Proposed Bertie High School

Windsor, North Carolina

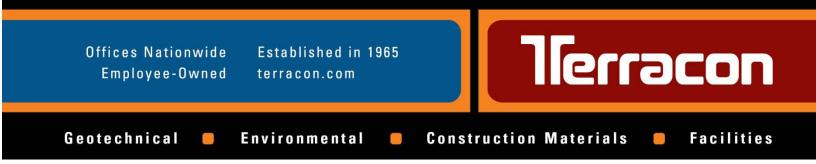
February 20, 2012 Project No. 72125002

Prepared for:

Bertie County Schools c/o Hite Associates Greenville, North Carolina

Prepared by:

Terracon Consultants, Inc. Winterville, North Carolina



February 20, 2012

lerracon

Bertie County Schools c/o Hite Associates 2600 Meridian Drive Greenville, North Carolina 27834

Attn: Mr. James G. Hite AIA, LEED AP

RE: Geotechnical Engineering Report Proposed Bertie High School US Highway 13 Windsor, North Carolina Terracon Project No. 72125002

Dear Mr. Hite:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with our proposal P72120004 dated January 17, 2012. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork, pavements and the design of foundations for the proposed high school.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,

Terracon Consultants, Inc.

Carl F Bomen

Carl F. Bonner, PE Principal / Office Manager Registered, NC 16252



Barney C. Hale, PE Senior Geotechnical Engineer Registered, NC 11285

Enclosures

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APPENDIX A – FIELD EXPLORATION

Exhibit A-1Site Location PlanExhibit A-2Boring Location PlanExhibit A-3Field Exploration DescriptionBorings B-1 to B-19, S-1-S-15Soils Laboratory Results

APPENDIX B – SUPPORTING DOCUMENTS

Exhibit B-1	General Notes
Exhibit B-2	Unified Soil Classification



EXECUTIVE SUMMARY

The following items represent a brief summary of the findings of our subsurface exploration, our conclusions and recommendations for the proposed high school to be located on US Highway 13 in Windsor, North Carolina.

- The proposed high school will be a single story building, with an approximate area of 80,000 square feet and associated paved parking lots and driveways. The gymnasium and auditorium are of high bay construction. The building will be supported on a combination of shallow foundations and helical piers with a concrete slab-on-grade.
- At the time of our site exploration, the site was wooded with volunteer pine trees. Native deposits of lean clay, clayey and silty sand were encountered in the borings.
- Geotechnical considerations for the proposed construction include relatively soft surficial soils, the high groundwater table and the magnitude of the loads associated with the gymnasium and auditorium. We recommend that site grades be raised 4 to 5 feet in order to place a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. We understand that grades will be raised as part of the planned site grading. We recommend a finish floor elevation of 36 feet.
- The lean clay at the surface is moisture sensitive and can rut or deflect excessively with elevated moisture contents. Performing earthwork operations during warmer, drier periods of the year (May through October) will reduce the potential for problems associated with unstable subgrades. The moisture sensitivity of the on-site soils does not preclude performing earthwork at other times of the year, but does lead to an increased potential for having to perform overexcavation and replacement or some other form of remedial work.
- Support of the proposed structure on conventional shallow foundations is recommended after the raising of site grades 4 to 5 feet. Foundations are expected to bear on new engineered fill compacted to the recommendations given herein. Foundations bearing on these suitable materials could be designed using a maximum net allowable soil bearing pressure of 2000 psf if the recommended fill is placed so that there is a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. The heavily loaded columns in the gymnasium and auditorium are expected to be founded on helical piers.
- Existing subgrade soils should be observed after stripping during the proofrolling process to evaluate the suitability of this material for support of the floor slabs and pavements and be corrected as necessary, as described in the following report. Unsuitable soils should be removed if they cannot be satisfactorily recompacted. We recommend an experienced geotechnical engineer be retained to observe and test the foundation bearing materials and as well as other construction materials at the site.

Responsive Resourceful Reliable



This summary should be used in conjunction with the entire report for design purposes. Details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of report limitations.

GEOTECHNICAL ENGINEERING REPORT BERTIE HIGH SCHOOL WINDSOR, NORTH CAROLINA Terracon Project No. 72125002 February 20, 2012

1.0 INTRODUCTION

A geotechnical engineering report has been completed for the proposed high school to be located on US Highway 13 in Windsor, North Carolina. Thirty four borings were performed to depths of approximately 5 to 85 feet below the existing ground surface at the requested locations. Logs of the borings along with a site location plan and a boring location plan are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- earthwork
- pavements

- foundation design and construction
- seismic considerations
- floor slab design and construction

2.0 PROJECT INFORMATION

Project information was obtained from our review of electronic correspondence from Mr. James G. Hite, architect, dated January 11, 2012, an attached drawing, a telephone conversation with Mr. Jack Deese, of JDA Engineering, a site visit and a subsequent telephone conversations with Mr. Brad Williams of Hite Associates. We understand that a new high school is planned for an undeveloped site across Highway 13 from the existing high school in Windsor, North Carolina.

2.1 Project Description

ITEM	DESCRIPTION
Site Location See Appendix A, Exhibit A-1, Site Location Plan	
Site layout	See Appendix A, Exhibit A-2, Boring Location Plan
Structure	Single story, approximately 80,000 square feet with associated paved parking lot and driveways. The gymnasium and auditorium are of high bay construction.

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ITEM	DESCRIPTION
Building Construction	Load bearing masonry walls and isolated steel columns supported on shallow foundations or helical piers with a concrete-slab-on grade
Maximum loads	Columns: Maximum column loads of 175 kips, most columns in the range of 30 to 45 kips (per JDA Engineering) Walls: 3 kips per linear foot (per JDA Engineering) Slab: 100 psf (assumed)
Maximum allowable settlement	Up to 1-inch Total and up to 3/4-inch differential over 40 feet (assumed)
Grading	Finish floor elevation was not provided. We recommend a finish floor elevation of 36 feet. Up to 4 to 5 feet of fill recommended.
Fill slopes	3H:1V (Horizontal to Vertical) max (assumed)
Retaining walls	None
Below grade levels	None

2.2 Site Location and Description

ITEM	DESCRIPTION	
Location	The proposed Bertie High School will be located on US Highway 13, across from the existing high school, north of Windsor, North Carolina.	
Existing improvements	Undeveloped	
Current ground cover	Wooded with volunteer pines, approximately 4 to 6 inches in diameter	
Existing topography	Relatively level, with some swales observed	

3.0 SUBSURFACE CONDITIONS

3.1 Typical Profile

Based on the results of the boring, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered	Consistency/Density
Surface	1.0	Vegetation / Topsoil / Rootmat	N/A
Stratum 1	13	Lean Clay (CL) and Fat Clay (CH)	Soft to Medium Stiff

Bertie High School = Windsor, North Carolina February 20, 2012 = Terracon Project No. 72125002



Stratum 2	28	Clayey Sand (SC) Fine to Medium Sand (SP) and Silty Sand (SM)	Very Loose to Medium Dense
Stratum 3	82	Lean Clay (CL) and Fat Clay (CH)	Stiff to Very Stiff
Stratum 4	83	Limestone	Very Dense

Laboratory classification testing was performed on three samples from borings B-5, B-8 and B-15 from 1 to 2.5 feet and 3.5 to 5 feet. The samples were classified as Fat Clay (CH). The laboratory test results are listed in Appendix A and on the boring logs.

Conditions encountered at the boring locations are indicated on the boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual and indistinct. Conditions can also vary between boring locations. Further details of the borings can be found on the boring logs in Appendix A of this report.

3.2 Groundwater

A mixture of water and "drilling mud" was used to advance the borings. The fluid used in this process can obscure the measurements of groundwater levels. However, after a period of time, the fluid typically stabilizes at a depth near the groundwater level. The boreholes were observed while drilling and after completion for the presence and level of groundwater. Groundwater levels were observed at a depth of approximately 1 to 3 feet in the borings while drilling. The moisture condition of the soil samples supported these groundwater levels.

Groundwater level fluctuations on the order of one to three feet occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

If seasonal high water table information and infiltration rates are required for the design of a stormwater detention system, we recommend that a soil scientist be retained for additional investigation.

3.3 Site Geology

The subject site is located in the Coastal Plain Physiographic Province. The Coastal Plain soils consist mainly of marine sediments that were deposited during successive periods of fluctuating sea level and moving shoreline. The soils include sands, silts, and clays with irregular deposits of shells, which are typical of those lain down in a shallow sloping sea bottom. Recent alluvial sands,



silts, and clays are typically present near rivers and creeks. According to the 1985 Geologic Map of North Carolina, the site is mapped within the Yorktown and Duplin Formation.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Geotechnical considerations for the proposed construction include relatively soft surficial soils, the high groundwater table and the magnitude of the loads associated with the gymnasium and auditorium. We recommend that site grades be raised 4 to 5 feet in order to place a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. We understand that grades will be raised as part of the planned site grading. We recommend a finish floor elevation of 36 feet. It should be understood that the recommendations of this report are contingent upon the understanding that site grades will be raised 4 to 5 feet. If site grades are not raised, Terracon should be contacted so that supplemental recommendations can be provided.

The near-surface fat clay and lean clay are moisture-sensitive and will lose strength and rut or deflect excessively under construction traffic when they become wet. Performing earthwork operations during warmer, drier periods of the year (May through October) will reduce the potential for problems associated with unstable subgrades. The moisture sensitivity of the on-site soils does not preclude performing earthwork at other times of the year, but does lead to an increased potential for having to perform overexcavation and replacement or some other form of remedial work. Protecting the exposed subgrade soils from infiltration of surface water by keeping the site grades sloped to promote runoff in advance of rain events will also reduce the potential for needing to perform remedial work on wet subgrades. Should unstable subgrade conditions develop, stabilization measures should be employed.

Support of the proposed structure on conventional shallow foundations is recommended after the raising of site grades 4 to 5 feet. Foundations are expected to bear on new engineered fill compacted to the recommendations given herein. Foundations bearing on these suitable materials could be designed using a maximum net allowable soil bearing pressure of 2000 psf if the recommended fill is placed so that there is a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. The heavily loaded columns in the gymnasium and auditorium are expected to be founded on helical piers.

4.2 Earthwork

Site preparation should begin with the complete removal of the existing surface vegetation. Grass, topsoil and rootmat at the ground surface should be stripped to a depth of approximately 6 inches. Stripping depth should be monitored and minimized in order to maintain the vertical



separation between the surface grades and the water table. A Terracon representative should field verify the stripping depth during construction. Topsoil may be re-used in areas of the site to be landscaped. Topsoil should not be used as structural fill or backfill.

After stripping, the exposed subgrade soils in areas to receive fill or at the subgrade elevation in cut areas should be proofrolled with an empty, tandem-axle dump truck or similar rubber-tired construction equipment. Proofrolling is recommended as a means of detecting areas of soft or unstable subgrade soils. The proofrolling should be performed during a period of dry weather to avoid degrading an otherwise suitable subgrade. The proofrolling operations should be observed by a representative of the geotechnical engineer. Subgrade soils that exhibit excessive rutting or deflection during proofrolling should be overexcavated as directed by the representative and replaced with properly compacted fill. Areas of localized undercut are likely to be required.

Engineered fill should meet the following material property requirements:

Fill Type ¹	USCS Classification	Acceptable Location for Placement
Imported Low	SC or CL	
Plasticity Soil	with	All locations and elevations
with > 15% fines	(LL < 50 & PI < 30)	

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

Onsite soils can be used for fill, such as trench backfill, if they meet the recommended classifications and are properly moisture conditioned.

4.2.1 Compaction Requirements

We recommend that site grades be raised 4 to 5 feet in order to create a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. The initial two lifts of soil should be placed in 6 inch loose thick lifts and compacted with tracked equipment to a minimum of 92% of the Standard Proctor. After placing and compacting this 'tracked-in lift', we recommend that the remainder of the fill be placed as recommended in the following table.

