

## Addendum # 1

April 12, 2018

### A New Building for: 170042.01 – Anderson County Net Zero Building

To: Prime contractors and all others to whom drawings and specifications have been issued. This Addendum forms part of the Contract Documents. It supplements and modifies them as follows:

#### A. Drawings:

1. Sheet A1.1
  - a. Delete General Notes #7. Exterior walls to have spray applied R-19 insulation per Wall Legend.

#### B. Specifications:

1. Section 31 31 16 Termite Control 3.06\_ Applying Borate Treatment
  - a. To be omitted. DO NOT USE
2. Section 00 73 00 – Supplementary Conditions 1.19 B.
  - a. To be omitted. DO NOT USE
3. Section 00 81 80 Wage Rate Determination #46 - #47 to be added to project manual
  - a. Davis – Bacon and related acts and current wage rate determination.
    1. See attached documents.

#### C. Clarifications:

1. All Health and Human Services officials or designee are to have unfettered access to the facility throughout all phases of construction.
2. All areas interior slab on grade to be polished concrete.
3. Contractor to provide in their bid an allowance of \$5,000.00 for electrical transformer / impact fees.
4. Contractor to provide in their bid an allowance of \$3,000.00 for gas meter / impact fees.
5. Geo tech report for the site done by GEOServices on 01 June 2017 provided.

## SECTION 00 81 80 – WAGE RATE DETERMINATION

### **46. Labor Standards - Davis-Bacon and Related Acts**

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

(a) Minimum Wages.

- (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.
  - (2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Administrator of the Wage and Hour Division shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
  - (3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
  - (4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- (b) Withholding of funds. The Department of Labor may withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments

or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. The Department of Labor may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

(c) Payrolls and basic records.

- (1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- (2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Administrator of the Wage and Hour Division. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)
  - (ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
    - (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
    - (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
    - (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
  - (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.

- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.
- (3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Department of Labor or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the

wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
  - (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
  - (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
  - (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of

the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause.

- (3) Withholding for unpaid wages and liquidated damages. The Administrator of the Wage and Hour Division its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.
- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as the Department of Labor or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions

#### **47. Non-Federal Prevailing Wage Rates**

- (a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:
  - (1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;
  - (b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or
  - (c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

The current wage rate determination for this project is included in the following page(s).

General Decision Number: TN180077 01/05/2018 TN77

Superseded General Decision Number: TN20170077

State: Tennessee

Construction Type: Building

County: Anderson County in Tennessee.

**BUILDING CONSTRUCTION PROJECTS** (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number      Publication Date  
                                     0                              01/05/2018

|   | Rates    | Fringes    |
|---|----------|------------|
| BOILERMAKER.....  | \$ 25.68 | 18.75      |
| BRICKLAYER.....   | \$ 26.03 | 2.17       |
| CARPENTER (Includes Scaffold Building and Excludes Drywall Hanging).....  | \$ 25.33 | 11.41      |
| ELECTRICIAN (Including Electrical Installer (Alarms).... Power Equipment Operator   | \$ 24.64 | 4.25%+9.76 |
| Backhoe/Trackhoe/Excavator..  | \$ 28.26 | 10.10      |
| Bulldozer.....  | \$ 28.26 | 10.10      |
| Crane.....  | \$ 28.26 | 10.10      |
| Forklift.....   | \$ 25.97 | 10.10      |
| Grader/Blade.....   | \$ 25.97 | 10.10      |
| IRONWORKER, STRUCTURAL AND REINFORCING.....   | \$ 27.43 | 13.56      |
| Laborers:   |          |            |
| GROUP 1*.....   | \$ 19.77 | 6.53       |
| GROUP 2*.....   | \$ 20.12 | 6.53       |
| *GROUP 1: Common or General, Landscaping  |          |            |
| *GROUP 2: Form Work   |          |            |
| PAINTER (Including Brush, Roller, Spray and Drywall Finishing/Taper).....   | \$ 26.43 | 10.05      |
| CEMENT MASON/CONCRETE FINISHER...   | \$ 31.00 | .06        |
| PIPEFITTER, Includes HVAC Pipe Installation.....  | \$ 28.68 | 12.20      |
| PLUMBER (Excluding HVAC Pipe Installation).....   | \$ 28.68 | 12.20      |
| SHEET METAL WORKER (Including Metal Building Erector Metal Siding/Wall Panel and HVAC Duct Installation) (Excluding Metal Roof Installation)..... | \$ 28.56 | 11.99      |
| CARPENTER (Drywall Hanging Only).....   | \$ 13.00 | 0.25       |

|  |          |      |
|--|----------|------|
| HVAC MECHANIC (Installation of HVAC Unit Only, Excludes Installation of HVAC Pipe and Duct)..... | \$ 12.75 | 1.49 |
| LABORER: Mason Tender - Brick...   | \$ 12.82 | 0.00 |
| LABORER: Roof Tearoff.....   | \$ 9.75  | 0.49 |
| OPERATOR: Bobcat/Skid Steer/Skid Loader.....   | \$ 17.05 | 0.00 |
| OPERATOR: Mechanic.....  | \$ 18.33 | 3.67 |
| OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....  | \$ 13.50 | 0.00 |
| OPERATOR: Roller.....  | \$ 13.98 | 0.00 |
| ROOFER: Built up Roof.....   | \$ 12.74 | 0.00 |
| ROOFER: Rubber Roof.....   | \$ 16.82 | 4.77 |
| ROOFER: Single Ply Roof.....   | \$ 16.50 | 0.32 |
| SHEET METAL WORKER (Metal Roofs Installation).....   | \$ 15.64 | 0.00 |
| TILE FINISHER.....   | \$ 10.00 | 0.74 |
| TRUCK DRIVER: Dump Truck.....  | \$ 12.56 | 0.00 |

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.  
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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).  
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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.



## Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

## Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

## WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the section) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

June 1, 2017

Anderson County Schools  
1010 Clinch Ave  
Clinton, TN 37716

Attention: Mr. Frank Hillon, Director of Maintenance  
[fhillon@acs.ac](mailto:fhillon@acs.ac)

Subject: **REPORT OF GEOTECHNICAL EXPLORATION**  
**Proposed Net Zero Building**  
**Anderson County High School**  
Clinton, Anderson County, Tennessee  
GEOServices Project No. 21-17305

Dear Mr. Hillon:

We are submitting the results of the geotechnical exploration performed for the subject project. The geotechnical exploration was performed in accordance with our Proposal No. 11-17138, dated April 7, 2017, and as authorized by you. The following report presents our findings and recommendations for the proposed construction. Should you have any questions regarding this report, or if we can be of any further assistance, please contact us at your convenience.

