REPORT OF PRELIMINARY SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

> CLINTON - ADAIR TRACT SC HIGHWAY 72 LAURENS COUNTY, SOUTH CAROLINA

> > **Prepared For**



MR. JOHN MONTGOMERY PACOLET MILLIKEN ENTERPRISES 105 CORPORATE DRIVE, SUITE A SPARTANBURG, SOUTH CAROLINA 29369

Prepared By



PARAGON ENGINEERING & GEOSCIENCES, LLC 1200 WOODRUFF ROAD, SUITE G-18 GREENVILLE, SOUTH CAROLINA 29607

JULY 7 2012



July 7, 2012

Pacolet Milliken Enterprises 105 Corporate Drive, Suite A Spartanburg, South Carolina, 29369

Attention: Mr. John Montgomery

Re: Report of Preliminary Subsurface Exploration and Geotechnical Engineering Evaluation Clinton - Adair Tract SC Highway 72 Laurens County, South Carolina PARAGON Project No. 10224-A

Dear Mr. Montgomery:

Paragon Engineering & Geosciences, LLC (PARAGON) has completed the preliminary subsurface exploration for Clinton - Adair Tract in Laurens County, South Carolina. The enclosed report describes the exploration and testing procedures, as well as our recommendations for development of the site. A Boring Location Plan and the Soil Test Boring Records from the field exploration are attached to this report.

We appreciate this opportunity to be of service to you during the design phase of this project. If you have any questions with regard to the information and recommendations presented in this report, or if we can be of further assistance to you in any way during the planning or construction of this project, please do not hesitate to contact us.

Respectfully,

PARAGON ENGINEERING & GEOSCIENCES, LLC represented by;

foli O. Bell

Robin D. Bell, P.E. Principal Engineer





Attachments: Boring Location Plan Unified Soil Classification System Reference Notes Soil Test Boring Records

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PROJECT INFORMATION

The Clinton - Adar Tract consists of a southern tract measuring 55.83 acres and a northern tract measuring 731.09 acres and consists of a combination of cleared grassed fields, previously timbered land, and woodlands. SC Highway 72 divides the property approximately 828 feet east of the intersection with I-26. A conceptual site plan indicates that the site is being considered for development with 10 industrial/warehouse facilities with building sizes ranging from 150,000 sf to 500,000 sf in size. The northern tract will be accessed by a roadway which will extend from SC Highway 72 in a north and then northeast direction within the central and eastern portions of the property. We have assumed that site development will consist of the construction light to moderately loaded 1-story structures with maximum column, wall, and floor slab loads of 100 kips, 4 kips per linear foot, and 100 psf, respectively. Maximum cuts and fills on the order of 15 feet or less are anticipated.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

The field exploration at the site consisted of performing fifteen (15) soil borings at the approximate locations identified on the attached Boring Location Plan. The borings were field located by our engineering personnel by measuring distances and directions from the existing site features identified on the provided conceptual site plan.

The borings were performed with an all-terrain-vehicle mounted rotary-type auger drill rig which utilized continuous hollow stem augers to advance the borehole. Representative soil samples were obtained by means of conventional split-barrel sampling procedures. In this procedure, a 2-inch O.D., split-barrel sampler is driven into the soil a distance of 18 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval, after initial setting of 6 inches, is termed the Standard Penetration Test (SPT) or N-value and is indicated for each sample on the boring log. The SPT value can be used as a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, it also indicates the consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the standard penetration resistance value and prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies. After completion of the drilling operations, the boreholes were backfilled with auger cuttings to the prevailing ground surface.

A field log of the soil encountered in the boring was maintained by the drill crew. After recovery, each geotechnical soil sample was removed from the sampler and visually classified. Representative portions of each soil sample were then sealed in air-tight containers and transported to our laboratory in Greenville, South Carolina for further visual examination.

Laboratory Testing Program

The laboratory testing program consisted of visual classifications of the recovered soil samples. A geotechnical engineer classified each soil sample on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS). The group symbols for each soil type are indicated in parentheses following the soil descriptions on the Soil Test Boring Records. A brief explanation of the USCS is included with this report. The geotechnical engineer grouped the various soil types into the major zones noted on the Soil Test Boring Records. The stratification lines designating the interfaces between earth

materials on the Soil Test Boring Records are approximate; in situ, the transitions may be gradual. The ground surface elevations identified on the Soil Test Boring Records were interpolated from the provided topographic site plan and should be considered approximate.

The soil samples will be retained in our laboratory for a period of 30 days, after which, they will be discarded unless other instructions are received as to their disposition.

EXPLORATION AND LABORATORY RESULTS

Site Conditions

The Clinton - Adar Tract consists of a southern tract measuring 55.83 acres and a northern tract measuring 731.09 acres and consists of a combination of cleared grassed fields, previously timbered land, and woodlands. SC Highway 72 divides the property approximately 828 feet east of the intersection with I-26. Wildlife food plots have recently been cleared and grassed at various locations within the central portion of the site. Graveled access roadways have been constructed extending from SC Highway 72 into the central portions of the south and north tracts. Grading for these roadways appears to have involved minimal cuts and fills on the order of 3 feet or less. Previous cleared trails traverse the remainder of the central portions of the site which is a combination of cleared fields, second growth trees within the previously timbered portions of the site, and mature woodlands.

The site is located at an elevation of approximately 580-feet to 440-feet above the National Geodetic Vertical Datum (NGVD) according to the Joanna, SC, and Philson Crossroads, SC USGS topographic maps. Topographically, the site is comprised of a series of distinct hilltops with connecting ridges located within the south central portion of the site. From these hilltops, the site slopes gradually to moderately downward to the north, east, and west.

Area Geology

The site lies in the Piedmont Geologic Region, an area underlain by igneous and metamorphic rock. The residual soils present in this geologic area have been formed by the in-place chemical and physical weathering of the parent rock. Weathering is facilitated by fractures, joints, and by the presence of less resistant rock types. The typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands that generally become harder with depth to the top of parent bedrock.

