Esse Architects
632 Pershing Road | Raleigh NC 27608

Addendum No. 1

Wake County EM Station 2

Esse Architects Project #2405 | Owner ID: RFB #25-075

Addendum No. 1

August 1, 2025

TO: ALL PRIME BIDDERS OF RECORD

This Addendum forms a part of the Contract Documents and modifies the original Project Manual and Construction Documents dated July 21, 2025. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification. This Addendum form consists of three (3) pages and attachments as described in this form. All documents are distributed digitally.

DRAWINGS

Item No.	Description

1. Sheet C2.00 SITE PLAN – Make the following revisions:
    a. Replace sheet C2.00 with the attached sheet C2.00.

2. Sheet S001 GENERAL STRUCTURAL NOTES – Make the following revisions:
    a. Replace sheet S001 with the attached sheet S001.

3. Sheet S201 WALL SECTIONS – Make the following revisions:
    a. Replace sheet S201 with the attached sheet S201.

4. Sheet A131 FINISH PLAN – Make the following revisions:
    a. Change KEYNOTES 2 to read “Provide Roller Window Shades”.
    b. Add KEYNOTED 2 to the interior storefront of Vestibule 100.

SPECIFICATIONS

Item No.	Description

5. Instructions to Bidders – Make the following revisions:
    a. Add the following sentence 9.I Failure to use bid bond form provided by Owner herein.
    b. Delete in its entirety sentence 10.I Failure to use bid bond form provided by Owner herein.

6. Specification Section 01 2100 ALLOWANCES – Make the following revisions:
    a. Change 3.3.I to Read “Allowance No. 10: Include an allowance of $45,000.00 for landscaping.”
    b. Add the following to 3.3.

2. Items covered by the allowance include:
    a. Trees
    b. Shrubs
    c. Ornamental grasses / ground covers
    d. Turf sod
    e. Mulch
    f. Soil amendments
    g. Decorative stone

c. Add the following to 3.3.
    3. Coordinate allowance with Sheets L1.00 and L2.00, as well as Specification Sections 329200-Turf & Grasses, 329219-Seeding, and 329300-Exterior Plants

d. Add the following to 3.3.
    4. The Contractor shall bid the landscape work out to a list of vendors provided by the Owner. The cost of this work shall be applied to the Allowance.

e. Change 3.3.J to Read "Allowance No. 11: Include an allowance of $25,000.00 for signage."

f. Add 3.3.K "Allowance No. 12: Include an allowance of $25,000.00 for any potential City of Raleigh site permit or tap fees."

7. Specification Section 04 2000 UNIT MASONRY – Make the following revisions:
    a. Add 2.6.A "Basis of Design shall be wire cut Cherry Velour as manufactured by US Brick in Columbia, South Carolina."

8. Specification Section 08 3613 SECTIONAL DOORS – Make the following revisions:
    a. Replace Specification Section 08 3613 with the attached revised Specification Section 08 3613.

9. Specification Section 11 3013 RESIDENTIAL APPLIANCES – Make the following revisions:
    a. Change 2.3.A to Read "Basis of Design: General Electric Model GFR600AVSS with ceramic glass cooktop.

CLARIFICATIONS

Item No. Description

1. The cost of the Ground Sign as shown on A114 shall be applied to Allowance No. 11. The entire base of the Ground Sign, including but not limited to the footing, foundation, masonry, electrical, etc. shall be included in the base bid and is not to be applied to Allowance No. 11.

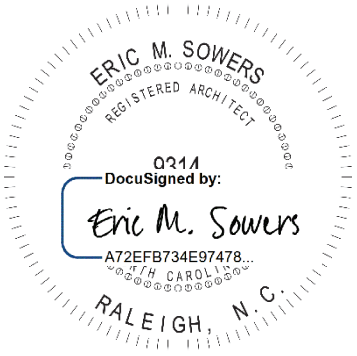
2. 08 3613 2.2B3 operability under wind load. These doors are designed to stay in place but not operate under wind load.
    a. Response: Sectional Doors must operate under wind loads.

3. Can the structural engineer confirm whether they intended for 16 gauge, for all truss member or just chords? The Chords are stringent as is, and if we make webs 16 gauge also then the price will be double what it would be normally.
   a. *Response: Truss webs may utilize a material thinner than 16 gage provided the webs and connections can support the required forces as determined by the truss supplier. Truss top and bottom chords shall utilize a 16 gage minimum thickness. The relevant general structural note will be altered to reflect this change on the design drawings. See attached sheet S001.*

ATTACHMENTS

1. Pre-Bid Conference Minutes and Sign-in Sheet (9 pages)
2. Specification Section 08 3613 SECTIONAL DOORS (8 pages)
3. Geotechnical Engineering Report (55 pages)
4. Sheet C2.00 SITE PLAN (Revision No. 1 ADDENDUM 1 8/1/2025)
5. Sheet S001 GENERAL STRUCTURAL NOTES (Revision No. 1 ADDENDUM 1 8/1/2025)
6. Sheet S201 WALL SECTIONS (Revision No. 1 ADDENDUM 1 8/1/2025)

END OF ADDENDUM NUMBER ONE



8/2/2025

Esse Architects
632 Pershing Road | Raleigh NC 27608

Pre-Bid Conference Minutes

Wake County EM Station 2

Esse Architects Project #2405 | Owner ID: RFB #25-075

Pre-Bid Conference

July 31, 2025 | 2:00 pm | Wake County Public Safety Center Room C170 | 330 Salisbury Street | Raleigh, NC 27601.

The following is to be discussed:

1. Introductions:
   - Greg Johnson is the owner's representative on this project for Wake County FD&C.
   - Natalya Anissimova with Esse Architects is the design team project manager, assisted by Eric Sowers.
   - Reggie Adams with Sigma Engineered Solutions is the MEP engineer.
   - Andy Terrell with Lysaght & Associates is the Structural engineer.
   - Spenser Meekins with WithersRavenel is the Site/Civil engineer.
   - The County's security consultant is Protus3. The point of contact is Jerry Blanchard jblanchard@protus3.com.

2. This is the non-mandatory Pre-Bid Conference for the new construction of the Wake County EMS Station 2 located at 2020 Noble Road, Raleigh, NC 27608.
   a. The project includes the demolition of the existing EMS Station located on site and the construction of a new approximately 4,000 square foot single story station.

3. Bids are due on **August 19, 2025, by 2:00 PM** to the Purchasing Department, Suite 2900, Wake County Justice Center, 300 South Salisbury Street (or 301 South McDowell Street), Raleigh, NC 27601. All bids will be opened and read aloud.
   a. Bids must be received no later than 2:00 PM on August 19, 2025, or they will be rejected. Be mindful that it may take some time to get through security. The WC parking deck is around the corner.
   b. All contractors must allow adequate time for parking and to get through the building security. Building security includes X-ray machines and metal detectors. Do not have any weapons, knives, or tools of any size with you as you go through security. It will be confiscated.
   c. The McDowell Street entry may be the better entry to use. It is located closer to the Purchasing Department.

4. All communication is to go through Esse Architects (Natalya Anissimova, natalya@esse-architects.com) and must be received in writing. Please thoroughly review all bid documents before submitting questions. Any subcontractor questions must come to the architect through a general contractor. Any changes in the bid phase will be issued via addendum. The cut-off date for questions is **Friday August 8, 2025, by noon.** and the

last addendum will be issued on **Tuesday, August 12, 2025.** Addenda will be issued to all plan holders via email and will also be uploaded to the digital plan room.

a. The digital plan room can be accessed at **https://www.planscope.com/projects/1419/details/wcob-12-14-upfit/**

5. The project is being bid as a single prime contract. All contractors must have a valid license under the state laws governing their trades.

6. Failure to use the bid bond provided by the Owner in the project manual will result in the rejection of the bid.

7. The project has been submitted to the Wake County Inspections Department for building permit review. All building inspections will be conducted by Wake County, not the City of Raleigh. Site plan approval was through the City of Raleigh. All site related inspections will be through the City of Raleigh. Contractors must be on site for any inspections.

8. The project is a formal bid contract with formal Minority Business Enterprise requirements. Wake County's policy for minority contractor participation is included in the bid documents. MBE forms must be submitted with the bid and the lowest apparent bidder must provide additional MBE information within a set time period following the bid.

9. The total contract time for the project is 365 calendar days from Notice-To-Proceed to Substantial Completion. Final Completion will be 30 Calendar days from the Substantial Completion date. All closeout documents must be submitted and approved prior to Final Completion. If there are any concerns with material lead times affecting the schedule, the general contractor must make the Architect aware prior to the issuing of the final addendum.

10. There are eleven (11) allowances included in the project. Refer to Specifications 01 2100 Allowances for more information. Allowances 1, 2, 10, and 11 will be bid by the General Contractor to Wake County's preferred vendors.
    a. Allowance No. 1: Lump-Sum Allowance: Include the sum of $80,000 for security.
        i. This allowance includes material cost, receiving, handling and installation and Contractor overhead and profit. Conduit and electrical power supporting the security system is part of the general bid.
        ii. The Contractor shall bid the security work out to a list of vendors provided by the Owner. The cost of this work shall be applied to the Allowance.

    b. Allowance No. 2: Include an allowance of $30,000.00 for Voice/Data.
        i. This allowance includes material cost, receiving, handling and installation and Contractor overhead and profit. Conduit and electrical power supporting the Voice/Data system is part of the general bid.
        ii. The Contractor shall bid the Voice/Data work out to a list of vendors provided by the Owner. The cost of this work shall be applied to the Allowance.

iii. Telecom conduit is to be provided by the electrical sub-contractor, and wiring is to be pulled by the telecom vendor. Refer to the MEP drawings.

c. Allowance No. 3: Unit-Cost Allowance: Unsuitable Soils Removal and Disposal Off-Site.
    i. Coordinate allowance adjustment with corresponding unit-price requirements in Section 01 2200 "Unit Prices."
    ii. Allowance Quantity: 1,000 CY.

d. Allowance No. 4: Unit-Cost Allowance: Replacement of Removed Unsuitable Soils with Off-Site Suitable Soil In-place.
    i. Coordinate allowance adjustment with corresponding unit-price requirements in Section 01 2200 "Unit Prices."
    ii. Allowance Quantity: 1,000 CY.

e. Allowance No. 5: Unit-Cost Allowance: Replacement of Removed Unsuitable Soils with No. 57 Washed Stone In-place.
    i. Coordinate allowance adjustment with corresponding unit-price requirements in Section 01 2200 "Unit Prices."
    ii. Allowance Quantity: 1,000 CY.

f. Allowance No. 6: Unit-Cost Allowance: Unsuitable soils (trenching) removal and disposal off-site:
    i. Coordinate allowance adjustment with corresponding unit-price requirements in Section 01 2200 "Unit Prices."
    ii. Allowance Quantity: 50 CY.

g. Allowance No. 7: Unit-Cost Allowance: Replacement of unsuitable soils (trenching) with #57 stone:
    i. Coordinate allowance adjustment with corresponding unit-price requirements in Section 01 2200 "Unit Prices."
    ii. Allowance Quantity: 50 CY.

h. Allowance No. 8: Include an allowance of $10,000.00 for Duke Energy power distribution.

i. Allowance No. 9: Include an allowance of $40,000.00 for Bi-Direction Amplifier (BDA).
    i. The BDA Survey is included in the base bid. Any system installation will be provided as a change order and applied to the Allowance.

j. Allowance No. 10: Include an allowance of $45,000.00 for landscaping.
    i. Allowance No. 10 has been increased from $40,000 to $45,000.00
    ii. This allowance includes material cost, receiving, handling and installation and Contractor overhead and profit.
    iii. The Contractor shall bid the landscape work out to a list of vendors provided by the Owner. The cost of this work shall be applied to the Allowance.

k. Allowance No. 11: Include an allowance of $25,000.00 for signage.
    i. Allowance No. 11 has been increased from $10,000 to $25,000.00
    ii. This allowance includes material cost, receiving, handling and installation and Contractor overhead and profit.
    iii. The Contractor shall bid all interior and exterior signage work out to a list of vendors provided by the Owner. The cost of this work shall be applied to the Allowance.
    iv. The cost of the Ground Sign as shown on A114 shall be applied to Allowance No. 11. The entire base of the Ground Sign, including but not limited to the footing, foundation, masonry, electrical, etc. shall be included in the base bid and is not to be applied to Allowance No. 11.

11. There are ten (10) Unit Prices included in the project. They can be found in the project manual and must be listed on the Bid Form. See Specifications 01 2200 Unit Prices
    a. Unit Price No. 1: Wall and ceiling exit signs.
        i. Unit of Measurement: Each.
    b. Unit Price No. 2: Fire alarm speaker/strobe.
        i. Unit of Measurement: Each.
    c. Unit Price No 3: Duplex/quad receptacle.
        i. Unit of Measurement: Each.
    d. Unit Price No. 4: Sprinkler head.
        i. Unit of Measurement: Each.
    e. Unit Price No. 5: Data drop.
        i. Unit of Measurement: Each.
    f. Unit Price No. 6: Unsuitable soils removal and disposal off-site.
        i. Unit of Measurement: Cubic Yard.
        ii. Allowance 1,000 Cubic Yard
    g. Unit Price No. 7: Replacement of removed unsuitable soils with off-site suitable soil in-place.
        i. Unit of Measurement: Cubic Yard.
        ii. Allowance 1,000 Cubic Yard
    h. Unit Price No. 8: Replacement of removed unsuitable soils with No. 57 washed stone in-place.
        i. Unit of Measurement: Cubic Yard.
        ii. Allowance 1,000 Cubic Yard
    i. Unit Price No. 9: Unsuitable soils (trenching) removal and disposal off-site.
        i. Unit of Measurement: Cubic Yard.
        ii. Allowance 50 Cubic Yard
    j. Unit Price No. 10: Replacement of unsuitable soils (trenching) with #57 stone.
        i. Unit of Measurement: Cubic Yard.
        ii. Allowance 50 Cubic Yard.

12. The project will begin when contracts are signed and the Notice-to-Proceed has been issued.

13. The rate of liquidated damages is $500.00 per calendar day as damages reasonably estimated in advance to cover the losses to be incurred by the Owner by reason of failure of the contractor to reach Substantial Completion and Final Completion within the time specified. An additional $500.00 per calendar day will be assessed for failure to submit required closeout documents and achieve Final Completion within 30 days after the date of Substantial Completion.

14. All general and subcontractors should visit the site and become familiar with the conditions. Two on site project walk-throughs have been scheduled for:
    a. August 4, 2025, at 9:00 AM
    b. August 6, 2025, at 1:00 PM

15. Contractor work hours will be between 7:00 AM and 6:00 PM during the work week. Weekends are available for construction with 72-hour notice. Contractors must verify with the City of Raleigh on noise restrictions and Wake County that working on the weekend is acceptable.

16. Contractors must make arrangements with the City of Raleigh to block sidewalks or streets. It is the contractor's responsibility to coordinate all dumpster placement and pick-ups, and all dumpsters must be located on site, not in the road. The contractor is expected to comply with all City of Raleigh requirements.

17. Weapons of any kind (including concealed firearms), illegal drugs, and explosives are prohibited at all times.

18. All Wake County properties are non-smoking. No smoking is allowed on the site. Alcohol, tobacco products, e-cigarettes, and vapes are prohibited at all times.

19. Time is critical to the project. The contractor will be required to submit a construction schedule by the beginning of each month and stick to it. Monthly schedule updates will be required to process all applications for payment.

20. A complete itemized and detailed breakdown of all labor, equipment, and material prices for any change order is required.

21. The successful contractor must name a superintendent and project manager. The project manager must be available between 8:00 AM and 5:00 PM during the week. The superintendent is required to be on site any time construction personnel are working on site. The contractor will be required to create and maintain a list of emergency contacts for all trades to be kept on site.