Sincerely,

**GEOServices, LLC**



Matthew T. Bible, E.I.T.  
Geotechnical Professional

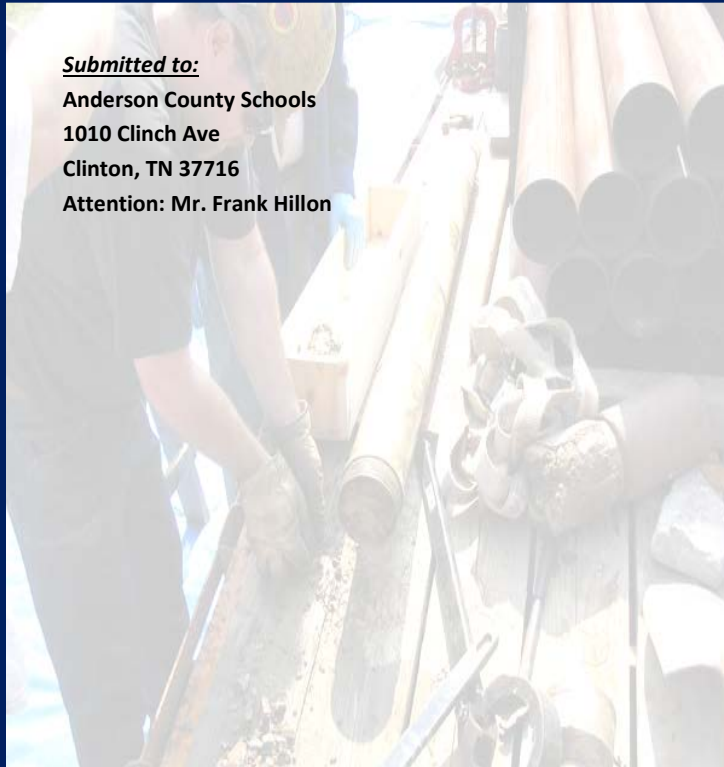


W. Ros Kingery III, P.E.  
Vice President  
TN 111,645

MTB/WRK/mtb

**Submitted to:**

**Anderson County Schools  
1010 Clinch Ave  
Clinton, TN 37716  
Attention: Mr. Frank Hillon**



# **REPORT OF GEOTECHNICAL EXPLORATION**

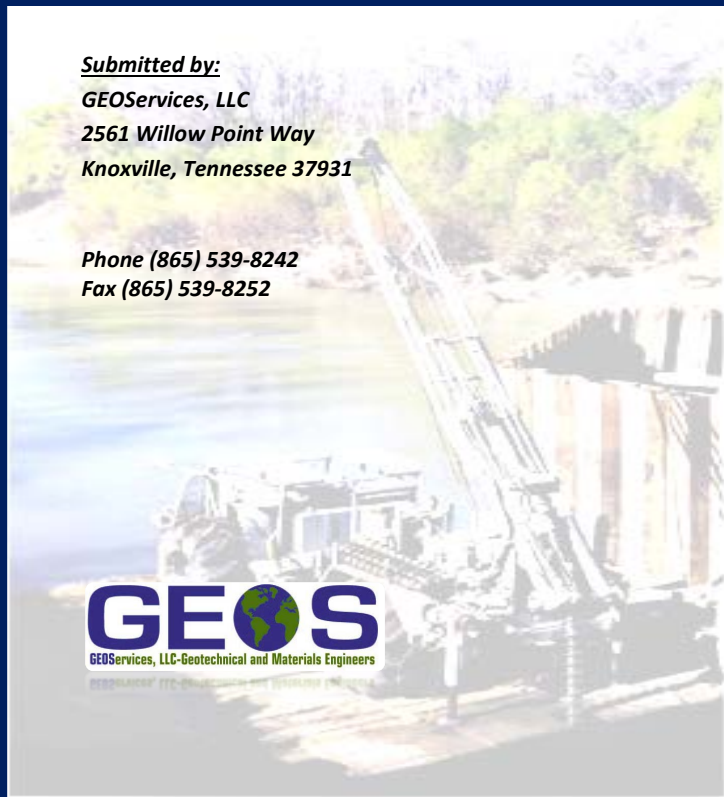
**Proposed Net Zero Building  
Anderson County High School**

**Clinton, Anderson County,  
Tennessee**

**Submitted by:**

**GEOServices, LLC  
2561 Willow Point Way  
Knoxville, Tennessee 37931**

**Phone (865) 539-8242  
Fax (865) 539-8252**



**GEOSERVICES, LLC  
PROJECT NO. 21-17305**

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## **1.0 INTRODUCTION**

### **1.1 PURPOSE**

The purpose of this geotechnical exploration was to explore the subsurface conditions for the proposed Net Zero Building to be located in Clinton, Tennessee. This report provides recommendations for site grading and for design and construction of the foundation system, including allowable bearing pressure. In addition, recommendations for light duty and heavy duty asphalt and concrete pavements are also provided.

### **1.2 PROJECT INFORMATION AND SITE DESCRIPTION**

The project site is located at the existing Anderson County High School, located at 130 Maverick Circle in Clinton, Tennessee. More specifically, the project site is located approximately 1000 feet north/northwest of the intersection of Maverick Circle and Anderson Highway, north of the existing high school and located between two existing parking areas. Project information was provided by Mr. Charles Grant, with Michael Brady Incorporated, in the form of email correspondence and an aerial image highlighting the location of the proposed construction. It is our understanding construction will consist of a new stand alone, single story, 1,440 square-foot (48 by 30 feet) wood-framed classroom building bearing on system of shallow foundations and concrete slabs-on-grade. Maximum column loads on the order of 75 kips and continuous footing loads of 1 to 2 kips per linear foot are anticipated.

Neither existing, nor proposed, topographic information has been provided at this time. Our review of available topographic information (USGS Topographic Quad Maps) indicates that the project site is generally sloping downhill from the north, west, and east towards an existing concrete ditchline located near the western extents of the site. We anticipate that earthwork cuts and fill of less than about 5 feet will be required for this project.

The project site is bordered by the existing concrete lined ditch to the west, asphalt paved parking to the north and east, and the existing High School to the south. The site is partially covered by short grasses.

### **1.3 SCOPE OF STUDY**

This geotechnical exploration involved a site reconnaissance, field drilling, and engineering analysis. The following sections of this report present discussions of the field exploration, site conditions, and conclusions and recommendations. Following the text of this report, Appendix A presents figures and test boring records.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air, on, or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

## **2.0 EXPLORATION AND TESTING PROGRAMS**

### **2.1 FIELD EXPLORATION**

The existing subsurface conditions were explored with four (4) soil test borings spread throughout the area of proposed construction. The locations and depths were selected and staked in the field by GEOServices personnel using a rough aerial image. Drilling was performed on May 4, 2017 by our subcontractor. The borings were advanced using 2.25-inch inside diameter hollow stem augers (HSA) with a Diedrich D-50 track mounted drill rig. The approximate locations of the test borings performed on site are referenced in Figure 2. Detailed logs for soil test borings can be found in Appendix A of this report.

Within each boring, SPT and split-spoon sampling were performed continuously in the upper 10 feet, and 5 feet intervals thereafter. The drill crew worked in accordance with ASTM D 6151

(hollow stem auger drilling). Standard Penetration Tests and split-spoon sampling were performed in accordance with ASTM D 1586.

In split-spoon sampling, a standard 2-inch O.D. split-spoon sampler is driven into the bottom of the boring with a 140 pound hammer falling a distance of 30 inches. The number of blows required to advance the sampler the middle 12 inches of the standard 24 inches of total penetration is recorded as the Standard Penetration Resistance (N-value). These N-values are indicated on the boring logs at the testing depth, and provide an indication of strength of cohesive materials.

## **2.2 LABORATORY TEST PROGRAM**

After completion of the field drilling and sampling phase of this project, the soil samples were returned to our laboratory where they were visually classified in general accordance with the Unified Soil Classification System (USCS – ASTM D 2487) by a GEOServices geotechnical professional. Select samples were then tested for natural moisture content (ASTM D 2216), organic contents (ASTM D 2974), and Atterberg limits determinations (ASTM D 4318). The laboratory test results are further discussed in the following sections of this report and a summary is provided in Appendix B.

## **3.0 SUBSURFACE CONDITIONS**

### **3.1 GEOLOGIC CONDITIONS**

The project site, as most of east Tennessee, lies in the Appalachian Valley and Ridge Physiographic Province. The Province is characterized by elongated, northeasterly-trending ridges formed on highly resistant sandstones and shales. Between ridges, broad valleys and rolling hills are formed primarily on less resistant limestones, dolomites and shales.