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ITEM	DESCRIPTION
Fill Lift Thickness	9-inches or less in loose thickness (4" to 6" lifts when hand- operated equipment is used)
Compaction Requirements ¹	Compact to a minimum of 95% of the materials maximum Standard Proctor dry density (ASTM D 698)
Moisture Content – Structural Fill	Within the range of -2% to +2% of optimum moisture content as determined by the standard Proctor test at the time of placement and compaction
1. Engineered fill should be tested for moisture content and compaction during placement. If in-place	

 Engineered fill should be tested for moisture content and compaction during placement. If in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the tests should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.2.2 Grading and Drainage

During construction, grades should be sloped to promote runoff away from the construction area. Final surrounding grades should be sloped away from the structures on all sides to prevent ponding of water. If gutters / downspouts do not discharge directly onto pavement, they should not discharge directly adjacent to the buildings. This can be accomplished through the use of splash-blocks, downspout extensions, and flexible pipes that are designed to attach to the end of the downspout. Flexible pipe should only be used if it is daylighted in such a manner that it gravity-drains collected water. Splash-blocks should also be considered below hose bibs and water spigots. Paved surfaces which adjoin the buildings should be sealed with caulking or other sealant to prevent moisture infiltration at the building envelope; maintenance should be performed as necessary to maintain this seal.

4.4.3 Construction Considerations

The near-surface fat clay and lean clay are moisture-sensitive and will lose strength and rut or deflect excessively under construction traffic when they become wet. Performing earthwork operations during warmer, drier periods of the year (May through October) will reduce the potential for problems associated with unstable subgrades and an elevated water table. The moisture sensitivity of the on-site soils does not preclude performing earthwork at other times of the year, but does lead to an increased potential for having to perform overexcavation and replacement or some other form of remedial work. Protecting the exposed subgrade soils from infiltration of surface water by keeping the site grades sloped to promote runoff in advance of rain events will also reduce the potential for needing to perform remedial work on wet subgrades. Should unstable subgrade conditions develop, stabilization measures should be employed.

The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted.



As a minimum, all temporary excavations should be sloped or braced as required by Occupational Safety and Health Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will most likely be required during grading operations. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proof-rolling; placement and compaction of controlled compacted fills; and backfilling of excavations.

4.3 Foundation Recommendations

4.3.1 Shallow Foundations

In our opinion, the proposed structure, with the exception of the gymnasium and auditorium, can be supported by a shallow, spread footing foundation system in conjunction with raising the site grades 4 to 5 feet in order to place a minimum of 3 to 4 feet of structural fill between the footing bearing elevation and the 'native' soil. The foundations may consist of either isolated column/wall footings or thickened sections of a monolithic slab. Design recommendations for a shallow foundation system are presented in the following table and paragraphs.

DESCRIPTION	Column	Wall
Net allowable bearing pressure ¹	2,000 psf	2,000 psf
Minimum dimensions	24 inches	16 inches
Minimum embedment below finished grade for frost protection ²	16 inches, but no deeper than 24 inches	16 inches, but no deeper than 24 inches
Approximate total settlement ³	<1 inch	<1 inch
Estimated differential settlement ³	<¾ inch between columns	<¾ inch over 40 feet
Ultimate coefficient of sliding friction ⁴	0.	35



- 1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable fill or soft soils, if encountered, will be undercut and replaced with engineered fill.
- 2. And to reduce the effects of seasonal moisture variations in the subgrade soils. For perimeter footing and footings beneath unheated areas.
- 3. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations.

For uplift resistance, use the weight of the foundation concrete plus the weight of the soil over the plan area of the footings. 110 pounds per cubic foot should be used for the density of the soil.

4.3.2 Helical Piers

For the more heavily loaded columns in the gymnasium and auditorium, we recommend the placement of helical piers. We expect helical piers extending into the sand layer to a depth of 17 to 20 feet could achieve a design capacity of 25 kips per pier. Anticipated pier design would include clusters of three to five helical piers at each interior column.

As a preliminary design, the helical piers should have 14 inch helical flight plates, a minimum 2 7/8 inch diameter pipe with 0.25 inch wall thickness and 10 foot bolted extensions with grouted shafts. The helical pier installer should use their system to develop the final design details.

Load testing of the test piers is recommended to verify that the contractor's construction methods and installation equipment can produce a foundation which will perform satisfactorily. We recommend that one pier in each area (gymnasium and auditorium) be tested. The geotechnical engineer should be retained to select the test pier to be load tested, witness the load test, analyze and report the load test results and develop recommendations for production foundation depths and installation procedures. The load test should be performed in general accordance with ASTM D 1143. The pier should be loaded to failure or at least 2.5 times the design capacity, whichever occurs first. Accurate deflection measurements should be made using at least two independent systems.

4.3.3 Construction Considerations

The foundation bearing condition for shallow footings should be evaluated at the time of the foundation excavation. A representative of the geotechnical engineer should use a combination of hand auger borings and dynamic cone penetrometer (DCP) testing to determine the suitability of the bearing materials for the design bearing pressure. DCP testing should be performed to a depth of 3 feet below the bottom of footing excavation. Excessively soft, loose or wet bearing soils should be overexcavated to a depth recommended by the geotechnical engineer. The footings



could then bear directly on these soils at the lower level or the excavated soils could be replaced with compacted soil fill or washed, crushed stone (NCDOT No. 57). The washed, crushed stone should be wrapped with geotextile fabric to limit the erosion of sand into the stone.

Hand auger borings and DCP testing will not be required for the footings supported by helical piers.

The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively disturbed or saturated, the affected soil should be removed prior to placing concrete.

4.4 Seismic Considerations

Code Used	Site Classification
2006 International Building Code (IBC) ¹ 2009 North Carolina Building Code	E

1. In general accordance with Table 1613.5.2 of the 2006 IBC, modified by North Carolina.

Based on our exploration of the upper 85 feet of the soil profile, it is our opinion that the subsurface characteristics reflect those of Site Class E as described in the 2009 North Carolina State Building Code. The seismic site classification could be further evaluated and potentially improved by developing the shear wave velocity profile to a depth of 100 feet.

4.5 Floor Slabs

4.5.1 Design Recommendations

ITEM	DESCRIPTION	
Floor slab support	Approved existing soils or new engineered fill	
Modulus of subgrade reaction	150 pounds per square inch per inch (psi/in) for point loading conditions	
Aggregate base course/capillary break	4 to 6 inches of free draining granular material (NCDOT No. 57 or recycled concrete)	

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings. The slab

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designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

4.5.2 Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. If such disturbance occurs, the floor slab subgrade may not be suitable for placement of the capillary break layer and concrete and corrective action will be required.

We recommend the floor slab subgrade be rough graded and then thoroughly proofrolled with a moderately loaded tandem axle dump truck prior to final grading and placement of the capillary break layer. Particular attention should be paid to high traffic areas that were rutted and disturbed by construction activities and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. Floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of the aggregate base course and concrete.

4.6 Pavements

4.6.1 Pavement Subgrades

The pavement subgrade should be stripped and then proofrolled as outlined in section **4.2 Earthwork** of this report. Loose or excessively wet soils delineated by the proofrolling operations should be undercut and backfilled as directed by the geotechnical engineer. The use of a geotechnical fabric and crushed stone is also a potential option for subgrade improvement. Upon completion of any necessary remediation, the subgrade should be adequate for support of the pavement sections recommended below.

Pavement thickness design is dependent upon:

- the anticipated traffic conditions during the life of the pavement;
- subgrade and paving material characteristics;
- climatic conditions of the region

We recommend that if borrow soils are used to raise site grades in the parking lot and driveways that they be tested for CBR to confirm suitability of pavement section before fine grading.

Asphaltic concrete pavements can be used for pavements such as drive lanes and parking areas. Recommended minimum thicknesses for light duty and standard duty areas are provided in the table below.

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Material	Light Duty Pavement Section ¹	Standard Duty Pavement Section ²
Asphalt Surface Course ³	3 inches (minimum-placed in 2 lifts)	1.5 inches (minimum)
Asphalt Base Course ⁴		2.5 inches (minimum)
Aggregate Base Course⁵	6 inches (minimum)	8 inches (minimum)

1. Light-duty asphaltic concrete parking areas serving only personal vehicle traffic

- 2. Standard-duty asphaltic concrete pavements for drive lanes and buses
- 3. NCDOT Type SF-9.5A
- 4. NCDOT Type I-19.0B
- 5. Crushed Stone NCDOT ABC, Type A or B

We recommend PCC pavements for entrance aprons, trash container pads, and in any other areas subjected to heavy wheel loads and/or turning traffic. Recommended minimum PCC pavement sections are provided in the table below.

Material	Light Duty Pavement Section	Standard Duty Pavement Section	Trash Container Pad/ Entrance Pavement Section ¹
Portland Cement Concrete ²	5 inches (minimum)	7 inches (minimum)	7 inches (minimum)
Aggregate Base Course ³	4 inches (minimum)	4 inches (minimum)	4 inches (minimum)

1. Pavement section for trash collection areas and other heavy traffic areas

2. PCC should have a minimum 28 day compressive strength of 4,000 psi, air entrainment of 5 to 7%, and be placed with a maximum slump of 4 inches.

3. Crushed stone (NCDOT ABC, Type A or B)

Standard duty pavement is recommended for the entrance road extending to the dumpster pad and truck delivery/unloading area and the bus loop and parking areas. Light duty pavement is recommended for the automobile parking areas.

For areas subject to concentrated and repetitive loading conditions, i.e. dumpster pads and ingress/egress aprons, we recommend using a Portland cement concrete pavement with a thickness of at least 7 inches underlain by at least 4 inches of crushed stone. For dumpster pads, the concrete pavement area should be large enough to support the container and tipping axle of the refuse truck.

The placement of a partial pavement thickness for use during construction is not suggested without a detailed pavement analysis incorporating construction traffic.

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Recommendations for pavement construction presented depend upon compliance with recommended material specifications. To assess compliance, observation and testing should be performed under the direction of the geotechnical engineer. Pavements and bases should be constructed in accordance with the guidelines of the North Carolina Department of Transportation "Standard Specifications for Roads and Structures". Materials, weather limitations, placement, and compaction are specified under appropriate sections of this publication. Concrete pavement should be air-entrained and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing per ASTM C-31.

The performance of all pavements can be enhanced by minimizing excess moisture which can reach the subgrade soils. The following recommendations should be considered a minimum:

- site grading at a minimum 2 percent grade away from the pavements;
- the subgrade and the pavement surface have a minimum 1/4 inch per foot slope to promote proper surface drainage;
- install joint sealant and seal cracks immediately; place curb, gutter and/or sidewalk directly on subgrade soils without the use of base course materials.

Prevention of infiltration of water into the subgrade is essential for the successful performance of any pavement. Both the subgrade and the pavement surface should be sloped to promote surface drainage away from the pavement structure.

