



Exhibit BB. Bastrop IP Mill Site Preliminary Geotechnical Engineering Report



Professional Service Industries, Inc.
1853 New Natchitoches Road
West Monroe, Louisiana 71292
Phone: (318) 387-2327

March 25, 2019

Northeast Louisiana Economic Alliance
204 Fair Avenue
Winnsboro, LA 71295

Attn: Ms. Tana Trichel
Phone: (318) 348-0826
Email: ttrichel@nelea.us

Bastrop IP Mill Site Preliminary Geotechnical Engineering Report

Re: Preliminary Geotechnical Site Characterization Report
International Paper Site
Bastrop, Louisiana
PSI Project No. 0257868

Dear Ms. Trichel:

Professional Service Industries, Inc. (PSI) is pleased to submit our Preliminary Geotechnical Site Characterization Report for the above-referenced project. This report presents the results of our field exploration and laboratory testing, as well as information regarding the compatibility of the site with industrial development, suitability of the soils for building foundations and on-site roadways, requirements for soil augmentation for construction, and depth of groundwater.

We appreciate the opportunity to perform this study. If you have any questions pertaining to this report, please contact our office at (318) 387-2327.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

David F. Loyless
Project Manager

Reda M. Bakeer, PhD, PE
Chief Engineer

Name: Reda M. Bakeer, PhD, PE
Date: March 25, 2019
License No.: 27123

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PROJECT INFORMATION

PROJECT AUTHORIZATION

Professional Service Industries, Inc. (PSI) has completed a preliminary geotechnical study at the site of the former International Paper facility in Bastrop, Louisiana. Our services were performed in general accordance with PSI Proposal No. 260509-R1, dated December 19, 2018. Authorization was provided by Ms. Tana Trichel of Northeast Louisiana Economic Alliance by signing our proposal on January 29, 2019.

PROJECT DESCRIPTION

The primary objectives for this preliminary report are to provide general information regarding the compatibility of the subject site with industrial developments, suitability of the soils for building foundations and on-site roadways, requirements for soil augmentation for construction, and depth of groundwater at the time of our investigation. This general geotechnical site characterization report provides an initial baseline of the site subsurface conditions that will likely be encountered during future site development. However, as with any geotechnical investigation, and particularly in this case given the site of the subject site and the limited number of exploration locations, variations in the subsurface conditions may exist and should be expected between and away from the exploration locations. Additionally, there remains a distinct possibility that other conditions may exist within the boundaries of the site that were not encountered during the field exploration.

PSI was provided with Google Earth location files and site maps depicting the boundaries of the subject site. It is understood that the site could be developed as a petrochemical plant or similar facility, and that it may accommodate structures such as tanks, pipe racks, manufacturing buildings, etc. No project-specific data with regard to the proposed development or structures was available at the time of this preliminary report. It was requested that PSI perform a limited, preliminary assessment of the site, as the specific sizes, locations, and structural loads of future buildings, equipment, and other features have not been determined at this time. It is understood that the required geotechnical information includes the approximate bearing capacity of a 14-inch square concrete pile or similar commonly used geotechnical support structures typical in this type of construction. In addition, it was requested that PSI provide preliminary bearing capacities for two to three sizes of shallow spread footings.

The preliminary geotechnical discussion presented in this report is based on the available project information and the subsurface materials described herein. The opinions and information presented in this report are preliminary in nature, are based on a limited geotechnical exploration, and should not be used for design or construction. If any of the information noted above is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the Client.

PURPOSE AND SCOPE OF SERVICES

The purpose of this preliminary study was to explore the subsurface conditions at the site and prepare a geotechnical discussion for use in evaluation of the general suitability of the subject property for support of conventional spread footings and deep foundation elements. PSI's contracted scope of services included conducting two soil borings and one Cone Penetrometer Test (CPT) sounding, performing select geotechnical laboratory testing, and preparing this Preliminary Geotechnical Site Characterization Report. This report briefly outlines the laboratory testing procedures, presents available project information, describes the site and subsurface conditions, and provides preliminary geotechnical discussions and



commentary. It should be noted that the results of the analyses included in this report are based on the limited number of borings and CPT soundings performed at accessible locations within the approximately 111-acre property and that these values may not be representative of the entire site. They are intended to be used only for feasibility studies, planning, and cost estimating purposes and should not be used in any formal designs unless they are confirmed with a more comprehensive and project-specific geotechnical investigation.