22. The contractor is responsible for coordinating all trades. Coordination between trades and contractors is critical for a successful project. All subcontractors need to read and understand the project manual.

23. The County expects all work to be of an exceptional quality and expectations for project documentation are high. All general and subcontractors should closely review all the documents, especially the General

Conditions, Supplementary General Conditions, all front end documents, and Division 01 sections to become familiar with how the County operates and to understand the expectations for this project.

24. Alternate: There is one alternate.
    a. Alternate No. E-1.

        i. Base Bid: Provide the infrastructure for a PV-Ready building which shall include the PV service disconnect and its primary wiring connected to the exterior mounted NEMA 3R wiring trough as indicated on the Electrical drawings.
        ii. Alternate: Provide the entire Photovoltaic (PV) System including the PV solar panels, power optimizers, combiners, wiring connectors, PV inverters INV-PV1 & INV-PV2, RTU communicators, cabling and conduit, testing, Operations & Maintenance Manuals and Closeout Documents. (All system equipment upstream of PV service disconnect).

25. Preferred Alternate: There is one preferred alternate.
    a. The Pre-Bid Conference also serves as the open public meeting for the Preferred Brand Alternate. The following preferred brand item is being considered as an Alternate by the owner for this project:

    b. Preferred Brand Alternate No. E-1A.
        i. Provide the Owner preferred alternate for all solar photovoltaic equipment and start up services, including but not limited to: solar photovoltaic panels, power optimizers, combiners, and inverters with SolarEdge Technologies, Inc. being the Owner's preferred manufacturer.

26. Sustainable Goals:
    a. Low Carbon Concrete for all Concrete
    b. PV Panels
    c. Low VOC interior finishes.

27. Site Communications:
    a. For the work included on sheet E101 , a specific sequence of activities will be required to ensure the adjacent Wake House maintains a telecommunications connection prior to demolition starting at the EMS Station.
    b. Additional information addressing the required sequence of activities will be provided in a future addendum.

28. Retaining Wall:
    a. The design team is looking into an MSE (mechanically stabilized earth) wall as a possible alternative design option for the cast-in-place concrete retaining wall.
    b. All contractors shall bid the retaining wall as currently shown in the bid documents.
    c. Additional information will be provided in a future addendum.

29. Questions/Clarifications:
    a. Addendum No 1 will be sent out end of day Friday or first thing Monday.
        i. The pre-bid minutes will be included in addendum no 1.
        ii. If questions have been submitted and are not responded to in Add No 1 they will be included in Add No 2, which will be sent out on 8/12/2025.
    b. The site plan has been approved by the City of Raleigh, and the building permit is expected to be issued by the Notice to Proceed for construction.
    c. Utilities connections are in the road and will require asphalt patching.
    d. The existing concrete pad and generator are to be removed. The General Contractor is to coordinate the pickup of the Generator with Wake County GSA.
    e. A permit allowance will be added to the project to address any potential site permit cost or tap fees.
    f. Due to the site's proximity to residential housing, contractors must take extra care to keep the roadways free of debris and dirt and to respect the neighbors.
    g. No easement will be required for the Station drive. Both properties are owned by Wake County.
    h. Weekend work is permitted, provided it complies with the Project Manual requirements.
    i. Contractors are to include in their bid the job trailer as indicated in the Project Manual.
    j. The contract is scheduled to be awarded by the Wake County Board of Commissioners on September 15, 2025. A Notice to Proceed will be issued the following day, initiating a 60-day pre-construction period to allow for the start of the submittal process and material procurement. Following the 60-days a Notice to Proceed for construction will be issued, which will start the 365 calendar day construction period.
    k. The site plan will be revised to include medium-weight concrete. This update will be included in Addendum No.1. Asphalt will be used only in the repaired area of the adjacent parking lot and at Noble Road.
    l. All special inspections and third party testing will be conducted by Terracon.
    m. Additional information will be provided by addendum concerning an asbestos report for the existing EMS Station demolition.
    n. A perimeter fence is not required.
    o. Two contractor walkthroughs are scheduled:
        • August 4, 2025, at 9:00 AM
        • August 6, 2025, at 1:00 PM

These minutes represent my understanding of the pertinent issues discussed. Any corrections or additions to these minutes should be submitted to the Architect within five (5) days of the distribution or the minutes shall be deemed an accurate representation of the issues discussed.

Minutes Prepared by:

Eric Sowers

Esse Architects,

Esse Architects

632 Pershing Road | Raleigh NC 27608

Wake County EMS Station 2
Esse Architects Project #2405 | Owner ID: RFB #25-075

July 31, 2025
Pre-Bid Conference

	X	NAME	COMPANY	PHONE	E-MAIL
1		Tommy Moorman	WC FD&C		tommy.moorman@wake.gov
2		Gregory Johnson	WC FD&C		gregory.johnson1@wake.gov
3		Eric Sowers	Esse Architects		eric@esse-architects.com
4		Natalya Anissimova	Esse Architects		natalya@esse-architects.com
5		Spencer Meekins	WithersRavenel		smeekings@withersravenel.com
6		Kayleigh Gill	WithersRavenel		kgill@withersravenel.com
7		Jon Blasco	WithersRavenel		jblasco@withersravenel.com
8		Andy Terrell	Lysaght Associates		abt@lysaghtassociates.com
9		Tim Cothran	Riggs-Harrod		tcothran@riggsharrod.com
10		Scott Dawson Sr.	Engineered Construction Co.		sdawsonsr@engrconst.com
11		Zack Poole	HM Kern		estimating@hmkern.com
12		Ben Cash	Progressive Contracting Co.		bcash@progressivecci.com
13		Rick Anderson	TCC		rick.anderson@tcc.enterprises.com
14		Gussett Hodges	Scotia Construction Inc.		estimating@csotiaconstructioninc.com
15		Sam Sneed	Summa General Contractors		sam.sneed@summagc.com
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21		Chad Brooks	Harrod&Assoc.Constructors		estmating@harrodandassoc.com
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SECTION 08 3613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sectional-door assemblies.

B. Related Requirements:

1. Section 05 5000 "Metal Fabrications" for miscellaneous steel supports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of sectional door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
2. For power-operated doors, include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. Include diagrams for power, signal, and control wiring.

C. Samples for Verification: For each type of exposed finish and for each color and texture required on the following components, in manufacturer's standard sizes:

1. Glazing.
2. Metal for door sections.
3. Hardware.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sectional doors to include in maintenance manuals.

B. Manufacturer's warranty.

C. Finish warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

B. Regulatory Requirements: Comply with provisions in the U.S. Department of Justice's "2010 ADA Standards for Accessible Design" applicable to sectional doors.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Failure of components or operators before reaching required number of operation cycles.
c. Faulty operation of hardware.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
e. Delamination of exterior or interior facing materials.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace steel that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Overhead Door Company.
2. Raynor Garage Doors.
3. Wayne-Dalton Garage Doors.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Provide sectional doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Drawings.
2. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.

    a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of door width.
    b. Deflection of horizontal track assembly shall not exceed 1/240 of door height.

3. Operability under Wind Load: Design sectional doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa) wind load, acting inward and outward.

2.3 SECTIONAL-DOOR ASSEMBLY

A. Steel Sectional Door: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; free of warp, twist and deformation and complies with requirements in DASMA 102.

B. Operation Cycles: Door components and operators capable of operating for not less than 25,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.

C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. (2.03 L/s per sq. m) when tested in accordance with ASTM E283 or DASMA 105.

D. U-Value: Shall meet North Carolina Building Code energy standards.

E. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with G60 (Z180) zinc coating.

1. Door-Section Thickness: 2 inches (51 mm).

2. Section Faces:

    a. Thermal-Break Construction: Provide sections with continuous PVC thermal-break construction separating the exterior and interior faces of door.
    b. Exterior Face: Fabricated from single sheets, not more than 24 inches (610 mm) high; with horizontal meeting edges rolled to continuous, interlocking, keyed,

rabbeted, shiplap, or tongue-in-groove, weather- and pinch-resistant seals and reinforcing flange return.

1) Steel Sheet Thickness: Manufacturer's standard.
2) Surface: Manufacturer's standard, flat.

c. Interior Face: Enclose insulation completely within steel exterior facing and interior facing material, with no exposed insulation. Provide the following interior-facing material:

1) Zinc-Coated (Galvanized) Steel Sheet: With minimum nominal coated thickness dimension recommended in writing by manufacturer to comply with performance requirements.

3. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than nominal coated thickness and welded to door section.

4. Intermediate Stiles: Manufacturer's standard coated thickness and spacing.

5. Section Reinforcing: Horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.

a. Bottom Section: Reinforce section with a continuous channel or angle conforming to bottom-section profile and allowing installation of weatherseal).
b. Hardware Locations: Provide reinforcement for hardware attachment.

6. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free and HCFC-free polyurethane insulation.

a. Fire-Resistance Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84.

7. Glazed Panels: Manufacturer's standard, steel-framed section with glazing sealed with glazing tape. Glazing as follows:

a. Insulating Glass Units: Manufacturers' standard unit with tempered glass lites complying with ASTM C1048, Kind FT (fully tempered), Condition A (uncoated)], Type I, Class 1 (clear), Quality-Q3.

F. Track: Manufacturer's standard track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.

1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 (Z180) zinc coating.
2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings.
3. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches (51 mm) apart for door-drop safety device.

a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide continuous angle attached to track and wall.

b. Horizontal Track: Provide continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.

G. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom, top and jambs of door. Provide combination bottom weatherseal and sensor edge for bottom seal.

H. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.

1. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch (2.01-mm) nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.

a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.

2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.

a. Roller-Tire Material: Manufacturer's standard.

3. Push/Pull Handles: Equip each door with galvanized-steel lifting handles on each side of door, finished to match door.

I. Locking Device:

1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.
2. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

J. Counterbalance Mechanism:

1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.

a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
b. Provide one additional midpoint bracket for shafts up to 16 ft. (4.88 m) long and two additional brackets at one-third points to support shafts more than 16 ft. (4.88 m) long unless closer spacing is recommended in writing by door manufacturer.

3. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 7 to 1.
4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.

5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

K. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

1. Monitored Entrapment Protection: Photoelectric sensor designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.

    a. Sensor shall be wall mounted above the doors.

L. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use.
4. Operator Type: Provide door operation equipment that functions with Wake County EMS vehicle’s remote control. Subcontractor shall meet with Wake County EMS personnel and the Architect to ensure the door operators function with theCounty’s control devices.
5. Motor: Reversible type with controller (disconnect switch)] for interior, clean and dry motor exposure. Use adjustable motor-mounting bases for belt-driven operators.

    a. Motor Size: As required to start, accelerate and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
    b. Mounting Location: Center ceiling.

6. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
7. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

    a. Monitored Entrapment Protection: Photoelectric sensor or electric sensor edge on bottom section designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
    b. Unmonitored Entrapment Protection: Pneumatic sensor edge, black, located within weatherseal mounted to bottom bar.

8. Control Station: Flush mounted, three-position (open, close, and stop) control.

    a. Operation: Push button interior and key exterior.
    b. Interior-Mounted Unit: Full-guarded, flush-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

c. Exterior-Mounted Unit: Full-guarded, flush-mounted, standard-duty, weatherproof type, NEMA ICS 6, Type 4 enclosure.
d. Features: Provide the following:

1) Vehicle detection operation.
2) Radio-control operation.
3) Card-reader control.
4) Photocell operation.
5) Door-timer operation.
6) Explosion- and dust-ignition-proof control wiring.
7) Audible and visual signals that comply with regulatory requirements for accessibility.

9. Emergency Manual Operation: Manufacturer’s standard type designed so required force for door operation does not exceed 25 lbf (111 N).
10. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
11. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

M. Metal Finish: Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

a. Color and Gloss: Custom color to match the standing seam metal roof.

2. High-Performance, Organic, (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Conversion coating; Organic Coating: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 or AAMA 2605 and with coating and resin manufacturers' written instructions.

a. Color and Gloss: Custom color to match the standing seam metal roof.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions.

B. Tracks:

1. Fasten vertical track assembly to opening jambs and framing with fasteners spaced not more than 24 inches (610 mm) apart.
2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Power-Operated Doors: Install automatic garage doors openers in accordance with UL 325.

3.3 STARTUP SERVICES

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.

D. Touchup Painting Galvanized Material: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 08 3613

Whitaker Mill EMS

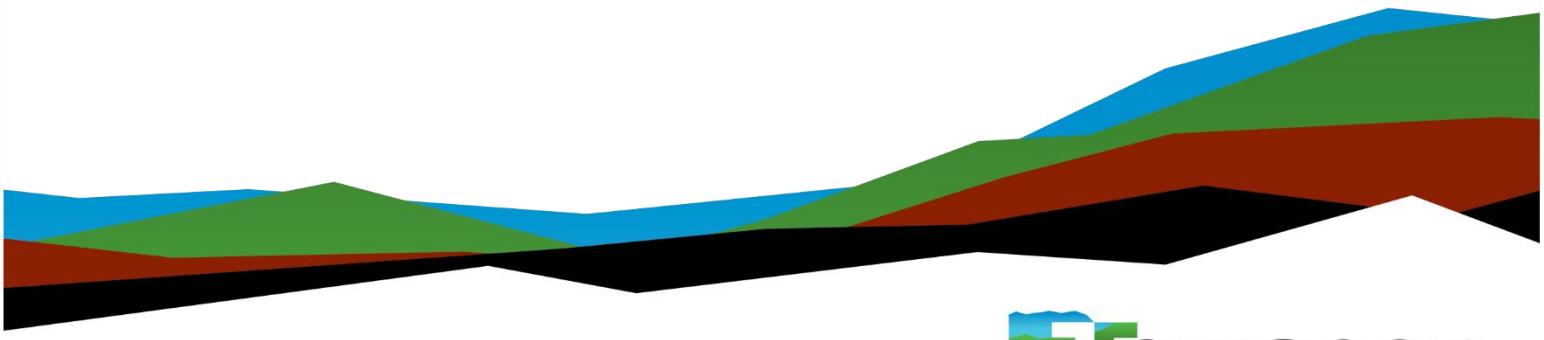
Geotechnical Engineering Report

Raleigh, North Carolina

November 14, 2024 | Terracon Project No. 70245228

Prepared for:

Wake County Government Facilities
Design & Construction
336 S. Fayetteville Street, Suite 1100



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November 14, 2024

Wake County Government Facilities Design & Construction
336 S. Fayetteville Street, Suite 1100
Raleigh, North Carolina 27601

Attn: Tommy Moorman
E: tommy.moorman@wake.gov

Re: Geotechnical Engineering Report
Whitaker Mill EMS
2020 Noble Road
Raleigh, North Carolina
Terracon Project No. 70245228

Dear Mr. Moorman:

We have completed the scope of Geotechnical Engineering services for the above-referenced project in general accordance with Terracon Proposal No. P70245228 dated September 20, 2024. This report presents the findings of the subsurface exploration and provides geotechnical recommendations for the proposed project.