The boundary between soil and rock is typically not sharply defined. A transitional zone termed "partially weathered rock" (PWR) is normally found overlying bedrock. PWR is defined for engineering purposes as residual material with a standard penetration resistance exceeding 100 blows per foot (bpf). The surface elevation of PWR and hard rock can vary significantly over short horizontal distances. Lenses and boulders of hard rock and zones of PWR may occur within the soil mantle.

Subsurface Conditions

The borings were performed within previously cleared areas of the site; therefore, no surficial layer of topsoil was encountered. The borings encountered undisturbed residual soils typical

of the Piedmont Region of South Carolina. The residual soils encountered typically consisted of firm to very stiff clayey silt (ML), clayey sandy silt (ML), and sandy silt (ML) and loose to dense clayey sand (SC) and silty sand (SM). Standard penetration resistances (N-values) recorded in these residual soils ranged from 5 to 51 blows per foot (bpf).

Boring B-8A encountered partially weathered rock (PWR) from a depth of 8 feet to a depth of 13 feet where refusal was encountered. The PWR exhibited SPT N-values of 50 blows for 3 inches of penetration.

Borings B-8A and B-10A met refusal at depths of 13 feet and 12 feet, respectively. The remaining borings were extended to their planned boring termination depths of 20 to 50 feet below the existing ground surface.

Groundwater

Observations for groundwater were made during sampling, upon completion of the drilling operations. In auger drilling operations, water is not introduced into the borehole, and the groundwater position can often be obtained by observing water flowing into or out of the borehole. Furthermore, visual observation of the soil samples retrieved during the auger drilling exploration can sometimes be used to aid in evaluating the groundwater conditions.

Groundwater was not encountered within any of the borings. The soils sampled within borings B-3B, B-6A, and B-9A were visibly damp to wet below depths of 18 feet, 12 feet, and 16 feet, respectively, indicative of capillary rise a few feet above the groundwater table. Borehole cave-in depths are shown on the Soil Test Boring Records. The borehole cave in depths appeared to be the result of cohesionless soils and did not appear to be the result of groundwater levels or elevated moisture contents within the soils.

It should be noted that the groundwater level can vary depending on precipitation, evaporation, surface run-off and other factors not immediately apparent at the time of this exploration.

CONCLUSIONS AND RECOMMENDATIONS

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions indicated by Soil Test Borings. If there are any changes to the project characteristics or if actual subsurface conditions differ from those described in this report, PARAGON should be consulted to review the recommendations of this report.

Site Preparation

Surface vegetation, roots, topsoil, and other deleterious materials should be removed from and to a horizontal distance of at least 5 feet beyond the limits of areas to receive fill, foundations, or pavements. Topsoil may be stockpiled for re-use in landscape or non-structural areas. Based upon our field data we estimate that the surficial topsoil layer is minimal within the previously cleared areas of the site; however, stripping to greater depths should be anticipated to completely remove the stumps and associated roots of the existing vegetation as well the surficial topsoil layer anticipated to exist within the portions of the site which have not been cleared.

Upon completion of the clearing and stripping of designated areas, all at-grade areas or areas to receive fill should be evaluated. During this evaluation, the exposed subgrade soils should be proofrolled with a fully loaded, tandem-axle dump truck or other pneumatic-tired vehicle of similar size and weight (25 to 30 tons). Proofrolling consists of applying repeated passes to the subgrade with this equipment. The purpose of proofrolling is to densify disturbed surface soils and detect unstable, soft, weak, or excessively wet surficial soils present at the time of construction. Materials judged to be unstable during proofrolling operations should be treated as recommended by PARAGON. Such treatment may include additional densification, stabilization in place, or undercutting and replacing with compacted fill. The most appropriate remedial activity should be determined in the field at the time of proofrolling.

Excavation Conditions

Partially weathered rock (PWR) was encountered at boring B-8A at a depth of 8 feet below the ground surface. Borings B-8A and B-10A met refusal at depths of 13 feet and 12 feet, respectively. The remaining borings were extended to their planned boring termination depths of 20 to 50 feet below the existing ground surface.

Excavation of the overburden soils similar to those encountered at the boring locations within mass-graded areas can be accomplished with self-loading scrapers or pusher-assisted scrapers. Rubber-tired backhoes are customarily used to excavate shallow trenches in overburden soils while large track-mounted backhoes are customarily used to excavate deeper trenches in overburden soils.

Very high consistency soils, PWR lenses, boulders, and PWR will typically require ripping with a large bulldozer (Caterpillar D-8) equipped with a hydraulic single-tooth ripper. A large tracked front-end loader, such as a Caterpillar Model 977 or equivalent, and large track-mounted backhoes, such as a Caterpillar Model 235 or equivalent, can usually excavate some PWR, although it becomes increasingly difficult in deep confined excavations. The actual depth to which machine excavation can be carried is dependent on the character and composition of the PWR. Hard rock lenses, boulders, or rock pinnacles within the soil and PWR zones will inhibit machine excavation and may require blasting or breaking up with pneumatic tools for removal. Blasting or the use of pneumatic tools to facilitate rock removal could be required if excavations extend within PWR which exhibit SPT values of 50 blows per 0 to 4 inches or below the refusal depth noted on the soil test boring.

If excavations extend to depths to encounter PWR, the excavation of PWR typically requires the use of a heavy tracked excavator operating with difficulty. Our experience indicates the ability to rip PWR is dependent on the equipment used, the bedding thickness, bedding dip, and its consistency. Because of the variable consistency of PWR, blasting could be needed to remove parts of this material, particularly within confined areas such as utility trenches. Where excavations extend below the recorded refusal depths in the vicinity of borings B-8A and B-10A, blasting is anticipated to be necessary to facilitate the removal of rock.

Rock excavation can be defined in many ways. In our opinion, rock excavation should be defined in a method specification based on the grading equipment commonly used in the project's area.

We offer the following as a guideline rock definition for use in preparing project specifications:

General Rock Excavation:

Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a draw bar pull rated at not less than 56,000 pounds (Caterpillar D8 or equivalent) or excavated by a front-end loader with a minimum bucket breakout force of 25,600 pounds (Caterpillar 977 or equivalent), occupying an original volume of at least one cubic yard or more, and requires blasting or other rock excavation methods.