The geotechnical scope of services did not include an environmental assessment for determining the presence or absence of wetland, or hazardous or toxic materials in the soil, surface water, groundwater, or air on, below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes. Additionally, PSI's geotechnical scope of services did not include environmental sampling or performing analytical testing of soil or groundwater samples. This is particularly important considering the former use of the site.

PSI did not provide any service to investigate or detect the presence of moisture, mold, or other biological contaminants within the project area, or any service that was designed or intended to prevent or lower the risk of the occurrence or amplification of the same. The Client should be aware that mold is ubiquitous to the environment, with mold amplification occurring when building materials are impacted by moisture. The Client should also be aware that site conditions are outside of PSI's control, and that mold amplification will likely occur or continue to occur in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

FIELD AND LABORATORY PROCEDURES

PSI's contracted scope of services included drilling two soil borings to a depth of approximately 50 feet each and performing one CPT sounding to a depth of about 100 feet. The soil borings were drilled to the planned depth at accessible locations. However, a significant amount of buried debris was encountered in the general area of the CPT sounding, and it was necessary to predrill to a depth of about 14 feet in order to bypass these materials. In addition, the CPT sounding encountered practical refusal in a very dense sand stratum at a depth of approximately 55 feet below the existing ground surface. It should be noted that practical refusal is defined by both the subsoil conditions and the CPT equipment specifications. CPT soundings are terminated when significant penetration resistance is encountered that could damage the electronic sensors on the cone tip and/or sleeve. Therefore, it is recommended that if future geotechnical investigations of the site require deeper borings or soundings, a heavier drill rig should be utilized. The Boring/Sounding Location Plan, which is included in the Appendix and based on the most recent Google Earth aerial imagery (dated April 2018), should be consulted for the approximate relative locations of the borings and sounding.

The boring and sounding locations and depths were selected by PSI and were identified in the field by PSI personnel using a furnished site plan and a handheld GPS unit. The site exploration was performed using a Geoprobe 7822DT ATV drilling rig. Hollow-stem auger drilling techniques were used to advance the boreholes. Samples were generally obtained continuously from the ground surface to a depth of about 10 feet, and at maximum intervals of five feet thereafter.

The soil borings were sampled using the Standard Penetration Test (ASTM D1586) and Shelby Tube (ASTM D1587) samplers. The samples were identified according to boring number and depth, placed in



polyethylene plastic wrapping to reduce moisture loss, and transported to PSI's laboratory in West Monroe, Louisiana. The CPT sounding was performed in general accordance with ASTM D5778.

All samples obtained during the field exploration were visually classified and evaluated by experienced geotechnical personnel upon arrival at the laboratory. Selected samples were tested in the laboratory to determine material properties for our evaluation. The geotechnical laboratory testing program included moisture content, Atterberg limits, percent passing the US Standard No. 200 sieve, and unconfined compressive strength testing. Additional estimates of unconfined compressive strength were obtained through the use of a hand penetrometer.

The geotechnical laboratory testing was conducted in general accordance with applicable ASTM procedures. The results of the laboratory tests are presented in the Boring Logs in the Appendix. The samples which were not altered by laboratory testing will be retained for 60 days from the date of this report and will then be discarded.

SITE AND SUBSURFACE CONDITIONS

SITE LOCATION AND DESCRIPTION

The approximately 111-acre site is located on the north side of Colliers Lane in Bastrop, Louisiana. The Latitude and Longitude near the center of the site are approximately N 32.78615° and W 91.90942°, respectively. At the time of our field exploration, the former International Paper facility had been mostly demolished and removed from the site. However, it was observed that concrete building foundations and pavements from the previous development remained in numerous areas throughout the property. In addition, it appeared that demolition debris and rubble was present at several locations.