Published geologic information indicates that the project site is underlain by bedrock from the Reedsville Shale formation of the Upper Part of the Chickamauga Group. This formation is



primarily composed of greenish-gray calcareous shale with medium-grained, fossiliferous limestone. Bedrock from this formation typically weathers to produce a thin, shaly residual soil with areas of thick clay from limestone units.

Since the bedrock underlying this site contains carbonate rock (I.e. limestone/dolomite) it is susceptible to the hazards of irregular weathering, cave and cavern conditions, and overburden sinkholes. Carbonate rock, while appearing very hard and resistant, is soluble in slightly acidic water. This characteristic, plus differential weathering of the bedrock mass is responsible for the hazards. Of these hazards, the occurrence of sinkholes is potentially the most damaging to overlying soil-supported structures. Sinkholes occur primarily due to differential weathering of the bedrock and "flushing" or "raveling" of overburden soils into the cavities in the bedrock. The loss of solids creates a cavity or "dome" in the overburden. Growth of the dome over time or excavation over the dome can create a condition in which rapid, local subsidence or collapse of the roof of the dome occurs.

A certain degree of risk with respect to sinkhole formation and subsidence should be considered with any site located within geologic areas underlain by potentially soluble rock units. While a rigorous effort to assess the potential for sinkhole formation on this site was beyond the scope of this evaluation, our borings did not encounter obvious indications of sinkhole development. In addition, we did observe several closed contour depressions, which are indicative of past sinkhole activity, on the published United States Geologic Survey (USGS – Norris, Tennessee Quadrangle) topographic map within 1,000 feet of the site.

Based on this information, it is our opinion that the risk of sinkhole development at this site is no greater than at other sites located within similar geologic settings which have been developed successfully. However, the owner must be willing to accept a slight to moderate risk of sinkhole development at this site. The risk of sinkhole development can be reduced by following the recommendations provided in the *Sinkhole Risk Reduction and Corrective Actions* (Section 5.6) section of this report.

## 3.2 SOIL STRATIGRAPHY

The following subsurface description is of a generalized nature to highlight the subsurface stratification features and material characteristics at the boring locations. The boring logs included in Appendix A of this report should be reviewed for specific information at each boring location. Information on actual subsurface conditions exists only at the specific boring locations and is relevant only to the time that this exploration was performed. Variations may occur and should be expected at the site.

### *Surface*

A surficial layer of topsoil approximately 1 foot in thickness was encountered in each boring conducted on site.

### *Fill Soils*

Underlying the surficial topsoil layers, existing fill soil was encountered in borings B-1, B-2 and B-4 to depths ranging from 3.5 to 6.5 feet beneath the existing ground surface. Fill is generally classified as soils that have been transported and placed by man. The fill soils generally consisted of dark brown fat clay (CH) and lean clay (CL) with varying amounts of rock fragments and organics. The SPT N-values used to evaluate the consistency of the fill soil encountered ranged from 0 to 9 blows per foot (bpf) of penetration, indicating a relative soil consistency of very soft to stiff. It should be noted that the stiff consistency fill material was encountered in boring B-4 in the presence of abundant rock fragments, which likely inflated the N-count. Therefore, the consistency of the existing fill material encountered was generally very soft to firm.

Moisture content testing of selected samples of the fill material indicated moisture contents ranging from about 21 to 42 percent. Atterberg limits testing indicated a liquid limit (LL) of 52 percent and a plasticity index (PI) of 35 percent. The fill soils tested are classified as fat clay (CH) in accordance with the Unified Soil Classification System (USCS). Organic content testing of a selected fill soil samples collected indicated organic contents ranging from about 3 to 9 percent, by weight.

### *Residual Soil*

Beneath the existing fill material encountered in three borings (B-1, B-2, and B-4), and beneath the surficial layer encountered in boring B-3, residual soils were encountered to depths ranging from 8.5 to 13 feet beneath the existing ground surface. The residual soil encountered generally consisted of brown, tan, and gray fat clay (CH) and clean clay (CL) with varying amounts of chert fragments. SPT N-values used to evaluate the consistency of the residual soil ranged from 4 bpf to 50 blows with no penetration, indicating a fine grained soil consistency ranging from soft to very hard. However, firm the very stiff soils encountered (SPT N-values greater than 15 bpf) were generally isolated to borings B-1 and B-2 nearing auger refusal and boring B-4 in the presence of abundant chert fragments, likely inflating the N-counts. Therefore, the consistency of the existing residual soils was generally soft to stiff. Moisture content testing of selected samples of the residual material indicated moisture contents ranging from about 16 to 50 percent.

### *Auger Refusal*

Auger refusal conditions were encountered in each of the four (4) borings conducted on site at depths ranging from 8.5 to 13 feet beneath the existing ground surface. Auger refusal is a designation applied to any material that cannot be penetrated by the power auger. Auger refusal may indicate dense gravel or cobble layers, boulders, rock ledges or pinnacles, or the top of continuous bedrock. Based on our experience in this geology, we anticipate that auger refusal corresponds to top of continuous bedrock.

### *Ground Water*

Ground water was not encountered in any borings performed on site upon completion of the soil test borings. Subsurface water levels may fluctuate due to seasonal changes in precipitation amounts. However, areas of perched water may exist in the overburden and/or near the contact with bedrock. The contractor should determine the actual subsurface water level at the time of construction.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 SITE ASSESSMENT

The results of the subsurface exploration indicate that the site is generally underlain by existing fill overlying residual soils.

Given the low consistency and unknown constituents of the fill material encountered, we recommend the fill material encountered in the building pad be undercut to suitable residual soil and/or bedrock and replaced with properly placed and compacted structural soil fill. Upon removal of the existing fill material, we recommend that the exposed subgrade be thoroughly proofrolled with a fully loaded (with soil or rock), tandem-axle dump truck or other pneumatic tired construction equipment of similar weight. A GEOServices geotechnical engineer, or qualified representative, should observe proofrolling. Some firm residual soil may be encountered upon removal of fill material. Some limited remediation of the residual soil should be anticipated. If necessary, remediation of these areas would likely consist of an undercut and replacement with structural soil fill or compacted dense graded aggregate.

Based on the conditions encountered in the geotechnical exploration and provided the recommendations set forth in the following sections of this report are followed, the proposed structure can be supported using conventional shallow foundations and/or concrete slabs-on-grade bearing on newly placed structural soil fill and/or approved existing soils.

### 4.2 SITE PREPARATION RECOMMENDATIONS

#### 4.2.1 Subgrade

All vegetation, unsuitable soil, existing fill material (as required), loose rock fragments greater than 6 inches, and other debris should be removed from the proposed construction areas. After completion of stripping operations and any required excavations to reach planned subgrade elevation, we recommend that the subgrade be proofrolled with a fully-loaded, tandem-axle dump truck or other pneumatic-tired construction equipment of similar weight. The geotechnical engineer

or his representative should observe proofrolling. Areas judged to perform unsatisfactorily by the engineer should be undercut and replaced with structural soil fill or remediated at the geotechnical engineer's recommendation. Areas to receive structural soil fill should also be proofrolled prior to the placement of any fill.

Initially, all topsoil, as well as existing utilities, must be removed from the areas proposed for construction and the resulting excavations backfilled with compacted fill as described below. Stripping operations should extend a minimum of 5 feet beyond the limits of proposed pavement areas and 10 feet beyond building limits.