Trench Excavation:

Any material which cannot be excavated with a Caterpillar 325 or equivalent, occupying an original volume of at least $\frac{1}{2}$ cubic yard or more, and requires blasting or other rock excavation methods.

Fill Placement

After subgrade evaluation/preparation and any required remedial actions, areas to receive fill may be brought to design subgrade levels with engineered fill. Engineered fill is defined as inorganic natural soil with maximum particle sizes of about 4 inches and Plasticity Indexes of about 30 or less. Engineered fill should be placed in relatively thin (4- to 8-inch) layers and compacted to a minimum of 95% of the maximum dry density determined in accordance with ASTM D 698, standard Proctor Method. Because floor slab and pavement support characteristics of Piedmont soils typically improve with greater density, the upper 12 inches of the building and pavement areas should be compacted to a minimum of 98% of the maximum dry density determined in accordance with ASTM D 698, standard Proctor Method. The materials should be moisture conditioned to within 3 percent of the soils' optimum moisture content, and then compacted as necessary to achieve the required minimum densities.

The majority of the residual soil sampled in the test boring should be suitable for use as engineered fill, although moisture conditioning of some soils may be needed prior to their use as engineered fill.

The deeper parts of fills beneath pavements and in non-structural areas can include a variety of materials including very coarse graded partially weathered rock, boulders, and shot rock. Excavated partially weathered rock fragments typically range from fine particles through cobble and boulder size. The degree of breakdown of the large fragments during excavation, placement, and compaction depends on rock type, degree of weathering, and joint spacing.

Partially weathered rock should be compacted with a heavy self-propelled sheepsfoot roller such as a Caterpillar Model 815. This device usually can break down partially weathered rock to a gradation compatible with both the maximum particle size criterion for structural fill and inplace density testing. Partially weathered rock should be compacted to at least 95% of its standard Proctor maximum dry density.

Partially weathered rock can be used as fill material to 3 feet below the parking area subgrade. Partially weathered rock which does not break down to 6 inches or less maximum particle size can be used in deeper parts of pavement area fill or in non-structural areas and should not be used within building areas or as wall backfill.

Groundwater Control

Groundwater is not anticipated to adversely impact site grading. The soils sampled within borings B-3B, B-6A, and B-9A were visibly damp to wet below depths of 18 feet, 12 feet, and 16 feet, respectively, indicative of capillary rise a few feet above the groundwater table. Additional soil test borings should be performed once site grades are finalized to aid in assessing the impact of groundwater on site development.

Foundation Recommendations

Based upon our findings, lightly to moderately loaded structure with maximum column loads on the order of 100 to 125 kips may be supported by conventional shallow foundations with foundation elements bearing on properly compacted engineered fill or residual soils. Allowable bearing pressures for shallow foundations bearing in properly compacted engineered fill or undisturbed residual soils on the order of 2,500 to 3,000 psf should be available.

Once buildings are sited and final grades established, additional soil test borings should be performed to determine available soil bearing pressures.

Floor Slab Recommendations

Slabs-on-grades including the accessory concrete pad can be supported by the undisturbed residual soils or new structural fill after implementation of the previously described site preparation measures. We would anticipate that for slab-on-grade design, modulus of subgrade reaction (k) values within the range of 120 to 140 pounds per cubic inch (pci) should be available. To reduce the possibility of slab cracking due to minor differential settlement, the floor slab should be structurally separate from the foundations.

Additional soil test borings should be performed once site grades are finalized to aid in assessing the need for underslab drainage layers. An underslab drainage layer and/or durable plastic vapor barrier may be required if final building slab grades are established within 5 feet of or below current groundwater levels.

Much of the exposed subgrade soils will be silty in nature and will deteriorate when exposed to weather and construction traffic during foundation and utility installation; therefore, we suggest a 6-inch thick layer of graded crushed stone (Macadam Base Course) be considered beneath all floor slabs. This layer will help reduce construction downtime during wet weather conditions and will provide a good leveling course. The crushed stone should be compacted to at least 98 percent of its standard Proctor maximum dry density.

Flexible Asphaltic Pavement Recommendations

Based on the exploration data and our experience, we would expect California Bearing Ratio (CBR) values on the order of 3 to 5 percent can be considered reasonable for conceptual design of flexible pavements.

Final Subgrade Preparation

Floor slab and pavement area subgrades often are disturbed between the completion of site grading and floor slab or pavement construction due to weather, footing or utility installation, and other construction activities. The soils encountered at the site are primarily fine-grained and micaceous. Although stable in dry conditions, these soils tend to become unstable when subjected to excess moisture or drying. For these reasons, it is important that the subgrades be evaluated just before slab or pavement construction. At that time, as much of the subgrade as practical should be proofrolled with a loaded dump truck in the presence of a PARAGON engineer. Any areas that deflect significantly under the proofrolling load, or which are otherwise assessed to be soft or unstable, should be undercut to firm materials. The undercut areas should be backfilled with compacted soil or crushed stone. A PARAGON engineer can provide recommendations for repairing any unstable areas that are observed. Pavement graded aggregate base course material should be placed immediately following the completion of the indication of stable areas during the proofrolling to not allow the subgrade soil support conditions to deteriorate due to exposure to weather and construction traffic.

Seismic Site Class

Based on the boring data of this exploration, the building sites within the three lots should have a seismic site class per International Building Code (IBC) 2006 of at least Site Class D. The site soils are not anticipated to be susceptible to liquefaction.

Earth Slopes

We anticipate that earth slopes will be constructed for the development of the three lots. We recommend that permanent slopes be inclined no steeper than 2H:1V. Temporary slopes less than 20 feet in height should be no steeper than $1\frac{1}{2}$ H:1V and meet the requirements of the most current Occupational Safety and Health Administration (OSHA) 29 CFR Part 1926, "Occupational Safety and Health Standards-Excavations".

Drop inlets or storm sewers should not be installed at the crest of slopes because leakage can result in maintenance problems or possible slope failure. The crest of slopes should be sloped to prevent surface runoff from flowing over the slope face.