Based on PSI's knowledge of the site, it is understood that the former International Paper facility closed in 2008, and that major demolition operations began in 2011. Based on a review of the available Google Earth historical aerial imagery, it appears that the majority of demolition was complete by 2014. In general, the northern half of the site was formerly developed as a wood yard, whereas the southern half of the site was developed with the mill industrial facilities. However, it should be noted that the available Google Earth aerial imagery includes some gaps in coverage and low-quality imagery, and it is therefore may not be sufficient to fully determine the extent of previous development.

SITE GEOLOGY

The United States Geological Survey (USGS) maps the site as located within the Upper Prairie Terraces formation. This formation is generally characterized by unconsolidated alluvial clays, sandy clays, silts, sands, and some gravel. However, it should be noted that due to the size of the site, the limited number of exploration locations, practical refusal encountered at relatively shallow depths, and variations typical of alluvial formations, all of the characteristics of the mapped USGS formation may not be reflected in the soils borings and CPT sounding performed as part of this limited investigation.

SUBSURFACE CONDITIONS

The soil borings generally encountered very soft to stiff lean clay within the upper four to six feet, followed by medium dense clayey sand and/or very stiff sandy lean clay to a depth of approximately 13 to 15 feet. Below this, stiff fat clay extended to about 23 to 25 feet, underlain by medium dense clayey sand and/or



silty sand to a depth of approximately 38 to 40 feet. Beneath this, medium dense sand with silt extended to the termination depth of the borings at about 50 feet below the existing ground surface at the boring locations.

As previously discussed a significant amount of buried debris was encountered within the general area of the CPT sounding, and it was necessary to predrill to a depth of about 14 feet in order to bypass these materials. Below the predrill depth, the CPT sounding generally encountered soft to stiff clays and silty clays within the upper 18 to 22 feet, followed by medium dense sands to a depth of approximately 33 feet. Below this, dense sands extended to about 50 feet, underlain by very dense sands to the termination of the sounding due to practical refusal at a depth of approximately 55 feet below the existing ground surface at the sounding location. The Robertson soil behavior type automatically generated from the CPT data indicates the possible presence of organic materials within the upper 16 feet.

The above subsurface descriptions are of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs and CPT summary data included in the Appendix should be reviewed for specific information at the individual exploration locations. These records include soil descriptions, stratifications, penetration resistances, and locations of the samples and laboratory test data. The stratifications shown represent the conditions only at the actual exploration locations at the time of our field activities. Variations may occur and should be expected between and away from the sample locations. This is particularly important considering the former development of the site, the subsequent demolition activities, and the relatively small number of borings/soundings performed at accessible locations within such a large area. In addition, some undocumented fill may be present within the footprints of former structures or ponds. The stratifications represent the approximate boundary between subsurface materials, but the actual transition may be more gradual.

WATER LEVEL MEASUREMENTS

Free groundwater was encountered at a depth of approximately 13 feet to 15 feet below the existing ground surface in the soil borings at the time of our field exploration. Pore pressure data from the CPT sounding was inconclusive, likely due to the fact that predrilling to a depth of about 14 feet was necessary to bypass buried debris. It should be noted that the groundwater information presented in this report is based on observations made at the time of our field exploration and may not have become fully static at the time of measurement. Groundwater levels at the site can fluctuate based on variations in rainfall, evaporation, surface runoff, and other hydro-geologic factors. In addition, based on the former development of the site, there is a possibility that perched water could exist in some areas of the site, particularly where former ponds were backfilled in an uncontrolled and undocumented manner. Therefore, it is recommended that the Contractor determine the groundwater depth at the time of construction.

GEOTECHNICAL DISCUSSION

The types and bearing depth of foundations suitable for a given structure depend primarily on several factors including the subsurface conditions, previous site development, the function of the structure, the loads it may carry, the cost of the foundation, and the criteria set by the Design Engineer with respect to vertical and differential movements which the structure can withstand without experiencing significant damage or intolerable movements.