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

Gunnar H. Goslin
Geotechnical Project Manager

Andrew A. Nash, P.E.
Geotechnical Engineering Manager

Table of Contents

Figures

Attachments

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Report Summary

Topic [1]	Overview Statement [2]
Project Description	EMS station with one retaining wall, associated paved parking/drives, and a dumpster pad
Geotechnical Characterization	Residual soils (mostly sandy silts/clays to silty/clayey sands). The upper 6 feet of the soil profile commonly contains highly plastic, fine-grained soils. Existing surface drainage is relatively poor; therefore, areas of shallow perched groundwater should be anticipated.
Earthwork	High-plastic soils (plasticity index, PI, greater than 30) should be removed where present, or not used as structural fill material, within 2 feet of finished building subgrade and within 2 feet of finished pavement subgrade.
Foundations	Use shallow foundations to support building based on assumed loads. Allowable bearing pressure = 3,000 psf
Site Retaining Walls	On-site soils are not suitable for use as reinforced backfill for mechanically stabilized earth (MSE) segmental retaining walls (SRWs)
Pavements	Design CBR= 5 Light Duty: 3 inches asphalt over 6 inches ABC 5 inches concrete over 6 inches ABC Heavy Duty: 3 in. asphalt over 8 in. ABC 5.5 inches concrete over 8 inches ABC
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed EMS station to be located at 2020 Noble Road in Raleigh, North Carolina. The purpose of these services was to provide the following information and recommendations:

- Site Location and Exploration Plans
- Subsurface exploration procedures
- Exploration logs
- Stratification based on visual soil classification
- Groundwater levels measured in the explorations
- Seismic site class per 2018 North Carolina Building Code
- Earthwork recommendations
- Recommended foundation type and recommended engineering design parameters
- Estimated foundation settlements
- Recommendations for design and construction of floor slabs
- Recommendations for the design of site retaining walls
- Recommended pavement soil subgrade design parameters.

The geotechnical engineering Scope of Services for this project included the advancement of Standard Penetration Test (SPT) borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and exploration locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included in the **Exploration and Laboratory Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Project Information Sources	This proposal is based on publicly available GIS information and a computer aided design (CAD) drawing file titled "2024-9-11 Whitaker Mill Boring Locations.dwg", provided by Wake County.

Item	Description
Project Description	Plans for the project include the construction of a new EMS station with associated parking located on the southeast side of the proposed building and driveway located on the north side of the proposed building.
Proposed Structure	The proposed building is approximately 5,000 square feet in plan dimension and will include a 3-bay garage. The building is assumed to be single-story.
Building Construction	Steel and masonry framing on a concrete slab-on-grade floor.
Finished Floor Elevation	We understand the finished floor elevation will be within 3 feet of existing grade in the proposed building areas.
Maximum Unfactored Service Loads	We understand the following maximum loads for estimating settlement and developing foundation recommendations are appropriate for this project based on our experience with similar projects: ▪ Columns: 150 kips ▪ Walls: 2 kips per linear foot (klf) ▪ Slabs: 250 pounds per square foot (psf)
Allowable Foundation Settlements	We understand that tolerable building settlements are 1 inch total and ½ inch differential within a horizontal distance of 50 feet.
Grading/Slopes	We assume up to approximately 5 feet of cut and 10 feet of fill will be required to develop design grades in building and pavement areas, excluding new utilities and remedial grading requirements. We assume cut and fill slopes will have inclinations of 3H:1V (Horizontal: Vertical) or flatter.
Below-Grade Structures	None
Free-Standing Retaining Walls	We understand one retaining wall is expected to be constructed as part of site development to achieve final grades. Wall height of up to 10 feet is anticipated. We understand a concrete retaining wall is planned.

Item	Description
Pavements	Paved driveways and parking areas are to be constructed around the new fire station building. We assume both rigid (concrete) and flexible (asphalt) pavement sections will be used for this project. We assumed the traffic classification as follows: ▪ Autos/light trucks: 50 vehicles per day Assumed traffic for heavy-duty private pavements is as follows: ▪ Autos/light trucks: 50 vehicle(s) per day ▪ Dual-axle light delivery trucks and trash collection vehicles: 25 vehicles per week ▪ Emergency EMS vehicles: 25 vehicles per week The pavement design period is 20 years.
Building Code	2018 North Carolina

Terracon should be notified if any of the above information is inconsistent with the planned construction, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from information provided to us, our site visits between October 1, 2024, to October 24, 2024, and our review of publicly available information.

Item	Description
Parcel Information	The project site is located at 2020 Noble Road in Raleigh, North Carolina. 0.5 acres Latitude/Longitude (approximate) 35.8092°N, -78.6352°W See **Site Location**
Existing Improvements	The existing Wake County EMS Station #2 building with associated pavements
Current Ground Cover	Bare ground, grass, weeds, bushes, trees, asphalt pavement, concrete pavement, mulch
Existing Topography	Based on the publicly available topographic information obtained from Google Earth Pro™, the ground surface elevations range from 295 feet to 300 feet (relative to local mean sea level) in the proposed construction areas.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

Geotechnical Characterization

Geology

The site is in the Piedmont physiographic province. The Piedmont is characterized by residual overburden soils and rock weathered in place from the underlying igneous and metamorphic rock. The soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has higher clay content near the surface because of the advanced weathering. The soils typically become coarser grained with increasing depth because of decreased weathering. The boundary between soil and bedrock in the Piedmont is not sharply defined. A transitional zone termed "partially weathered rock" is normally found overlying the parent bedrock. Partially weathered rock (PWR) is an intermediate geomaterial defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot. Based on the 1985 Geologic Map of North Carolina, the site is underlain by injected gneiss bedrock.

Soil Conditions

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration and Laboratory Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Residuum 1**	Medium Stiff to Stiff Clay and Silt, Loose to Medium Dense Silty Sand and Clayey Sand (N<=15 bpf)
2	**Residuum 2**	Very Stiff Clay, Medium Dense Silty Sand (15 bpf<N<30 bpf)

The borings generally encountered 6 inches of asphalt at the surface underlain by 3 inches of crushed stone aggregate

The borings generally encountered an average of 6 inches of topsoil, mulch, and pine straw in the existing paved areas and 6 inches of topsoil/mulch in existing landscaped areas. However, based on our experience with construction on similar sites, rootmat in wooded and landscaped areas likely extends down through the topsoil into the underlying soils to an average depth of approximately 12 inches or more depending on the size of the tree.

Groundwater Conditions

The borings were advanced in the dry using hollow stem augers, which allows for short-term groundwater observations to be made at the completion of drilling. Groundwater seepage was not encountered within the maximum drilling depth at the time of our field exploration.

Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of exploration. Long-term groundwater monitoring was outside the scope of services for this project. Evaluation of seasonal high water table conditions was also not in our scope of services.

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with the 2018 North Carolina Building Code, the 2015 International Building Code, and Section 20.3 of ASCE 7-10. Based on the materials encountered in the explorations and the standard penetration test N-values, we recommend use of **Seismic Site Classification D** for this project. Subsurface explorations at this site were extended to a maximum depth of 20 feet. The site properties below the maximum exploration depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area.

Our experience indicates that evaluation of seismic site class using SPT N-values can be overly conservative. If it is determined that advantage could be gained with an improved Site Class, additional site testing could be performed to measure shear wave velocities

at the site after preliminary grades have been determined. ASCE 7-22, when adopted, will include site class designations that are entirely based on measured shear wave velocity profiles, and hybrid descriptions other than the common designations of "D" or "C" will be included. Terracon can provide a proposal for measuring the shear wave velocities at the site upon request.

Geotechnical Overview

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the SPT borings, provided that the recommendations given in this report are implemented in the design and construction phases of this project.

Mitigation of existing fill around the existing building will be required for this project. The lowest risk approach is to completely remove the fill. If the owner elects to construct the buildings and pavements on the existing fill to reduce initial construction costs the fill should be further evaluated during construction. Subgrade stabilization, including undercut and replace, will likely be necessary in localized areas of the site if the fill is left in place.

Mitigation of potentially expansive soils will be required for this project.

Based on the conditions encountered and estimated load-settlement relationships, the proposed buildings should be supported on a shallow foundation system consisting of post-tensioned monolithic turn-down slabs.

The on-site highly plastic soils are unsuitable for use as backfill for the planned cast-in-place concrete site retaining wall. Imported select granular fill should be considered.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report limitations.

Earthwork

The following sections provide recommendations for use in the preparation of site drawings and specifications for this project. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for the project.

Expansive Soils

The on-site high plasticity Fat Clay (CH) and Elastic Silt (MH) are potentially expansive soils, exhibiting the potential to swell with increased water content and shrink upon drying. Construction of the project by revising site drainage, in addition to future weather conditions, create the potential for gradual changes in water contents within the expansive soils. Increases in water content could cause the expansive soils to swell and drying of the expansive soils could cause them to shrink, resulting in damage to the foundations, floor slabs, hardscaping, and pavements. Potentially expansive soils, if present under shallow foundations, should be removed and replaced with suitable material to a depth of at least 2 feet below the footing bearing elevations. To reduce the shrink/swell potential to less than about 1 inch, the upper 2 feet of subgrade soils below the base course layers under floor slabs, pavements, and hardscaping should consist of low-plasticity soil.

Demolition

The proposed construction areas include existing site features which will need to be demolished, such as the existing building, sidewalks, pavements, and underground utilities. We recommend the existing site features be removed from within the proposed construction areas. For areas outside the proposed building footprints and foundation bearing zones, existing foundations and slabs should be removed to a depth of at least 4 feet below the affected utility or design pavement subgrade elevation. Below that depth, existing foundations and slabs can be left in place outside of proposed building footprints.

Special precautions should be made to remove existing underground utilities in proposed construction areas. Terracon considers removing the existing utilities and/or underground structures and backfilling the resulting trenches to be the preferred method of demolition. In-place abandonment by filling utility or stormwater pipes with grout should only be considered after checking the location of the piping in both plan and elevation space for potential conflict with the proposed foundations and new utilities.

The existing concrete pavements, slabs, and foundations at the site could be re-used as structural fill, provided the concrete is first crushed to less than 1-1/2 inch in maximum particle size and is well-graded. Reinforcing steel should be removed from the crushed concrete. Properly crushed concrete may also be used as a subgrade stabilization material in building and pavement areas and as backfill where foundation undercut is required to remove unsuitable materials.

Site Preparation

Vegetation, topsoil, and rootmat should be removed completely from the proposed construction areas. Topsoil was encountered in the explorations to depths of approximately 6 inches. We anticipate that rootmat extends to an average depth of approximately 12 inches or more in the wooded areas of the site.

The Geotechnical Engineer should field-verify the stripping depth during construction.

Stripped materials consisting of soil with organic material should be removed from the site or placed in non-structural areas to be landscaped. Roots from the excavated rootmat zone material can be removed by raking or screening if the material is to be re-used as topsoil in areas to be landscaped.

Although no evidence of existing fill was observed and no below-grade obstructions were encountered during the exploration and site reconnaissance, existing fill, obstructions, and/or debris could be encountered during construction. If unexpected fills or underground facilities or obstructions are encountered, such materials and features should be removed, with the resulting excavations backfilled with structural fill.

Subgrade Preparation

Proofrolling should be performed after stripping and prior to placing fill in fill areas and after stripping and excavating to design subgrade elevations in cut areas. The subgrade should be proofrolled with an adequately loaded vehicle such as a fully loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer. Areas excessively deflecting and/or pumping under the proofrolling should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should be stabilized as described in the next section of this report.

Soil Subgrade Stabilization

Loose near-surface soils were encountered in Boring B-2. These soils will likely be unstable when proofrolled. Soil subgrades in other areas of the site may also be unstable when proofrolled. Soil subgrades in localized areas of the site may be unstable when proofrolled.

Methods of subgrade improvement, as described below, could include scarification, moisture conditioning and recompaction or removal of unstable materials and replacement with select granular fill (with or without geosynthetics). The appropriate method of improvement, if required, would be dependent on factors such as design grades, schedule, weather, the size of area to be stabilized, and the nature of the instability. More detailed recommendations can be provided during construction as the

need for subgrade stabilization occurs. Performing site grading operations during warm seasons and dry periods would help reduce the amount of subgrade stabilization required.

If the exposed subgrade is unstable during proofrolling operations, it could be stabilized using one of the methods outlined below.

- **Scarification and Recompaction** - It may be feasible to scarify, dry, and recompact the exposed soils. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Stable subgrades likely would not be achievable if the thickness of the unstable soil is greater than about 1 foot, if the unstable soil is at or near groundwater levels, or if construction is performed during a period of wet or cool weather when drying is difficult.
- **Undercut and Replace** - The use of undercutting and backfilling with select granular fill is a common procedure to improve subgrade stability. Typical undercut depths would be expected to range from about 12 to 24 inches below finished subgrade elevation. The use of high modulus geosynthetics (i.e., geotextiles or geogrid) could also be considered after underground work such as utility construction is completed. Prior to placing the geotextile or geogrid, we recommend that all below grade construction, such as utility line installation, be completed to avoid damaging the geotextile or geogrid. Equipment should not be operated above the geotextile or geogrid until one full lift of granular fill is placed above it. The maximum particle size of granular material placed over geotextile geotextile or geogrid should not exceed 1-1/2 inches.

Undercutting and replacement of soft or loose subgrade soil in localized areas should be anticipated for this project and could be addressed contractually through allowances and unit prices.

Further evaluation of the need and recommendations for subgrade stabilization can be provided during construction as the geotechnical conditions are exposed.

Excavation Considerations

Excavatability

We anticipate that excavation of soil can generally be accomplished with conventional earthmoving equipment. Large obstructions, like existing foundations, if encountered, will be more difficult to excavate and could require hammering (e.g., hydraulic hoe ram) to break up before removal from the site.

Excavation Safety

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local and/or state regulations.

Excavations or other activities resulting in ground disturbance have the potential to affect nearby structures, pavements, and utilities. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities should be monitored or instrumented for potential ground movements that could negatively affect nearby structures, pavements, and utilities.

Excavation should not be conducted below a downward 1H:1V projection from the bottom edges of existing wall footings or column footings without engineering review of shoring/underpinning requirements and geotechnical observation during construction.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below or within 10 feet of structures, pavements, retaining walls, utilities, or constructed slopes. General fill is material used to achieve grade outside of these areas. Additional recommendations for retaining wall backfill are provided in **Earth Retaining Walls.**

Fill Properties: Material property requirements for general fill and structural fill are given in the following table:

Property	General Fill	Structural Fill
Composition	Free of deleterious material	Free of deleterious material
Maximum particle size	6 inches (or 2/3 of the lift thickness)	3 inches

Property	General Fill	Structural Fill
Fines content	Not limited	Not limited
Plasticity	Not limited	Maximum plasticity index of 30 in upper 2 feet below design subgrade Not limited more than 2 feet below design subgrade
Standard Proctor Maximum Dry Unit Weight	Not limited	At least 90 pcf

Reuse of On-Site Materials: Excavated on-site soil and may be selectively reused as general fill and structural fill with the limitations noted below regarding deleterious materials, fines content, plasticity, maximum particle size, and dry unit weight. Please note, however, that moisture-conditioning of on-site soils may be required to achieve adequate compaction. If existing fill is encountered on site, it may be selectively reused as structural fill or general fill, provided it is free of deleterious material (e.g., organics, debris) and meets the plasticity values given in the table below.

Imported Fill Materials: Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Fine-Grained Soil	CL, CL-ML ML	Liquid Limit less than 50 Plasticity index less than 30
Coarse-Grained Soil	GW, GP, GM, GC, SW, SP, SM, SC	Less than 50% passing No. 200 sieve Liquid Limit less than 50 Plasticity index less than 30
Select Granular Fill[2]	SP, SP-SM, SW, or SW-SM	Less than 12% passing No. 200 sieve Plasticity index less than 10

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)

1. Structural fill should consist of approved materials free of organic matter and debris. Frozen materials should not be used, and fill should not be placed on frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.
2. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site. Additional geotechnical consultation should be provided prior to use of uniformly graded gravel (GP) on the site.
3. NCDOT Class II, Type 1 Select Material, which is a fine aggregate material consisting of crushed stone screenings (washed or unwashed) meeting the grading requirements in Table 1016-1 of the NCDOT Standard Specifications

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	10 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 6 inches in loose thickness when hand-guided equipment (e.g., trench roller, jumping jack, or plate compactor) is used	Same as structural fill
Minimum Compaction Requirements [1,2]	95% of the material's standard Proctor maximum dry density (ASTM D698) more than 1 foot below subgrade. 98% of the material's standard Proctor maximum dry density (ASTM D698) in upper 1 foot of structural fill.	92% of the material's standard Proctor maximum dry density (ASTM D698).
Water Content Range [1]	Low plasticity fine-grained soil (PI<30): -3% to +3% of optimum High plasticity fine-grained soil (PI>=30): 0 to +3% of optimum Coarse-grained soil (SM, SC): -3% to +3% of optimum Coarse-grained clean sand (SP, SW): -5% to +5% of optimum	As required to achieve min. compaction requirements

Item	Structural Fill	General Fill

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D698).
2. Materials not amenable to density testing should be placed and compacted to a stable condition observed by the Geotechnical Engineer or representative.