It is difficult to construct fill slopes without leaving a loose, poorly compacted zone on the slope face. For this reason, we recommend that any fill slopes be slightly over-built, then cut back to firm, well compacted soils prior to applying a vegetative cover. If the slopes cannot be slightly over-built and cut back, we recommend that finished soil slopes be compacted to reduce, as much as practical, the thickness of this soft surficial veneer. The compaction may be done by making several coverages from top to bottom of the slopes using a moderate-sized bulldozer.

Retaining Walls

Site retaining walls may be required for site development. If loading dock or pit foundation walls are constructed at the site, we anticipate that these walls will likely be laterally restrained and not free to deflect or rotate. For such walls, we recommend design using the "at-rest" earth pressure condition. For exterior conventional cast-in-place concrete retaining walls that are free to deflect or rotate, the "active" earth pressure condition should be utilized for design.

The following table presents preliminary lateral earth pressure parameters which should be reevaluated after additional soil test borings are performed and confirmed by laboratory analysis:

Lateral Earth Pressure Coefficient	Preliminary Estimated Value
"At-Rest" Condition Coefficient (Ko)	0.5 to 0.6
Active Condition Coefficient (KA)	0.3 to 0.4
Passive Condition Coefficient (K _P)	2 to 3
Moist Unit Weight of Soil (pcf)	110 to 125
Foundation/Soil Interface Friction Values	0.3 to 0.4

Site grading should allow positive drainage away from all retaining walls. Drainage systems consisting of either filtered open graded crushed stone encapsulating a perforated pipe surrounded by a non-woven geotextile cloth should be installed behind each wall extending to within at least 2 feet of the ground surface. The drainage systems should be connected to a positive draining footing drain or weep holes.

Backfill behind the retaining walls should be compacted to at least 95% of the material's standard Proctor maximum dry density.

Supplemental Explorations

PARAGON has conducted a preliminary geotechnical exploration at the site consisting of widely spaced borings. The exploration was performed to aid in evaluating the site's suitability for industrial development which included characterizing the general subsurface conditions at the individual lots. Preliminary recommendations regarding site development have been presented within this report. The preliminary recommendations must be confirmed by additional subsurface explorations consisting of additional soil test borings along with laboratory testing of soil present at the site once proposed building locations are sited, structural loads are estimated, and grades are finalized.

CLOSING

We recommend that the construction activities be monitored by PARAGON to provide the necessary overview, to check the suitability of the subgrade conditions for supporting the foundations, and to verify that soils are consistent with the subsurface conditions encountered during the exploration.

This report has been prepared in order to aid in the evaluation of this property and to assist the client in the design of this project. The scope is limited to the specific project and locations described herein and our description of the project represents our understanding of the significant aspects relative to soil and foundation characteristics. In the event that any change in the nature or location of the proposed construction outlined in this report are planned, PARAGON should be informed so that the changes can be reviewed and the conclusions of this report modified or approved in writing by the geotechnical engineer. It is recommended that all construction operations associated with earthwork and foundations be observed by an experienced geotechnical engineer to provide information on which to base a decision as to whether the design requirements are fulfilled in the actual construction. PARAGON welcomes the opportunity to provide field services for you during construction.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated on the Boring Location Plan and other information referenced in this report. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, it is a well known fact that variations in soil conditions can exist and groundwater levels will vary over time. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, after performing on-site observations during the construction period and noting characteristics and variations, a re-evaluation of the recommendations of this report may be necessary.

ATTACHMENTS

Boring Location Plan Unified Soil Classification System Reference Notes Soil Test Boring Records



<u>LEGEND</u>

APPROXIMATE SOIL TEST BORING LOCATION



BORING LOCATION PLAN CLINTON – ADAIR TRACT SC HIGHWAY 72 LAURENS COUNTY, SOUTH CAROLINA PARAGON PROJECT NO. 10224-A

UNIFIED CLASSIFICATION SYSTEM

	MAJOR DIVISIONS		GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
	GRAVEL AND	CLEAN GRAVELS	20°00 00°00 00°00	GW	WELL-GRADED GRAVEL WELL-GRADED GRAVEL WITH SAND
		(LITTLE OR NO FINES)		GP	POORLY GRADED GRAVEL POORLY GRADED GRAVEL WITH SAND
COARSE GRAINED	MORE THAN 50% OF COARSE ERACTION	GRAVELS WITH FINES		GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
SCIED	RETAINED ON NO. 4 SIEVE	APPRECIABLE AMT. OF FINES)	1/1/1/2 2/2/2/2	GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
MORE THAN 50° OF MATERIAL IS LARGER THAN	% SAND AND	CLEAN SAND		SW	WELL-GRADED SAND WELL-GRADED SAND WITH GRAVEL
NO. 200 SIEVE SIZE	SANDY SOILS	FINES)		SP	POORLY GRADED SAND POORLY GRADED SAND WITH GRAVEL
	MORE THAN 50% OF COARSE FRACTION	SANDS WITH FINES		SM	SILTY SAND SILTY SAND WITH GRAVEL
	PASSING NO. 4 SIEVE	(APPRECIABLE AMT. OF FINES)		SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
				ML	SILT, SILT WITH SAND, SANDY SILT GRAVELLY SILT, GRAVELLY SILT WITH SAND
	SILT AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	LEAN CLAY WITH SAND, SANDY LEAN CLAY GRAVELLY LEAN CLAY WITH SAND
SOILS MORE THAN 50% OF MATERIAL IS	6			OL	ORGANIC CLAY, SANDY ORGANIC CLAY ORGANIC SILT, SANDY ORGANIC SILT WITH GRAVEL
SMALLER THAN NO. 200 SIEVE SIZE				МН	ELASTIC SILT WITH SAND, SANDY ELASTIC SILT GRAVELLY ELASTIC SILT WITH SAND
	SILT AND CLAYS	LIQUID LIMIT <u>GREATER</u> <u>THAN 50</u>		СН	FAT CLAY WITH SAND, SANDY FAT CLAY GRAVELLY FAT CLAY WITH SAND
				ОН	ORGANIC CLAY WITH SAND, SANDY ORGANIC CLAY, ORGANIC SILT, SANDY ORGANIC SILT
	HIGHLY ORG	ANIC SOILS		РТ	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
5	For classification of fine and fine-grained fractic grained soils.	e-grained soils n of coarse-	/		
<u>a</u> 40	Equation of "A" - line Horizontal at PI=4 to Li then PI=0.73 (LL-20)	_=25.5,		OT	- ALLINE
X INDEX الم	Equation of "U" - line Vertical at LL=16 to PI= then PI=0.9 (LL-8)	=7,	/ d	X OF	
-IOILSP 20					
<u>م</u>		C C		MH <	DR OH
10 7 2	CLIML 77	ML OR (DL		
C	0 10 16 20	30 40	50	60 7	0 80 90 100 110
				i (LL)	