Based on our limited field exploration and the field and laboratory test results, the proposed site is generally considered compatible with industrial development, depending on the function and anticipated loads of the proposed structure(s). The soils at the boring/sounding locations indicate that they are suitable for building foundations and/or construction of on-site roadways following proper site preparation. It is believed that either shallow or deep foundation systems are suitable for use at the site, depending on the structure type and anticipated loads. However, as stated previously, the information presented in this preliminary report is provided for planning purposes only and is not intended for use in design and construction. A detailed geotechnical investigation will be necessary prior to design of any proposed structures.

The choice of the type of foundation to be used for support of a specific structure should be based on the tolerance criteria for the performance of the structure and economics of construction. Ground-supported shallow foundations or surface improvements will likely be governed by the anticipated loads and settlement tolerances. Due to the presence of medium dense sands encountered at relatively shallow depths, it is believed that displacement type driven piles may be difficult to install without performing predrilling to avoid damaging the piles; therefore, if deep foundations are to be used for support of a given structure, consideration could be given to the use of straight-sided drilled shafts, auger cast-in-place (ACIP) piles, open-ended steel pipe piles, or steel H-piles.

SITE PREPARATION

It is our opinion that the means, methods, and sequence of the proposed construction, including demolition and site preparation, should be the responsibility of the Contractor, who should specialize in this type of work. However, general geotechnical related discussion is offered herein in this regard for guidance and consideration. Site preparation requirements will vary throughout the relatively large property and will depend on the structure type and foundation system, and they should be established once the specific features of a particular project have been identified. Prior to construction, positive drainage and collection of surface water should be established throughout the construction area and maintained throughout the duration of the construction period.

In any case, PSI recommends that all existing foundations and/or pavements, demolition debris, deleterious material, organic matter, undocumented fill, extremely soft or loose near-surface soils, highly disturbed soils, or other unsuitable materials be stripped and removed from the footprints of areas selected for development. Any voids resulting from the removal of unsuitable materials should be backfilled with good quality compacted fill material.

It is possible that soil treatment and/or removal and replacement may be necessary within some areas of the site considering its former development. The need for remediation should be determined based on soil and groundwater sampling and analytical testing, which was beyond the scope of services for this preliminary geotechnical study.

SHALLOW FOUNDATIONS

It was requested that PSI provide preliminary estimated bearing capacities for a range of shallow spread footing sizes. However, in view of the variation encountered in the near-surface soils at the exploration locations, buried debris encountered at the CPT sounding location, the remaining foundations and pavements observed at the site, our understanding of the previous development, and unknown variables



associated with the demolition of the former facility, we do not believe that there is sufficient data to develop a range of allowable bearing capacities that would be applicable for all areas of the subject site. It is believed that shallow spread footings bearing at least 24 inches below final grade could be designed for a minimum net allowable bearing capacity of 1,500 psf for a maximum footing width of 10 feet, provided that the site is properly prepared. However, as previously discussed, this value is based on the near-surface soils encountered at the boring locations, which were performed at accessible locations across the relatively large site, and a detailed geotechnical investigation should be performed prior to the design or construction of any specific structure(s).

DEEP FOUNDATIONS

As previously discussed, due to the presence of medium dense sands encountered at relatively shallow depths, it is believed that displacement type driven piles may be difficult to install without performing predrilling to avoid damaging the piles; therefore, if deep foundations are to be used for support of a given structure, consideration could be given to the use of straight-sided drilled shafts, auger cast-in-place (ACIP) piles, open-ended steel pipe piles, or steel H-piles. The type of deep foundation system to be used in the design of a given structure should be determined based on the results of soil and groundwater sampling and analytical testing, which was beyond the scope of services for this preliminary geotechnical study.

We have provided allowable capacity estimates for 14-inch diameter straight-sided drilled shafts or ACIP piles for use in feasibility studies, planning, and cost estimating purposes. These allowable capacity estimates are based on the results of our limited field and laboratory testing and assume proper design and installation. The allowable capacities were estimated using a factor of safety of 2.0 for compression and 3.0 for tension, which assumes that a static load test will be performed. If a static load test is not performed, a factor of safety of 3.0 should be used for compression to determine the allowable capacities.