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should have a minimum vertical face height of 1 foot and a maximum vertical face height of 3 feet and should be cut wide enough to accommodate the compaction equipment. This benching will help provide a positive bond between the fill and natural soils and reduce the possibility of failure along the fill/natural soil interface.

Grading and Drainage

All grades must provide effective drainage away from the building(s) during and after construction and should be maintained throughout the life of the structure(s). Water retained next to the building(s) can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements resulting in cracked slabs and walls.

Subgrade Protection and Repair

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent surface water from ponding on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Construction Observation and Testing

Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proofrolling, placement and compaction of structural fill, backfilling of excavations, and just prior to construction of building floor slabs and pavements.

The earthwork efforts should be observed by the Geotechnical Engineer (Terracon). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill

materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofrolling.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,000 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. 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 to 5 feet below the bottom of the foundation excavation. If existing fill is found below the proposed foundation the hand auger and DCP should be extended to natural soils. In areas where existing fill remains under the proposed building the frequency of testing should be increased. If unanticipated conditions are observed, the Geotechnical Engineer should recommend mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

The proposed structure can be supported by shallow foundations. If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive and Lateral Loads

Item	Description
Maximum Net Allowable Bearing Pressure [1, 2]	3,000 psf
Required Bearing Stratum [3]	Undisturbed low-plasticity (PI<30) native soils or structural fill.

Item	Description
	Footing excavations should be overexcavated, as necessary, such that the footings bear on at least 2 feet of low-plasticity (PI<30) soil.
Minimum Foundation Dimensions [4]	Columns: 2 ft width and 2 ft length Walls: 2 ft width
Ultimate Passive Resistance [5] **(Equivalent fluid pressure)**	300 pcf
Sliding Resistance [6]	0.30 ultimate coefficient of friction
Minimum Embedment below Finished Grade [7]	Columns: 2 feet Walls: 2 feet
Estimated Total Settlement from Structural Loads [2]	Less than about 1 inch under sustained gravity loads
Estimated Differential Settlement [2, 8]	Less than about 1 inch under sustained gravity loads

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. The allowable bearing pressure can be increased by ⅓ for use with the alternative load combinations given in Section 1605.3.2 of the 2018 North Carolina Building Code. Please note, however, that additional foundation settlement will occur under these load combinations. The project structural engineer should select the appropriate footing width to maintain a bearing pressure not exceeding that recommended in this table, and to maintain an appropriate clear distance between footings to prevent overlap of soil stress distributions. Values assume that exterior grades are no steeper than 20% within 10 feet of structure(s).
2. Values provided are for maximum unfactored service loads noted in **Project Description**. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. Unsuitable, unstable, very soft to soft soil, and/or very loose to loose soil should be overexcavated and replaced per the recommendations presented in **Earthwork**.
4. Minimum footing dimensions required to achieve recommended allowable bearing pressure with a factor of safety of at least 2.5.
5. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure. Horizontal movement of the foundation must occur to mobilize full passive resistance values. Apply a factor of safety of at least 2.0 to this value when designing for lateral force resistance.
6. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance is dependent on the bearing pressure which may vary due to load combinations. Horizontal movement of the foundation must occur to mobilize the frictional resistance.

Item	Description

7. Embedment necessary to minimize the effects of frost, to minimize the effects of seasonal water content variations, and to achieve recommended allowable bearing pressure with a factor of safety of at least 2.5. Finished grade is the lowest adjacent grade for perimeter footings and final building pad grade for interior footings. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
8. Differential settlements are for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Design Parameters – Overturning and Uplift Loads

Shallow foundations subjected to overturning loads should be proportioned such that the resultant eccentricity is maintained in the center-third of the foundation (e.g., e < b/6, where b is the foundation width). This requirement is intended to keep the entire foundation area in compression during the extreme lateral/overturning load event. Foundation oversizing may be required to satisfy this condition.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils with consideration to the IBC basic load combinations.

Item	Description
Soil Moist Unit Weight	120 pcf
Soil Effective Unit Weight[1]	57 pcf
Soil weight included in uplift resistance	Soil included within the prism extending up from the top perimeter of the footing at an angle of 0 degrees from vertical to ground surface

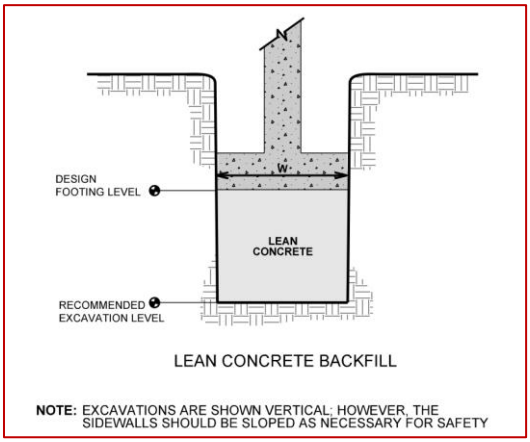
1. Effective (or buoyant) unit weight should be used for soil above the foundation level and below a water level. The high groundwater level should be used in uplift design as applicable.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose/soft soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Very loose to loose soil exposed at the surface of footing excavations may require surficial compaction with hand-held dynamic compaction equipment prior to placing structural fill, steel, and/or concrete. Very loose to loose soil that cannot be adequately compacted should be remediated as described in the following paragraphs.

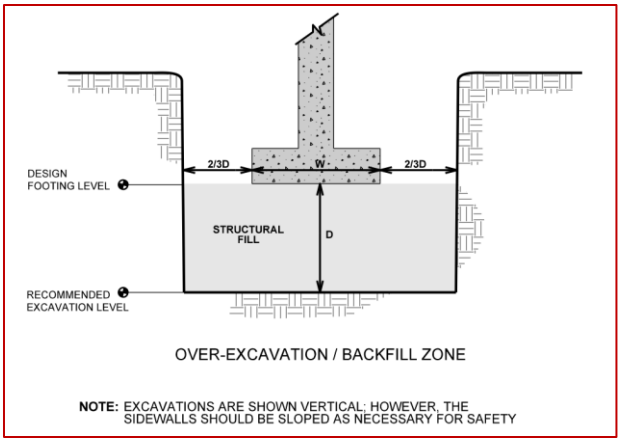
If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level. Alternatively, the footings could bear on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated in the sketch below.



LEAN CONCRETE BACKFILL

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Another option is overexcavation for structural fill placement below footings, which should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation with structural fill placed as recommended in the **Earthwork** section. If poorly-graded gravel (e.g., No. 57 stone) is used, it should be wrapped in a woven geotextile that can be used for both separation and filtration (e.g., Mirafi HP270).



OVER-EXCAVATION / BACKFILL ZONE

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Floor Slabs

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the building.

The on-site soils include high plasticity Fat Clay (CH) that is potentially expansive, exhibiting the potential to swell with increased water content and shrink upon drying. Construction of the floor slabs and revising site drainage creates the potential for gradual changes in water contents within the expansive soils. Increases in water content could cause the expansive soils to swell and damage the floor slabs. Drying of the expansive soils could cause them to shrink and damage the floor slabs. To reduce the swell potential to less than about 1 inch, the upper 2 feet of subgrade soils below the floor slabs (excluding the aggregate base course) should consist of low-plasticity soil.

Floor Slab Design Parameters

Item	Description
Floor Slab Support	Subgrade compacted to recommendations in **Earthwork** For slabs above exterior grades, use 4 inches of base course meeting material specifications of ACI 302 and the 2018 North Carolina Building Code[1]. The base course material should consist of compactible, easy-to-trim granular fill that will remain stable and support construction traffic. Suitable materials include SP, SW, SM, and well-graded gravel (GW or ABC)[2]. For slabs below exterior grades, the base course material should consist of 6 inches of gravel or crushed stone containing no more than 10% passing a No. 4 sieve per the 2018 North Carolina Building Code. Suitable materials include No. 57 and No. 67 stone. A woven filtration/separation geotexile (e.g., Mirafi HP270) should be placed between the base course and the subgrade soil, and pipes should be installed through the foundation walls to allow for drainage of the base course layer to the exterior.
Estimated Modulus of Subgrade Reaction [3]	100 pounds per square inch per inch (psi/in) for point loads

1. A base course is not required by 2018 NC Building Code nor ACI 302 for floor slabs above exterior grade. However, it is good design and construction practice to include a

Item	Description

base course to provide uniform support and improve constructability, especially over fine-grained subgrade soils.

2. Per ACI 360R-12, ABC produces more uniform support and provides an all-weather working surface to speed construction during inclement weather.
3. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction 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. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for concrete floor slabs and wet environments.

Floor slabs should be structurally independent of building and rack footings to reduce the possibility of floor slab cracking caused by differential movements between the slab and footings (unless the slab is structurally designed to accommodate the stresses from the potential differential footing-slab settlements). Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted but could be larger than normal and result in some cracking. Mitigation measures, as noted in **Existing Fill** within **Earthwork**, are critical to the performance of floor slabs. In addition to the mitigation measures, the floor slabs can be stiffened by adding steel reinforcement, grade beams, and/or post-tensioned elements.

Floor Slab 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. As a result, the

floor slab subgrade may not be suitable for placement of base course and concrete, and corrective action will be required to repair the damaged areas.

Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

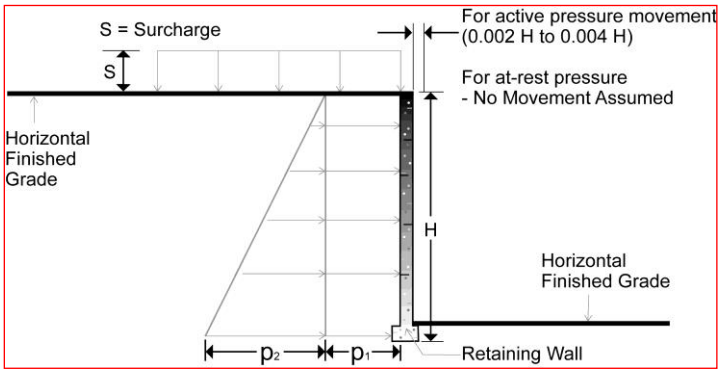
The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab base course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Earth Retaining Walls

Cast-In-Place Concrete Retaining Walls

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction, and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters

Earth Pressure Condition [1]	Backfill Type [2]	Earth Pressure Coefficient	Surcharge Pressure [3] p_1 (psf)	Equivalent Fluid Pressures (psf) [2,4]	
				Un-saturated [5]	Submerged [5]
Active (Ka)	Fine-Grained	0.36	(0.36)S	(43)H	(83)H
At-Rest (Ko)	Fine-Grained	0.53	(0.53)S	(63)H	(93)H
Passive (Kp)	Fine-Grained	2.77	--	(332)H	(220)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.01H to 0.04H for fine-grained soil, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance. Fat clay or other expansive soils should not be used as backfill behind the wall.
2. Uniform, horizontal backfill, with a maximum unit weight of 120 pcf for fine-grained soils
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. To achieve "Unsaturated" conditions, follow guidelines in **Subsurface Drainage for Below-Grade Walls** below. "Submerged" conditions are recommended when drainage behind walls is not incorporated into the design.

Backfill placed against structures should consist of coarse-grained soils or low plasticity fine-grained soils. For the values given in the previous table to be valid, the backfill must extend out and up from the base of the wall at an angle of at least 45 degrees from vertical.

The lateral earth pressure recommendations given in this section are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity

type concrete walls. These recommendations are not applicable to the design of modular block - geogrid reinforced backfill walls (also termed MSE walls). Recommendations covering these types of wall systems are beyond the scope of services for this assignment. However, we would be pleased to develop a proposal for evaluation and design of such wall systems upon request.

Pavements

Pavement Materials

Pavement section materials should be in accordance with NCDOT City of Raleigh specifications and standard details.

General Pavement Comments

Pavement section thicknesses are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement section thicknesses noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

A California Bearing Ratio (CBR) of 5 was used to determine recommended pavement section thicknesses for the asphaltic concrete (AC) pavement. A modulus of subgrade reaction of 100 psi/in was used to develop the Portland cement concrete (PCC) pavement section thickness recommendations. These values are based on the laboratory test results and are based on our expectation of the quality of the subgrade as prescribed in **Earthwork**.

Pavement Section Thicknesses

The following table provides our opinion of minimum thickness for AC sections for drives and parking areas:

Asphalt Pavement Sections

Layer [2]	Thickness (inches)	
	Light Duty [1]	Heavy Duty [1]
Asphalt Surface Course	3 [3]	3 [3]
Aggregate Base Course (ABC)	6	8

1. See **Project Description** for more specifics regarding traffic information and assumptions.
2. All materials should meet the current North Carolina Department of Transportation (NCDOT) Standard Specifications for Highway and Bridge Construction.
   - Asphalt Surface - NCDOT Type S9.5B Asphaltic Cement Concrete: Division 6, Section 610
   - Asphalt Intermediate Course – NCDOT Type 19.0C Asphaltic Cement Concrete: Division 6, Section 610
   - Asphalt Base - NCDOT Type B25.0C Asphaltic Cement Concrete: Division 6, Section 610
   - Aggregate Base Course – NCDOT ABC: Division 10, Section 1005
3. Placed in two equal-thickness lifts Placed in two equal lifts

The following table provides our estimated minimum thickness of concrete pavements for drives, and parking areas:

Pavement Sections

Layer [2]	Thickness (inches)	
	Medium Duty [1,4]	Heavy Duty [1]
Concrete [3]	5	5.5
Aggregate Base Course (ABC)	6	8

1. See **Project Description** for more specifics regarding traffic classifications.
2. All materials should meet the current North Carolina Department of Transportation (NCDOT) Standard Specifications for Highway and Bridge Construction.
   - Concrete Pavement - NCDOT Portland Cement Concrete: Division 7, Section 710 and Division 10, Section 1000.
   - Aggregate Base Course – NCDOT ABC: Division 10, Section 1005
3. Concrete Pavement – Air entrained with a minimum compressive strength of 4,000 psi after 28 days of laboratory curing per ASTM C31.
4. Medium duty concrete pavement recommended for loading docks and dumpster pads.

Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or

aggregate shoulders) should be planned along curves and areas of maneuvering vehicles.

Although not required for structural support, a minimum 4-inch-thick base course layer under concrete pavements is recommended to help reduce potential for slab curl, shrinkage cracking, and subgrade pumping through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer. PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with ACI 330 and ACI 325.