#### *4.2.2 Structural Soil Fill*

Material considered suitable for use as structural fill should be clean soil free of organics, trash, and other deleterious material, containing no rock fragments greater than 6 inches in any one dimension. Preferably, structural soil fill material should have a standard Proctor maximum dry density of 90 pcf or greater and a plasticity index (PI) of 40 percent or less. All material to be used as structural fill should be tested by the geotechnical engineer to confirm that it meets the project requirements before being placed.

Structural fill should be placed in loose, horizontal lifts not exceeding 8 inches in thickness. Each lift should be compacted to at least 98 percent of the soil's maximum dry density per the standard Proctor method (ASTM D 698) and within the range of minus (-) 2 percent to plus (+) 3 percent of the optimum moisture content. Each lift should be tested by geotechnical personnel to confirm that the contractors' method is capable of achieving the project requirements before placing any subsequent lifts. Any areas which have become soft or frozen should be removed before additional structural fill is placed.

#### *4.2.3 Dense Graded Aggregate*

Dense graded aggregate (DGA) fill may be required as backfill, to reach finished floor elevation. The DGA used for this section should be Type A, Class A, and Grading D in accordance with Section 903.05 of the Tennessee Department of Transportation specifications. The DGA fill should be placed in loose, horizontal lifts not exceeding 8 inches in loose thickness. Each lift should be

compacted to at least 98 percent of maximum dry density per the standard Proctor method (ASTM D 698) and within the range of minus 2 to plus 3 percent of the optimum moisture content. Each lift should be compacted, tested by geotechnical personnel and approved before placing any subsequent lifts.

### **4.3 FOUNDATION RECOMMENDATIONS**

#### *4.3.1 Shallow Foundations*

Foundations for the proposed construction are anticipated to bear in newly placed structural fill and/or residual soil. The recommended allowable soil bearing capacity for design of the foundations is 2,000 psf. Even if design loads would allow smaller sizes, we recommend that continuous footings be a minimum of 18 inches wide and isolated spread footings be a minimum of 24 inches wide to reduce the possibility of a localized punching shear failure. All exterior footings should be designed to bear at least 18 inches below finished exterior grade to protect against frost heave.

Detailed foundation subgrade observations should be performed by a GEOServices geotechnical engineer, or his qualified representative so that the recommendations provided in this report are consistent with the site conditions encountered. Where unacceptable materials are encountered, the material should be excavated to stiff, suitable soils or remediated at the geotechnical engineer's direction. Typical remedial measures consist of undercutting, overexcavation, or combinations thereof.

#### *4.3.2 Slabs-on-Grade*

For slab-on-grade construction, the site should be prepared as previously described. We recommend that the subgrade be topped with a minimum 4-inch layer of crushed stone to act as a capillary moisture block. The subgrade should be proofrolled and approved prior to the placement of the crushed stone. Based on the conditions encountered on this site, we recommend that the floor slabs be designed using a subgrade modulus of 110 pounds per cubic inch (pci). This modulus is appropriate for small diameter loads (i.e. a 1ft x 1ft plate) and should be adjusted for wider loads.

#### *4.3.3 Settlement*

Provided the site is prepared and remediated as previously described, we have estimated the total and differential settlements expected at this site. The method is based on the Federal Highways Administration (FHWA) Empirical Settlement Analysis Procedure. This FHWA empirical method allows the use of the SPT N-values in this calculation and includes the type of soil encountered. Based on this empirical method, we anticipate total settlements of less than 1 inch and differential settlements of less than ½ inch. The settlement information provided was calculated based on a maximum column load of 75 kips and maximum continuous loads of 2 kips per linear foot (kpf) with an allowable bearing pressure of 2,000 psf.

#### 4.4 SEISMIC DESIGN CRITERIA

##### International Building Code

In accordance with the International Building Code 2012/2015, we have provided the following table of seismic design information. After evaluating the subsurface conditions and the planned site changes at the site, it was determined that the site would be located within seismic site class D and Seismic Design Category C. A table follows, showing the calculated spectral response accelerations for both a short and 1-second period.

*Table 1: Seismic Design Parameters*

| Structure         | IBC Year  | S <sub>s</sub><br>(g) | S <sub>1</sub><br>(g) | S <sub>DS</sub><br>(g) | S <sub>D1</sub><br>(g) |
|-------------------|-----------|-----------------------|-----------------------|------------------------|------------------------|
| Proposed Net Zero | 2012/2015 | 0.367                 | 0.119                 | 0.368                  | 0.185                  |

#### 5.0 CONSTRUCTION CONSIDERATIONS

##### 5.1 FOUNDATION CONSTRUCTION

Foundation excavations should be opened, the subgrade evaluated, remedial work performed (if required), and concrete placed in an expeditious manner. Exposure to weather often reduces foundation support capabilities, thus necessitating remedial measures prior to concrete placement. It is also important that proper surface drainage be maintained both during construction (especially in

terms of maintaining dry footing trenches) and after construction. Soil backfill for footings should be placed in accordance with the recommendations for structural fill presented herein.

## **5.2 EXCAVATIONS**

As previously mentioned, auger refusal materials were encountered at depths ranging from 8.5 to 13 feet beneath the existing ground surface. Auger refusal conditions generally correspond to materials which require difficult excavation techniques for removal. Typically, soils penetrated by augers can be removed with conventional earthmoving equipment. However, excavation equipment varies, and field refusal conditions may vary. Generally, the weathering process is erratic and variations in the rock profile can occur in small lateral distances. Therefore, it is possible that some partially weathered rock and/or rock pinnacles or ledges requiring difficult excavation techniques may be encountered in site areas between our boring locations.

### *5.2.1 Excavation Safety*

Excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. The contractor is usually solely responsible for site safety. This information is provided only as a service, and under no circumstances should GEOServices be assumed responsible for construction site safety.

## **5.3 HIGH PLASTICITY SOIL CONSIDERATIONS**

Based on our experience in the East Tennessee area, soils with plasticity indices (PI) less than 30 percent have a slight potential for volume changes with changes in moisture content, and soils with a PI greater than 50 percent are highly susceptible to volume changes. Between these values, we consider the soils to be moderately susceptible to volume changes. Based on the laboratory testing conducted, we anticipate the on-site residual soils will be slightly to moderately susceptible to volume changes.

Highly plastic soils have the potential to shrink or swell with significant changes in moisture content. Unlike other areas of the country where high plasticity soils cause considerable



foundation problems, this region does not typically endure long periods of severe drought or wet weather. However, in recent years drought conditions have been sufficient to cause soil shrinkage and related structural distress of buildings, floor slabs and pavements at sites underlain by high plasticity soils.

At sites that have high plasticity soils, certain precautions should be considered to minimize or eliminate the potential for volume changes. The most effective way to eliminate the potential for volume changes is to remove highly plastic soils and replace them with compacted fill of non-expansive material. Testing and recommendations for the required depth of removal can be provided, if needed. If removal of the highly plastic soils is not desirable, then measures should be taken to protect the soils from excessive amounts of wetting or drying. In addition, modification of the soils by lime or cement treatment can be utilized to reduce the soil plasticity.

Several construction considerations may reduce the potential for volume changes in the subgrade soils. Foundations should be excavated, checked, and concreted in the same day to prevent excessive wetting or drying of the foundation soils. The floor subgrade should be protected from excessive drying and wetting by covering the subgrade prior to slab construction. The site should be graded in order to drain surface water away from the building both during and after construction. Installing moisture barriers around the perimeter of the slab will help limit the moisture variation of the soil and reduce the potential for shrinking or swelling. In addition, roof drains should discharge water away from the building area and foundations. Heat sources should be isolated from foundation soils to minimize drying of the foundation soils. Trees and large shrubs can draw large amounts of moisture from the soil during dry weather and should be kept well away from the building to prevent excessive drying of the foundation soils. Watering of lawns or landscaped areas should be performed to maintain moisture levels during dry weather.