**TABLE 1: Estimated Allowable Capacities for
14-inch Diameter ACIP Piles or Drilled Shafts**

Embedment Depth (feet)	Allowable Capacity (tons)	
	Compression	Tension
20	12	5
25	15	7
30	20	10
35	25	13
40	30	16
45	35	19
50	40	23

As previously discussed, detailed structural loads are not known at this time since no specific project or structure is being considered for construction. In addition, piles longer than 50 feet could be required for



support of heavier loads and large spans, which should be determined as part of the full geotechnical investigation once a project is selected for development.

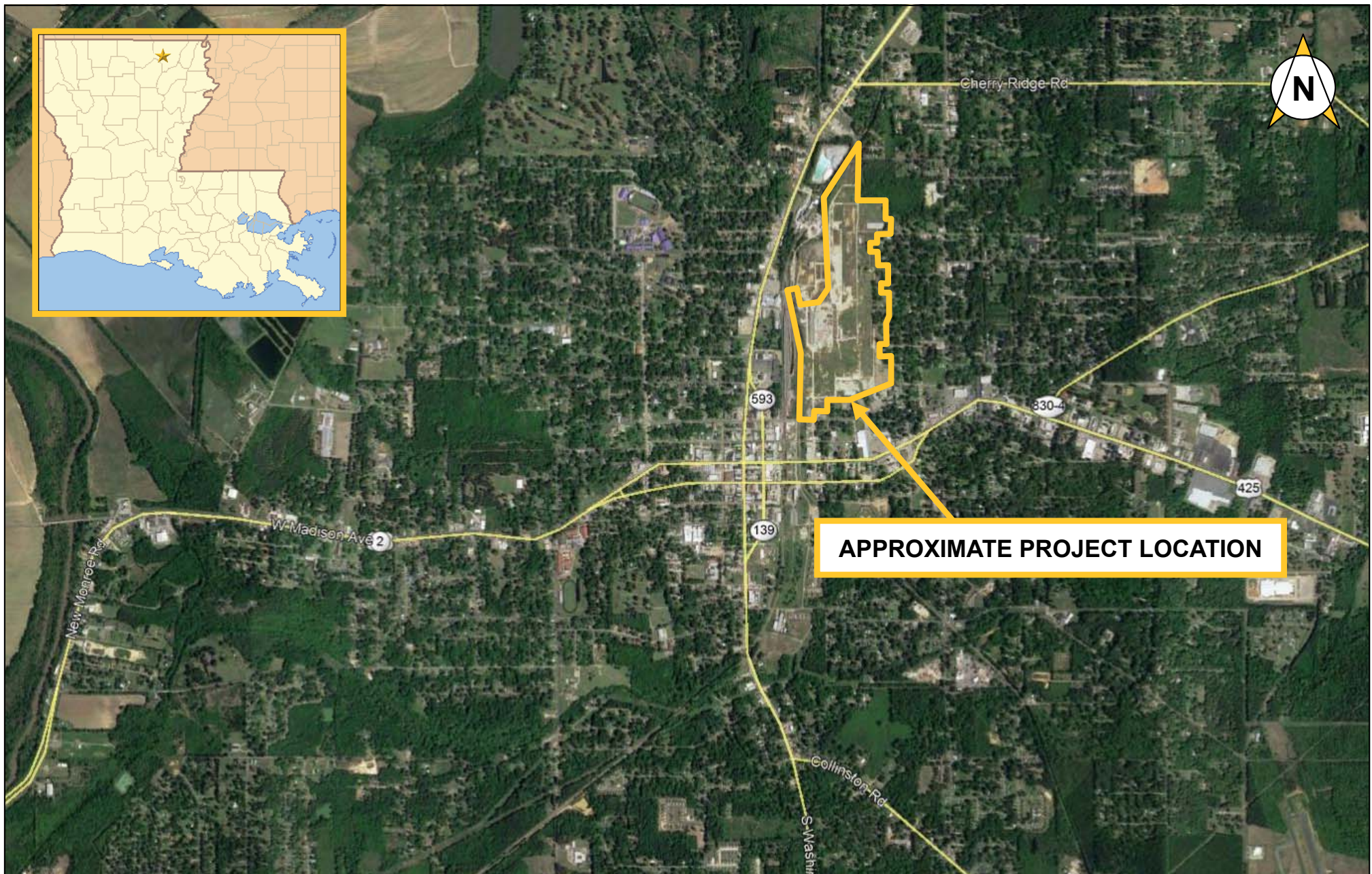
REPORT LIMITATIONS

The information and preliminary recommendations provided in this report are based on the available project information and the subsurface materials encountered at the specific exploration locations described herein. The geotechnical investigation conducted for this report is preliminary in nature and is not to be used for design or construction. It is not intended to provide any opinions on the geotechnical performance of any specific structure or equipment, as such opinions would require further investigation and specific analyses. The actual conditions in specific areas of the site may vary from those encountered at the exploration locations. This preliminary report has been prepared for the exclusive use of Northeast Louisiana Economic Alliance and CSRS for the proposed redevelopment of the former International Paper facility site in Bastrop, Louisiana.



PSI Project No: 0257868
IP Mill Site Characterization
Bastrop, Louisiana
March 25, 2019

APPENDIX



PRELIMINARY GEOTECHNICAL SITE
CHARACTERIZATION STUDY
INTERNATIONAL PAPER SITE
BASTROP, LOUISIANA

SITE VICINITY MAP

PSI PROJECT NO.: 0257868