Preventive maintenance should be planned and provided for an on-going pavement management program in order to enhance future pavement performance. Preventive maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance of concrete pavement typically consists of filling cracks that develop. Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance most applicable to the proposed project.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

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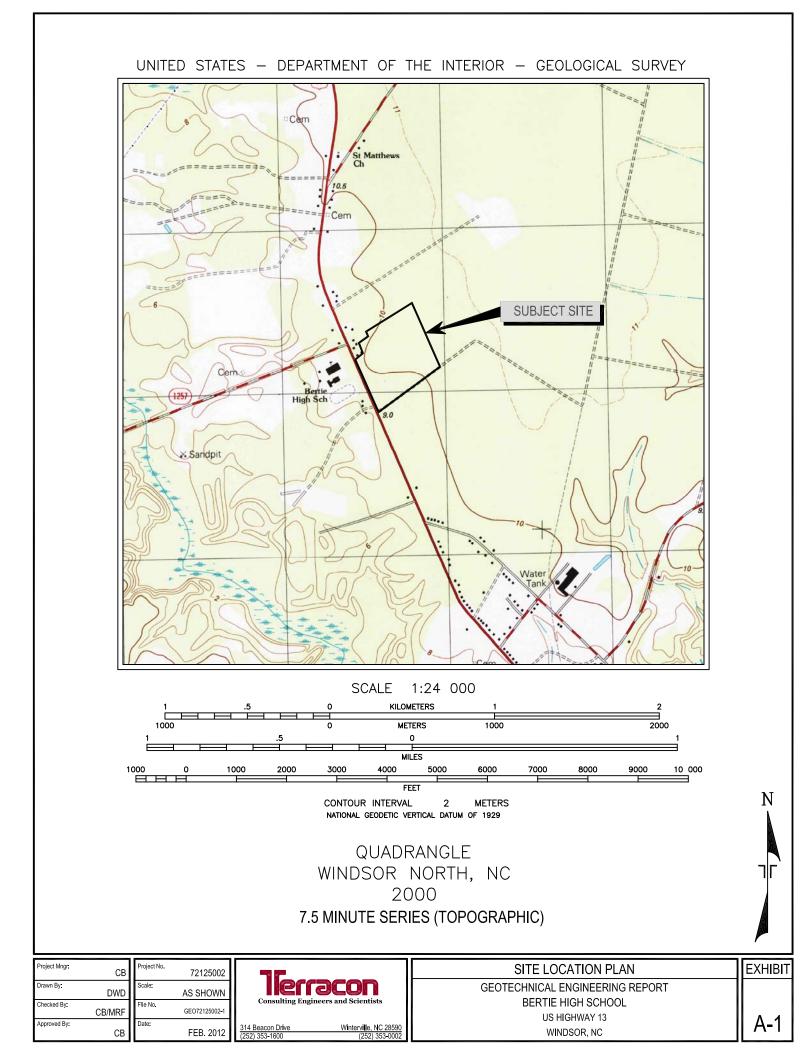


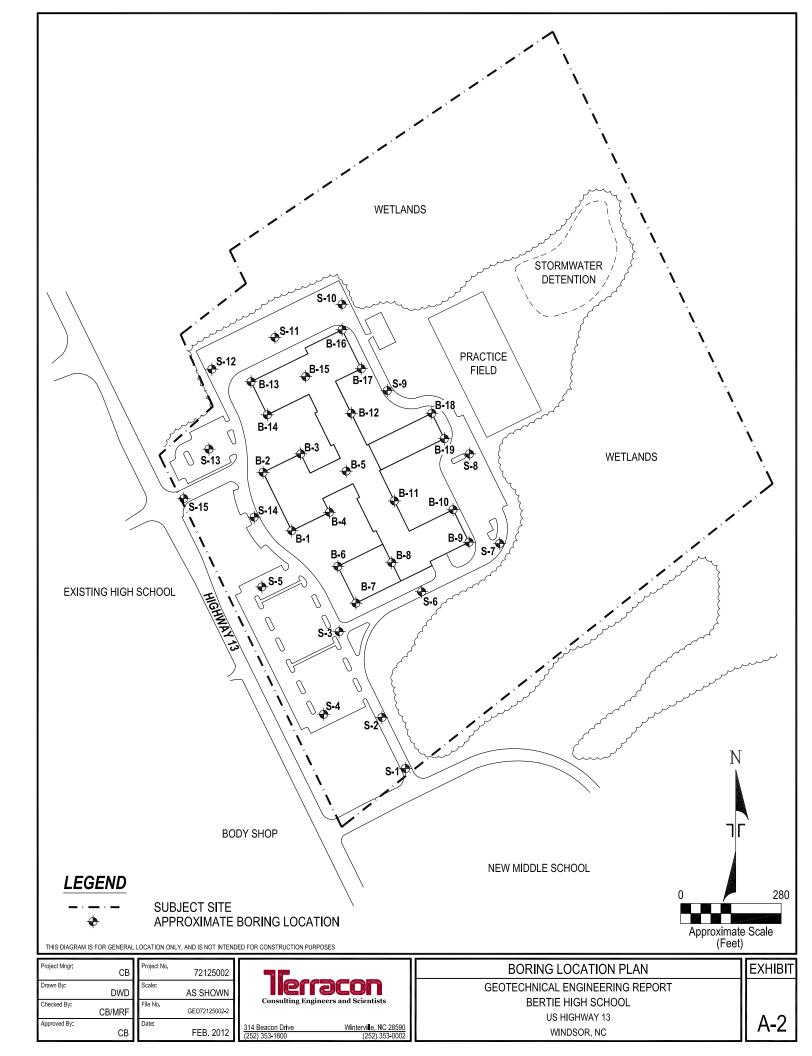
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A FIELD EXPLORATION





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SIT	ΓE	_		US Hwy 13		PRO	JEC	Т	_						
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СГ				DESCRIPTION		ŧ	SYMBOL	~		ERΥ	۲	Ļ,	<u>≻</u>		
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GRAPHIC LOG						DEPTH, ft.	nscs	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
U		Surta	ce Elev.: 32 ft					z	Ĥ	Я	ы	≤0	Δă	N⊂	
	1		Brush/Topso	II/Rootmat	31	1 =	CL	1	SS		4				-
			LEAN CLAY	and Red, Medium		-		•			-				-
			to Wet				CL	2	SS		5				-
	6	;			26	5.0-									-
	1		CLAYEY SAN			1 =	SC	3	SS		2				
	8)	<u> </u>	d Orange, Very Loo	ose, Wet24	1 =	<u></u>]
	1		LEAN CLAY	lot		10.0	CL	4	SS		2				_
			Gray, Soft, W	el		Ξ	1								
	1	3			19		1								
	T		FINE TO MED	DIUM SAND		=	SP	5	SS		15				-
			Gray, Mediun	n Dense, Wet		15.0					10				-
						=	1								
7777	1	8	CLAYEY SAM		14		1								
			Dark Grav an	d Black, Very Loos	e to		SC	6	SS		2				
			Medium Dens	se. Wet		20.0 =									
				·			1								
							sc	7	SS		10				-
2///	12	.5	BORING TER			25.0-	30	· /	33		10				-
2/14			BURING IER												
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5126 W	٩T	ER I	EVEL OBSER	RVATIONS, ft					T	BOR	ING S	TARTE	ED		1-24-12
s WL		<u>⊻ 2</u>		<u>,</u>							ING C)	1-24-12
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1				-	SAN	/PLES	>			TESTS	
Ŋ			30L			'n.		%	L.	UNCONFINED STRENGTH, psf	
GRAPHIC LOG	DESCRIPTION	t di	SYMBOL	2		RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	5TH,	
Ηd		Ť,	S	1BE	ш	NO:	N SN	ITER	NU	NON ENCON	
SRA	Surface Elev.: 32 ft	DEPTH, ft.	USCS	NUMBER	ТҮРЕ	REC	SPT	VAT NOX	м М Х	JNC STR	
<u>71 % . 1</u>		31	1			Ľ.	υш	>0		00	
<i>\[\</i>]	LEAN CLAY	4	CL	1	SS		6				1
	Light Gray, Orange and Dark Gray, Soft to		_								•
	Medium Stiff, Moist to Wet	5.0-	CL	2	SS		5				
			CL	3	SS		3				
			CL	4	SS		2				
		10.0-		- T			-				
	13	19 -	_								
	CLAYEY SAND		SC	5	SS		4				
	Dark Gray, Loose to Medium Dense, Wet Shell Fragments	15.0-		1							1
	Ŭ										
			sc	6	SS		17				1
		20.0-	=								•
	23	9 -									
	25Dark Gray, Stiff, Wet	7 05 0	CL	7	SS		10				-
14/1	BORING TERMINATED	25.0-									1
N N											
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The betw	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.										
2	TER LEVEL OBSERVATIONS, ft					BOR	ING S	TARTE	-D		1-24-12
B WL											1-24-12
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GRAPHIC LOG			DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Sur	face Elev.: 32.5				ä	۳ ۲	ž	F	R	ВЧ	₹ŭ	Бg	л С	
	1	Brush/Topso	oil/Rootmat		31.5	4 =									-
	6	Wet	ange, Medium Stiff,	Moist to	<u>7</u> 26.5	5.0	CL CL	1			7 6				-
	8	SILTY SAND	d Tan Oranga Ma		24.5	E	SM	3			10				-
	~	Dense, Wet	nd Tan Orange, Meo			10.0	CL	4			3				
	13	Dark Gray Br	own, Soft, Wet		19.5										
		FINE TO MED	DIUM SAND				SP	5			26				1
		Dark Gray, M	ledium Dense, Wet			15.0 -									1
	18				14.5		1								
	-	SILTY SAND				1 =	SM	6			2				_
		Dark Gray an	d Black, Very Loos	e, Wet		20.0-					2				-
	~~				0.5										
	23	LEAN CLAY			9.5	1 =									-
	25	Dark Gray, M	ledium Stiff, Wet		7.5	25.0	CL	7			6				_
2/14/		Shell Fragme	ents												
		BORING TER	RMINATED												
GAGE LENKACON.GDI 2/14/12															
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betw	/een	soil and rock types	sent the approximate b : in-situ, the transition	oundary lines may be gradu	al.										
WA		R LEVEL OBSER	RVATIONS, ft							BOR	ING S	TARTE	ED		1-25-12
B WL	\mathbb{Z}	3 WD	Ţ			_	_			BOR	ING C	OMPL	ETED		1-25-12
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		N	/indsor, NC							OPOS APLES	sed Be	rtie H	igh So	tests	
GRAPHIC LOG			DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u></u>	Surfa	ace Elev.: 32.5 _ Brush/Topso			31.5		Š	ĨŹ	F	R	BI	≥ŏ	ja g	U S	
		LEAN CLAY	inge, Soft to Mediu	m Stiff,	<u> </u>	5.0	CL CL	1	SS SS		7 8				
							CL	3	SS		3				
							CL	4	SS		4				
	13				19.5	10.0									
		FINE TO MEE Light Gray, M	<u>DIUM SAND</u> edium Dense, Wet			15.0	SP	5	SS		20				
	18	CLAYEY SAN			14.5		0.0	-							
	23		d Black, Medium D	ense, Wet	9.5	20.0	SC	6	SS		11				
	25	LEAN CLAY					CL	7	SS		10				
14/12	25	Dark Gray, St BORING TER			7.5	25.0 —									
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON.GDT 2/14/12 T M M T M Spart															
The betw	stratif veen s	ication lines represolition lines represolition lines represoned the second second second second second second s	sent the approximate b in-situ, the transition	oundary lines may be gradual.											
WW 12125		LEVEL OBSER									ING ST				1-25-12
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	Windsor, NC					OPOS APLES	sed Be	ertie H	igh So	tests	
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GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	LAB RESULTS
<u>74 1^x. 74</u>	Surface Elev.: 32.5 ft 1Brush/Topsoil/Rootmat 31.5			Z		<u>r</u>	SВ	50	00	ວິດ	
	FAT CLAY Gray, Light Gray and Orange, Soft to ✓ Medium Stiff, Moist to Wet	5.0	CH CH	1 2	SS SS		6 6	44.6			PL=24 LL=70 PI=45
<i>V//</i>	0	Ξ	СН	3	SS		3				
	8 24.5 LEAN CLAY		CL	4	SS		9				
	Light Gray, Stiff, Moist to Wet	10.0		-	00		0				
	13 19.5										
	FINE TO MEDIUM SAND Gray, Loose to Medium Dense, Wet		SP	5	SS		15				
	Gray, Loose to medium Dense, wet	15.0									
		20.0	SP	6	SS		7				
		=									
(11)	23 9.5 CLAYEY SAND	=	00	-	00		•				
112	Dark Gray, Very Loose, Wet	25.0-	SC	7	SS		3				
1 2/1	Shell Fragments 28 4.5										
GAGE TERRACON. GDT 2/14/12	LEAN CLAY	1 =	CL	8	SS		5				
RACO	Dark Gray, Medium Stiff, Wet	30.0		-			•				
TER	33 -0.5	_									
Bel///	<u>CLAYEY SAND</u> Dark Gray, Loose, Wet	25 0	SC	9	SS		6				
G	Dain Gray, 20000, Wor	35.0									
Я 2											
SCHOOL, WINDSOR, NC. GPJ		40.0	SC	10	SS		5				
₹ <i>\}\</i>	40.5	=									
	43 -10.5 FAT CLAY		СН	11	SS		6				
BHO	Dark Gray, Medium Stiff to Stiff, Wet	45.0		11	55		0				
			СН	12	SS		9				
Ш SOd	Continued Next Page	50.0			_						
	stratification lines represent the approximate boundary lines /een soil and rock types: in-situ, the transition may be gradual.										
AW 51250	TER LEVEL OBSERVATIONS, ft					BOR	ING ST	TARTE	ED		1-23-12
8 WL							ING C				1-23-12
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		Windsor, NC			1			sed Be	rtie H	igh S		
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		DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	LAB RESULTS
		FAT CLAY	=									
		Dark Gray, Medium Stiff to Stiff, Wet										
			55.0	СН	13	SS		8				
					11							
V			60.0	СН	14	SS		6				
V												
				СН	15	SS		7				
			65.0									
V			-									
			70.0	СН	16	SS		5				
					17	SS		9				
4/12			75.0	СН	17	33		9				
T 2/1												
ON.GE				СН	18	SS		8				
RAC		82 -49.5	80.0									
画	Ő	Limestone	1 -									
GAG	5	No recovery -52.5	85.0	GW	19	SS		25/0"				
WINDSOR, NC.GP		BORING TERMINATED										
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ												
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L PR	he : hetw	stratification lines represent the approximate boundary lines een soil and rock types: in-situ, the transition may be gradual.										
21250		TER LEVEL OBSERVATIONS, ft					BOR	ING S	TARTE	ED		1-23-12
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GRAPHIC LOG	Surf	ace Elev.: 32 ft				DEPTH, ft.	nscs	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>17 71</u>	1	_ Brush/Topso			31		-	~		ш.	0,11	20		00	
		LEAN CLAY				1 =	CL	1	SS		5				1
		Gray and Ora	ange, Medium Stiff,	Moist to \square											
		Wet				5.0	CL	2	SS		6				
	6	CLAYEY SAM	חו		26		SC	3	SS		13				-
	8	_ Light Grav an	id Tan Orange, Me	dium	24		30	3	33		13				-
		Dense, Wet				=	SM	4	SS		19				1
		SILTY SAND		/		10.0-									-
	10	Light Gray, M	ledium Dense, Wet		40										
	13	FINE TO MED			19										-
		Light Gray, M	ledium Dense, Wet			15.0	SP	5	SS		12				-
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	18				14										
		SILTY SAND	d Block Joooo W	ot		Ξ	SM	6	SS		8				
		Dark Gray an	d Black, Loose, W	el		20.0 -									-
	23				9										
		LEAN CLAY					CL	7	SS		6				1
27 1	25		edium Stiff, Wet		7	25.0 —		1	33		6				1
2/14		BORING TER	RMINATED												
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GRAPHIC LOG						DEPTH, ft.	nscs	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, ⁶	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Surfa	ace Elev.: 32 ft				<u>ط</u>	L S	لا ا	≿	RE	ВГ	₹ö	ЪС	ST	
	1	_Brush/Topso	il/Rootmat	~	31	=									
		LEAN CLAY		 V			CL	1	SS		5				
			ange, Medium Stiff,	Moist to					00		<u> </u>				
		Wet			~~	5.0-	CL	2	SS		6				
	6	CLAYEY SAM	חו		26	1 <u> </u>	SC	3	SS		9				
	8	Light Grav an	id Orange, Loose, \	Vet _	24		100	5	00		9				
		SILTY SAND	,,			=	SM	4	SS		23				
		Light Gray, M	ledium Dense, Wet			10.0-									
			,			=	1								
	13				19										
		FINE TO MED	<u>DIOM SAND</u> ledium Dense, Wet			150	SP	5	SS		29				
		Light Gray, M				15.0	-								
	18				14		1								
	10	SILTY SAND					<u> </u>	6	0		10				
			d Black, Medium D	ense, Wet		20.0-	SM	6	SS		10				
		-					1								
	23				9		1								
	25	LEAN CLAY			7		CL	7	SS		11				
4////	20	_ Dark Gray, St			1	25.0—									
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		Windsor, NC		1	1			sed Be	rtie H	igh So		
						SAN	/IPLES	כ ו			TESTS	
GRAPHIC LOG		DESCRIPTION	DEPTH, ft.	CS SYMBOL	NUMBER	Ъ.	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	LAB RESULTS
	Sur	rface Elev.: 32 ft	DEF	nscs	N N	ТҮРЕ	RE(SP1 BLC	COI COI	pcť,	STF	LAE
	1	Brush/Topsoil/Rootmat31	=									
	3	LEAN CLAY 29		CL	1	SS		6				
	5	Gray and Orange, Medium Stiff, Moist		СН	2	SS		9	35.9			PL=24,
	6	<u>FAT CLAY</u> Light Gray and Orange, Stiff, Moist to Wet <u>26</u>	5.0-	1	<u> </u>	00		3	55.9			LL=57,
		CLAYEY SAND	1 =	SC	3	SS		2				PI=33
		Gray, Very Loose to Medium Dense, Wet										
			10.0	SC	4	SS		11				
			Ξ	1	l							
	13	19		1	l							
		FINE TO MEDIUM SAND		SP	5	SS		16				
		Gray, Medium Dense, Wet	15.0									
	18	14	· _	1	l							
리험		SILTY SAND	1 =	SM	6	SS		3				
		Dark Gray and Black, Very Loose, Wet	20.0-					5				
				1	l							
1///	23	9 CLAYEY SAND	=	1								
			25.0-	SC	7	SS		6				
14		Shell Fragments										
	28	4		1								
9 Z		LEAN CLAY		CL	8	SS		6				
GAGE TERRACON. GDT 2/14/12		Dark Gray, Medium Stiff, Wet	30.0									
			· _	1	l							
<u>بارارا</u>			۱ <u>=</u>	CL	9	SS		6			l	
~ <i>V////</i> /			35.0-		9	33		0			L	
5	I			1	l							
z ¥	38	CLAYEY SAND	<u>-</u>	1								
	40		40.0	SC	10	SS		5				
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E E E					l							
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품 The		tification lines represent the approximate boundary lines										
20		n soil and rock types: in-situ, the transition may be gradual.										
WA 1212		R LEVEL OBSERVATIONS, ft					BOR	ING ST	TARTE	ED		1-24-12
s WL	Ā	3 WD 🗵				_ [BOR	ING C	OMPL	ETED		1-24-12
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		tia County Sch	ools c/o Hite Asso	ciatos PA											
SIT				CIALES FA		PRO		т							
511			US Hwy 13 Vindoor, NC			PRU	J⊑C	1	р.	0000	ad D-	ntic L	iah C	abaal	
		v	Vindsor, NC								sed Be	rtie H	ign So		
									SAN	/PLES	> 			TESTS	
GRAPHIC LOG			DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	ЭС	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
LA N	Surfa	ace Elev.: 33 ft				l H	SL	Ş	ТҮРЕ	SE(BLC	.ĕö	g H	NUE	
1/2 <u>x1 / x</u>	1	_ Brush/Topso		∇	32			~	-		0,00				
		LEAN CLAY		/ _	52	1 E	CL	1	SS		5				
		Gray, Orange Medium Stiff,	e, Red and Dark Gra Moist to Wet	ay,			CL	2	SS		5				
						5.0	CL	3	SS		4				
						10.0	CL	4	SS		4				
	13				20	=									
		FINE TO MED	DIUM SAND			1 E	SP	5	SS		20				
		Light Gray, M	edium Dense, Wet			15.0-		5	00		20				
						=									
	18				15										
		SILTY SAND Dark Gray an	d Black, Very Loos	e. Wet		20 0	SM	6	SS		1/18				
		Dan Gray an	a black, very LOOS	o, wol		20.0									
	23				10	=									
		CLAYEY SAN				1 =	SC	7	SS		5				
¥////	25	Dark Gray, Lo	oose, Wet	Γ	8	25.0	100								-
		Shell Fragme]											
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WA	TER	LEVEL OBSER	RVATIONS, ft							BOR	ING S	TARTE	ED		1-25-12
B WL	<u>₹</u> 1		⊻						_		ING C				1-25-12
WL	Ā		Ϋ́	٦ſe		ar	- 6		┓┟	RIG				OREMA	
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ğ WL												C	FB J0	OB #	72125002