Structural details to make the building flexible should be considered to accommodate potential volume changes in the subgrade. Floor slabs should be liberally jointed to control cracking, and the floor slab should not be structurally connected to the walls. Walls should incorporate sufficient expansion/contraction joints to allow for differential movement.

## **5.4 MOISTURE SENSITIVE SOILS**

The moderately plastic fine-grained soils encountered at this site will be sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Construction traffic patterns should be varied to prevent the degradation of previously stable subgrade. In addition, the soils at this site which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. We caution if site grading is performed during the wet weather season increases in the undercut volume required due to the marginal fills should be expected. Further for site fills, methods such as discing and allowing the material to dry will be required to meet the required compaction recommendations. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. However, November through March is typically the difficult grading period due to the limited drying conditions that exist.

## **5.5 DRAINAGE AND SURFACE WATER CONCERNS**

To reduce the potential for undercut and construction induced sinkholes, water should not be allowed to collect in the foundation excavations, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, subsurface water, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slab. The grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

## **5.6 SINKHOLE RISK REDUCTION AND CORRECTIVE ACTIONS**

Based on our experience, corrective actions can also be performed to reduce the potential for sinkhole development at this site. These corrective actions would decrease but not eliminate the

potential for sinkhole development. Much can be accomplished to decrease the potential of future sinkhole activity by proper grade selection and positive site drainage.

In general, the portions of a site that are excavated to achieve the desired grades will have a higher risk of sinkhole development than the areas that are filled, because of the exposure of relic fractures in the soil to rainfall and runoff. On the other hand, those portions of a site that receive a modest amount of fill (or that have been filled in the past) will have a decreased risk of sinkhole development caused by rainfall or runoff because the placement of a cohesive soil fill over these areas effectively caps the area with a relatively impervious “blanket” of remolded soil. Therefore, the recommendations that follow incorporate a modest remedial treatment program designed to make the surface of the soil in excavated areas less permeable.

Although it is our opinion that the risk of ground subsidence associated with sinkhole formation cannot be eliminated, we have found that several measures are useful in site design and development to reduce this potential risk. These measures include:

- Maintaining positive site drainage to route surface waters well away from structural areas both during construction and for the life of the structure.
- The scarification and re-compaction of the upper 6 to 10 inches of soil in earthwork cut areas.
- Verifying that subsurface piping beneath structures is carefully constructed and pressure tested prior to its placement in service.
- The use of pavement or lined ditches, particularly in cut areas, to collect and transport surface water to areas away from structures.

Considerations when building within a sinkhole prone area are to provide positive surface drainage away from any proposed building or parking area both during and after construction. Backfill in utility trenches of other excavations should consist of compacted, well-graded material such as dense graded aggregate or compacted on site soils. The use of an open graded stone such as No. 57 stone is not recommended unless the stone backfill is provided an exit path and not allowed to pond. If sinkhole conditions are observed, the type of corrective action is most appropriately determined by GEOServices on a case-by-case basis.

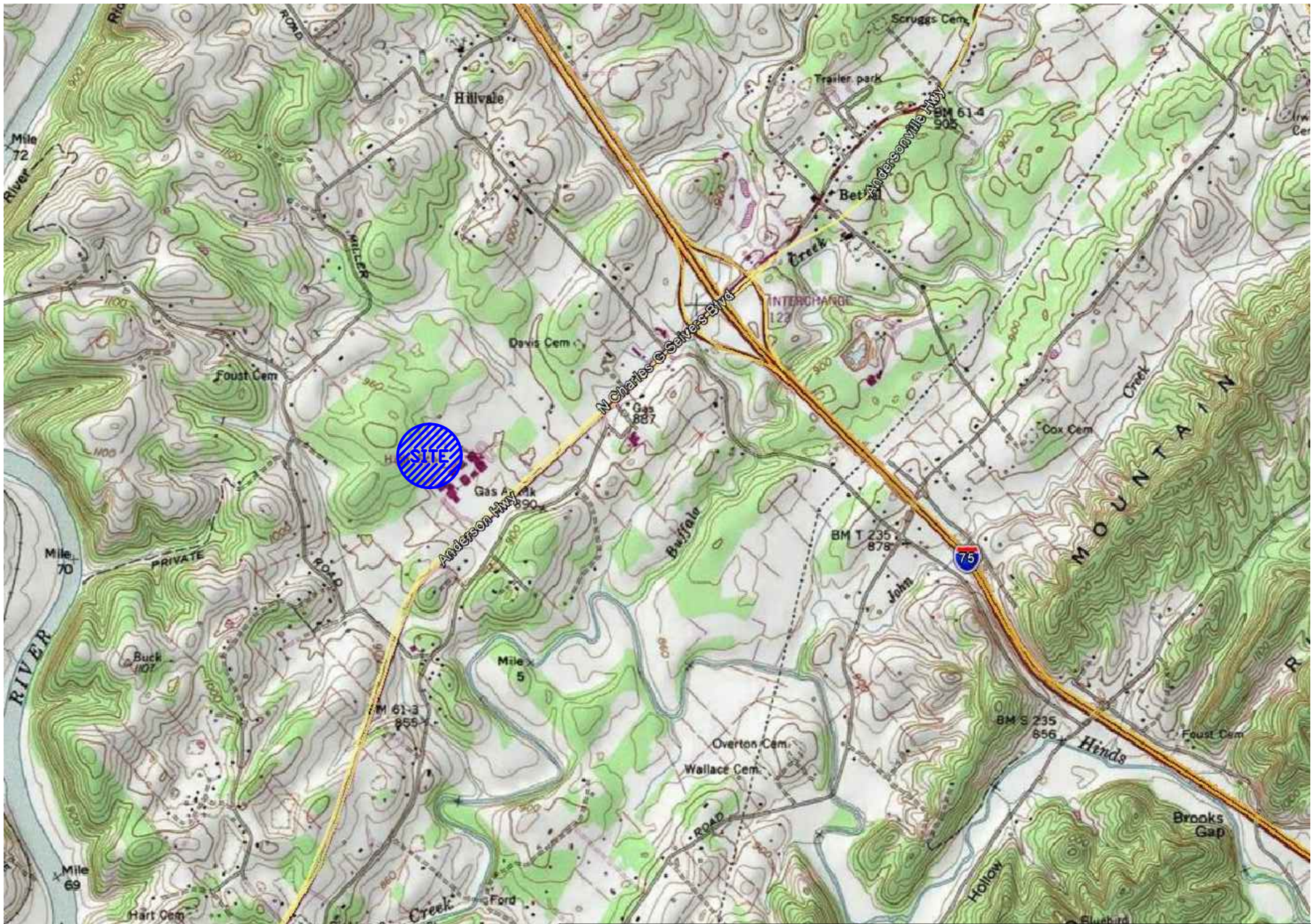
## 6.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. This report is for our geotechnical work only, and no environmental assessment efforts have been performed. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the exploration. The nature and extent of variations between the borings will not become evident until construction. We recommend that GEOServices be retained to observe the project construction in the field. GEOServices cannot accept responsibility for conditions which deviate from those described in this report if not retained to perform construction observation and testing. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing. Also, if the scope of the project should change significantly from that described herein, these recommendations may need to be re-evaluated.