GOOGLE EARTH IMAGERY DATE: 4/16/2018



LOG OF BORING B-1

International Paper Site
Bastrop, Louisiana

TYPE OF BORING: Hollow Stem Auger

LOCATION: Former Plant Area

PSI Project No.: 0257868

DEPTH, FT.	SOIL TYPE	USCS SYMBOL	SAMPLES	SOIL DESCRIPTION	N-BLOWS/FT.	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	% PASSING No. 200 SIEVE	SHEAR STRENGTH (tsf)				SHEAR STRENGTH (tsf)				UNIT DRY WEIGHT (pcf)
							LL	PL	PI		SHEAR STRENGTH (tsf)				HAND PEN (tsf)	UC (tsf)	TORVANE (tsf)	UU (tsf)	
											○ HP	● UC	△ TV	▲ UU					
											0.0	1.0	2.0	3.0					
		CL	X	Very Soft Brown & Tan LEAN CLAY	1	20				89									
-2.5				- Firm below 2 feet		20	41	19	22			●				0.37			88
-5.0						24						●				0.49			96
-7.5		SC	X	Medium Dense Tan & Gray CLAYEY SAND	13	23				47									
-10.0			X		14	20													
-12.5																			
-15.0		CH	X	Stiff Brown FAT CLAY	11	34	50	26	24										
-17.5																			
-20.0						31						●				0.66			99
-22.5																			
-25.0		SC		Medium Dense Tan CLAYEY SAND		19	31	17	14	42									
-27.5																			
-30.0			X		17	22													
-32.5		SM		Medium Dense Tan SILTY SAND															
-35.0			X		18	18				15									
-37.5																			
-40.0		SP-SM	X	Medium Dense Tan SAND with Silt	20	6													
-42.5																			
-45.0			X		21	13				12									
-47.5			X																
-50.0			X		20	8													
				Boring Terminated at 50 feet															

DEPTH OF BORING: 50 FEET

DATE DRILLED: 2/9/19

NOTE:

▽ GROUNDWATER DURING DRILLING: 13 feet

▼ GROUNDWATER UPON COMPLETION: Not Measured

⚡ DELAYED GROUNDWATER: N / A

BORING LOG - WEST MONROE - PSI/HOUSTON GDT - 3/20/19 12:38 - 0257



Professional Service Industries, Inc.
1853 New Natchitoches Road
West Monroe, Louisiana 71292
Phone: (318) 387-2327