LOG	OF B	ORING	NO.	B-10
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CLI																	
				ools c/o Hite Asso	ociates PA	1				_							
SITE US Hwy 13 Windsor, NC				PRO	JEC	I	D		sed Be	rtia Ll	iah S	chool					
			v									APLES			ign S	TESTS	
GRAPHIC LOG	S	Surface El	ev : 33 ff	DESCRIPTION				DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>xt 1/</u> <u>xt</u>				il/Rootmat		∇	32		-		<u> </u>	-	0, 11				
		LEA Ligh	N CLAY	range and Dark Gra	ay, Soft,			5.0	CL CL	1 2	SS SS		3				-
									CL	3	SS		2				
													_				
								10.0	CL	4	SS		4				
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	1:						20										
		<u>FINE</u> Liah	<u>t Grav. M</u>	<u>DIUM SAND</u> ledium Dense, Wet				15.0-	SP	5	SS		24				
		3	· · · · · j , · · ·	,													
	18						15										
		<u>SIL</u> 1 Dark	(Grav M	edium Dense, Wet					SM	6	SS		10				
		She	ll Fragme	ents				20.0									
	23		C C				10										
	2	5 LEA	N CLAY				8		CL	7	SS		7				
	2	Dair	ll Fragme	edium Stiff, Wet		<u> </u>		25.0 —									
7				RMINATED													
4.GL																	
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ο N/Δ				RVATIONS, ft	.,							B∩₽	ING S	TART	-D		1-24-12
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ξ WL														C	FB J	OB #	72125002

LOG OF BORING NO	Э. B-11
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	ENT Bertie County Schools c/o Hite Associates PA												
				PROJECT									
	Windsor, NC			Proposed Bertie High School									
					SAN	/IPLES	6			TESTS			
GRAPHIC LOG	DESCRIPTION Surface Elev.: 32.5 ft	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf			
<u>74 1[×]. '71</u>				~		ш.	бШ	>0		00			
	LEAN CLAY Light Gray, Orange and Dark Gray, Medium Stiff to Stiff, Moist to Wet	5.0-	CL CL	1 2	SS SS		6 5						
		5.0	CL	3	SS		9						
	8 24.	5 -		5	55		9						
	<u>CLAYEY SAND</u> Gray, Medium Dense, Wet	10.0	SC	4	SS		10						
		10.0	1										
	13 19.	5 -	-										
	<u>FINE TO MEDIUM SAND</u> Light Gray, Medium Dense, Wet	15.0	SP	5	SS		24						
		-	1										
	20 12.	5 20.0	SP	6	SS		7						
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON GDT 2/14/12 T T 중 하 4 구 각하	BORING TERMINATED												
The betv	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.												
AW 2125	TER LEVEL OBSERVATIONS, ft		BORING STARTED 1-2						1-24-12				
® WL				_	_ f	BOR	ING C	OMPL	ETED		1-24-12		
u WL	^{₹ 2.6} WD ¥ ¥ ¥	a			1	RIG		A	-	OREMA			
WL					╹┠	-				OB #	72125002		