CORRELATION OF STANDARD PENETRATION RESISTANCE WITH RELATIVE COMPACTNESS AND CONSISTENCY

Sand and Gravel

Standard Penetration Resistance <u>Blows/Foot</u>

Relative Compactness

0-4	Very Loose
5-10	Loose
11-20	Firm
21-30	Medium Dense
31-50	Dense
Over 50	Very Dense

Silt and Clay

Standard Penetration Resistance <u>Blows/Foot</u>	Relative Compactness
0-1	Very Soft
2-4	Soft
5-8	Firm
9-15	Stiff
16-30	Very Stiff
31-50	Hard
Over 50	Very Hard



BORING: B-2A

PROJECT: Clintn - Adair Tract								DJEC	T NO:	10224-A					
Р	PROJECT LOCATION: SC Highway 72, Laurens County, South Caroli														
D	ATE	DRI	LED: 7/2/12		ELEVAT	ION:	DRI	LLIN	g me	THOD: Hollow Sten	ו Auge	r			
D	RILL	LER:	H. Wessinger		WATER	LEVEL: Not Encountere	d HA	MMI	E R: Au	itomatic Hammer	DRILI	L RIG: C	ME 5	50	
6	RO	UND	WATER: 💆	Feet ATD	<u> </u>	Feet after 24 Hou	rs				SHEE	T 1 OF	1		
Ren	nark	ks: B	orehole caved at	12'											
ELEVATION		UEP IH (FT)	DESCRIPTION	ı				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	TRATIO (N) 20 30 44	N 0 50 7	0 100	N VALUE
		_	RESIDUUM	- Stiff red o	range	clayey sandy silt (ML)		Χ		•				15
		5	Firm red, or medium sar	ange, & wh nd (SC), witl	ite clay n some	yey silty fine to quartz fragment	s		Χ						15
		_	Stiff orange some mica	-brown clay	vey san	dy silt (ML), with			Χ	4					9
	1	10	Loose tan si	lty fine san	d (SM)				Χ						7
	1		-						X						9
	2	20	-						X						8
				Boring terr	ninate	d at 20 feet.									



BORING: B-2A

PROJECT: Clintn - Adair Tract								PROJEC	T NO:	10224-A					
PR	OJEC	T LO	CATION: SC Hig	ghway 72, Lau	urens Co	Carolina									
DA	TE D	RILLI	ED: 7/2/12		ELEVAT	ION:		DRILLIN	IG ME	THOD: Hollow Sten	n Auge	r			
DF		R: H.	Wessinger		WATER	LEVEL: Not End	countered	HAMM	ΕR: Αι	utomatic Hammer	DRILI	RIG:	CME	550	
G	ROUI	NDW	ATER: <u>¥</u>	Feet ATD	<u> </u>	Feet after	24 Hours				SHEE	T 1 OF	1		
Rem	arks:	Bor	ehole caved at	13' 6"											_
ELEVATION	DEPTH	(FT)	DESCRIPTION	V				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATI((N) 20 30 4	DN 40 50	70 10	₀ N VALUE
			RESIDUUM (ML)	- Very Stiff	red ora	ange clayey	/ sandy si	lt	Χ		٩				18
	5		Firm orange	e brown mi	caceou	s sandy silt	(ML)		X		1				7
									X						8
	10								X						6
	15		Loose orang	ge, tan, & b	rown s	ilty fine sar	nd (SM)		X						5
	20								X						6
				Boring teri	ninate	d at 20 fee	t.								



BORING: B-3A

PR	PROJECT: Clintn - Adair Tract						PROJECT NO: 10224-A						
PR	OJECT L	OCATION: SC Highway 72, La											
DA	TE DRIL	LED: 7/2/12	ELEVAT	ION:	DRI	LLIN	G ME	THOD: Hollow Sten	n Auge	er			
DR	ILLER: I	I. Wessinger	WATER I	LEVEL: Not Encounter	ed HAI	MM	Ε R: Αι	itomatic Hammer	DRILI	L RIG: (CME 5	550	
GF	ROUND	VATER: 👱 Feet ATD	<u> </u>	Feet after 24 Hou	urs				SHEE	T 1 OF	1		
Rema	arks: Bo	rehole caved at 12' 8"											
ELEVATION	DEPTH (FT)	DESCRIPTION				WATER LEVEL	SAMPLE	STANDARD RESIST	PENE ^T ANCE	TRATIC (N) 20 30 4	DN 10 50 7	70 100	N VALUE
		RESIDUUM - Firm orar	ige mic	aceous sandy silt	t (ML)		X	•					7
	5	-											5
		Loose orange brown m	nicaceo	us silty fine sand	(SM)								9
	10	Firm tan & brown mica	aceous	silty fine sand (SI	M)								12
		Firm tan brown micace	eous sai	ndy silt (ML)									
	15	-					X	l f					8
		-											
	20	-					X						7
		Boring ter	minate	d at 20 feet.									