LOG OF BORING B-2

International Paper Site
Bastrop, Louisiana

TYPE OF BORING: Hollow Stem Auger

LOCATION: Former Wood Yard Area

PSI Project No.: 0257868

DEPTH, FT.	SOIL TYPE	USCS SYMBOL	SAMPLES	SOIL DESCRIPTION	N-BLOWS/FT.	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	% PASSING No. 200 SIEVE	SHEAR STRENGTH (tsf) ○ HP ● UC △ TV ▲ UU	SHEAR STRENGTH (tsf)				UNIT DRY WEIGHT (pcf)
							LL	PL	PI			HAND PEN (tsf)	UC (tsf)	TORVANE (tsf)	UU (tsf)	
0.0		CL		Stiff Brown & Black LEAN CLAY		18							0.51			96
2.5					9	16	30	15	15							
5.0			SC		Medium Dense Tan & Gray CLAYEY SAND		16				43					
7.5					27	22										
10.0					12	22	35	18	17							
12.5		CL		Very Stiff Tan & Gray SANDY LEAN CLAY	16	18				63						
15.0			CH		Stiff Brown FAT CLAY											
17.5																
20.0						36							0.67		90	
22.5					16	29										
25.0			SM		Medium Dense Tan SILTY SAND											
27.5						20	18				22					
30.0																
32.5					22	17										
35.0																
37.5						22	17			24						
40.0			SP-SM		Medium Dense Tan SAND with Silt											
42.5					21	5										
45.0																
47.5					20	4				10						
50.0																
					Boring Terminated at 50 feet											

DEPTH OF BORING: 50 FEET

DATE DRILLED: 2/12/19

NOTE:

▽ GROUNDWATER DURING DRILLING: 15 feet

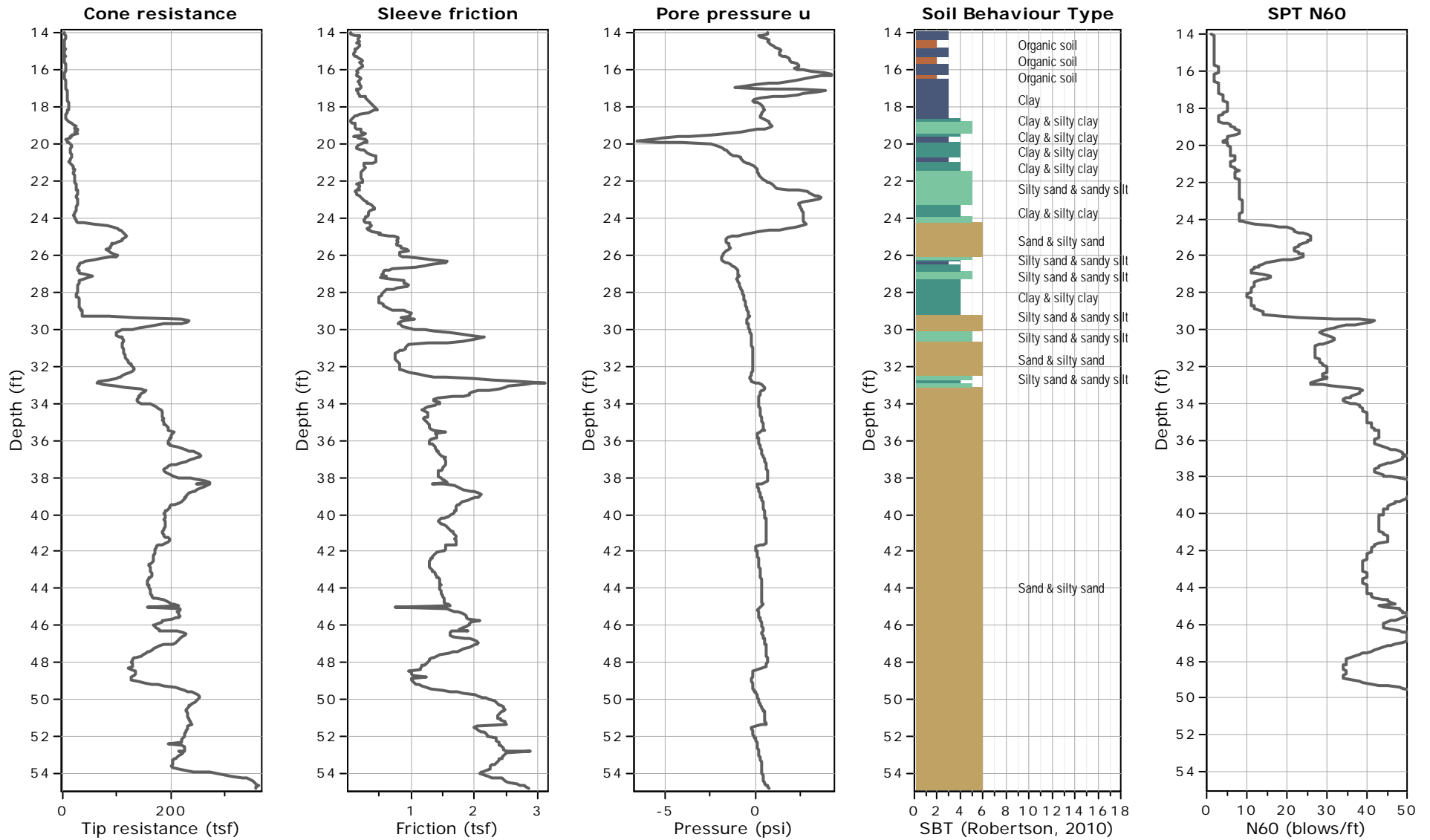
▼ GROUNDWATER UPON COMPLETION: Not Measured