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CLI				alata - P	•											
	Bertie County Schools c/o Hite Associates PA			DDC	10.0	-										
SIT	E		US Hwy 13				PROJECT Proposed Bertie High School									
	Windsor, NC												ertie H	ign S		
									SAN	/PLE	>			TESTS	1	
											<i></i>				Sf.	
Ö			DESCRIPTION					BO			, ir		%	1×	Ц Т Д	
							ŧ	SYMBOL	Ъ		ЕŖ	/ H	Ľ Ľ	É.		
H							Η	S S	1BE	ш	^S	NN NN		5	N N N	
GRAPHIC LOG	Surfe	ice Elev.: 33 ft					DEPTH, ft.	NSCS	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>v, v, v</u>	JUITE	Brush/Topso				32			2	-	ĽĽ.	ωщ	>0		0	
	-I	LEAN CLAY			-2			CL	1	SS		7				-
		Grav and Ora	ange, Medium Stiff,	Moist to												
		Wet	J ² , 2 ² , 2 ³ , 3 ⁴ , 3				= =	CL	2	SS		6				
	6					27	5.0-					_				
	8	CLAYEY SAN				25		SC	3	SS		3				-
	-	Gray, Very Lo LEAN CLAY						CL	4	SS		4				-
		Gray and Ora	ange, Medium Stiff,	Wet			10.0-		4	33		4				-
	13					20										
		FINE TO MED	n Dense, Wet					SP	5	SS		14				
		Gray, Meulun	ii Dense, wei				15.0									1
	18					15										
		CLAYEY SAM	ND				=	<u> </u>	~	00						_
	20	_ Dark Gray, V	ery Loose, Wet			13	20.0 —	SC	6	SS		2				-
		BORING TER														
4/12																
GAGE TERRACON.GDT 2/14/12																
GDT																
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WA 121		LEVEL OBSER									BOR	ING S	TARTE	ED		1-25-12
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	Bertie County Schools c/o Hite Associates PA				_							
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	Windsor, NC			Proposed Bertie High School SAMPLES TESTS								
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00	DESCRIPTION			SYMBOL			, in		%	¥	, pí	
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GRAPHIC LOG	Outras Flags 20 th		DEPTH, ft.	USCS :	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
U <u>1, 1, 1/2</u>	Surface Elev.: 32 ft	~ ~ ~			Z			о m	50		S	
	1Brush/Topsoil/Rootmat	31	1 =	CL	1	SS		5				1
	LEAN CLAY Gray and Orange, Soft to Stiff, Moist to		=		· ·				-			-
	Wet			CL	2	SS		8]
			5.0									1
	8	24	_	CL	3	SS		2				
	CLAYEY SAND	24	1 =	SC	4	SS		5				-
	Dark Gray, Loose, Wet		10.0	30	4	33		5				-
			=									
	13	19	-									
	FINE TO MEDIUM SAND Gray, Loose, Wet		Ξ	SP	5	SS		8				1
	Glay, LOOSE, WEL		15.0			1						1
	18	14										
(///	CLAYEY SAND	14	1 =	00		00		4 -				-
	Dark Gray, Medium Dense, Wet		20.0	SC	6	SS		15				-
	Shell Fragments		<u> </u>	1								
			-=	1								
	25	7	=	SC	7	SS		10				1
4/12	BORING TERMINATED		25.0			1						1
GAGE IERRACON.GDI 2/14/12												
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	stratification lines represent the approximate boundary lines		1		I		I			l		I
B betw	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.											
2	TER LEVEL OBSERVATIONS, ft						BUD	ING S		=D		1-25-12
® WL				-				ING C	JMPL	FIED		1-25-12
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WL	│	_				- F			C	FB JO	OB #	72125002
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Bertie County Schools c/o Hite Associates PA																	
SI	SITE US Hwy 13					PR	OJ	EC	I	_							
	Windsor, NC										Proposed Bertie High Schoo						
											SAN	/IPLES	5			TESTS	1
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СГ				DESCRIPTION			بن ا		Σ	Ŷ		ERΥ	/Ħ.	Ľ,	<u>≻</u>		
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GRAPHIC LOG							DEPTH, ft.		USCS	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
		Surfa	ace Elev.: 32 ft					_	Ő	ž	Ĥ	R	B	≥õ	百집	ΩΩ	
	ł	1	Brush/Topso	il/Rootmat			51	=	CL	1	SS		4				-
			LEAN CLAY	ngo Modium Ctiff	Maint to	$\overline{\Delta}$		=		I	55		4				-
			Wet	inge, Medium Stiff,	woist to			=	CL	2	SS		4				
	2	6	Wet			2	26 5.0-	=		-	00						-
	1	-	CLAYEY SAM	<u>ID</u>				=	SC	3	SS		3				
	1		Dark Gray, V	ery Loose, Wet			-	-									
	2						10.0	=	SC	4	SS		7				
							10.0-	Ξ									1
		13				1	9 -	Ξ									
///	1		FINE TO MED	DIUM SAND			-	=			00		04				-
				n Dense, Wet			15.0-	Ę	SP	5	SS		21				-
			-					Ξ									
		18				1	4 -	=									
			CLAYEY SAN	<u>ID</u>				\pm	sc	6	SS		7				-
			Dark Gray, Lo	oose, Wet			20.0-	=		-			-				-
			Shell Fragme	nts				Ξ									
		23					9 -	-									
	2	25	LEAN CLAY → Dark Gray, Si	tiff \M/ot			7 05 0		CL	7	SS		9				
GAGE TERRACON.GDT 2/14/12	1		Shell Fragme	in, wei			25.0-										
5			BORING TER														
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VV 13			LEVEL OBSER										ING S				1-24-12
8 WL	_	⊻ 2	.6 WD	Ţ	76			_				BOR	ING C	OMPL	ETED)	1-24-12
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ğWL	_													С	FB J	OB #	72125002

LOG OF BORING NO. B-15

CL		NT Sertie County Schools c/o Hite Associates PA										
SIT		US Hwy 13	PRO	JEC	Т	-						
		Windsor, NC					OPOS 1PLES	sed Be	rtie H	ign So	TESTS	
GRAPHIC LOG		DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	LAB RESULTS
<u></u> <u></u>	SI 0	urface Elev.: 32 ft		Š	ž	ŕ	R	ыщ	≥ŏ		Ωγ⊆	L,
	3 6	5 Brush/Topsoil/Rootmat 31.5 LEAN CLAY 29 Gray and Orange, Medium Stiff, Moist 29 FAT CLAY 29 Light Gray and Orange, Medium Stiff, Moist 29 Moist to Wet 26	5.0	CL CH SC	1 2 3	SS SS SS		5 7 5	40.2			PL=23, LL=61, PI=38
		CLAYEY SAND		80	4	00		6				
		Orange, Light Gray and Dark Gray, Very Loose to Medium Dense, Wet	10.0	SC SC	4	SS SS		6				
			=	<u> </u>	6	00		<u></u>				
	23		20.0	SC	6	SS		2				
GDT 2/14/12		<u>LEAN CLAY</u> Dark Gray, Medium Stiff, Wet Shell Fragments	25.0	CL	7	SS		7				
GAGE TERRACON GDT 2/14/12	33		30.0	CL	8	SS		6				
		<u>CLAYEY SAND</u> Dark Gray, Loose, Wet	35.0	SC	9	SS		4				
			40.0	SC	10	SS		5				
SCHOOL, WINDSOR, NC. GPJ	43		40.0	СН	11	SS		6				
		Darle Orace Mardiana Otiff to Otiff Mart	45.0	Сп	11	33		6				
			50.0	СН	12	SS		7				
The source of th		Continued Next Page										
품 The 장 betv	e sti vee	ratification lines represent the approximate boundary lines en soil and rock types: in-situ, the transition may be gradual.										
21250 4 W		ER LEVEL OBSERVATIONS, ft					BOR	ING ST	FARTE	Ð		1-23-12
® WL	Ī	Z 3 WD ¥ 7 C			_	_ İ	BOR	ING CO	OMPL	ETED		1-23-12
WL	Ī		JC		Jľ		RIG		A	TVF	OREMA	N GE
WL									C	FB J	OB #	72125002

LO	g of	BOR	ING	NO.	B-15
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Page 2 of 2

CL		ENT Restie County Schools of Hite Accessions DA										
SI		Bertie County Schools c/o Hite Associates PA US Hwy 13	PR	OJE	СТ							
		Windsor, NC				Р	ropo	sed Be	ertie H	iah Se	chool	
							MPLE			<u> </u>	TESTS	
GRAPHIC LOG		DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	LAB RESULTS
		FAT CLAY										
		Dark Gray, Medium Stiff to Stiff, Wet	-	=								
			55.0-	C	H 13	SS		8				
			-			00						
<i>V//</i>			60.0-		14	SS		6				
					H 15	SS		8				
			65.0-									
			-									
			70.0	CI	H 16	SS		9				
			70.0-									
			-									
			75.0-	C	17	SS		9				
2/14												
		78			C 18	SS		3				
ACO ACO		Dark Gray and Black, Very Loose, Wet	80.0-			33		3				
TERRA		-51	_									
		Limostono		G	V 19	SS		25/0"				
G		BORING TERMINATED	85.0-									
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GFJ TAR TAR A A A TAR A A A A A A A A A A A A A A A A A A												
The	e s	stratification lines represent the approximate boundary lines						I			I	I
bet	We	een soil and rock types: in-situ, the transition may be gradual.										
V 15		TER LEVEL OBSERVATIONS, ft						ING S				1-23-12
® WL								ING C	OMPL	ETED		1-23-12
WL	_	¥ ¥ IEF	J				RIG		A	TV F	OREMA	N GE
ğWL	-								CI	FB J	OB #	72125002

LOG OF BORING NO. B-16

CLI	ENT Bertie County Schools c/o Hite Associates PA											
SIT	E US Hwy 13		PRO	JEC.	Т							
	Windsor, NC						opos APLES	sed Be	rtie H	igh So	chool TESTS	
GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Surface Elev.: 31 ft		DE	N	NN	F	RE	BLO	₹S	Ъď	UN STI	
		30		CL	1	SS		3				
	LEAN CLAY Light Gray, Orange and Dark Gray, Soft to $\frac{\nabla}{\nabla}$ Stiff, Moist to Wet		5.0	CL	2	SS		8				
	8	23		CL	3	SS		3				
	<u>CLAYEY SAND</u> Dark Gray, Very Loose to Medium Dense,		0.0	SC	4	SS		2				
	Wet Shell Fragments		0.0									
	C C			SC	5	SS		28				
			5.0									
				SC	6	SS		8				
			0.0									
	23 LEAN CLAY ²⁵ Dark Grav. Stiff. Wet	8		CL	7	SS		8				
2/14/12	²⁵ Dark Gray, Stiff, Wet BORING TERMINATED	-22	5.0 —									
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON GDT 2/14/12 TA TA T												
The betv	stratification lines represent the approximate boundary lines een soil and rock types: in-situ, the transition may be gradual.											
AW 1217	TER LEVEL OBSERVATIONS, ft							ING ST				1-25-12
% WL			٦٢	-6	זר	┓┞		ING CO				1-25-12
WL WL		C				∎┠	RIG				OREMA	N GE 72125002

LOG OF	BORING	NO.	B-17
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CLI	ENT	tio County Sch	ools c/o Hite Ass	ociatos PA											
SIT			US Hwy 13	UCIALES FA		PRO	JEC	Т							
			Vindsor, NC						Pr	opos	sed Be	rtie H	igh So	chool	
			· · · · ·							/PLES				TESTS	
GRAPHIC LOG	Surf	ace Elev.: 32 ft	DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
11.1	1	Brush/Topso			31			~		<u> </u>	0,11	20		00	
		LEAN CLAY	range and Dark Gr	 av. ⊻			CL	1	SS		6				
		Medium Stiff,	Moist to Wet			5.0-	CL	2	SS		5				
	8				24		CL	3	SS		4				
	<u> </u>	CLAYEY SAN Light Gray an	<u>\D</u> id Orange, Loose, \	Wet		10.0	SC	4	SS		9				
	13	C ()			19	Ξ									
	10	FINE TO COA Gray, Loose,	ARSE SAND Wet			15.0	SP	5	SS		9				
	18	, ,			14										
	10	CLAYEY SAN					sc	6	SS		4				
		Dark Gray, Lo	oose, wet			20.0		-							
	23	LEAN CLAY			9										
	25	Dark Gray, St	tiff, Wet		7	25.0 —	CL	7	SS		6				
BOREHOLE 39 / 212002 PROPOSED BEKILE HIGH SCHOOL, WINDSOR, NC.GPJ GAGE LENKACON.GDI / 21472 M M P aq M M M M M M M M M M M M M M M M M M M		BORING TER	RMINATED												
The betw			sent the approximate to the sent the approximate to the sentence of the senten												
WA	TER	LEVEL OBSER	RVATIONS, ft							BOR	ING S	TARTE	ED		1-24-12
B WL	⊻ 3		⊻	٦ſe	rr'						ING C				1-24-12
	Ā		Y			٦٢		J	∎∣	RIG				OREMA	
ğ WL												C	FB J0	OB #	72125002