BORING: B-3B

PROJECT: Clintn - Adair Tract							DJEC	T NO:	10224-A					
PR	PROJECT LOCATION: SC Highway 72, Laurens County, South Caro													
DA	TE DRIL	LED: 7/2/12		ELEVATI	ON:	DRI	LLIN	G ME	THOD: Hollow Sten	n Auge	r			
DR	ILLER: H	H. Wessinger	_ _ _	WATER L	EVEL: Not Encountere	HA	MMI	E R: Au	utomatic Hammer	DRILL	RIG: (CME 5	550	
G	ROUND	NATER: 👱	Feet ATD	<u> </u>	Feet after 24 Hou	'S				SHEE	T 1 OF	1		
Rema	arks: Bo	rehole caved at	t 13' 6"				1							
ELEVATION	DEPTH (FT)	DESCRIPTIO	N				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATIC (N) 20 30 4)N	0 100	N VALUE
		RESIDUUM	- Stiff red c	layey si	lt (CL)			X						11
	5							X						14
	_	Very Stiff re some mica	ed orange cl	ayey sa	ndy silt (ML), wit	h	-	Χ		A				16
	10	Firm orange	e brown mio	caceous	s sandy silt (ML)			X						7
	15							X						6
	20	- damp					-	X						8
			Boring terr	ninateo	d at 20 feet.									



BORING: **B-4A**

PROJECT: Clintn - Adair Tract								PROJE	ст NO	: 10224-A					
PR	OJEC	T LO	CATION: SC Hig	shway 72, Laւ	irens Co	Carolina									
DA	TE D	RILLE	D: 7/2/12		ELEVAT	ION:		DRILLI	NG M	ETHOD: Hollow Ster	n Auge	er			
DR	ILLER	: Н.	Wessinger		WATER	LEVEL: Not En	countered	HAMN	IER: A	utomatic Hammer	DRIL	L RIG:	CME	550	
GF	ROUN	IDW	ATER: 💆	Feet ATD	<u> </u>	Feet after	24 Hours				SHEE	T 1 OF	1		
Rema	arks:	Bor	ehole caved at	13' 3"											
ELEVATION	DEPTH	(FT)	DESCRIPTION	1				WATER LEVEL	SAMPLE	STANDARD RESIST	PENE ANCE	TRATI((N) 20 30 -	DN 40 50 5	70 100	N VALUE
	-		RESIDUUM (ML), with se	- Very Stiff ome mica	red ora	ange clayey	y sandy si	lt	X		•				18
	5								X						22
	-								X						24
	10		Loose orang	e brown m	icaceo	us silty fine	e sand (SN	Л)	X						8
	15								X						8
	20		Firm white, (SM)	gray, & brc	own mi	caceous sil	ty fine sa	nd	X						14
			I	Boring terr	ninate	d at 20 fee	t.								



BORING: B-4B

PROJECT: Clintn - Adair Tract								T NO:	10224-A					
PR	OJECT L	DCATION: SC Hig	ghway 72, Lau	olina										
DA	TE DRIL	ED: 7/2/12		ELEVAT	ION:	D	RILLIN	IG ME	THOD: Hollow Sten	n Auge	r			
	ILLER: H	I. Wessinger		WATER	LEVEL: Not Encou	ntered H	AMM	ER: Au	itomatic Hammer	DRILL	RIG: C	ME 5	550	
G	KUUNDV		Feet AID	<u> </u>	Feet after 24	Hours				SHEE	TUF	1		
Rema	arks: Bo	rehole caved at	38'				-	, ,						
ELEVATION	DEPTH (FT)	DESCRIPTION	I				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATIO (N) 20 30 40	N 0 50 7	70 100	N VALUE
		RESIDUUM	- Very Stiff	red cla	yey sandy silt	: (ML)		X						20
		Stiff orange.	brown mic		s sandy silt (M	<u> </u>		\square						12
	5		-brown mic	aceous	s saliuy siit (iv	11)		\bigotimes						12
	_						_	\square						15
	10	Firm orange	, brown, &	black r	nicaceous sai	ndy silt		А	/					9
									/					
	15							\boxtimes	∮					6
		-												
	20	-												6
		- 	.		····		-	\square						
		Firm gray &	brown mic	aceous	s silty fine san	d (SIVI)		\vdash						1.4
	25							А						14
		_												
	30	-						А						15
		Medium De	nse orange	, brow	n, & tan mica	ceous	-1			$ \rangle$				
	35	silty fine sar	nd (SM)					\mathbf{X}						21
								\square						
	40	-												23
		-						Ĥ			711			23
		Firm to Mec	lium Dense	tan br	own silty fine	sand	-1	\vdash						10
	45	(SM)						Å		٦ ا				18
	50	-					_	Д						20
			Boring terr	ninate	d at 50 feet.									



BORING: **B-5A**

PROJECT: Clintn - Adair Tract							T NO:	10224-A					
PR	OJECT L	OCATION: SC Highway 72, L	ounty, South Carolina	ī									
DA	TE DRIL	LED: 7/2/12	TION:	DRIL	LIN.	g me	THOD: Hollow Sten	ו Auge	er				
DR	ILLER: I	H. Wessinger	WATER	LEVEL: Not Encountered	HAN	/ME	R: Au	Itomatic Hammer	DRILI	L RIG: (CME	550	
GF	ROUND	WATER: 👱 🛛 Feet ATD	Feet after 24 Hours	5				SHEE	T 1 OF	1			
Rema	arks: Bo	rehole caved at 13' 7"											
ELEVATION	DЕРТН (FT)	, DESCRIPTION				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	TRATIC (N) 20 30 4	DN 10 50	70 100	N VALUE
	_	RESIDUUM - Stiff red	orange	clayey silt (ML)			Χ		•				14
	5	-					Χ		ł				11
		-					X	f					9
	10	Loose yellow-brown	ilty fine	to medium sand (S	5M)		Χ						8
	_	Firm tan & orange sa	ndy silt (ML)									
	15	-					Å						7
		-											
	20	-					Х	•					6
		Boring te	rminate	d at 20 feet.									
		1									111	111	



