on undisturbed samples obtained from the boring. The results of these laboratory tests are shown on the boring log in the Appendix.

#### DESCRIPTION OF SURFACE AND SUBSOIL CONDITIONS

9. Site Description. The project site is an existing Shell gas station with four gas pumps and an existing canopy. The lot is bordered by Paris Avenue to the west and Gentilly Boulevard to the southeast.
10. Subsoil Conditions. Review of the log of the boring indicates an asphalt pavement was initially encountered with a thickness of 1 foot or less. Beneath the pavement, medium stiff to stiff gray and tan silty clay with concretions continues to the

approximate 6-ft depth. Strata of very loose to compact gray clayey and sandy silt were then encountered to a depth of approximately 30 feet. Underlying these deposits is a stratum of stiff gray silty clay extending to a depth of 35 feet, overlying a stratum of loose gray clayey sand to a depth of 40 feet. Beneath these layers, strata of soft to medium stiff gray clay with sandy silt lenses were encountered to a depth of 50 feet. Loose gray clayey sand was then encountered to a depth of 60 feet, the terminal depth of exploration.

### Ground Water

11. To determine ground water conditions at the time of the field investigation, observations were made in the undisturbed boring prior to the introduction of drilling fluids. Free water was initially encountered during drilling at a depth of 7 feet. Note the ground water level in the bore hole may not have stabilized prior to the addition of drilling fluids. We have estimated the ground water table is located approximately 2 feet below the existing ground surface for our analyses. The depth to ground water will vary with climatic conditions, drainage improvements, and other factors. The depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

### FOUNDATION ANALYSIS

#### Furnished Information

12. Information provided by Dammon Engineering indicates the proposed canopy will service the two existing, uncovered gas pumps. The previous damaged canopy has been removed and the footprint of the new canopy will extend beyond any existing foundations. The proposed canopy's columns will be anchored to the ground via three concrete footings. We understand that fill will not be placed at the site.

Drawings furnished by Dammon Engineering give minimum dimensions of the footings and expected service loads for the canopy.

### Foundation Recommendations

13. The proposed canopy may be supported on shallow surface foundations provided the recommendations contained in this report regarding drainage and site preparation are adhered to and the structure's design will accommodate the allowable bearing values and potential settlements. Concrete for footings should be placed integrally with grade beams and slab. The slab should be made as rigid as possible to minimize the effects of settlement and differential settlement. The near surface soils at the site are moisture sensitive. Without proper preparation and drainage, the underlying soils could produce excessive settlement and differential settlement. Therefore, site preparation and drainage are extremely important.
14. As an alternative to shallow foundations, we are providing capacities for driven timber piles for support of the structure where bearing or settlement tolerances cannot be achieved. For deep foundation support, all structural loads from the columns should be supported on piles having the same approximate tip embedment below the existing ground surface to minimize differential settlement. Pile caps should be structurally integrated with the grade beams.
15. We have assumed fill will not be placed at the site for the recommendations provided in this report. Eustis Engineering should be contacted if additional filling is planned. Your structural engineer must determine the appropriate foundation support based on estimated allowable pile load capacities, allowable soil bearing values, settlement estimates, and settlement tolerances. Consideration should be given to both ultimate settlement and differential settlement when selecting the type of foundation.

## Site Preparation

16. Drainage During Construction. The initial step to prepare the site for construction should be to establish adequate temporary and permanent drainage to prevent ponding of water and ensure immediate runoff of all rainfall. We strongly recommend the contractor maintain adequate surface drainage away from all foundations during and after construction. This may be accomplished by setting grades to ensure positive drainage of water away from the foundation areas and providing adequate surface and subsurface drainage structures as required.
17. Permanent Drainage. The near surface soils are subject to a reduction in shear strength and excessive settlement if the moisture content of these soils increases (naturally or as a result of construction operations). We strongly recommend adequate permanent drainage (including surface and subsurface features as required) be provided to collect all rainfall away from the foundations after completion of construction. All gutters draining rainfall from the structure should be connected to pipes which discharge away from the foundations or into a drainage system. Water should not be allowed to collect near the foundations.
18. Clearing and Stripping. The existing ground surface should be stripped of any vegetation, loose topsoil, debris, asphalt, stumps, organic matter, loose fill, and any other deleterious materials. Stripping should be to the minimum depth necessary to remove any vegetation, roots, and non-uniform fill from previous structures. The exact depth of stripping should be determined during construction.
19. Demolition. All existing pavements, structures, and slabs located within the proposed construction areas should be demolished and removed from the site. Provisions should be made to locate any abandoned underground utilities and foundations which could impact new construction. Existing footings or abandoned pipes should be excavated and removed from the site. These structures could