**APPENDIX A**

Figures and Test Boring Records



**NOTES:**

1.) BASE MAP: USGS QUADRANGLE (NORRIS, TENNESSEE)



2561 Willow Point Way  
Knoxville, Tennessee 37931

Office: 865-539-8242  
Fax: 865-539-8252

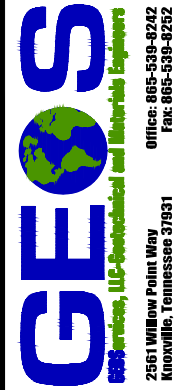
**SITE VICINITY MAP**  
**PROPOSED NET ZERO BUILDING**

CLINTON, TENNESSEE

|              |           |
|--------------|-----------|
| DRAWN BY:    | MTB       |
| APPROVED BY: | WRK       |
| SCALE:       | N.T.S.    |
| JOB NO.:     | 21-17305  |
| DATE:        | 5-30-2017 |

FIGURE

1



DRAWN BY: MTB  
 APPROVED BY: WRK  
 SCALE: N.T.S.  
 JOB NO: 21-17305  
 DATE: 5-30-2017

**BORING LOCATION PLAN  
 AERIAL OVERLAY  
 PROPOSED NET ZERO BUILDING**

CLINTON, TENNESSEE

**NOTES:**

- 1.) BORING LOCATIONS ARE SHOWN IN GENERAL ARRANGMENT ONLY.
- 2.) DO NOT USE BORING LOCATIONS FOR DETERMINATIONS OF DISTANCES OR QUANTITIES.
- 3.) BASE MAP PROVIDED BY: GOOGLE EARTH

 LOCATION OF SOIL TEST BORINGS

FIGURE 2

# GENERAL NOTES

## FINE AND COARSE GRAINED SOIL PROPERTIES

### PARTICLE SIZE

|                |                      |
|----------------|----------------------|
| BOULDERS:      | GREATER THAN 300 mm  |
| COBBLES:       | 75 mm to 300 mm      |
| GRAVEL:        | 4.74 mm to 75 mm     |
| COARSE SAND:   | 2 mm to 4.74 mm      |
| MEDIUM SAND:   | 0.425 mm to 2 mm     |
| FINE SAND:     | 0.075 mm to 0.425 mm |
| SILTS & CLAYS: | LESS THAN 0.075 mm   |

### COARSE GRAINED SOILS (SANDS & GRAVELS)

| N-VALUE | RELATIVE DENSITY |
|---------|------------------|
| 0 - 4   | VERY LOOSE       |
| 5 - 10  | LOOSE            |
| 11 - 30 | MEDIUM DENSE     |
| 31 - 50 | DENSE            |
| OVER 50 | VERY DENSE       |

### FINE GRAINED SOILS (SILTS & CLAYS)

| N-VALUE | CONSISTENCY | Qu, PSF     |
|---------|-------------|-------------|
| 0 - 2   | VERY SOFT   | 0 - 500     |
| 3 - 4   | SOFT        | 500 - 1000  |
| 5 - 8   | FIRM        | 1000 - 2000 |
| 9 - 15  | STIFF       | 2000 - 4000 |
| 16 - 30 | VERY STIFF  | 4000 - 8000 |
| OVER 31 | HARD        | 8000 +      |

## STANDARD PENETRATION TEST (ASTM D1586)

THE STANDARD PENETRATION TEST AS DEFINED BY ASTM D1586 IS A METHOD TO OBTAIN A DISTURBED SOIL SAMPLE FOR EXAMINATION AND TESTING AND TO OBTAIN RELATIVE DENSITY AND CONSISTENCY INFORMATION. THE 1.4 INCH I.D./2.0 INCH O.D. SAMPLER IS DRIVEN 3-SIX INCH INCREMENTS WITH A 140 LB. HAMMER FALLING 30 INCHES. THE BLOW COUNTS REQUIRED TO DRIVE THE SAMPLER THE FINAL 2 INCREMENTS ARE ADDED TOGETHER AND DESIGNATED THE N-VALUE. AT TIMES, THE SAMPLER CAN NOT BE DRIVEN THE FULL 18 INCHES. THE FOLLOWING REPRESENTS OUR INTERPRETATION OF THE STANDARD PENETRATION TEST WITH VARIATIONS.

### BLOWS/FOOT (N-VALUE)

### DESCRIPTION

|             |  |
|-------------|--|
| 25.....     | .....25 BLOWS DROVE SAMPLER 12" AFTER INITIAL 6" SEATING     |
| 75/10"..... | .....75 BLOWS DROVE SAMPLER 10" AFTER INITIAL 6" SEATING     |
| 50/PR.....  | .....PENETRATION REFUSAL OF SAMPLER AFTER INITIAL 6" SEATING |

## SAMPLING SYMBOLS

|       |                     |
|-------|---------------------|
| ST:   | UNDISTURBED SAMPLE  |
| SS:   | SPLIT SPOON SAMPLE  |
| CORE: | ROCK CORE SAMPLE    |
| AU:   | AUGER OR BAG SAMPLE |

## SOIL PROPERTY SYMBOLS

|      |                                      |
|------|--------------------------------------|
| N:   | STANDARD PENETRATION, BPF            |
| M:   | MOISTURE CONTENT %                   |
| LL:  | LIQUID LIMIT %                       |
| PI:  | PLASTICITY INDEX %                   |
| Qp:  | POCKET PENETROMETER VALUE, TSF       |
| Qu:  | UNCONFINED COMPRESSIVE STRENGTH, TSF |
| DUW: | DRY UNIT WEIGHT, PCF                 |

## ROCK PROPERTIES

### ROCK HARDNESS

### ROCK QUALITY DESIGNATION (RQD)

| PERCENT   | QUALITY   |
|-----------|-----------|
| 90 TO 100 | EXCELLENT |
| 75 TO 90  | GOOD      |
| 50 TO 75  | FAIR      |
| 25 TO 50  | POOR      |
| 0 TO 25   | VERY POOR |

|                  |  |
|------------------|--|
| VERY SOFT:       | ROCK DISINTEGRATES OR EASILY COMPRESSES TO TOUCH: CAN BE HARD TO VERY HARD SOIL.   |
| SOFT:            | ROCK IS COHERANT BUT BREAKS EASILY TO THUMB PRESSURE AT SHARP EDGES AND CRUMBLES WITH FIRM HAND PRESSURE.                  |
| MODERATELY HARD: | SMALL PIECES CAN BE BROKEN OFF ALONG SHARP EDGES BY CONSIDERABLE HARD THUMB PRESSURE: CAN BE BROKEN BY LIGHT HAMMER BLOWS. |
| HARD:            | ROCK CAN NOT BE BROKEN BY THUMB PRESSURE, BUT CAN BE BROKEN BY MODERATE HAMMER BLOWS.                                      |
| VERY HARD:       | ROCK CAN BE BROKEN BY HEAVY HAMMER BLOWS.  |





**Net Zero Building**  
**Clinton, Tennessee**  
 GEOServices Project # 21-17305

LOG OF BORING **B-1**  
 SHEET 1 OF 1

DRILLER M.W. Drilling  
 ON-SITE REP. \_\_\_\_\_

BORING NO. / LOCATION B-1 DRY ON COMPLETION ? Yes

DATE May 4, 2017 SURFACE ELEV. \_\_\_\_\_ FT.  
 REFUSAL: Yes DEPTH 9.5 FT. ELEV. -9.5 FT.  
 SAMPLED 9.5 FT. 2.9 M  
 TOP OF ROCK DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
 BEGAN CORING DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
 FOOTAGE CORED (LF) \_\_\_\_\_ FT.  
 BOTTOM OF HOLE DEPTH 9.5 FT. ELEV. -9.5 FT.