BORING: B-5B

PR	OJEC	т: с	lintn - Adair Tra	act	PROJECT NO: 10224-A												
PR	OJEC	T LO	CATION: SC Hig	ghway 72, La	urens Co	unty, South Caro	lina	1									
DA	TE D	RILLI	D: 7/2/12		DR	LLIN	G ME	THOD: Hollow Sten	n Auge	r							
DR	ILLER	: H.	Wessinger		WATER I	EVEL: Not Encour	tered HA	MMI	Ε R: Αι	itomatic Hammer	DRILL	. RIG:	CME	550			
G	ROUN	IDW	ATER: <u>¥</u>	Feet ATD	<u> </u>	Feet after 24	Hours	S SHEET 1 OF 1									
Rema	arks:	Bor	ehole caved at	14'													
ELEVATION	DEPTH	(FT)	DESCRIPTION	ı				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATI((N) 20 304	DN 40 50	70 100	N VALUE		
			RESIDUUM	- Stiff red o	clayey si	ilt (CL)			X		•				14		
	5		Loose red &	orange sil	ty fine t	o medium sa	nd (SM)		Χ	┥					9		
			Stiff red san	dy silt (ML), with t	crace clay			X						12		
	10		Firm red bro	own micaco	eous silt	ty fine sand (S	M)		X						17		
	15		Firm orange	brown mi	caceous	s sandy silt (M	IL)		X						5		
	20								X						8		
				Boring ter	minateo	d at 20 feet.											



BORING: B-6A

PROJECT: Clintn - Adair Tract PROJECT LOCATION: SC Highway 72. Laurens County. South Carolina										PROJECT NO: 10224-A							
PR	OJECT	LOC	ATION: SC Hig	hway 72, Lau	urens Co	unty, South Ca	arolina										
DA	TE DRI	ILLE	D: 7/2/12		ELEVAT	ION:		DRILLIN	IG ME	THOD: Hollow Sten	ו Auge	r					
DR	ILLER:	Н. \	Wessinger		WATER	LEVEL: Not Enco	ountered	HAMM	ER: Au	Itomatic Hammer	DRILL	. RIG: (CME 5	550			
GF	ROUNE	OWA	ATER: <u>Y</u>	Feet ATD	<u> </u>	Feet after 2	24 Hours	Irs SHEET 1 OF 1									
Rema	arks: E	Bore	hole caved at	13' 6"	·												
ELEVATION	DEPTH	(FT) 1	DESCRIPTION					WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	RATIC (N) 20 30 4)N 0 50 7	0 100	N VALUE		
	_	(R ESIDUUM - (ML)	- Stiff to Ve	ery Stiff	red clayey	sandy silt	Ι	X		•				14		
	5								X						17		
	-								X						14		
	10		Loose white	& brown s	silty fine	e sand (SM)			X						8		
			Loose white	& brown s	silty fine	e sand (SM),	, damp		X						7		
	20								X						6		
			I	Boring teri	minate	d at 20 feet											



BORING: B-6B

PR	OJEC	T: C	lintn - Adair Tra	ct			PRC	DJEC		: 10224-A					
PR	OJEC	T LO	CATION: SC Hig	hway 72, Lau	irens Cou	inty, South Carolina	na								
DA	TE D	RILLI	ED: 7/2/12		ELEVATI	ON:	DRI	LLIN	g me	THOD: Hollow Sten	n Auge	r			
DR	ILLEF	к: Н.	Wessinger		WATER L	EVEL: Not Encountered	HAN	ИМЕ	ER: A	utomatic Hammer	DRILL	. RIG:	CME	550	
G	ROUN	IDW	ATER: 🖳	Feet ATD	<u> </u>	Feet after 24 Hou	urs SHEET 1 OF 1								
Rem	arks:	Bor	ehole caved at	14' 7"											
ELEVATION	DEPTH	(FT)	DESCRIPTION					WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATI (N) 20 30	ON 40 50	70 10	0 N VALUE
			RESIDUUM -	- Very Stiff	red clay	yey sandy silt (MI	.)		Х		۰				17
	5		Firm red ora	nge sandy	silt (MI	.)			Χ						7
			Firm orange	& brown r	nicaceo	us sandy silt (ML			Χ						8
	10								Χ						9
	15		Loose gray 8	k brown sil	ty fine s	and (SM)			X						8
			Firm brown	& white sil	ty fine t	o medium sand (SM)								
	20								Χ						19
			I	Boring terr	ninateo	l at 20 feet.									



BORING: B-7A

PR	OJEC	T: C	lintn - Adair Tra	act			PI	ROJEC	T NO:	10224-A					
PR	OJEC	T LO	CATION: SC Hig	hway 72, Lau	irens Co	unty, South Ca	rolina	a							
DA	TE D	RILL	ED: 7/2/12		ELEVAT	ION:	D	RILLIN	G ME	THOD: Hollow Sten	n Auge	r			
DR	ILLEF	R: H.	Wessinger			LEVEL: Not Enco	untered H	AMM	Ε R: Αι	utomatic Hammer	DRILI	. RIG: (CME 5	550	
GI	ROUN	IDW	ATER: 💆	Feet ATD	<u> </u>	Feet after 2	4 Hours				SHEE	T 1 OF	1		
Rema	arks:	Bor	ehole caved at	14' 3"											
ELEVATION	DEPTH	(FT)	DESCRIPTION	I				WATER LEVEL	SAMPLE	STANDARD RESIST	PENET ANCE	FRATIC (N) 20 30 4	DN	70 100	N VALUE
			RESIDUUM	- Stiff red c	orange (clayey sandy	silt (ML)		X						15
	5		Firm to Stiff	orange mi	caceou	s sandy silt (ML)		Χ						8
									Χ						11
	10		Loose tan-bi	rown silty f	ine san	id (SM)			X						10
	15		Very Stiff tai	n-brown &	orange	e sandy silt (I	 ML)		X						18
	20		Firm tan-brc	own & whit	e silty f	fine sand (SN	<u>л</u> , — -		X						20
			1	Boring terr	ninateo	d at 20 feet.									