Where practical, we recommend early-entry cutting of crack-control joints in concrete pavements. Cutting of the concrete in its "green" state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

The placement of a partial pavement thickness for use during construction is not recommended without a detailed pavement analysis incorporating construction traffic. In addition, we should be contacted to confirm the traffic assumptions outlined above. If the actual traffic varies from the assumptions outlined above, modification of the pavement section thickness could be required.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. Islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils are particular areas of concern. The civil design for the pavements with these conditions should include features to restrict or collect and discharge excess water from the islands. Examples of features are edge drains connected to the stormwater collection system, longitudinal subdrains, or other suitable outlets and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations 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. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services 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.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and

recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

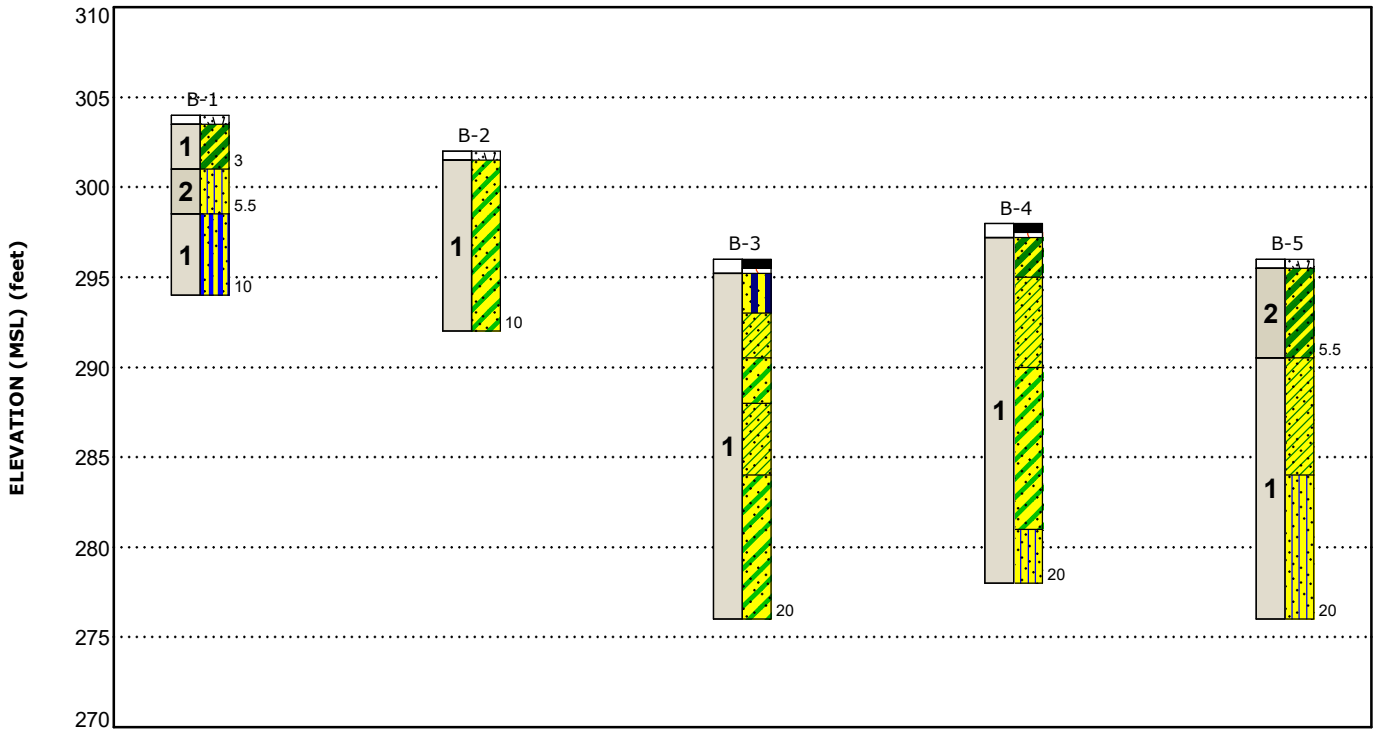
Figures

Contents:

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Residuum 1	Medium Stiff to Stiff Clay and Silt, Loose to Medium Dense Silty Sand and Clayey Sand (N<=15 bpf)
2	Residuum 2	Very Stiff Clay, Medium Dense Silty Sand (15 bpf<N<30 bpf)

Legend

- Topsoil
- Silty Sand
- Clayey Sand
- Aggregate Base Course
- Sandy Lean Clay
- Sandy Fat Clay
- Sandy Silt
- Asphalt
- Sandy Elastic Silt

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

Attachments

Exploration and Testing Procedures

Field Exploration

SPTs

Number of Borings	Approximate Boring Depth (feet)	Location
3	20	Building area
2	10	Site retaining wall area

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment and referencing existing site features (estimated horizontal accuracy of about ±20 feet). Approximate ground surface elevations were obtained from the Wake County GIS website.

Subsurface Exploration Procedures: We advanced the borings with a rotary drill rig using hollow stem augers. Four split-spoon samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-spoon sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration was recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths.

We observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. The attached boring logs provide groundwater information, including groundwater depths, if boreholes were dry, and/or borehole cave-in depths.

For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with cold-mix asphalt, as appropriate.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our geotechnical laboratory for testing and classification by geotechnical staff. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

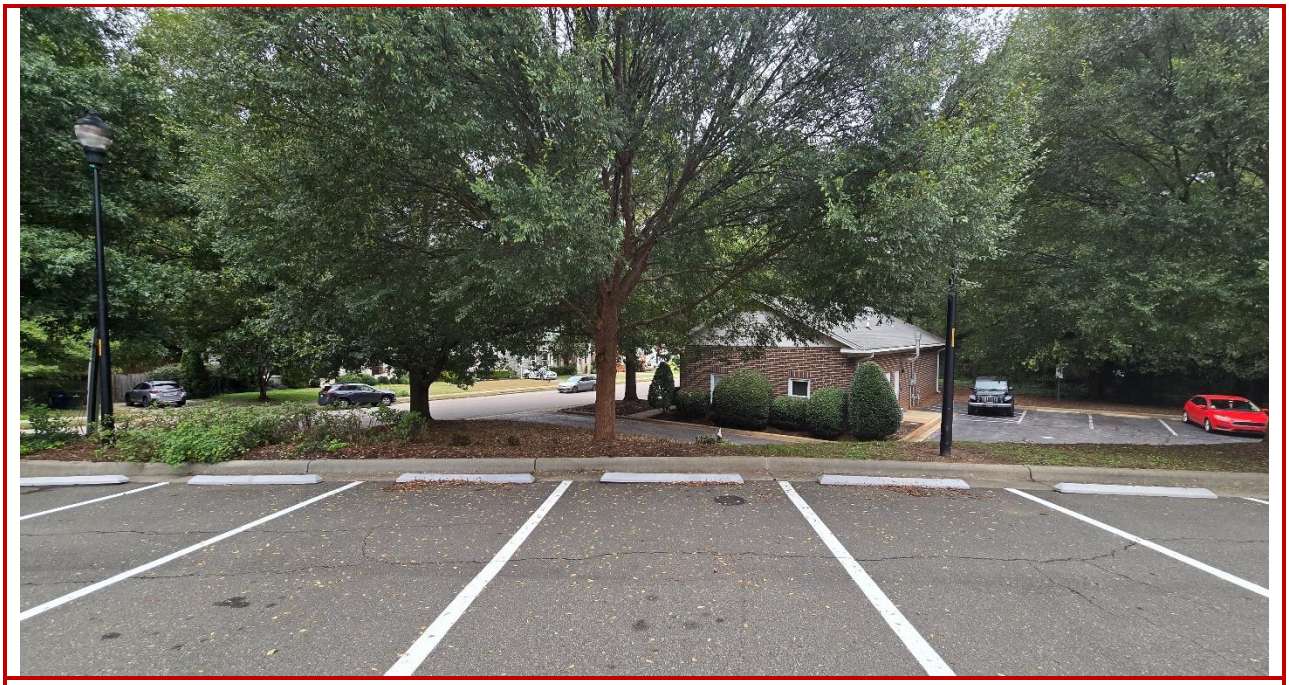
Laboratory Testing

Geotechnical staff reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Water content
- Atterberg limits
- Grain size analysis
- Moisture-density relationship (standard Proctor)
- California Bearing Ratio

The laboratory testing program included classification of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Photography Log



North view near location B-1 on October 1, 2024.

East view near location B-2 on October 22, 2024.

Southeast view near location B-3 on October 22, 2024.

North view near location B-4 on October 22, 2024.

South view near location B-4 on October 1, 2024.

South view near location B-5 on October 1, 2024.

Site Location and Exploration Plans

Contents:

Note: All attachments are one page unless noted above.

Site Location

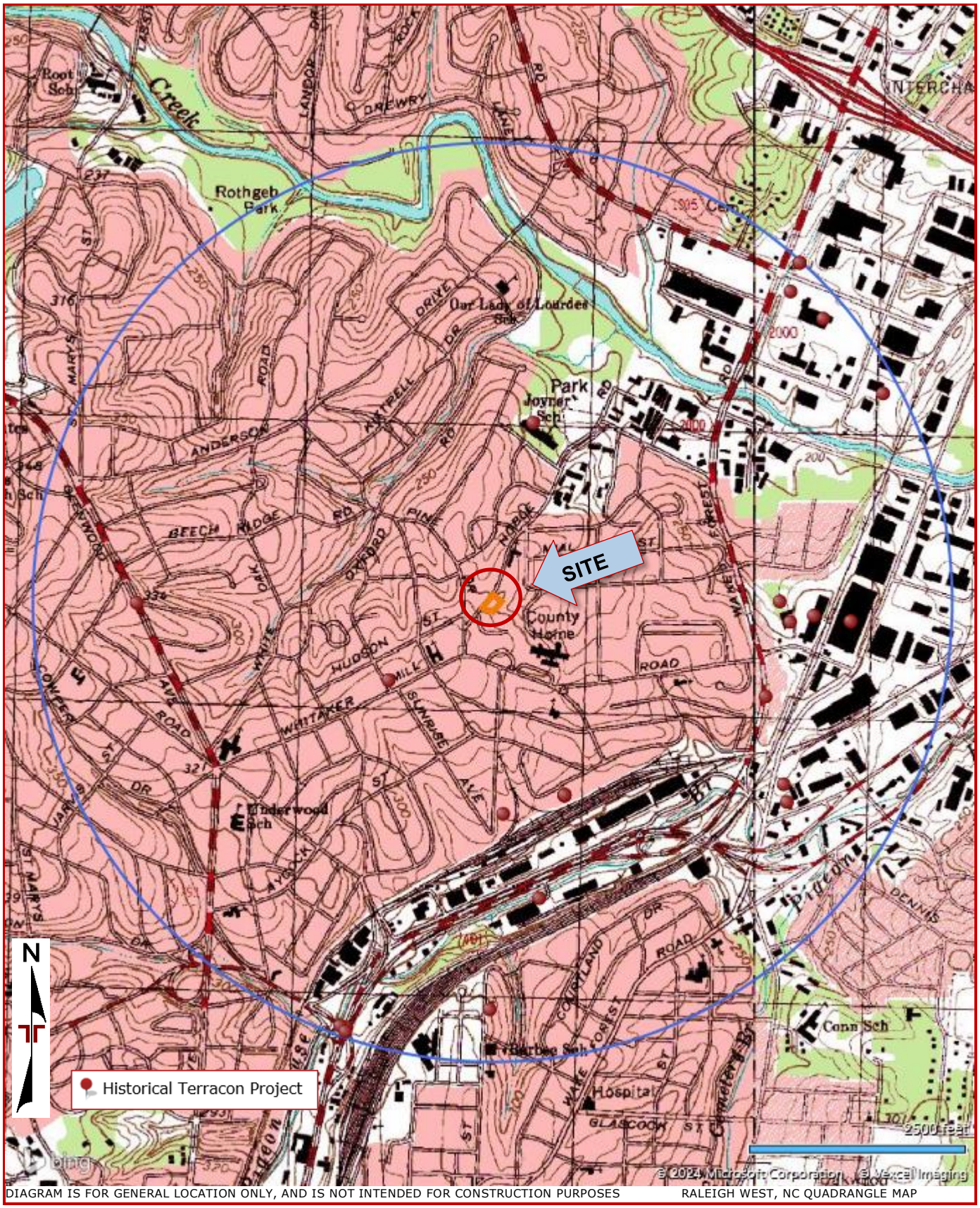


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES RALEIGH WEST, NC QUADRANGLE MAP

Exploration Plan

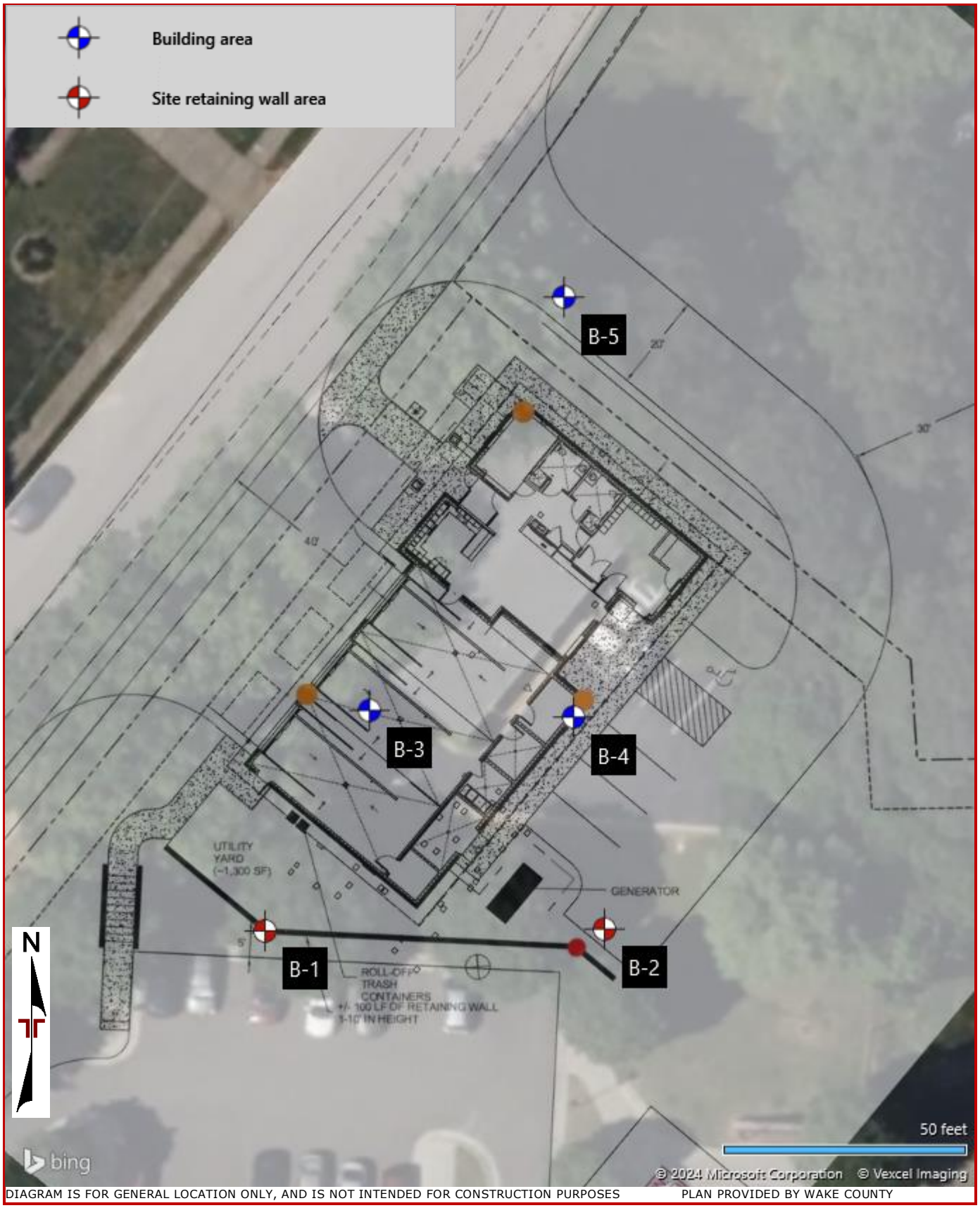


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES PLAN PROVIDED BY WAKE COUNTY

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Boring Log No. B-1

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.8091° Longitude: -78.6353° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		0.5 **MULCH and TOPSOIL**, 6 inches							
1		**SANDY FAT CLAY (CH)**, with silt, red, stiff				4-6-6 N=12			
		3.0							
2		**SILTY SAND (SM)**, fine to medium grained, red and purple, medium dense				5-7-9 N=16	21.6	55-30-25	46
		5.5	5						
1		**SANDY SILT (ML)**, red and purple, stiff				6-7-7 N=14			
		10.0				6-7-6 N=13			
		Boring Terminated at 10 Feet	10						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations were interpolated from Wake County GIS website.