LC)G (OF	BO	RIN	GN	NO.	B-18
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SITE US Hwy 13 Windsor, NC PROJECT 001 DESCRIPTION SAMPLES TESTS 1 Brush/Topsoil/Rootmat 32 Surface Elev:: 33 ft 31 1 Brush/Topsoil/Rootmat 32 Sample CL 1 13 CLAYE SAND Gray, Medium Dense, Wet 50 5 1 18 CLAYE SAND Gray, Medium Dense, Wet 13 SS 5 1 20 CLAYE SAND Dark Gray, Loose, Wet Shell Fragments 13 SS 6 14 18 Dark Gray, Loose, Wet Shell Fragments 13 SS 7 1 <th>CLI</th> <th>IENT Bertie County Schools c/o Hite Associates PA</th> <th></th>	CLI	IENT Bertie County Schools c/o Hite Associates PA											
Ogeneration Samples TESTS Surface Elev:: 33 ft 31 32 0	SIT	E US Hwy 13		PRO	JEC	Т							
OD OUTWORK DESCRIPTION Image: Constraint of the second se		Windsor, NC								rtie H	igh So		
1 Brush/Topsoil/Rootmat 32 LEAN CLAY Gray and Orange, Soft to Medium Stiff, Moist to Wet CL 1 SS 6 Gray and Orange, Soft to Medium Stiff, Moist to Wet CL 2 SS 5							SAN	/PLES	5			TESTS	
Image: Second State Sta	GRAPHIC LOG	Surface Elev.: 33 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
Gray and Orange, Soft to Medium Stiff, Moist to Wet CL 2 SS 5 CL 3 SS 5 CL 4 SS 3 CL 4 SS 3 CL 4 SS 3 CL 4 SS 3 SP 5 SS 14 SP 5 SS 14 SS 6 SS 7 Shell Fragments BORING TERMINATED 	<u>11/2 11</u>		32	=									
Image: constraint of the second sec		LEAN CLAY Gray and Orange, Soft to Medium Stiff,			CL	2	SS		5				
13 20 FINE TO MEDIUM SAND Gray, Medium Dense, Wet 15.0 18 15 20 CLAYEY SAND Dark Gray, Loose, Wet 13 5 20 Sc 6 Shell Fragments BORING TERMINATED					CL	3	SS		5				
13 20 FINE TO MEDIUM SAND Gray, Medium Dense, Wet 15.0 18 15 20 CLAYEY SAND Dark Gray, Loose, Wet 13 5 20 SC 6 Shell Fragments BORING TERMINATED				=	CI	4	SS		3				
Gray, Medium Dense, Wet 18 15.0 37 33 14 14 14 15.0			20										
18 15 20 Dark Gray, Loose, Wet Shell Fragments BORING TERMINATED		Grav. Medium Dense. Wet		15.0	SP	5	SS		14				
20 CLAYEY SAND Dark Gray, Loose, Wet Shell Fragments BORING TERMINATED		,,											
BORING TERMINATED	1117		15										
BORING TERMINATED		20 Dark Gray, Loose, Wet	13	20.0	SC	6	SS		7				
Gage Terracon GDT 2/14/12		Shell Fragments											
The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual. WATER LEVEL OBSERVATIONS, ft WL ⊻ 1 WD ¥ WL ¥ ¥ WL ¥ ¥ WL ✓													
WATER LEVEL OBSERVATIONS, ft Image: transmit and	The betv	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.											
WL VL	WA							BOR	ING ST	FARTE	Đ		1-26-12
	s WL						_						1-26-12
	WL			ar			h				-	ORFMA	
	S WL	┤───┤╹╹┗┓╹					╹┠						72125002

L	OG	OF	BO	RINC	S NO.	B-19
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CLI	ENT											
SIT	Bertie County Schools c/o Hite Associates P E US Hwy 13	Ά	PRO	JEC	т							
0.11	Windsor, NC			020	•	Pr	opos	sed Be	rtie H	iqh So	chool	
							/PLES			5	TESTS	
GRAPHIC LOG	DESCRIPTION Surface Elev.: 33 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	түре	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	1Brush/Topsoil/Rootmat	<u>∑ 32</u>	=									
	LEAN CLAY Gray and Orange, Soft to Medium Stiff, Moist to Wet		5.0	CL CL CL	1 2 3	SS SS SS		6 6 4				
								-				
	13	20	10.0	CL	4	SS		4				
	<u>FINE TO MEDIUM SAND</u> Dark Gray, Medium Dense, Wet		15.0	SP	5	SS		12				
			15.0									
7777	18 CLAYEY SAND	15										
	²⁰ Dark Gray, Loose, Wet	13	20.0 —	SC	6	SS		WOH				
BOREHOLE % 72125002 PROPOSED BERTIE HIGH SCHOOL: WINDSOR, NC.GPJ GAGE TERRACON.GDT 2/14/12 T T 중 역 대 구 강 하	BORING TERMINATED											
The betv	stratification lines represent the approximate boundary lin veen soil and rock types: in-situ, the transition may be gra											
AW 1212		1						ING ST				1-24-12
® WL	¥ 1 WD ¥					ا د		ING CO				1-24-12
	ĬŽ III	211	٦٢		J	∎∣	RIG				OREMA	
WL									CI	FB J0	OB #	72125002

LOG	OF	BO	RING	NO.	S-1
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CLI	ENT Bertie County Schools c/o Hite Associates PA											
SIT			PRO	JEC	Т							
	Windsor, NC							sed Be	rtie H	igh So		
						SAN	/PLES	6			TESTS	
GRAPHIC LOG	DESCRIPTION Surface Elev.: 31 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>7 18 - 7</u>		30		_	~		<u> </u>	07 Ш				
	LEAN CLAY		=	CL	1	SS		8				
	Dark Gray Brown, Gray and Orange, Medium Stiff to Stiff, Moist to Wet BORING TERMINATED	26	5.0	CL	2	SS		10				-
BOREHOLE 39 (212002 PROPOSED BERTIE FIGH SCHOUL, WINDSOR, NC.GPU GAGE TERRACON.GDI (2114/12) TA A and au T A A and au	stratification lines represent the approximate boundary lines											
betv	veen soil and rock types: in-situ, the transition may be gradual.									- D		4.04.40
WA	TER LEVEL OBSERVATIONS, ft							ING ST				1-24-12
B WL						┓╽		ING CO				1-24-12
WL WL			JL		J	∎∤	RIG					
									C	FB J(OB #	72125002

LO	g of	BOR	ING	NO.	S-2
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CL	ENT Bertie County Schools c/o Hite Associates PA											
SIT	E US Hwy 13		PRO	JEC.	Т							
	Windsor, NC				Proposed Bertie High School							
						SAN	/IPLES	6			TESTS	
GRAPHIC LOG	DESCRIPTION Surface Elev.: 30 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>xt 1</u> x . <u>xt</u>		∑ 29			_		_				-	
	LEAN CLAY Dark Gray Brown, Gray and Orange, Medium Stiff, Moist to Wet BORING TERMINATED	25	5.0	CL CL	2	SS SS		7				
0T 2/14/12												
3PJ GAGE TERRACON.GDT 2/14/12												
school; windsor, NC.C												
BOREHOLE 99 72125002 PROPOSED BERTLE HIGH SCHOOL; WINDSOR, NC.GPJ TAR A G G G TAR A G G G G G G G G G G G G G G G G G G												
Here The Betw	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradu	ıal.										
AW 1320	TER LEVEL OBSERVATIONS, ft						BOR	ING ST	TARTE	ED		1-26-12
8 WL												1-26-12
WL	$\frac{\mathbb{Y} \ 1 \qquad \text{WD}}{\mathbb{Y}} \qquad \frac{\mathbb{Y}}{\mathbb{Y}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \\ \mathbb{Y} \\ \mathbb{Y} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \end{array} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \end{array} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \end{array} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \end{array} \qquad \boxed{\begin{array}{c} \mathbb{Y} \end{array}} \$ } \\\ \mathbb{Y} \end{array} \end{array}		7G	7	זר	h	RIG				OREMA	
WL	╎╴╴╴╴┤╹╹┖━					■┠					OREI07	72125002

LOG	OF	BOR	ING	NO.	S-3
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CL	IENT													
		hools c/o Hite Ass	ociates PA			150	_							
51		US Hwy 13 Vindsor, NC			PRO	JEC	I	D -		ad Da	utio Ll	iah C	shaal	
	V								OPUS APLES	sed Be		iyn S	TESTS	
										, 				
U						Ъ			Ľ				osf	
P		DESCRIPTION				SYMBOL			₹,	÷	Ľ, %	\geq	Ы Ч Ц Ц Ц Ц	
ЧС					r ⊥	S	ER		VEF	z s	ЧЧЧ	I II	EN EN EN	
GRAPHIC LOG					DEPTH, ft.	uscs	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	Surface Elev.: 31.5				DE	SU	٦٢	≽	RE	SP BL	₹ö	Бд	STU	
				30.5	Ξ	CL	1	SS		2				
	LEAN CLAY	Cray and Orange			-	OL.	1	33		2				
	5 Medium Stiff	Gray and Orange, S , Moist to Wet	5011 10	26.5	Ξ	CL	2	SS		5				
/////	BORING TE			20.5	5.0—									
N														
/14/1														
GAGE LERRACON.GDT 2/14/12														
U.Z.														
ACC														
E K K														
GP														
S Z														
SOF														
MIN														
OL;)														
СНО														
S T T														
ШНЦ														
H H														
Сļ														
10St														
Th	e stratification lines repre	esent the approximate b	oundary lines											
BOREHOLE 99 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ S S S S 중 정 정 J	ween soil and rock types	s: in-situ, the transition	may be gradual.											
M 8125	ATER LEVEL OBSE	RVATIONS, ft							BOR	ING ST	FARTE	ED		1-26-12
s WI		-						ŀ	BOR	ING C	OMPI	ETFD		1-26-12
J WI		<u> </u>	7 [er			-٢	זר	٦ŀ	RIG					
		-						∎∣	RIG				OREMA	
ğWI	-										C	FB J	OB #	72125002

LO	G	OF	BO	RIN	IG I	NO.	S-4
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CL	ENT Bertie County Schools c/o Hite Associates	εDΔ										
SIT	E US Hwy 13	51 A	PRC	JEC	Т							
	Windsor, NC			1	1		OPOS	sed Be	ertie H	igh S	chool TESTS	
GRAPHIC LOG			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
Ū 1/2. · <u>x¹ / z</u>	Surface Elev.: 30 ft 1 Brush/Topsoil/Rootmat	∇	<u> </u>	Ĵ	Ż	Ĥ	R	ы Ш П	≥õ	百절	⊡່⊘	
GAGE TERRACON GDT 2/14/12	LEAN CLAY Dark Gray Brown, Gray and Orange, S to Medium Stiff, Moist to Wet BORING TERMINATED	oft	5 5.0	CL	1	SS SS		4				
betv	stratification lines represent the approximate boundary reen soil and rock types: in-situ, the transition may be TER LEVEL OBSERVATIONS, ft V 1 WD V V V	y lines gradual.	50					ING ST	OMPL A	ETED TV F	OREMA OB #	1-26-12 1-26-12 N GE 72125002

LOC	G OF	BOR	ING	NO.	S-5
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CLI	ENT Bertie County Schools c/o Hite Associates	s PA												
SIT				PRO	JEC	т								
	Windsor, NC						Proposed Bertie High School							
							SAN	/PLES	S			TESTS		
GRAPHIC LOG	DESCRIPTION Surface Elev.: 31 ft			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf		
<u>xt 1_x . xt</u>	1Brush/Topsoil/Rootmat		30		_			-	0, 11					
	LEAN CLAY	<u> </u>		Ξ	CL	1	SS		4					
	Gray and Orange, Medium Stiff, Moist	to	26	5.0	CL	2	SS		4					
	BORING TERMINATED													
BOREHOLE 99 / 212002 PROPOSED BEKILE PIIGH SCHOOL; WINDSOK, NC.GPJ GAGE LERKACON.GDI 2/14/12 A A A A A T A A A A A	stratification lines represent the approximate boundary	/ lines												
	veen soil and rock types: in-situ, the transition may be TER LEVEL OBSERVATIONS, ft	graduai.						BUD	ING S		-0		1 0/ 10	
B WL		er	-					BOR	ING S				1-24-12 1-24-12	
WL	Ϋ́ Ψ	IGL		JL		Jſ		RIG		A	TV F	OREMA	N GE	
WL			- `							С	FB J	OB #	72125002	