impact the performance of new foundations if not properly removed, proofrolled, and backfilled with structural fill material. Existing piles should not be incorporated into the new structure nor should they be removed. In general, these features should be cut off 5 feet below the proposed grade beams or below the existing ground surface, whichever is greater. Removal and relocation of structures and obstructions should also conform to the requirements outlined in Section 202 of the Louisiana Standard Specifications for Roads and Bridges, 2006 edition (LSSRB).

20. Subgrade Preparation. After the stripping, clearing, and demolition operations, the exposed surface should be proofrolled with a bulldozer or tracked vehicle exerting a ground pressure between 10 and 15 psi. The vibratory system on the compactor, if present, should not be used during proofrolling. Alternative proofrolling techniques may be proposed, but these methods should be approved by Eustis Engineering prior to their use at the site. Any depressions, stump holes, or weak areas identified should be thoroughly cleaned out to the surface of firm undisturbed soil and backfilled with a select structural fill material placed and compacted under controlled conditions. All clearing and compaction operations should be performed only during periods of dry weather.
21. Structural Fill. A select granular material, such as locally available river sand, should be used as backfill and/or fill required to reach design grade. Sand fill should be non-plastic and free of roots, clay lumps, and other deleterious materials with no more than 10% by weight of material passing a U.S. Standard No. 200 mesh sieve. The organic content should not exceed 5% by weight. Prior to transporting structural fill on site, a sample should be tested to verify its conformance to these recommendations.
22. Placement and Compaction. In general, the structural fill should be placed in lifts of 6 to 8 inches loose measure when used beneath grade supported features. Each lift within the uppermost 1 foot beneath slabs, or within the uppermost 2 feet below

footings, should be compacted to at least 95% of its maximum dry density within  $\pm 2\%$  of optimum water content in accordance with ASTM D 1557. The initial lift of backfill placed in depressions or excavations may be compacted to at least 92% of its maximum dry density within  $\pm 2\%$  of optimum moisture in accordance with ASTM D 1557 provided the top of this lift is more than 1 foot below the proposed slab and more than 2 feet below any proposed footings. If pile foundations are used, structural backfill used as form fill need only be compacted to at least 95% of its maximum dry density in accordance with ASTM D 698, within 2% of its optimum moisture content.

23. Quality Control. Density tests should be performed on each lift of the compacted structural fill to determine if the contractor has achieved the recommended density. All clearing, filling, and compaction operations should be accomplished during periods of dry weather only. The contractor should exercise caution during and after inclement weather to ensure subsoil support is not degraded by construction operations.

#### Grade Supported Foundations

24. Depth of Footings. Isolated square footing foundations for the canopy should be placed to bear at least 2 feet below existing grade on firm undisturbed soils. Precautions should be exercised so excavations for footings do not become wet prior to pouring concrete. The foundation should be poured immediately after the completion of the excavations. All footing excavations should be carefully inspected by qualified personnel to verify footings will be placed to bear on firm soils or compacted structural fill at the recommended depth, and the excavation is in a dry condition prior to pouring concrete. Eustis Engineering should be retained to observe the condition within footing excavations prior to concrete placement.