Samples obtained using a 2" O.D. split spoon sampler

Water Level Observations
Groundwater not encountered

Cave dry at 8.3ft

Drill Rig
3230DT GeoProbe

Hammer Type
Automatic

Driller
S. Harig

Logged by
G. Goslin

Boring Started
10-24-2024

Boring Completed
10-24-2024

Notes

Advancement Method
2-1/4" hollow-stem augers

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Boring Log No. B-2

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 35.8091° Longitude: -78.6351° Depth (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		0.5 **TOPSOIL**, 6 inches							
1		**CLAYEY SAND (SC)**, fine grained, orange and brown, loose	5			4-4-5 N=9	21.9		
						4-3-4 N=7			
						3-2-3 N=5	26.7		
		10.0	10			2-3-4 N=7			
		Boring Terminated at 10 Feet							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations were interpolated from Wake County GIS website.

Samples obtained using a 2" O.D. split spoon sampler

Water Level Observations
Groundwater not encountered

Cave dry at 7.5ft

Drill Rig
3230DT GeoProbe

Hammer Type
Automatic

Driller
S. Harig

Logged by
G. Goslin

Boring Started
10-24-2024

Boring Completed
10-24-2024

Notes

Advancement Method
2-1/4" hollow-stem augers

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Boring Log No. B-3

Location: See Exploration Plan

Latitude: 35.8092° Longitude: -78.6353°

Model Layer	Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		0.5	**ASPHALT**, 6 inches							
		0.8	**AGGREGATE BASE COURSE**, 3 inches							
1			**SANDY ELASTIC SILT (MH)**, red and purple, stiff				3-3-5 N=8	29.9	53-33-20	68
		3.0	**SANDY LEAN CLAY (CL)**, purple and red, stiff				3-4-5 N=9			
		5.5	**CLAYEY SAND (SC)**, red and brown, medium dense	5			3-5-6 N=11			
		8.0	**SANDY LEAN CLAY (CL)**, orange and brown, medium stiff				3-3-5 N=8			
		12.0	**CLAYEY SAND (SC)**, purple and brown, loose to medium dense	10						
				15			3-3-5 N=8			
		20.0					3-4-6 N=10			
			Boring Terminated at 20 Feet	20						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations were interpolated from Wake County GIS website.

Samples obtained using a 2" O.D. split spoon sampler

Water Level Observations
Groundwater not encountered

Cave dry at 14.6ft

Drill Rig
3230DT GeoProbe

Hammer Type
Automatic

Driller
S. Harig

Logged by
G. Goslin

Boring Started
10-24-2024

Boring Completed
10-24-2024

Notes

Advancement Method
2-1/4" hollow-stem augers

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with asphalt

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Boring Log No. B-4

Location: See Exploration Plan

Latitude: 35.8092° Longitude: -78.6351°

Model Layer	Graphic Log	Depth (Ft.)	Description	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		0.5	**ASPHALT**, 6 inches						
		0.8	**AGGREGATE BASE COURSE**, 3 inches						
1			**SANDY FAT CLAY (CH)**, with silt, orange, red, and purple, medium stiff			2-3-3 N=6			
		3.0	**SANDY LEAN CLAY (CL)**, red, orange, and purple, medium stiff			3-3-4 N=7	29.8		
						3-2-4 N=6			
		8.0	**CLAYEY SAND (SC)**, fine grained, purple and red, loose			3-4-5 N=9			
		17.0	**SILTY SAND (SM)**, fine to medium grained, red and tan, medium dense			3-4-5 N=9			
		20.0				3-5-5 N=10			
			Boring Terminated at 20 Feet						

Depth (Ft.): 5, 10, 15, 20

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations were interpolated from Wake County GIS website.

Samples obtained using a 2" O.D. split spoon sampler

Water Level Observations
Groundwater not encountered

Cave dry at 18.9ft

Drill Rig
3230DT GeoProbe

Hammer Type
Automatic

Driller
S. Harig

Logged by
G. Goslin

Boring Started
10-24-2024

Boring Completed
10-24-2024

Notes

Advancement Method
2-1/4" hollow-stem augers

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with asphalt

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Boring Log No. B-5

Location: See Exploration Plan

Latitude: 35.8094° Longitude: -78.6351°

Model Layer	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
	0.5	**PINE STRAW and TOPSOIL**, 6 inches							
2	5.5	**SANDY FAT CLAY (CH)**, with silt, purple and red, very stiff	5			9-10-13 N=23 8-12-14 N=26	22.1	72-25-47	68
1	12.0	**SANDY LEAN CLAY (CL)**, trace mica, red and orange, stiff	10			6-6-8 N=14 5-7-8 N=15			
	20.0	**SILTY SAND (SM)**, fine grained, tan, medium dense	15	▨		4-6-6 N=12 4-4-6 N=10			
		Boring Terminated at 20 Feet	20						

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation Reference: Elevations were interpolated from Wake County GIS website.

Samples obtained using a 2" O.D. split spoon sampler

Water Level Observations
Groundwater not encountered

▨ Cave dry at 15.2ft

Drill Rig
3230DT GeoProbe

Hammer Type
Automatic

Driller
S. Harig

Logged by
G. Goslin

Boring Started
10-24-2024

Boring Completed
10-24-2024

Notes

Advancement Method
2-1/4" hollow-stem augers

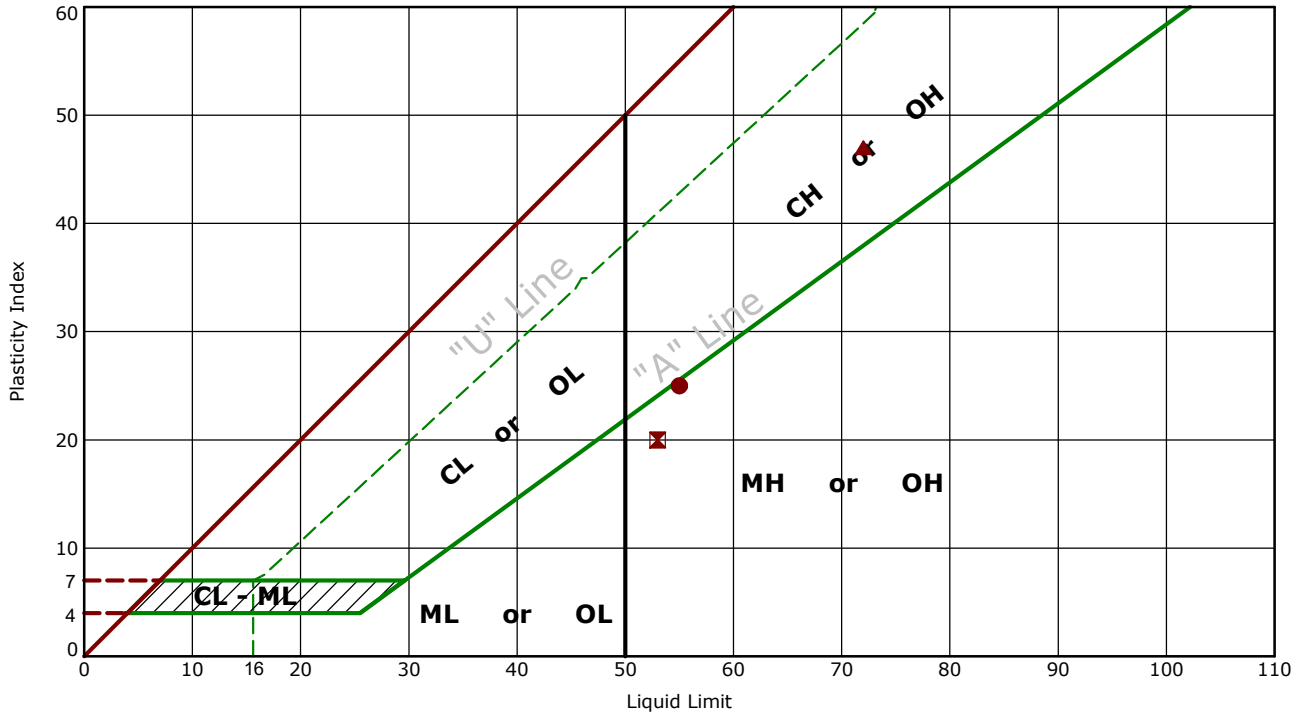
Abandonment Method
Boring backfilled with auger cuttings upon completion.

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

2401 Brentwood Rd Ste 107
Raleigh, NC

Atterberg Limit Results

ASTM D4318



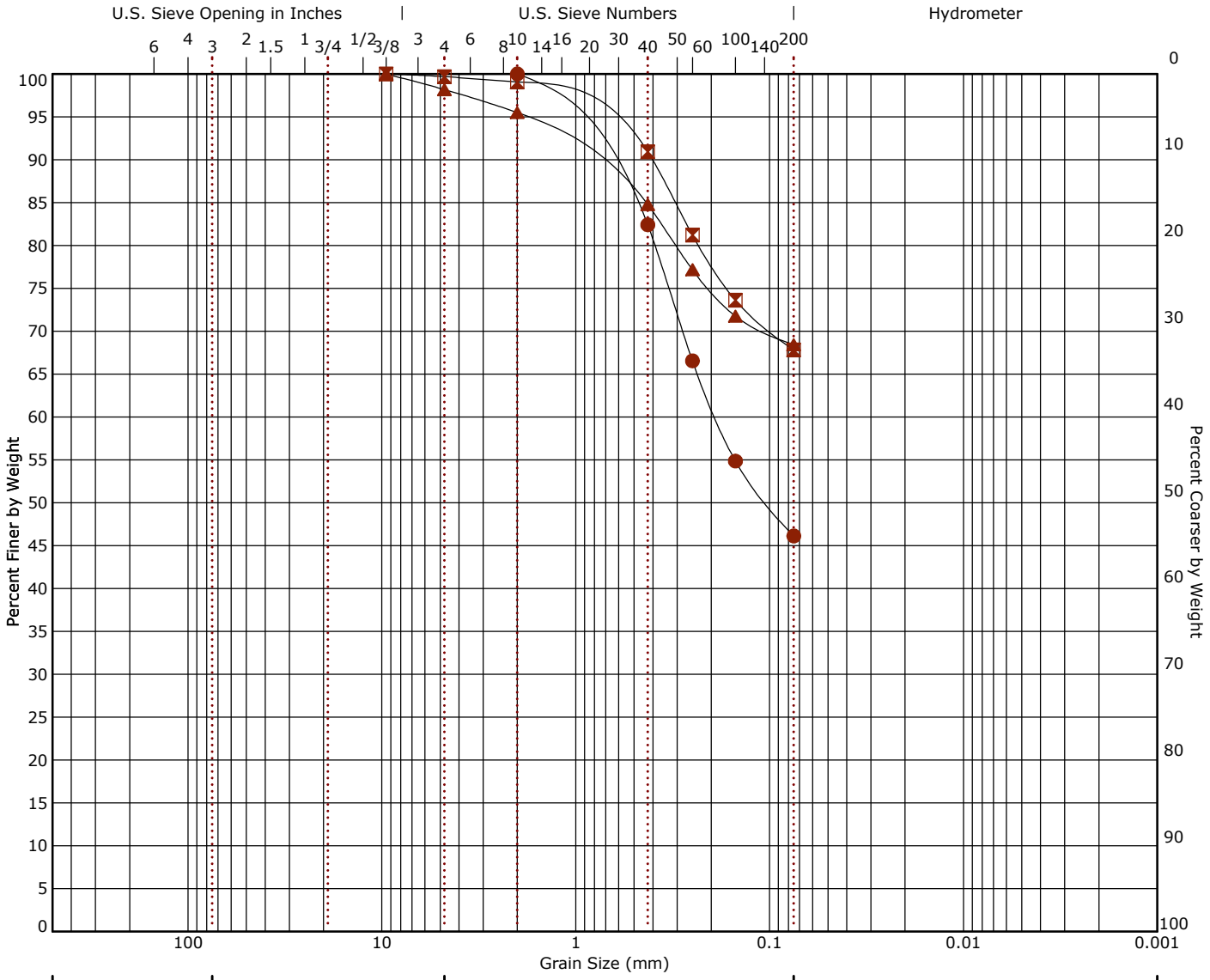
	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-1	3.5 - 5	55	30	25	46.1	SM	SILTY SAND
⊠	B-3	1 - 2.5	53	33	20	67.8	MH	SANDY ELASTIC SILT
▲	B-5	0.9 - 5.8	72	25	47	68.4	CH	SANDY FAT CLAY

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

Grain Size Distribution

ASTM D422 / ASTM C136 / AASHTO T27



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID	Depth	% Cobbles	% Gravel	% Sand	% Fines	% Silt	% Clay	USCS
● B-1	3.5 - 5	0.0	0.0	53.9	46.1			SM
⊠ B-3	1 - 2.5	0.0	0.3	31.9	67.8			MH
▲ B-5	0.9 - 5.8	0.0	1.8	29.7	68.4			CH

Description	
●	SILTY SAND
⊠	SANDY ELASTIC SILT
▲	SANDY FAT CLAY

Remarks	
●	
⊠	
▲	

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	3/8"	100.0	3/8"	100.0
#40	82.41	#4	99.69	#4	98.18
#60	66.54	#10	99.08	#10	95.5
#100	54.86	#40	90.94	#40	84.78
#200	46.13	#60	81.21	#60	77.17
		#100	73.62	#100	71.76
		#200	67.81	#200	68.44