**WATER LEVEL DATA (IF APPLICABLE)**  
 COMPLETION: DEPTH Dry FT.  
 ELEV. \_\_\_\_\_ FT.  
 AFTER 1 HRS: DEPTH TNP FT.  
 ELEV. \_\_\_\_\_ FT.  
 AFTER 24 HRS: DEPTH TNP FT.  
 ELEV. \_\_\_\_\_ FT.

BORING ADVANCED BY: \_\_\_\_\_ POWER AUGERING X PROPOSED FFE: \_\_\_\_\_ FT.

| STRATUM DEPTH | SAMPLE DEPTH |       | SAMPLE OR RUN NO. | SAMPLE TYPE | FIELD RESULTS |        | LABORATORY RESULTS |    |      | STRATUM DESCRIPTION   |
|---------------|--------------|-------|-------------------|-------------|---------------|--------|--------------------|----|------|---|
|               | FT.          | ELEV. |                   |             | FROM FT.      | TO FT. | N-Value            | Qu | LL   |   |
| 0.0 - 1.0     |              |       |                   |             |               |        |                    |    |      | Topsoil (1 foot)  |
| 1.0 - 2.5     |              |       | 1                 | SS          | 6             |        |                    |    | 30.8 | Fat CLAY (CH) - with organics - dark brown - moist - very soft to firm (FILL) |
| 2.5 - 3.5     |              |       | 2                 | SS          | 2             |        | 52                 | 35 | 41.9 |   |
| 3.5 - 5.0     |              |       | 3                 | SS          | 0             |        |                    |    | 31.3 | Fat CLAY (CH) - brown and tan - very moist - hard (RESIDUUM)                  |
| 5.0 - 6.0     |              |       | 4                 | SS          | 50/6"         |        |                    |    | 50.4 | Auger Refusal at 9.5 feet   |
| 6.0 - 7.5     |              |       |                   |             |               |        |                    |    |      |   |
| 7.5 - 8.5     |              |       |                   |             |               |        |                    |    |      |   |
| 8.5 - 9.5     |              |       |                   |             |               |        |                    |    |      |   |
| 9.5 - 10.0    |              |       |                   |             |               |        |                    |    |      |   |
| 10.0 - 11.0   |              |       |                   |             |               |        |                    |    |      |   |
| 11.0 - 12.5   |              |       |                   |             |               |        |                    |    |      |   |
| 12.5 - 13.5   |              |       |                   |             |               |        |                    |    |      |   |
| 13.5 - 15.0   |              |       |                   |             |               |        |                    |    |      |   |
| 15.0 - 16.5   |              |       |                   |             |               |        |                    |    |      |   |
| 16.5 - 17.5   |              |       |                   |             |               |        |                    |    |      |   |
| 17.5 - 18.5   |              |       |                   |             |               |        |                    |    |      |   |
| 18.5 - 19.5   |              |       |                   |             |               |        |                    |    |      |   |
| 19.5 - 20.0   |              |       |                   |             |               |        |                    |    |      |   |

REMARKS: Organic content testing on SS#2 and 4 indicated 9.1 and 6.2 percent organics, by weight, respectively



**Net Zero Building  
Clinton, Tennessee**  
GEOservices Project # 21-17305

LOG OF BORING **B-2**  
SHEET 1 OF 1

DRILLER M.W. Drilling  
ON-SITE REP. \_\_\_\_\_

BORING NO. / LOCATION B-2 DRY ON COMPLETION ? Yes

DATE May 4, 2017 SURFACE ELEV. \_\_\_\_\_ FT.  
REFUSAL: Yes DEPTH 8.5 FT. ELEV. -8.5 FT.  
SAMPLED 8.5 FT. 2.6 M  
TOP OF ROCK DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
BEGAN CORING DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
FOOTAGE CORED (LF) \_\_\_\_\_ FT.  
BOTTOM OF HOLE DEPTH 8.5 FT. ELEV. -8.5 FT.

**WATER LEVEL DATA (IF APPLICABLE)**  
COMPLETION: DEPTH Dry FT.  
ELEV. \_\_\_\_\_ FT.  
AFTER 1 HRS: DEPTH TNP FT.  
ELEV. \_\_\_\_\_ FT.  
AFTER 24 HRS: DEPTH TNP FT.  
ELEV. \_\_\_\_\_ FT.

BORING ADVANCED BY: \_\_\_\_\_ POWER AUGERING X PROPOSED FFE: \_\_\_\_\_ FT.

| STRATUM DEPTH | SAMPLE DEPTH |       | SAMPLE OR RUN NO. | SAMPLE TYPE | FIELD RESULTS |        | LABORATORY RESULTS |    |      | STRATUM DESCRIPTION  |
|---------------|--------------|-------|-------------------|-------------|---------------|--------|--------------------|----|------|--|
|               | FT.          | ELEV. |                   |             | FROM FT.      | TO FT. | N-Value            | Qu | LL   |  |
| 0.0 - 1.0     |              |       |                   |             |               |        |                    |    |      | Topsoil (1 foot)   |
| 1.0 - 2.5     |              |       | 1                 | SS          | 8             |        |                    |    | 21.2 | Lean CLAY (CL) - with silt - dark brown - very moist (FILL)              |
| 2.5 - 5.0     |              |       | 2                 | SS          | 7             |        |                    |    | 29.9 | Lean CLAY (CL) - with silt - gray - very moist - firm to hard (RESIDUUM) |
| 5.0 - 7.5     |              |       | 3                 | SS          | 5             |        |                    |    | 43   |  |
| 7.5 - 8.5     |              |       | 4                 | SS          | 50/0          |        |                    |    |      | Auger Refusal at 8.5 feet  |
| 8.5 - 10.0    |              |       |                   |             |               |        |                    |    |      |  |
| 10.0 - 12.5   |              |       |                   |             |               |        |                    |    |      |  |
| 12.5 - 15.0   |              |       |                   |             |               |        |                    |    |      |  |
| 15.0 - 17.5   |              |       |                   |             |               |        |                    |    |      |  |
| 17.5 - 20.0   |              |       |                   |             |               |        |                    |    |      |  |

REMARKS: Organic content testing on SS#1 and 2 indicated 3.1 and 3.9 percent organics, by weight, respectively



**Net Zero Building  
Clinton, Tennessee**  
GEOservices Project # 21-17305

LOG OF BORING **B-3**  
SHEET 1 OF 1

DRILLER M.W. Drilling  
ON-SITE REP. \_\_\_\_\_

BORING NO. / LOCATION B-3 DRY ON COMPLETION ? Yes

DATE May 4, 2017 SURFACE ELEV. \_\_\_\_\_ FT.  
REFUSAL: Yes DEPTH 12.0 FT. ELEV. -12.0 FT.  
SAMPLED 10.0 FT. 3.0 M  
TOP OF ROCK DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
BEGAN CORING DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
FOOTAGE CORED (LF) \_\_\_\_\_ FT.  
BOTTOM OF HOLE DEPTH 10.0 FT. ELEV. -10.0 FT.

**WATER LEVEL DATA (IF APPLICABLE)**  
COMPLETION: DEPTH Dry FT.  
ELEV. \_\_\_\_\_ FT.  
AFTER 1 HRS: DEPTH TNP FT.  
ELEV. \_\_\_\_\_ FT.  
AFTER 24 HRS: DEPTH TNP FT.  
ELEV. \_\_\_\_\_ FT.