25. Allowable Soil Bearing Value. Analyses have been made to estimate the net allowable soil bearing value for isolated square footing foundations. A shallow isolated square footing foundation, placed to bear at the recommended depth and having a width no greater than 6 feet, may be designed for a net allowable soil bearing value of 1,000 psf. This allowable soil bearing value contains an estimated factor of safety of 3 against a soil shear failure. A factor of safety of 2 may be used when evaluating transient loads such as wind. Larger footings should be evaluated further.
26. Estimated Settlement of Footings. Assuming a long term dead load pressure intensity equal to 80% of the allowable soil bearing value, estimates of settlement were made for isolated square footing foundations. We estimate consolidation settlement for an isolated square footing with side dimensions of 6 feet or less to be  $\frac{1}{2}$  to  $\frac{3}{4}$  inch.
27. Our estimates of settlement assume the center to center spacing between adjacent square footings is not less than twice the largest footing side dimension. We have also assumed the site has been prepared as recommended in this report, the foundation soils are not degraded or exposed to excess moisture prior to placing concrete for the footings, and no fill above the existing ground surface will be required to reach finished grade at the site. To decrease the potential of differential movements, concrete for footings should be placed integrally with grade beams and slabs. If any of our assumptions are not met, Eustis Engineering should be notified to reevaluate potential settlement.

### Deep Foundations

28. Estimated Pile Load Capacities. Based on the soil boring and laboratory tests, engineering analyses have been made to determine estimates of the allowable compressive and tensile load capacities for treated ASTM D 25 quality timber piles.

The results of these analyses are shown on Figure 2. Our allowable pile load capacities include a 2-ft cutoff below the existing ground surface for embedment within the pile cap. These allowable pile load capacities also contain an estimated factor of safety of 2 against failure of a single pile through the soil. Use of this factor of safety assumes the capacity will be verified with a pile load test.

29. Structural Capacity. The estimated load capacities provided are based only on a soil-pile relationship. The structural capacity of the individual piles to transmit these loads, and any connections between the piles and the canopy, should be determined by a structural engineer.
  
30. Timber Piles. We recommend the treatment of timber piles meet the current American Wood Preservers Association Standards as outlined in Section 1014 of the LSSRB for both preservative and quality assurance. Treatment should also follow Section 812.06 where applicable. Furthermore, we recommend the timber piles meet the quality (clean peeled, straightness, etc.) requirements outlined in ASTM D 25 and size requirements outlined in Table X1.5 of ASTM D 25 for minimum pile tips. The pile dimensions assumed in our analyses are provided on Figure 2.
  
31. Pile Group Capacity and Spacing. The allowable pile load capacities presented in this report will derive the majority of the compressive and tensile capacity through skin friction. In this regard, the supportive compressive and tensile value of the piles driven in groups should be investigated on the basis of group perimeter shear by the formula shown on Figure 3. For group effects on tensile capacities, the second term of the equation should be neglected. The minimum center to center pile spacing within a row or group of timber piles should be at least 3 feet. The minimum spacing between piles applies to both new piles and existing piles, if applicable. The minimum spacing between rows or groups of piles should also meet the requirements discussed in the following paragraphs.

32. Estimated Settlement due to Structural Loads. We recommend slabs be cast monolithically with grade beams and rigidly connected to pile caps to minimize the potential for differential settlements. We estimate settlement of piles embedded a minimum of 30 feet below existing grades will be ¼ inch or less due to structural loads. These estimates do not include elastic deformation of the piles which should be added to the settlement estimates. Elastic deformation of the piles may be estimated as 67% to 75% of the static column strain of a pile acting as a column. These estimates of settlement are due to structural loads only.
33. Our estimates of settlement are based on the assumption piles will be driven in small groups. We have assumed the largest group dimension will be no greater than 20% of the pile length and the center to center spacing between groups will be no closer than twice the largest group dimension. In the event of any of our assumptions are not valid, Eustis Engineering should be contacted to evaluate the potential settlement of pile foundations.
34. All piles supporting the canopy should be driven to the same approximate tip elevation. These recommendations are made to minimize the potential for differential movements. Eustis Engineering should be contacted to reevaluate pile settlement if any of our assumptions are not met.
35. Differential Settlement. Your design should recognize the potential for differential settlement between new pile supported features and adjacent pile supported or grade supported features, including pavements. Therefore, appropriate architectural or structural features should be incorporated in your design to accommodate differential settlement. In addition, the canopy should be designed as rigidly as possible to minimize the potential for differential settlements.