Grain Size			
	●	⊠	▲
D_{60}	0.188		
D_{10}			

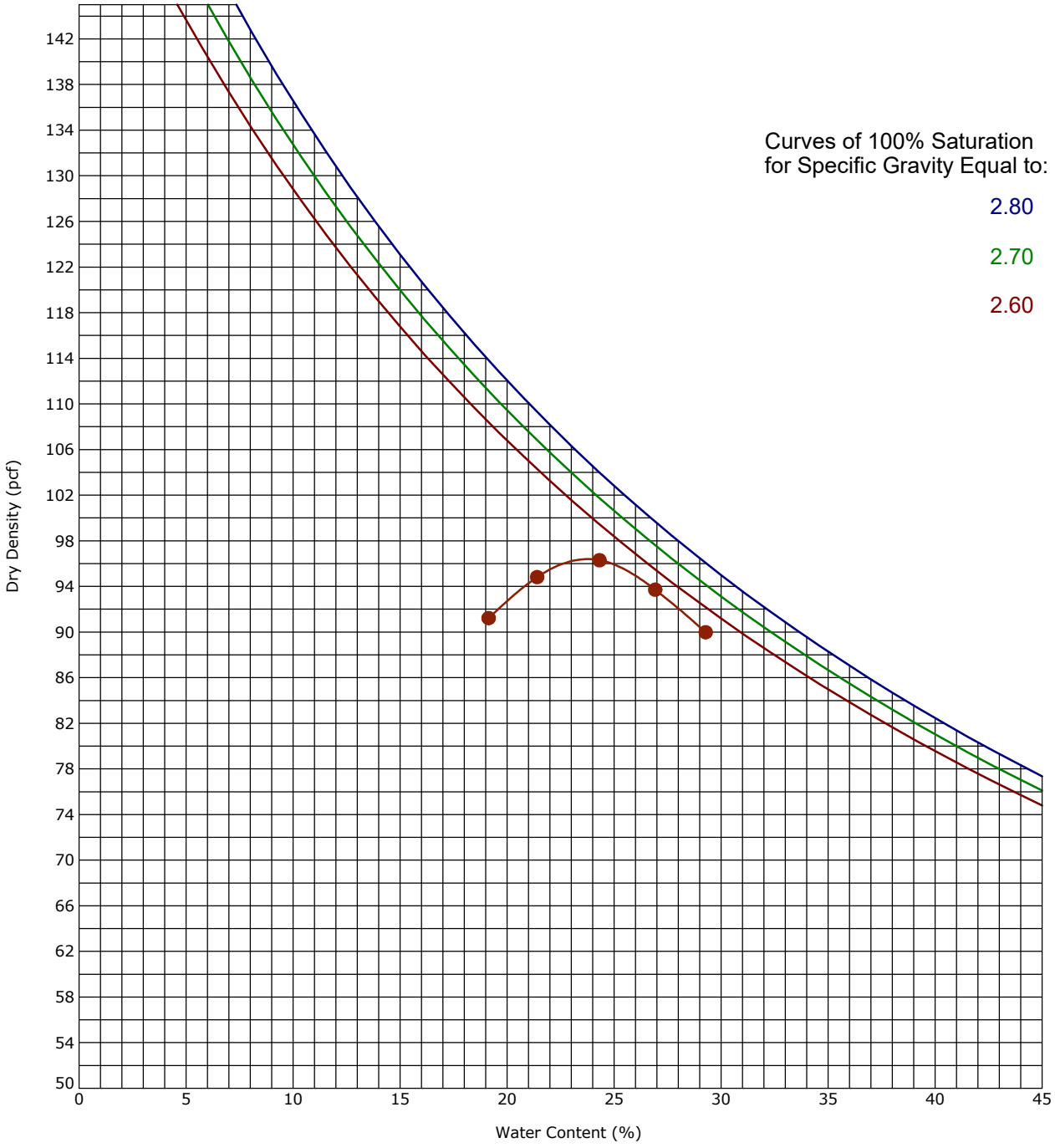
Coefficients			
	●	⊠	▲
C_c			
C_u			

Whitaker Mill EMS
2020 Noble Road | Raleigh, NC
Terracon Project No. 70245228

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

Moisture-Density Relationship

ASTM D698-Method A



Boring ID	Depth (Ft)	Description of Materials
B-5	0.9 - 5.8	SANDY FAT CLAY(CH)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
68	0.0	72	25	47	ASTM D698-Method A	96.4	23.7

REPORT FOR CALIFORNIA BEARING RATIO

Service Date: 11/05/24
Report Date: 11/12/24

Terracon
3150 Spring Forest Road, Suite 100
Raleigh, North Carolina 27616
919-873-2211

Client

Wake County NC
Attn: Tommy Moorman
336 S. Fayetteville Street
Suite 1100
Raleigh, North Carolina 27601

Project

Whitaker Mill EMS
2020 Noble Road
Raleigh, North Carolina 27608

Project No. 70245228

SAMPLE INFORMATION

Sample Number:	Bulk Sample	Proctor Method:	ASTM D698 - Method A
Boring Number:	B-5	Maximum Dry Density (pcf):	96.4
Sample Location:	Bulk Sample	Optimum Moisture:	23.7
Depth:	0.9 - 5.8'	Liquid Limit:	72
Material Description:	Brown-Red Sandy Fat Clay	Plasticity Index:	47

CBR TEST DATA

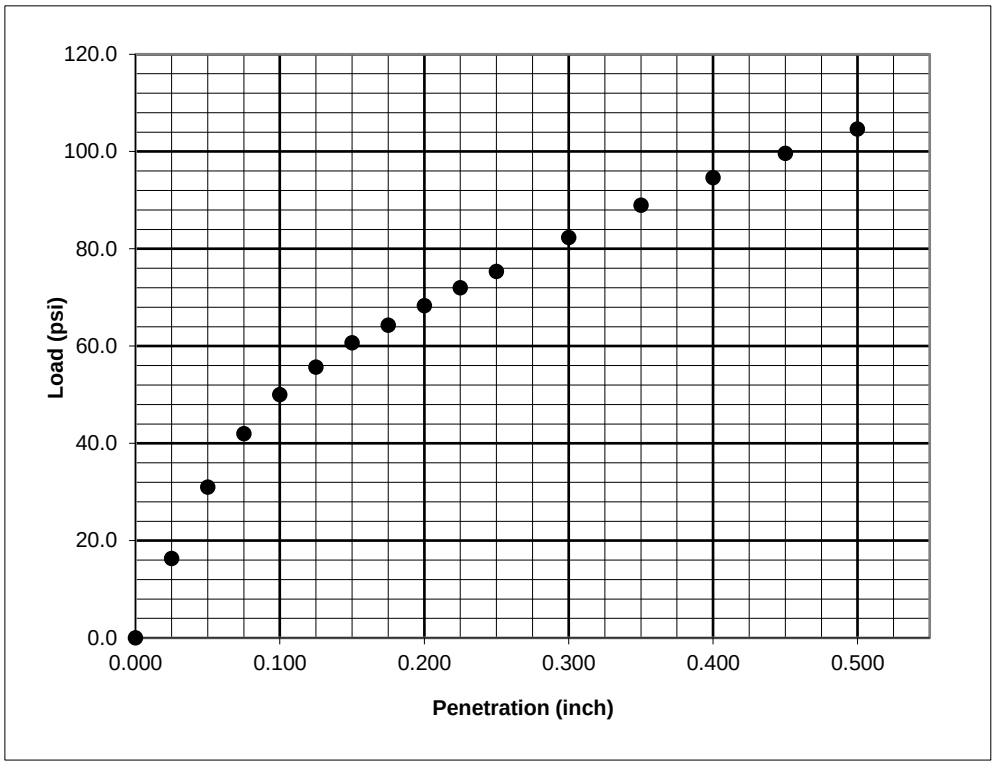
CBR Value at 0.100 inch	**5.0**
CBR Value at 0.200 inch	**4.6**
Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	1.1

DENSITY DATA

Dry Density Before Soaking (pcf)	92.0
Compaction of Proctor (%)	95.5

MOISTURE DATA

Before Compaction (%)	24.8
After Compaction (%)	24.1
Top 1" After Soaking (%)	32.7
Average After Soaking (%)	27.9



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Gunnar Goslin
Contractor:

Report Distribution

Reviewed by: _____
Gunnar Goslin
Geotechnical Project Manager

Test Methods: ASTM D1883

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

Terracon
3150 Spring Forest Rd Ste 100
Raleigh, NC

General Notes

Sampling	Water Level	Field Tests
 Grab Sample  Standard Penetration Test	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time  Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (tsf)**	**Standard Penetration or N-Value (Blows/Ft.)**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

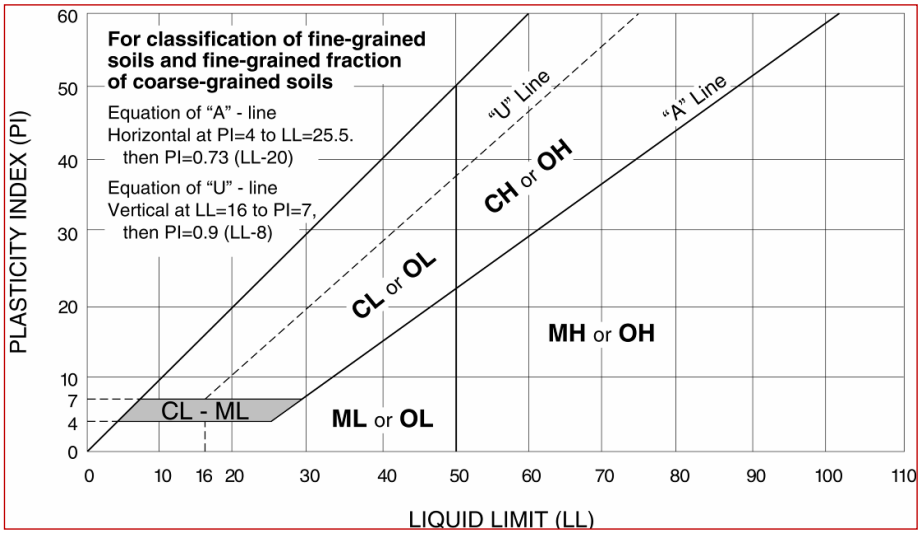
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels 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.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 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.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



CITY OF RALEIGH STANDARD NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH STANDARD DETAILS AND SPECIFICATIONS.
2. IF UNFORESEEN CONDITIONS DEVELOP DURING CONSTRUCTION, REFER TO "RALEIGH STREET DESIGN MANUAL" AND CONTACT PUBLIC WORKS DEPARTMENT STAFF FOR FURTHER GUIDANCE.
3. ALL SIGNAGE SHALL ADHERE TO MUTCD STANDARDS AND SPECIFICATIONS.
4. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE A MEETING WITH THE CITY'S PUBLIC WORKS DEPARTMENT/TRANSPORTATION OPERATIONS DIVISION TO REVIEW THE SPECIFIC COMPONENTS OF THE PLAN
5. AND OPERATION OF THESE FACILITIES DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL OBTAIN A RIGHT-OF-WAY OBSTRUCTION PERMIT FOR ANY WORK WHICH REQUIRES THE OBSTRUCTION OF A SIDEWALK, TRAVEL LANE, OR FULL STREET FROM THE RIGHT-OF-WAY SERVICES PERMITTING COORDINATOR AT 919-996-2483 OR HTTPS://RALEIGHNC.SEAMLESSDOCS.COM/F/EMERGENCYCLOSURE NO LESS THAN FORTY-EIGHT (48) HOURS IN ADVANCE OF LANE CLOSURES, AND NO LESS THAN TWO (2) WEEKS IN ADVANCE OF STREET CLOSURE.
7. THE CONTRACTOR MUST CONTACT THE PARKING SECTION 919-996-4047 OF TRANSPORTATION OPERATIONS IF ANY WORK VEHICLES OR DUMPSTERS WILL OCCUPY PARKING SPACES.
8. NO PLACEMENT OF EQUIPMENT OR MATERIALS IS ALLOWED OUTSIDE OF THE APPROVED AREA.
9. THE SIDEWALK AND PAVEMENT SHALL BE FREE AND CLEAR OF DEBRIS AT ALL TIMES.
10. ALL SIDEWALKS ARE PUBLIC AND MUST BE ACCESSIBLE TO PEDESTRIANS WHO ARE VISUALLY IMPAIRED AND/OR PEOPLE WITH MOBILITY DISABILITIES. EXISTING AND ALTERNATIVE PEDESTRIAN ROUTES DURING CONSTRUCTION SHALL BE REQUIRED TO BE COMPLIANT WITH THE PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG), 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
11. CONSTRUCTION FENCING SHOULD NOT ENCROACH INTO THE PUBLIC RIGHT OF WAY. IF IT DOES, IT MUST BE MOVABLE IN CASE ADJUSTMENTS HAVE TO BE MADE. NO DRILLING, BORING OR ANY PERMANENT FASTENING OF THE FENCE IS ALLOWED IN THE PUBLIC RIGHT OF WAY.
12. IT IS THE APPLICANT'S RESPONSIBILITY TO VERIFY ANY DOWNTOWN EVENT CLOSURE DATES. NO WORK SHALL OCCUR DURING SAID DATES. ANY FENCING SHALL BE MOVED TO ACCOMMODATE PEDESTRIANS AND EVENTS.
13. FIELD ADJUSTMENTS TO THIS PLAN MAY BE REQUIRED BY THE CITY OF RALEIGH AS NEEDED DURING CONSTRUCTION.
14. ANY DAMAGE TO THE RIGHT OF WAY SHALL BE REPAIRED PER CITY OF RALEIGH SPECIFICATIONS AT NO COST TO THE CITY.
15. ACCESS TO ALL DRIVEWAYS AND SIDE STREETS SHALL BE MAINTAINED AT ALL TIMES. FURTHER INFORMATION AND CONTACTS CAN BE FOUND ON WWW.RALEIGHNC.GOV UNDER "RIGHT OF WAY AND SIDEWALK CLOSURES".

2017 NOBLE RD
0.18 ACRES
ZONING: RA
LAND-USE: SINGLE FAMILY
MUNDT, KARL
MUNDT, JENNIFER
2017 NOBLE RD
RALEIGH, NC 27608
WAKE COUNTY
DB 016759, PG 1207
PIN: 1704-89-0863
REID: 0077345

2013 NOBLE RD
0.17 ACRES
ZONING: RA
LAND-USE: SINGLE FAMILY
THORNTON, EDSEL RAY
2013 NOBLE RD
RALEIGH, NC 27608
WAKE COUNTY
DB 019189, PG 1280
PIN: 1704-89-0747
REID: 0070585

2009 NOBLE RD
0.19 ACRES
ZONING: RA
LAND-USE: SINGLE FAMILY
MASON, EDWARD A
MASON, ALLISON
2129 BUCKINGHAM RD
RALEIGH, NC 27607
WAKE COUNTY
DB 017414, PG 543
PIN: 1704-89-0710
REID: 0030274

2024 NOBLE RD
ZONING: R-10
LAND-USE: CIVIC
N/F
WAKE COUNTY
DB 276, PG 349
BM 2010, PG 241
PIN: 1704-89-3731
REID: 0122615
AREA
84,426 SQ. FT.
1.94 ACRES

401 E WHITAKER MILL RD
8.90 ACRES
ZONING: R-10
LAND-USE: CIVIC
N/F
WAKE COUNTY
DB 324, PG 519
BM 2010, PG 241
PIN: 1704-89-2333
REID: 0113601

NOBLE ROAD
(64' PUBLIC R/W)

WAKE HOUSE
VISITATION CENTER
ONE STORY
BRICK

EMS
STATION
REF: ARCH PLANS

DETECTABLE WARNING SURFACE, TYP.
6' WIDE CONCRETE SIDEWALK
30" STD. CONCRETE CURB AND GUTTER, TYP. REFER TO DETAIL ON SHEET C9.00
HEAVY DUTY CONCRETE, TYP. REFER TO DETAIL ON SHEET C9.00
FLUSH CURB
30' WIDE DRIVEWAY
END 24" STD. CONCRETE CURB AND GUTTER, TYP.
CURB TERMINUS, REFER TO DETAIL ON SHEET C9.00
SHORT-TERM BICYCLE PARKING, REFER TO DETAIL ON SHEET C9.01
30" STD. CONCRETE CURB AND GUTTER (TYP.)
6' WIDE CONCRETE SIDEWALK, REFER TO DETAIL ON SHEET C9.00
MONUMENT SIGN, REF: ARCH. PLANS
MEDIUM DUTY CONCRETE, TYP. REFER TO DETAIL ON SHEET C9.00
20' TALL FLAGPOLE, REFER TO DETAIL ON SHEET C9.01
6" TRENCH DRAIN, REFER TO DETAIL ON SHEET C9.10
24" CONCRETE SPILL CURB AND GUTTER, TYP.
24" STD. CONCRETE CURB AND GUTTER, TYP.
PEDESTRIAN ACCESS POINT
HEAVY DUTY CONCRETE
CURB TERMINUS, REFER TO DETAIL ON SHEET C9.00
DETECTABLE WARNING SURFACE, TYP.
33' WIDE SERVICE DRIVEWAY
6" BOLLARD, TYP. REFER TO DETAIL ON SHEET C9.01
REPAIR UTILITY TRENCH PER C.O.R. DETAIL W-2, SEE SHEET C9.10
24" STD. CONCRETE CURB AND GUTTER, TYP.
CURB TERMINUS, REFER TO DETAIL ON SHEET C9.00
10' BUILDING SETBACK
30" STD. CONCRETE CURB AND GUTTER (TYP.)
6' WIDE CONCRETE SIDEWALK
5' WIDE CONCRETE SIDEWALK
ROLL-OFF TRASH CONTAINERS TO BE BROUGHT TO THE STREET FOR TRASH COLLECTION SERVICES
DOUBLE GATE REF: ARCH PLANS
CMU WALL, APPEARANCE TO MATCH BUILDING REF: ARCH PLANS
STAIRCASE WITH CHEEK WALLS, REFER TO DETAIL ON SHEET C9.01
UTILITY YARD (~1,000 SF) REFER TO DETAIL ON SHEET C9.01
3 A/C UNITS, REFER TO MECHANICAL PLANS
CMU WALL TO BE OFFSET 4" FROM RETAINING WALL
DUKE ENERGY TRANSFORMER ON CONCRETE PAD REF: ELECTRICAL PLANS
CMU WALL TO BE OFFSET 4" FROM RETAINING WALL
DUKE ENERGY LIGHT POLE
57 STONE GRAVEL YARD OVER GEOTEXTILE FABRIC SEE DETAIL ON SHEET C9.01
CIP RETAINING WALL #1 LENGTH: 128' MAX HEIGHT: 10' REF: STRUCTURAL PLANS
DUKE ENERGY LIGHT POLE
GENERATOR ON CONCRETE PAD REF: ELECTRICAL PLANS
CURB RAMP
ADA PARKING SIGN
MEDIUM DUTY CONCRETE, TYP. REFER TO DETAIL ON SHEET C9.00
6" TRENCH DRAIN, REFER TO DETAIL ON SHEET C9.10
2' WIDE CONCRETE FLUME, REFER TO DETAIL ON SHEET C9.01
PROPERTY LINE
10' BUILDING SETBACK
24" CONCRETE SPILL CURB AND GUTTER, TYP.
DUKE ENERGY LIGHT POLE