BORING: B-8A

PR	OJEC	T: C	lintn - Adair Tra	act				PROJEC	T NC): 10224-A					
PR	OJEC	T LO	CATION: SC Hig	ghway 72, Lau	irens Co	unty, South Car	olina	a 							
DA	TE D	RILL	ED: 7/2/12		ELEVAT	ION:		DRILLIN	IG M	ETHOD: Hollow Stem	Auger				
DR	ILLEF	R: H	Wessinger		WATER L	EVEL: Not Encou	untered	HAMMER: Automatic Hammer DRILL RIG: CME 550							
G	ROUN	NDW	ATER: 💆	Feet ATD	<u> </u>	Feet after 24	4 Hours				SHEET 1	OF 1			
Rem	arks:	Bor	ehole caved at	5' 2"					1 1						
/ATION	Ŧ							TER LEVEL	IPLE	STANDARD P RESISTA	ENETRA'	ΓΙΟΝ		ALUE	
ELE	DEP	Ē	DESCRIPTION	I				.AW	SAN	1 1	0 20 3	30 40 50 7	70 100	> z	
		-	RESIDUUM	-Very Stiff ı	ed clay	vey sandy silt	t (ML)								
				-	-				Χ		•			20	
	5		Medium De sand (SM)	nse tan-ora	inge mi	caceous silty	/ fine		X					23	
	·		Dense tan-o	range & br	own m	icaceous silty	y fine		X					34	
												N			
			PARTIALLY			K - Sampled	as Very	'	∇					50/3"	
	10		Dense tan si	lity fine san	a (Sivi)				\square						
	15			Refusal	met at	13 feet.									



BORING: B-9A

PI	roje	ст: с	lintn - Adair Tra	act				PROJE	CT NO	: 10224-A						
PI	ROJE	CT LO	CATION: SC Hig	ghway 72, Lau	irens Co	unty, South	Carolina	a								
D	ATE	DRILL	ED: 7/2/12		ELEVAT	ION:		DRILLI	IG M	ETHOD: Hollow Sten	n Auge	r				
D	RILLE	ER: H	Wessinger		WATER	LEVEL: Not Er	ncountered	A HAIVINER: Automatic Hammer DRILL RIG: CME 550								
G	ROL	JNDW	ATER: <u>¥</u>	Feet ATD	<u> </u>	Feet afte	r 24 Hours	SHEET 1 OF 1								
Rem	arks	s: Bor	ehole caved at	14' 2"												
ELEVATION	DEPTH	(FT)	DESCRIPTION	J				WATER LEVEL	SAMPLE	STANDARD RESIST	PENE ANCE	FRATI((N) 20 304	DN 40 50	70 10	° N VALUE	
			RESIDUUM (ML)	- Very Stiff	red ora	ange claye	y sandy si	ilt	X		1				19	
	ŗ	5	Stiff orange	micaceous	sandy	silt (ML)			X						12	
									X						9	
	10	0	Firm orange (ML)	, tan, & bro	own mi	caceous sa	andy silt		Χ						5	
	1	5	Firm orange	e & brown r	nicaceo	bus sandy	silt (ML),		X						5	
	20		wet						Χ						6	
				Boring terr	ninate	d at 20 fee	et.									



BORING: B-9B

PR	OJEC	:т: с	lintn - Adair Tra	act				PROJ	ЕСТ	NO:	10224-A						
PR	PROJECT LOCATION: SC Highway 72, Laurens County, South Carolina																
DA	DATE DRILLED: 7/2/12 ELEVATION:										THOD: Hollow Sten	ו Auge	r				
DR	ILLEF	R: H.	Wessinger		WATER	LEVEL: Not I	Encountered	HAM	MER	≀: Au	itomatic Hammer	DRILL	. RIG:	CME	550)	
GI	ROUM	NDW	ATER: <u>¥</u>	Feet ATD	<u> </u>	Feet aft	er 24 Hours	DUIRS SHEET 1 OF 1									
Rema	arks:	Bor	ehole caved at	12'													
ELEVATION	DEPTH	(FT)	DESCRIPTION	4						SAMPLE	STANDARD RESIST	PENET ANCE	FRATI (N) 20 30	ON 40 50	70 1	.00	N VALUE
			RESIDUUM	- Stiff red o	range	clayey sa	ndy silt (M	L)		X		1					15
	5		Firm red & c		aceous	s sandy sil	t (ML)			X							16
							- ()			X							16
	10		Firm tan, br (SM)	own, & bla	ck mic	aceous sil	ty fine san	d		X							13
	15		Very Stiff or silt (ML)	ange, brow	ın, & b	lack mica	ceous sand	dy		X							17
	20								2	X							20
				Boring terr	ninate	ed at 20 fe	et.										



BORING: B-10A

PR	OJEC	T: C	lintn - Adair Tract			PR	OJEC	T NO:	: 10224-A						
PR	OJEC	t lo	CATION: SC Highway 72, Lau	rens Co	unty, South Caro	lina									
DA	TE D	RILL	ED: 7/2/12	ELEVAT	ION:	DF	RILLIN	IG ME	THOD: Hollow Ster	n Auger	-				
DR	ILLER	t: Н.	Wessinger	WATER	LEVEL: Not Encoun	tered HA	d HAMMER: Automatic Hammer DRILL RIG: CME 550								
GF	ROUN	IDW	ATER: 👱 Feet ATD	<u> </u>	Feet after 24	Hours	JIRS SHEET 1 OF 1								
Rema	arks:	Bor	ehole caved at 7' 1"												
Z							EVE EVE							ш	
ATI	Ξ						ER	PLE	STANDARD	PENET		N		٩٢∩	
ILEV	DEP1	Ē	DESCRIPTION				VAT	AM	1 KESISI	10	(IN) 20 304	0 50 70	100	Š	
		<u> </u>	RESIDUUM - Verv Stiff	red cla	vev sandv silt	(ML)	-	0,			20 30 4		100		
	-				, , , , , , , , , , , , , , , , , , , ,	()		\square						17	
	-							Д							
	-		Firm red & orange clav	ev siltv	fine to mediu	m sand									
	5		(SC)	-,,				X		•				17	
								H		\					
			Firm red, orange, & bro	own mi	caceous silty f	ine to		\square						19	
	-		medium sand (SM)		,			Д			NI				
			Very Dense gray & blac	k mica	ceous silty fin	e to					N				
	10		medium sand (SM)					X				P		51	
								M							
	-														
	-														
	15		Refusal	met at	: 12 feet.										