## Installation of Driven Piles

36. Quality Control. All pile driving operations should be supervised by experienced personnel to ensure proper procedures are followed and accurate records are kept during all pile driving operations. The driving records should include the date, type of pile, pile tip and butt diameter, overall pile length, hammer model, driving energy, and number of blows per foot of penetration for the full embedment of the pile. An accurate driving record is especially important to verify piles are installed to the required tip embedment and to give an indication of any unusual driving characteristics which may include pile breakage. We strongly recommend Eustis Engineering be retained to observe, record, and evaluate all pile driving operations with respect to the recommendations presented in this report.
  
37. Hammers. Small treated ASTM D 25 quality timber piles with minimum tip diameters of 6 inches and butt diameters of at least 8 inches may be driven with a drop hammer or a single acting air hammer having a manufacturer's rated energy of 7,500 ft-lbs per blow. If a drop hammer is used, the ram weight should not exceed 2,500 pounds and the drop should not exceed 3 feet. Larger treated ASTM D 25 quality timber piles with minimum tip diameters of 7 to 8 inches and butt diameters of at least 12 inches may be driven with a single acting air hammer having a rated energy of 15,000 ft-lbs per blow. Timber piles should be driven no harder than 25 blows per foot with the recommended hammer or damage may occur. Additional refusal criteria should be developed during the test pile program.
  
38. Alternate Installation Methods. We do not recommend vibratory methods be utilized for pile installation. If a vibratory hammer is selected for the project, Eustis Engineering should be contacted to evaluate the reduction in the estimated allowable pile load capacities presented. If any other alternate installation methods are selected, Eustis Engineering should be contacted to evaluate the impact on the estimated capacities presented.

## Test Piles and Load Test

39. Eustis Engineering considers a test pile program and load test as an extension of our geotechnical investigation. Therefore, Eustis Engineering should be retained to perform these services. Assuming the pile embedments are selected using a factor of safety of 2, we recommend one test pile be installed for the project. This test pile may be installed at a job pile location.
40. The test pile should be the same type and embedment anticipated for the job piles and installed with the same equipment and techniques proposed for the job piles. The test pile can be used to evaluate installation methods. A driven test pile will provide more definitive information regarding the anticipated driving resistance and vibrations from pile driving.
41. The test pile should be allowed to set for at least 14 days subsequent to the installation of the reaction system. This test pile should then be load tested to failure in accordance with the New Orleans Building Code and ASTM D 1143. The results should be evaluated by Eustis Engineering to verify the estimated pile load capacities presented in this report.
42. If a minimum number of piles are required for the project, consideration may be given to the use of a factor of safety of 3 in lieu of a static load test. However, Eustis Engineering should be contacted if piles do not meet their design embedment.

## Vibrations

43. Pile driving, as well as other construction activities such as demolition, has the potential to generate vibrations that may affect nearby structures, pavements, and underground utilities. Eustis Engineering recommends vibrations be monitored during the test pile program and during construction activities of concern. This

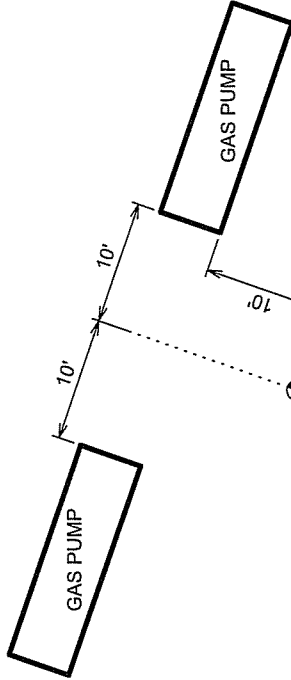
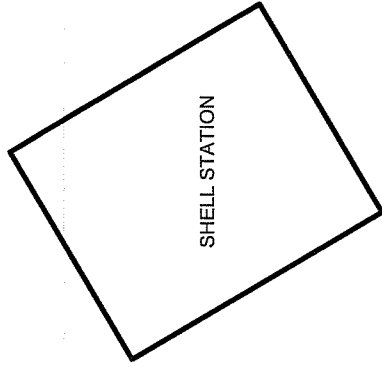
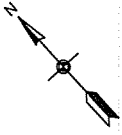
monitoring should evaluate peak particle velocities during pile driving at critical structures with a seismograph, as well as other construction activities generating vibrations (demolition, hauling of fill, moving heavy equipment, etc.). The record of peak particle velocities will provide information in assessing potential damage and the need for changes in construction operations.