⚡ DELAYED GROUNDWATER: N / A

BORING LOG - WEST MONROE - PSI HOUSTON GDT - 3/20/19 12:38 - 0257



Professional Service Industries, Inc.
1853 New Natchitoches Road
West Monroe, Louisiana 71292
Phone: (318) 387-2327



KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE					
FAT CLAY	LEAN CLAY	ORGANIC CLAY	SAND	SILT	GRAVEL
SOIL TYPE		MODIFIERS			
TOPSOIL	FILL	CLAYEY	SANDY	SILTY	GRAVELLY

SAMPLER TYPE			
NO RECOVERY	AUGER SAMPLE	SHELBY TUBE	SPLIT SPOON
GROUNDWATER DURING DRILLING GROUNDWATER UPON COMPLETION			

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

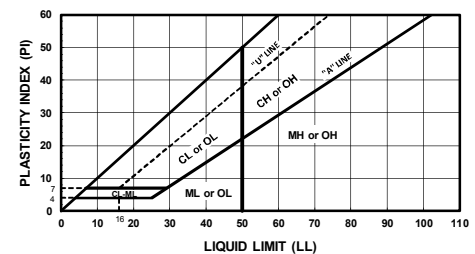
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELLY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		WITH APPRECIABLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL-GRADED SAND
			SP	POORLY-GRADED SANDS
		WITH APPRECIABLE FINES	SM	SILTY SANDS
			SC	CLAYEY SANDS
FINE-GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT < 50		ML	INORGANIC SILTS & VERY FINE SANDS, CLAYEY SILT W/ LOW PLASTICITY INDEX
			CL	INORGANIC LEAN CLAYS GRAVELLY, SANDY, OR SILTY LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS W/LOW PLASTICITY INDEX
	SILTS AND CLAYS LIQUID LIMIT ≥ 50		MH	INORGANIC SILTS W/ HIGH PLASTICITY INDEX, ELASTIC SILTS
			CH	INORGANIC FAT CLAYS GRAVELLY, SANDY, OR SILTY FAT CLAYS
			OH	ORGANIC CLAYS OF MED TO HIGH PLASTICITY, ORGANIC SILTS
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 - 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 .50
STIFF	0.50 TO 1.00
VERY STIFF	1.00 TO 2.00
HARD	> 2.00 OR 2.00+

RELATIVE DENSITY - GRANULAR SOILS

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



ABBREVIATIONS

HP - HAND PENETROMETER	UC - UNCONFINED COMPRESSION TEST
TV - MINIATURE TORVANE	UU - UNCONSOLIDATED UNDRAINED TRIAXIAL

NOTE: BORING LOGS INDICATE SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)							
12"	3"	3/4"	4	10	40	200	
BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
300	75	19	4.75	2.0	0.42	0.075	0.005
GRAIN SIZE IN MM							