BORING ADVANCED BY: \_\_\_\_\_ POWER AUGERING X PROPOSED FFE: \_\_\_\_\_ FT.

| STRATUM DEPTH | SAMPLE DEPTH |       | SAMPLE OR RUN NO. | SAMPLE TYPE | FIELD RESULTS |    | LABORATORY RESULTS |    |      | STRATUM DESCRIPTION  |
|---------------|--------------|-------|-------------------|-------------|---------------|----|--------------------|----|------|--|
|               | FT.          | ELEV. |                   |             | FROM          | TO | N-Value            | Qu | LL   |  |
| 0.0 - 1.0     | -0.0         | -1.0  |                   |             |               |    |                    |    |      | Topsoil (1 foot)   |
| 1.0 - 2.5     | -1.0         | -2.5  | 1                 | SS          | 9             |    |                    |    | 34.3 | Fat CLAY (CH) - with trace rock fragments at depth - brown and gray - moist - soft to stiff (RESIDUUM) |
| 2.5 - 3.5     | -2.5         | -3.5  |                   |             |               |    |                    |    |      |  |
| 3.5 - 5.0     | -3.5         | -5.0  | 2                 | SS          | 9             |    |                    |    | 30.1 |  |
| 5.0 - 7.5     | -5.0         | -7.5  |                   |             |               |    |                    |    |      |  |
| 7.5 - 8.5     | -7.5         | -8.5  | 3                 | SS          | 7             |    |                    |    | 30.1 |  |
| 8.5 - 10.0    | -8.5         | -10.0 |                   |             |               |    |                    |    |      |  |
| 10.0 - 12.5   | -10.0        | -12.5 | 4                 | SS          | 4             |    |                    |    | 30.7 |  |
| 12.5 - 15.0   | -12.5        | -15.0 |                   |             |               |    |                    |    |      | Auger Refusal at 12 feet   |
| 15.0 - 17.5   | -15.0        | -17.5 |                   |             |               |    |                    |    |      |  |
| 17.5 - 20.0   | -17.5        | -20.0 |                   |             |               |    |                    |    |      |  |
| 20.0 - 22.5   | -20.0        | -22.5 |                   |             |               |    |                    |    |      |  |

REMARKS: Organic content testing on SS#1 indicated 3.3 percent organics, by weight



**Net Zero Building**  
**Clinton, Tennessee**  
 GEOServices Project # 21-17305

LOG OF BORING **B-4**  
 SHEET 1 OF 1

DRILLER M.W. Drilling  
 ON-SITE REP. \_\_\_\_\_

BORING NO. / LOCATION B-4 DRY ON COMPLETION ? Yes

DATE May 4, 2017 SURFACE ELEV. \_\_\_\_\_ FT.  
 REFUSAL: Yes DEPTH 13.0 FT. ELEV. -13.0 FT.  
 SAMPLED 10.0 FT. 3.0 M  
 TOP OF ROCK DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
 BEGAN CORING DEPTH \_\_\_\_\_ FT. ELEV. \_\_\_\_\_ FT.  
 FOOTAGE CORED (LF) \_\_\_\_\_ FT.  
 BOTTOM OF HOLE DEPTH 10.0 FT. ELEV. -10.0 FT.

**WATER LEVEL DATA (IF APPLICABLE)**  
 COMPLETION: DEPTH Dry FT.  
 ELEV. \_\_\_\_\_ FT.  
 AFTER 1 HRS: DEPTH TNP FT.  
 ELEV. \_\_\_\_\_ FT.  
 AFTER 24 HRS: DEPTH TNP FT.  
 ELEV. \_\_\_\_\_ FT.

BORING ADVANCED BY: \_\_\_\_\_ POWER AUGERING X PROPOSED FFE: \_\_\_\_\_ FT.

| STRATUM DEPTH |       | SAMPLE DEPTH |        | SAMPLE OR RUN NO. | SAMPLE TYPE | FIELD RESULTS |    | LABORATORY RESULTS |    |      | STRATUM DESCRIPTION  |
|---------------|-------|--------------|--------|-------------------|-------------|---------------|----|--------------------|----|------|--|
| FT.           | ELEV. | FROM FT.     | TO FT. |                   |             | N-Value       | Qu | LL                 | PI | %M   |  |
| -             | -     |              |        |                   |             |               |    |                    |    |      | Topsoil (1 foot)   |
| 2.5           | -2.5  | 1.0          | 2.5    | 1                 | SS          | 9             |    |                    |    | 22.2 | Lean CLAY (CL) - abundant rock fragments and sand - dark brown - slightly moist (FILL) |
| 5.0           | -5.0  | 3.5          | 5.0    | 2                 | SS          | 16            |    |                    |    | 15.5 | Fat CLAY (CH) - dark brown and brown - moist - firm to very stiff (RESIDUUM)           |
| 7.5           | -7.5  | 6.0          | 7.5    | 3                 | SS          | 9             |    |                    |    | 26.5 |  |
| 10.0          | -10.0 | 8.5          | 9.5    | 4                 | SS          | 7             |    |                    |    | 39   |  |
| 15.0          | -15.0 |              |        |                   |             |               |    |                    |    |      | Auger Refusal at 13 feet   |
| 17.5          | -17.5 |              |        |                   |             |               |    |                    |    |      |  |
| 20.0          | -20.0 |              |        |                   |             |               |    |                    |    |      |  |

REMARKS: Organic content testing on SS#1 indicated 4.1 percent organics, by weight

**APPENDIX B**

Soil Laboratory Data



**Proposed Net Zero Building**  
**GEOservices Project No. 21-17305**  
**May 17, 2017**

**SOIL DATA SUMMARY**

| Boring Number | Sample Number | Depth (feet) | Natural Moisture Content | Atterberg Limits |    |    | Soil Type | Percent Organic Content |
|---------------|---------------|--------------|--------------------------|------------------|----|----|-----------|-------------------------|
|               |               |              |                          | LL               | PL | PI |           |                         |
| B-1           | 1             | 1.0-2.5'     | 30.8%                    |                  |    |    |           | 9.1                     |
|               | 2             | 3.5-5.0'     | 41.9%                    | 52               | 17 | 35 | CH        |                         |
|               | 3             | 6.0-7.5'     | 31.3%                    |                  |    |    |           | 6.2                     |
|               | 4             | 8.5-10.0'    | 50.4%                    |                  |    |    |           |                         |
| B-2           | 1             | 1.0-2.5'     | 21.2%                    |                  |    |    |           | 3.1                     |
|               | 2             | 3.5-5.0'     | 29.9%                    |                  |    |    |           | 3.9                     |
|               | 3             | 6.0-7.5'     | 43.0%                    |                  |    |    |           |                         |
| B-3           | 1             | 1.0-2.5'     | 34.3%                    |                  |    |    |           | 3.3                     |
|               | 2             | 3.5-5.0'     | 30.1%                    |                  |    |    |           |                         |
|               | 3             | 6.0-7.5'     | 30.1%                    |                  |    |    |           |                         |
|               | 4             | 8.5-10.0'    | 30.7%                    |                  |    |    |           |                         |
| B-4           | 1             | 1.0-2.5'     | 22.2%                    |                  |    |    |           | 4.1                     |
|               | 2             | 3.5-5.0'     | 15.5%                    |                  |    |    |           |                         |
|               | 3             | 6.0-7.5'     | 26.5%                    |                  |    |    |           |                         |
|               | 4             | 8.5-10.0'    | 39.0%                    |                  |    |    |           |                         |
|               |               |              |                          |                  |    |    |           |                         |
|               |               |              |                          |                  |    |    |           |                         |
|               |               |              |                          |                  |    |    |           |                         |