44. Peak particle velocities (measured at a structure) exceeding 0.5 in./sec may induce damage to the structure, particularly when this structure has been previously stressed by settlement or other movements. Peak particle velocities between 0.25 and 0.5 in./sec may be sensed as being detrimental by human perception. If sustained vibration levels of 0.5 in./sec are measured at a structure, pavement, or utility of concern, Eustis Engineering should be notified, the construction operations generating these vibrations terminated, and consideration given to altering these procedures.

#### GEOTECHNICAL SERVICES DURING CONSTRUCTION

45. In order to provide continuity between the investigation, design, and construction phases, Eustis Engineering should be retained to review plans and specifications developed for the project and all contractor submittals related to geotechnical issues and foundations. Eustis Engineering can provide additional geotechnical services which may include consultation during design and construction. We can also provide steel and concrete inspection services, and compaction and in-place density determinations on fill materials. We can perform appropriate laboratory tests to determine the gradation and quality of material proposed as structural fill or backfill. Eustis Engineering can also inspect footing excavations or log the installation of test piles and job piles, perform and evaluate pile load tests, and monitor vibrations.

46. Eustis Engineering should be retained to monitor the geotechnical related work performed by the contractor. This permits the geotechnical engineer that prepared the report to be on hand and quickly evaluate unanticipated conditions, conduct additional tests if required, and, when necessary, recommend alternative solutions to problems. This is recommended to avoid major construction cost overruns or contractual disputes on the project.



B-1

CURB OF PAVEMENT

GENTILLY BOULEVARD

PARIS AVENUE



EUSTIS ENGINEERING SERVICES, L.L.C.

GEOTECHNICAL ENGINEERS

3011 28TH STREET

METAIRIE, LOUISIANA

BORING LOCATION PLAN

PROPOSED CANOPY  
2035 GENTILLY BOULEVARD  
NEW ORLEANS, LOUISIANA

⊕ DENOTES LOCATION OF UNDISTURBED SOIL BORING DRILLED:  
14 JULY 2009

NOT TO SCALE

DRAWN BY: J.L.S.

PLOT DATE: 31 JULY 09

CADD FILE:  
FIGURE1.DGN

CHECKED BY: M.K.M.

JOB NO.: 20886

FIGURE 1

PROPOSED CANOPY  
 2035 GENTILLY BOULEVARD  
 NEW ORLEANS, LOUISIANA  
 EUSTIS ENGINEERING PROJECT NO. 20686

ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES  
 TREATED ASTM D 25 QUALITY TIMBER PILES

PILE SIZE	PILE TIP EMBEDMENT BELOW EXISTING GROUND SURFACE IN FEET	ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITY IN TONS FACTOR OF SAFETY $\approx 2^{(1)}$	
		COMPRESSION	TENSION
6-In. Tip 8-In. Butt	30	4½	3
	35	5½	3½
	40	6½	4½
8-In. Tip 12-In. Butt	30	6½	4
	35	7½	5
7-In. Tip 12-In. Butt	40	9	6
	45	11	7½
	50	13	9

<sup>(1)</sup>Use of a factor of safety of 2 assumes a static load test is performed.