LO	G O	F BC	RING	NO.	S-6
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CL	IEN Be		ools c/o Hite Asso	ociates PA											
SIT		l	US Hwy 13			PRO	JEC	Т							
		N	/indsor, NC				Proposed Bertie High School								
									SAN	/PLES	5			TESTS	
GRAPHIC LOG	Su	ırface Elev.: 32 ft	DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>11/2</u> . <u>11</u>		Brush/Topso			31	=									
	3	CLAYEY SAN	ID	∕	29	_	SC	1	SS		7				
	5	LEAN CLAY	own, Loose, Moist t	to Wet	27	5.0-	CL	2	SS		9				
		Light Gray an	d Orange, Stiff, We	et 🦳		5.0									
BOREHOLE 99 72128002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON.GDT 2/14/12 TA A G G G F F A G G G F F A G G G G G G		BORING TER													
OSED B.															
The	e stra	atification lines repres	sent the approximate b in-situ, the transition	oundary lines				1	I		I	1	I	I	I
		R LEVEL OBSER		may be grauuar.						R∩₽	ING S	ΓΔΡΤΙ	-D		1-25-12
B WL											ING S				1-25-12
u WL		2.0 118	<u> </u>	Jleu				זנ	1 t	RIG				OREMA	
WL									■┠					OB #	72125002

LOG	OF	BC	RING	NO.	S-7
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CLI	ENT Bertie County Schools c/o Hite Associates PA													
SIT			PRO	JEC	Т									
	Windsor, NC					Pr	Proposed Bertie High School							
							/PLES				TESTS			
GRAPHIC LOG	DESCRIPTION Surface Elev.: 32 ft		DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf			
<u>17. x17.</u>		31												
	LEAN CLAY Gray and Orange, Medium Stiff, Moist to			CL	1	SS		5						
		27	5.0-	CL	2	SS		5						
BOREHOLE 99 72128002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON.GDT 2/14/12 TA A aq T A pagu	stratification lines represent the approximate boundary lines													
betv	een soil and rock types: in-situ, the transition may be gradual.													
WA	TER LEVEL OBSERVATIONS, ft							ING ST				1-25-12		
® WL	$\frac{\mathbb{Y} 2.5 \text{WD} \mathbb{Y}}{\mathbb{Y}} \qquad \boxed{160}$			-6	זר	┓┞		ING CO				1-25-12		
WL WL		C				∎┠	RIG				OREMA OB #	N GE 72125002		

LOG	OF	BOR	RING	NO.	S-8
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CL	IENT Bertie County Schools c/o Hite Associates	s PA											
SI				PRO	JEC	Т							
	Windsor, NC						Pr	opos	sed Be	ertie H	igh S	chool	
							SAN	/PLES	S			TESTS	
GRAPHIC LOG	DESCRIPTION Surface Elev.: 32.5 ft			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>A Izi A</u>	1Brush/Topsoil/Rootmat		31.5						0, 11				
	LEAN CLAY	 	01.0	1 =	CL	1	SS		4				
	Gray and Orange, Medium Stiff, Moist t 5 Wet	0	27.5	5.0	CL	2	SS		5				-
	BORING TERMINATED												
BOREHOLE 39 /212002 PKOPOSED BEKILE HIGH SCHOOL; WINDSOK, NC.GPU GAGE LERKACON.GDI 2/14/12 TA A G G L	stratification lines represent the approximate boundary	lines											
	ween soil and rock types: in-situ, the transition may be	gradual.									- D		1 0 4 4 0
	TER LEVEL OBSERVATIONS, ft								ING S				1-24-12
B WL	✓ 2.5 WD ✓	6					┓┞		ING C				1-24-12
WL WL	<u>▼</u> <u>▼</u>				_L	JI	∎∤	RIG				OREM/	
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LO	g of	F BOF	RING	NO.	S-9
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CLI	ENT Bertie County Scho	ols c/o Hite Asec	ciates PA											
SIT		S Hwy 13			PRO	JEC.	Т							
		ndsor, NC			Proposed Bertie High School									
		·						SAN	/PLES	6			TESTS	
GRAPHIC LOG	[Surface Elev.: 32.5 ft	DESCRIPTION			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
	1Brush/Topsoil/			31.5	=									
	LEAN CLAY	and Red, Medium	∑ Stiff, Moist	27.5	5.0	CL	1	SS		5				
The s	stratification lines represe een soil and rock types: i	nt the approximate bin-situ, the transition	oundary lines may be gradual.											
	TER LEVEL OBSERV							T	BOR	ING ST	TARTE	ED		1-24-12
	⊻ 2 WD ⊻									ING CO				1-24-12
WL	$\overline{\Lambda}$ $\overline{\Lambda}$		T ler		ar			h	RIG				OREMA	
WL								∎⊦					OR #	72125002

LOG OF BORING NO	D. S-10
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CL	ENT												
	Bertie County Sch	nools c/o Hite Ase	ociates PA										
SIT		US Hwy 13			JEC	т							
511		Vindsor, NC					D	ono	end Br	ntia H	iah S	chool	
	V			Proposed Bertie High School SAMPLES TESTS									
						<u> </u>			5			12313	
								<i>.</i>				sf	
ŏ		DESCRIPTION			SYMBOL			۲, ir		%	ž	D d Ť	
CL		DESCINI HON		i u i	Σ	2		ЦЦ	/ ft.	Ļ	É		
H				Ξ	s s	BE		NO	NNS'		5	NON	
GRAPHIC LOG	Curfese Flows 24 ft			DEPTH, ft.	nscs	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>7, 1², 7, 1</u>	Surface Elev.: 31 ft				<u> </u>	z		Ř	νщ	50		⊃ິິ	
	1Brush/Topso	ni/Rootmat		30 -	CL	1	SS		6				-
	3 <u>LEAN CLAY</u>	ange, Medium Stiff,		28 -		· ·							_
	5 Wet	ange, medium Sun,		26 50	sc	2	SS		7				-
		ND	/	5.0-	-								-
	Light Gray an	nd Orange, Loose, \	Vet										
	BORING TER												
21/													
51/2													
GAGE LERKACON.GDI 2/14/12													
D.N.													
AC													
П Х													
<u>-</u>													
GAG													
5													
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The	stratification lines repre	sent the approximate b	oundary lines										
BOREHOLE 39 72125002 PROPOSED BEKILE HIGH SCHOOL, WINDSOK, NC.GPJ The page MA MA MA MA MA MA MA	een soil and rock types	: in-situ, the transition	may be gradual.										
WA	TER LEVEL OBSER	RVATIONS. ft					T	BOR	ING S	TARTI	ED		1-25-12
s WL		⊻					_						
5ö VVL ⊔			Jleu		-		┓╽		ING C				1-25-12
WL	$\bar{\mathbf{\Lambda}}$	⊻		٦l	L			RIG		A	TV F	OREMA	AN GE
Š WL		1					- F			<u>_</u>	FB J	OB #	72125002
¥	1									U	יטן טי	-υ <i>π</i>	12120002

LOG OF	BORING	NO.	S-11
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CL	IENT Bertie County Schools c/o Hite Asso	nciatos PA										-
SI	TE US Hwy 13		PRO	JEC	Т							
	Windsor, NC		Proposed Bertie High School SAMPLES TEST								chool TESTS	
GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>v, 1</u> 7	Surface Elev.: 31 ft	30		\supset	z	H	R	SВ	≤U	Δă	⊃õ	
GAGE TERRACON GDT 2/14/12	LEAN CLAY Light Gray and Tan Orange, Med Moist to Wet BORING TERMINATED	Ţ	5.0	CL	1	SS		5				
bet	e stratification lines represent the approximate b ween soil and rock types: in-situ, the transition ATER LEVEL OBSERVATIONS, ft	oundary lines may be gradual.					BOR	ING ST				1-24-12
38 721 W						_		ING C			1	1-24-12
		Jleu	30	.C) [RIG				OREMA	
Щ WL											OB #	72125002