### CAPACITY OF PILE GROUPS

The maximum allowable load carrying capacity of a pile group is no greater than the sum of the single pile load capacities, but may be limited to a lower value if so indicated by the result of the following formula.

$$Q_a = \frac{P \times L \times c}{(FSF)} + \frac{2.6 q_u (1 + 0.2 \frac{w}{b}) A}{(FSB)}$$

In Which:











- Q<sub>a</sub> = Allowable load carrying capacity of pile group, lb
- P = Perimeter distance of pile group, ft
- L = Length of pile, ft
- c = Average (weighted) cohesion or shear strength of material between surface and depth of pile tip, psf
- q<sub>u</sub> = Average unconfined compressive strength of material in the zone immediately below pile tips, psf  
(unconfined compressive strength = cohesion x 2)
- w = Width of base of pile group, ft
- b = Length of base of pile group, ft
- A = Base area of pile group, sq ft
- (FSF) = Factor of safety for the friction area = 2
- (FSB) = Factor of safety for the base area = 3

The values of c and q<sub>u</sub> used in this formula should be based on applicable soil data shown on the Log of Boring and Test Results for this report. In the application of this formula, the weight of the piles, pile caps and mats, considering the effect of buoyancy, should be included.

## APPENDIX



**LEGEND AND NOTES FOR  
LOG OF BORING AND TEST RESULTS**

- PP** Pocket penetrometer: Resistance in tons per square foot
- SPT** Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches
- SPLR** Type of Sampling  Shelby  SPT  Auger  No sample
- SYMBOL** Clay  Silt  Sand  Peat/Humus  Shells  Stone/Gravel   
Predominant type shown heavy; Modifying type shown light
- USC** Unified Soil Classification
- DENSITY** Unit weight in pounds per cubic foot

**SHEAR TESTS**

**TYPE**

- UC Unconfined compression shear  
OB Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure  
UU Unconsolidated undrained triaxial compression shear  
CU Consolidated undrained triaxial compression shear  
DS Direct shear

- $\phi$  Angle of internal friction in degrees  
c Cohesion in pounds per square foot

**ATTERBERG LIMITS**

- LL Liquid Limit  
PL Plastic Limit  
PI Plasticity Index

**OTHER TESTS**

- CON Consolidation  
PD Particle size distribution (sieve and/or hydrometer)  
k Coefficient of permeability in centimeters per second  
SP Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

**GENERAL NOTES**

- (1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.
- (2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.



PROPOSED CANOPY  
2035 GENTILLY BOULEVARD  
NEW ORLEANS, LOUISIANA

Scale In Feet	PP	SPT	S P L R	Datum: Water Depth: See Text	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits			Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI	
0					Asphalt													
	1.50				Stiff gray & tan silty clay w/concretions	CL	1	2-3	30	94	122	UC	--	1284				
	0.50				Medium stiff gray silty clay	CL	2	5-6	31	94	124	UC	--	531				
					Very loose gray clayey silt	ML	3	8-9	39	85	117	OB	0	244				
					Loose gray clayey silt	ML	4	11-12	38	83	115	OB	0	284				
					Compact gray sandy silt	ML	5	14-15	30	97	126	OB	0	1168				
					Compact gray clayey silt	ML	6	18-19										
					Very loose gray clayey silt	ML	7	23-24	35									
					Loose gray sandy silt	ML	8	28-29	28									
	1.50				Stiff gray silty clay	CL	9	33-34	29	93	120	UC	--	1264				
					Loose gray clayey sand	SC	10	38-39	29									
					Soft gray clay w/sandy silt lenses	CH	11	43-44	64	62	101	UC	--	279				
	0.75				Medium stiff gray clay w/sandy silt lenses	CH	12	48-49	46	74	108	UC	--	764				

Ground Elev.: Datum: Water Depth: See Text Job No.: 20686 Date Drilled: 7/14/09 Boring: 1 Refer to "Legends & Notes"

Comments: Latitude: 29° 59.393' N  
Longitude: 90° 04.349' W



PROPOSED CANOPY  
2035 GENTILLY BOULEVARD  
NEW ORLEANS, LOUISIANA

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests		Atterberg Limits			Other Tests
										Dry	Wet	Type	ø	C	LL	PL	
50					Loose gray clayey sand	SC	13	53-54	26								
60							14	58-59	24								
70																	
80																	
90																	
100																	

Ground Elev.: Datum: Water Depth: See Text Job No.: 20686 Date Drilled: 7/14/09 Boring: 1 Refer to "Legends & Notes"

Comments: Latitude: 29° 59.393' N  
Longitude: 90° 04.349' W