LOG OF BORING NO. S-12	
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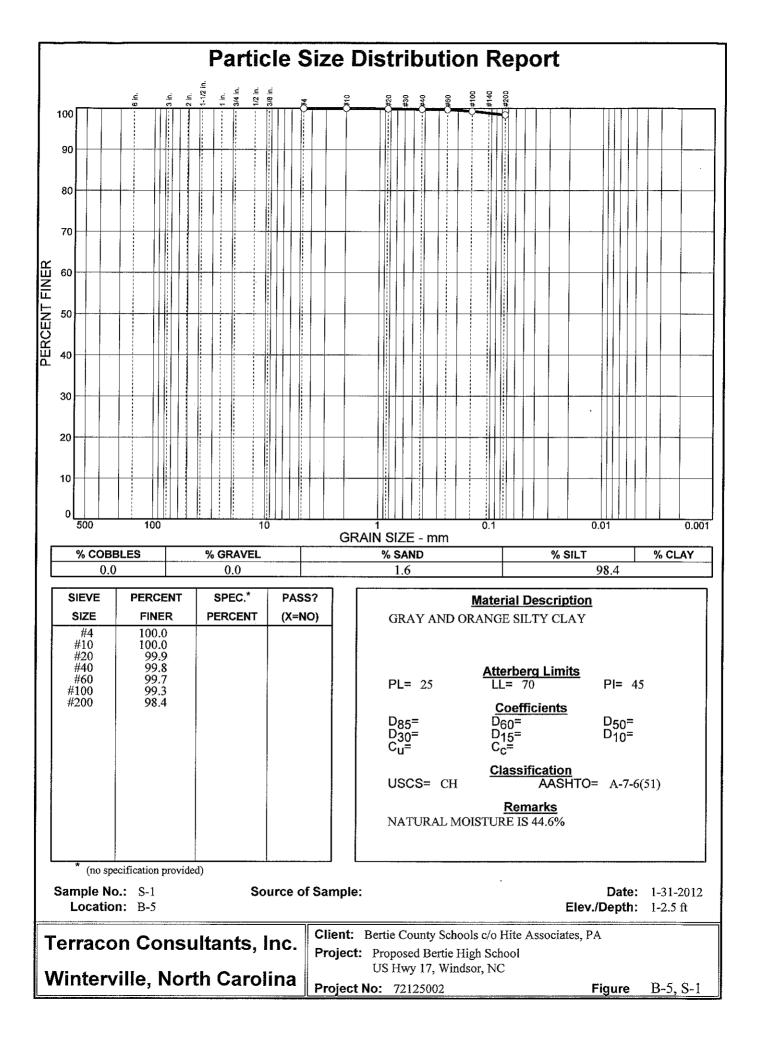
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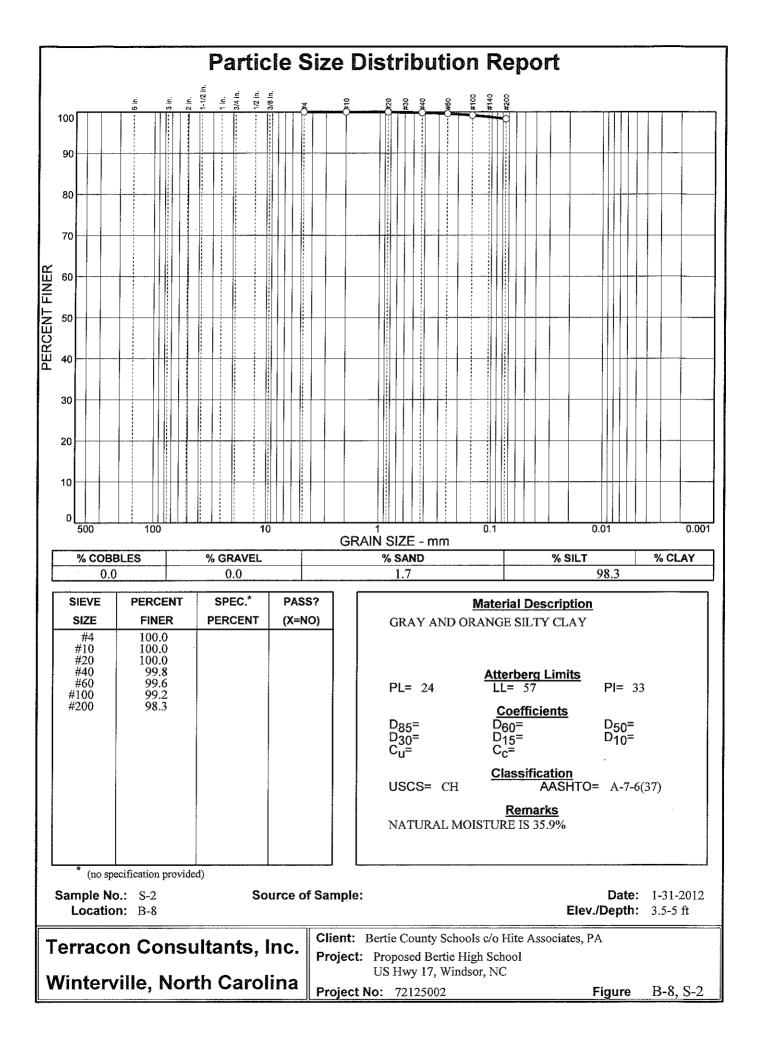
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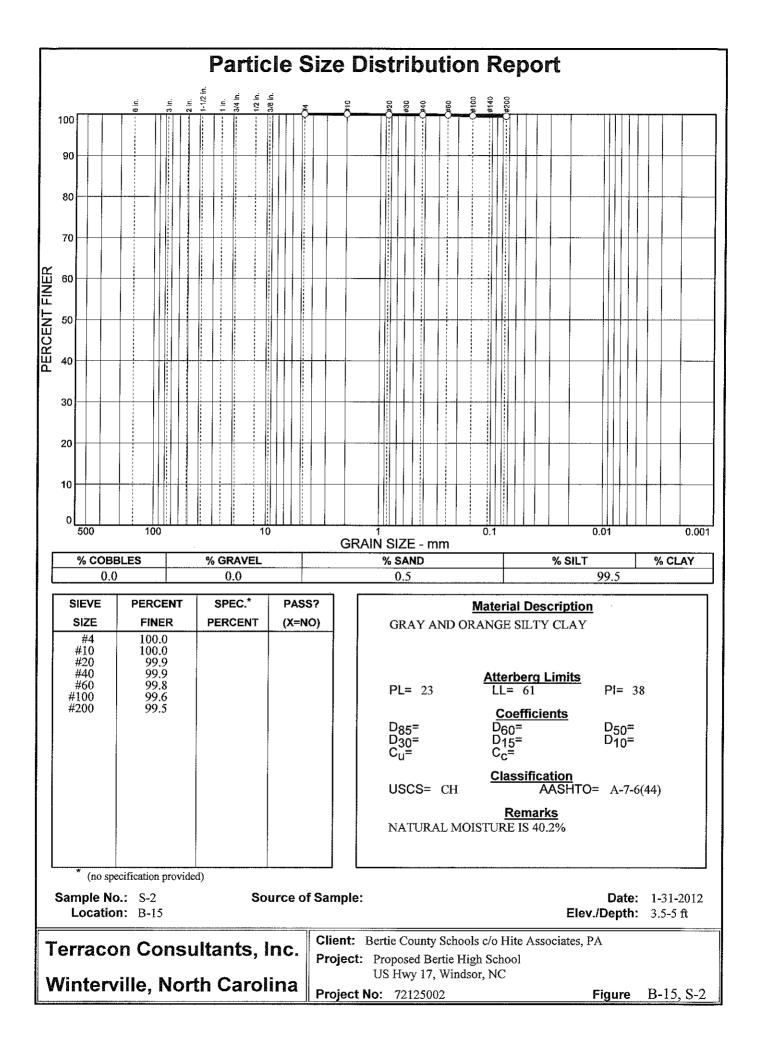
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GRAPHIC LOG	DESCRIPTION Surface Elev.: 31.5 ft	DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
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	LEAN CLAY Orange and Gray, Medium Stiff, Moist to		CL	1	SS		7 7				
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LOG OF	BORING	NO.	S-15
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	Windsor, NC		Proposed Bertie High School SAMPLES TESTS									
GRAPHIC LOG			DEPTH, ft.	USCS SYMBOL	NUMBER	ТҮРЕ	RECOVERY, in.	SPT - N BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf	UNCONFINED STRENGTH, psf	
<u>0</u> <u>x </u>	Surface Elev.: 31 ft Brush/Topsoil/Pootmat	30		Ő	Ż	Ĥ	R	ы В Ш	≥õ	百절	ΩΩ	
BOREHOLE 39 72125002 PROPOSED BERTIE HIGH SCHOOL; WINDSOR, NC.GPJ GAGE TERRACON GDT 2/14/12	Brush/Topsoil/Rootmat LEAN CLAY Gray, Orange and Red, Medium Stiff, Moist to Wet BORING TERMINATED	_3026	5.0	CL	1	SS SS		7				
25002 PROPOSED BERT	stratification lines represent the approximate boundary lines veen soil and rock types: in-situ, the transition may be gradual.						POD	ING S				1 26 12
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UW 10	^{₹ 1.5} WD ₹ ₹ ₹	ſ	30		זנ	٦ŀ	BOR RIG				OREMA	1-26-12 N GE
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APPENDIX B SUPPORTING DOCUMENTS



Field Exploration Description

The boring locations were staked by representative of Terracon using a hand held GPS on the paths cut through the site by the surveyor. Elevations were interpolated from a site plan provided by Hite Associates. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The soil test borings were performed by an ATV-mounted power drilling rig utilizing mud rotary drilling procedures to advance the boreholes. The drilling tools were removed from the borehole and representative soil samples were obtained at 2.5 to 5 foot intervals using split-barrel sampling procedures. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground with a 140-pound hammer falling a distance of 30 inches. A cathead and rope assembly is used to lift the 140 pound hammer. After seating the sampler 6 inches at the bottom of the borehole to penetrate any loose cuttings, the sampler is driven an additional 12 inches. The number of blows required to advance the sampling spoon the last 12 inches is recorded as the standard penetration resistance value (N-value). These N-values are indicated on the boring logs at the depths of occurrence.

A field log of each boring was prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples. Additional information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions

Laboratory Testing

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Also shown are estimated Unified Soil Classification Symbols. A brief description of this classification system is attached to this report. Soils laboratory testing was performed under the direction of a geotechnical engineer and included visual classification, moisture content, grain size analysis and Atterberg limits, as appropriate. The results of the laboratory testing are shown on the borings logs and in Appendix A.



GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

- SS: Split Spoon 1-³/₈" I.D., 2" O.D., unless otherwise noted
- ST: Thin-Walled Tube 2" O.D., 3" O.D., unless otherwise noted
- RS: Ring Sampler 2.42" I.D., 3" O.D., unless otherwise noted
- DB: Diamond Bit Coring 4", N, B
- BS: Bulk Sample or Auger Sample

HS: Hollow Stem Auger PA: Power Auger (Solid Stem) HA: Hand Auger RB: Rock Bit WB Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	BCR:	Before Casing Removal
WCI:	Wet Cave in	WD:	While Drilling	ACR:	After Casing Removal
DCI:	Dry Cave in	AB:	After Boring	N/E:	Not Encountered

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSIST	ENCY OF FINE-GRAIN	ED SOILS	RELATIVE DENSITY O	DF COARSE-GRAINED SOILS
Unconfined	Standard Penetration		Standard Penetration	
Compressive	or N-value (SS)	<u>Consistency</u>	or N-value (SS)	Relative Density
Strength, Qu, psf	Blows/Ft.		Blows/Ft.	
< 500	0 – 1	Very Soft	0-3	Very Loose
500 - 1,000	2 – 4	Soft	4 – 9	Loose
1,000 - 2,000	4 – 8	Medium Stiff	10 – 29	Medium Dense
2,000 - 4,000	8 – 15	Stiff	30 – 49	Dense
4,000 - 8,000	15 – 30	Very Stiff	50+	Very Dense
8,000+	30+	Hard		
RELATIVE PR	OPORTIONS OF SAND	AND GRAVEL	<u>GRAIN SIZ</u>	<u>E TERMINOLOGY</u>
Descriptive Te	erm(s)	Percent of	Major Component	Partiala Siza
of other consti	ituents I	Dry Weight	of Sample	Particle Size
Trace		<15	Boulders	Over 12 in. (300mm)
With		15 – 29	Cobbles	12 in. to 3 in. (300mm to 75mm)
Modifier		>29	Gravel	3 in. to #4 sieve (75mm to 4.75mm)
			Sand	#4 to #200 sieve (4.75 to 0.075mm)
			Silt or Clay	Passing #200 Sieve (0.075mm)
	IVE PROPORTIONS O		PLASTICI	TY DESCRIPTION
Descriptive Te		Percent of	Term	<u>Plasticity</u>
of other consti	tuents	Dry Weight		Index
Trace		<5	Non-plasti	
With		5 – 12	Low	1 – 10

>12



Modifier

11 – 30 >30

Medium

High

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria f	Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A				Soil Classification		
					Group Symbol	Group Name ^B	
Coarse Grained Soils	Gravels	Clean Gravels	$Cu \geq 4 \mbox{ and } 1 \leq Cc \leq 3^{\text{E}}$		GW	Well-graded gravel ^F	
More than 50% retained	More than 50% of coarse	Less than 5% fines ^c	$Cu < 4 \ and/or \ 1 > Cc > 3^{\text{E}}$		GP	Poorly graded gravel ^F	
on No. 200 sieve	fraction retained on No. 4 sieve	Gravels with Fines More	Fines classify as ML or MH		GM	Silty gravel ^{F,G, H}	
		than 12% fines ^c	Fines classify as CL or CH		GC	Clayey gravel ^{F,G,H}	
	Sands	Clean Sands	$Clean Sands \qquad \qquad Cu \geq 6 \text{ and } 1 \leq Cc \leq 3^{\text{E}}$		SW	Well-graded sand	
	50% or more of coarse	Less than 5% fines ^D	$Cu < 6$ and/or $1 > Cc > 3^{\text{E}}$		SP	Poorly graded sand	
	fraction passes No. 4 sieve		Fines classify as ML or MH		SM	Silty sand G,H,I	
		More than 12% fines ^D	Fines Classify as CL or CH		SC	Clayey sand ^{G,H,I}	
Fine-Grained Soils Silts and Clays		inorganic	PI > 7 and plots on or above	"A" line	CL	Lean clay ^{K,L,M}	
50% or more passes the	Liquid limit less than 50	limit less than 50 PI < 4 or plots below "A" line ¹			ML	Silt ^{K,L,M}	
No. 200 sieve		organic	Liquid limit - oven dried	0.75	OL	Organic clay ^{K,L,M,N}	
			Liquid limit - not dried	< 0.75		Organic silt ^{K,L,M,O}	
	Silts and Clays	inorganic	PI plots on or above "A" line		СН	Fat clay ^{K,L,M}	
	Liquid limit 50 or more		PI plots below "A" line		MH	Elastic Silt ^{K,L,M}	
		organic	Liquid limit - oven dried	< 0.75	ОН	Organic clay ^{K,L,M,P}	
			Liquid limit - not dried	< 0.75	Оп	Organic silt ^{K,L,M,Q}	
Highly organic soils	Prima	rily organic matter, dark in co	blor, and organic odor		PT	Peat	

Based on the material passing the 3-in. (75-mm) sieve

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^cGravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

^ECu =
$$D_{60}/D_{10}$$
 Cc = $\frac{(D_{30})^2}{D_{10} \times D_{60}}$

^F If soil contains \geq 15% sand, add "with sand" to group name.

^GIf fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

- ^HIf fines are organic, add "with organic fines" to group name.
- ¹ If soil contains \geq 15% gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

 $^{\sf L}$ If soil contains \geq 30% plus No. 200 predominantly sand, add "sandy" to group name.

^MIf soil contains \geq 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

^N PI \geq 4 and plots on or above "A" line.

^oPI < 4 or plots below "A" line.

^P PI plots on or above "A" line.

^QPI plots below "A" line.