SITE PLAN LEGEND

- PROPERTY LINE
- BUILDING SETBACK LINE
- FENCE
- HEAVY-DUTY CONCRETE
- MEDIUM DUTY CONCRETE
- FLAG POLE
- BIKE RACKS
- PARKING SIGN
- MONUMENT SIGN
- ROLL-OFF TRASH CAN
- A/C UNIT
- BOLLARD
- BUILDING

GENERAL LAYOUT PLAN NOTES:

1. ANY DISCREPANCIES IN THE LAYOUT TO BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT IMMEDIATELY. WORK SHOULD CEASE UNTIL DISCREPANCIES ARE ADDRESSED & SOLVED.
2. ALL PROPOSED SURFACES TO MEET OTHER PROPOSED & EXISTING SURFACES FLUSH.
3. REFER TO DIMENSIONS, DO NOT SCALE DRAWINGS.
4. LANDSCAPE ARCHITECT TO APPROVE LAYOUT IN FIELD PRIOR TO STARTING WORK.
5. PROVIDE EXPANSION JOINT WHERE PROPOSED CONCRETE PAVING MEETS EXISTING.
6. ALL SITE FURNISHINGS TO BE FIELD LOCATED BY LANDSCAPE ARCHITECT.
7. SIGN PERMITS WILL BE SUBMITTED AND PERMITTED SEPARATELY.

Esse Architects
632 PERSHING ROAD
RALEIGH, NORTH CAROLINA 27608
P 919.740.5669
www.essearchitects.com

WAKE COUNTY EMS 2

2020 NOBLE ROAD
RALEIGH, NC
27608

WAKE COUNTY
FACILITIES DESIGN & CONSTRUCTION

CONSULTANTS

CIVIL & LANDSCAPE ARCHITECTS
WITHERSRAVENEL
137 SOUTH WILMINGTON STREET, SUITE 200
RALEIGH, NC 27601
919.535.5200 T

STRUCTURAL
LYSAGHT & ASSOCIATES
120 ST. MARY'S STREET
RALEIGH, NC 27605
919.833.0495 T

MECHANICAL, ELECTRICAL, & PLUMBING
SIGMA
5909 FALLS OF NEUSE RD., SUITE 101,
RALEIGH, NC 27609
919.840.9300 T

WAKE COUNTY
NORTH CAROLINA

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 056188 ENGINEER JENNIFER W. MEEKINS
8/1/2025

SCALE: 1 inch = 10 ft.

PROJECT INFORMATION

PROJECT NO.:	23-0851-003
PHASE:	BID / PERMIT
DATE:	08/01/2025
DRAWN BY:	AB
CHECKED BY:	SM

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM 1	8/1/2025

SHEET INFORMATION

C2.00
SITE PLAN

GENERAL STRUCTURAL NOTES

GENERAL

THESE DRAWINGS, AS INSTRUMENTS OF PROFESSIONAL SERVICE, ARE THE PROPERTY OF LYSAGHT & ASSOCIATES, P.A., FOR USE SOLELY WITH THIS PROJECT AND SHALL NOT BE REPRODUCED FOR OTHER PURPOSES.

THE PROFESSIONAL ENGINEER WHOSE SEAL APPEARS ON THESE DRAWINGS IS THE PROJECT STRUCTURAL ENGINEER-OF-RECORD (SER) WHO BEARS LEGAL RESPONSIBILITY FOR THE PERFORMANCE OF THE STRUCTURAL FRAMING RELATING TO PUBLIC HEALTH, SAFETY, AND WELFARE. NO OTHER PARTY, WHETHER OR NOT A PROFESSIONAL ENGINEER, MAY COMPLETE, CORRECT, REVISE, DELETE, OR ADD TO THESE CONSTRUCTION DOCUMENTS OR PERFORM INSPECTIONS OF THE WORK WITHOUT THE WRITTEN PERMISSION OF THE SER.

USE STRUCTURAL DRAWINGS IN CONJUNCTION WITH JOB SPECIFICATIONS, AND OTHER DRAWINGS.

SECTIONS AND DETAILS SHOWN SHALL BE CONSIDERED TYPICAL FOR ALL SIMILAR CONDITIONS.

ALL NON-STRUCTURAL ELEMENTS INDICATED ON THE STRUCTURAL DRAWINGS HAVE BEEN SHOWN IN GENERAL RELATIONSHIP TO THE STRUCTURAL ELEMENTS. THEY SHALL NOT BE ASSUMED TO BE ACCURATE AND REFERENCE MUST BE MADE TO THE APPROPRIATE CONSULTANT(S) PLANS AND SPECIFICATIONS.

CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD AND TAKE ALL NECESSARY FIELD MEASUREMENTS.

THE STRUCTURE SHOWN ON THESE DRAWINGS IS STRUCTURALLY SOUND ONLY IN ITS COMPLETED FORM. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BRACING TO STABILIZE THE BUILDING DURING CONSTRUCTION.

SCOPE OF STRUCTURAL ENGINEERING SERVICES

LYSAGHT & ASSOCIATES, P.A. HAS PERFORMED THE STRUCTURAL DESIGN AND PREPARED THE STRUCTURAL WORKING DRAWINGS FOR THIS PROJECT.

PORTIONS OF THE STRUCTURAL DESIGN (AS NOTED ON THE DRAWINGS AND IN THESE NOTES) ARE THE RESPONSIBILITY OF THE MATERIAL SUPPLIERS. SHOP DRAWINGS FOR EACH OF THE STRUCTURAL COMPONENTS MUST BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION AND ERECTION.

THE STRUCTURAL ENGINEER IS RESPONSIBLE FOR THE DESIGN OF THE PRIMARY STRUCTURAL SYSTEM, EXCEPT FOR THE COMPONENTS NOTED ABOVE. RESPONSIBILITY FOR ANY SECONDARY STRUCTURAL AND NON-STRUCTURAL SYSTEMS NOT SHOWN ON THE STRUCTURAL PLANS RESTS WITH SOMEONE OTHER THAN THE STRUCTURAL ENGINEER.

THE STRUCTURAL ENGINEER HAS NOT DONE A SUBSURFACE INVESTIGATION (HE IS NOT A SOILS SPECIALIST). THE FOUNDATION DESIGN IS BASED UPON INFORMATION AND RECOMMENDATIONS WITHIN THE GEOTECHNICAL REPORT PROVIDED BY TERRACON AS SHOWN IN THE "FOUNDATION" STRUCTURAL NOTES.

THE STRUCTURAL ENGINEER HAS DESIGNED THE STRUCTURAL SLAB CONSTRUCTION FOR CONCENTRATED LOADS DUE TO VEHICULAR OR FORKLIFT TRAFFIC. THE SLAB IS DESIGNED FOR UNIFORM AND CONCENTRATED LOADING AS NOTED IN THE "DESIGN LOADS" PORTION OF THE STRUCTURAL NOTES.

THE STRUCTURAL ENGINEER HAS NOT DESIGNED THE STRUCTURE FOR SPECIFIC VIBRATION LIMITS. VIBRATION LIMITATIONS ARE BASED ON STANDARD ENGINEERING PRACTICES AND PAST EXPERIENCE WITH SIMILAR CONSTRUCTION.

THE STRUCTURAL ENGINEER HAS NOT DESIGNED THE STRUCTURE TO SUPPORT DYNAMIC LOADS FROM VIBRATING MACHINERY OR EQUIPMENT. ALL VIBRATING EQUIPMENT AND MACHINERY MUST BE ISOLATED FROM THE STRUCTURE.

THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR, AND WILL NOT HAVE CONTROL OF, CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE CONSTRUCTION WORK; NOR WILL HE BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE CONSTRUCTION WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CODE

NORTH CAROLINA STATE BUILDING CODE - 2018 EDITION

BUILDING OCCUPANCY CATEGORY	IV	

DESIGN LOADS - EMS BUILDING

ROOF DEAD LOAD	28	PSF
ROOF LIVE LOAD	20	PSF
FLOOR LIVE LOAD AT 4" SLAB	100	PSF
FLOOR LIVE LOAD AT 6" SLAB	250	PSF + AXLE LOAD
MAX AXLE LOAD	12	KIPS
SNOW LOAD DATA :		
GROUND SNOW LOAD	15	PSF
SNOW EXPOSURE FACTOR	1.0	
SNOW LOAD IMPORTANCE FACTOR	1.2	
THERMAL FACTOR	1.1	
ROOF SLOPE FACTOR	0.87	
PITCHED ROOF SNOW LOAD	12.1	PSF
UNBALANCED SNOW LOAD	PER TRUSS LOADING DIAGRAM	
WIND LOAD DATA :		
ULTIMATE WIND SPEED (ASCE 7-10)	128	MPH
NOMINAL WIND SPEED (ASD)	99	MPH
WIND IMPORTANCE FACTOR	1.0	
WIND EXPOSURE	B	
INTERNAL PRESSURE COEFFICIENTS	+0.18, -0.18	
WIND BASE SHEAR (x-x DIRECTION)(ASD)	12.8	KIPS
WIND BASE SHEAR (y-y DIRECTION)(ASD)	25.8	KIPS
WIND PRESSURE FOR COMPONENTS / CLADDING PER ASCE 7-10 SEE SHEET S002 FOR LOADING TABLES		
SEISMIC LOAD DATA :		
SEISMIC IMPORTANCE FACTOR, I	1.50	
MAPPED SPECTRAL RESPONSE ACCELERATION, Ss	0.117	
MAPPED SPECTRAL RESPONSE ACCELERATION, S1	0.059	
SITE CLASS	D	
SPECTRAL RESPONSE COEFFICIENT, SDS	0.125	
SPECTRAL RESPONSE COEFFICIENT, SD1	0.094	
SEISMIC DESIGN CATEGORY	C	
BASIC STRUCTURAL SYSTEM	BEARING WALL SYSTEM	
SEISMIC RESISTING SYSTEM	INTERMEDIATE REINF. MASONRY SHEAR WALLS	
RESPONSE MODIFICATION COEFFICIENT, R	3.50	
SYSTEM OVERSTRENGTH FACTOR, Omega	2.50	
DEFLECTION AMPLIFICATION FACTOR, Cd	2.25	
SEISMIC RESPONSE COEFFICIENT, Cs	0.053	
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE	
SEISMIC BASE SHEAR (ASD)	25.6	KIPS
LATERAL DESIGN CONTROL: LONGITUDINAL	SEISMIC	
TRANSVERSE	WIND	

CODE (CONT'D)

DESIGN LOADS - RETAINING WALL

LIVE LOAD DATA :		
RETAINING WALL VEHICULAR SURCHARGE	250	PSF
SNOW LOAD DATA :		
GROUND SNOW LOAD	15	PSF
SNOW IMPORTANCE FACTOR	1.2	
WIND LOAD DATA :		
ULTIMATE WIND SPEED (ASCE 7-10)	128	MPH
NOMINAL WIND SPEED (ASD)	100	MPH
WIND IMPORTANCE FACTOR	1.0	
WIND EXPOSURE	B	
SEISMIC LOAD DATA :		
SEISMIC IMPORTANCE FACTOR	1.5	
MAPPED SPECTRAL RESPONSE ACCELERATION, Ss	0.117	
MAPPED SPECTRAL RESPONSE ACCELERATION, S1	0.059	
SITE CLASS	D	
SPECTRAL RESPONSE COEFFICIENT, SDS	0.125	
SPECTRAL RESPONSE COEFFICIENT, SD1	0.095	
SEISMIC DESIGN CATEGORY	C	
BASIC STRUCTURAL SYSTEM	CANTILEVER RETAINING WALL	

FOUNDATIONS

REFER TO TERRACON GEOTECHNICAL ENGINEERING REPORT PROJECT NO. 70245228 DATED NOVEMBER 14, 2024, FOR ADDITIONAL SUBSURFACE INFORMATION AND RECOMMENDATIONS.

ALL FOOTINGS SHALL REST ON SOIL CAPABLE OF SAFELY SUPPORTING 3000 PSF. CONTACT STRUCTURAL ENGINEER IF UNSATISFACTORY SUBSURFACE CONDITIONS ARE ENCOUNTERED.

FOOTINGS SHALL BE CARRIED TO A LOWER ELEVATION THAN THOSE INDICATED ON THESE DRAWINGS IF NECESSARY TO REACH FIRM UNDISTURBED SOIL.

THE BOTTOM OF ALL EXTERIOR FOOTINGS SHALL BE A MINIMUM OF 24" BELOW FINISHED GRADE UNLESS NOTED OTHERWISE.

SLAB ON GRADE SHALL BE FOUNDED ON STABLE NATURAL SOIL OR CONTROLLED COMPACTED FILL. THE MINIMUM BEARING CAPACITY SHALL BE 3000 PSF.

ALL STRUCTURAL FILL SHALL BE PLACED IN 8" MAXIMUM LOOSE LIFTS FOR HEAVY SELF-PROPELLED COMPACTION EQUIPMENT AND 6" MAXIMUM LOOSE LIFTS FOR HAND GUIDED COMPACTION EQUIPMENT. STRCUTRAL FILL SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D-698 (STANDARD PROCTOR METHOD). THIS REQUIREMENT SHOULD BE INCREASED TO 98 PERCENT OF ASTM D-698 IN THE FINAL FOOT BENEATH FOOTINGS, FLOOR SLABS, AND PAVEMENTS.

STRUCTURAL FILL SHALL BE PLACED WITH A WATER CONTENT RANGE WITHIN ±3% OF OPTIMUM FOR FINE GRAINED SOILS WITH A PLASTICITY INDEX (PI)≤30, BETWEEN 0 AND +3% OF OPTIMUM FOR FINE GRAINED SOILS WITH A (PI)>30, WITHIN ±3% OF OPTIMUM FOR COARSE GRAINED SOILS (SM, SC), AND WITHIN ±5% OF OPTIMUM FOR COARSE GRAINED SAND (SP, SW).

THE RETAINING WALL FOUNDATION DESIGN IS BASED UPON AN ALLOWABLE BEARING PRESSURE AND SKIN FRICTION OF THE NATIVE SOILS AND THE UNIT WEIGHT AND INTERNAL FRICTION ANGLE OF RETAINING WALL BACKFILL MATERIAL AS SHOWN ON THE CONCRETE RETAINING WALL SECTIONS AND NOTES. THESE VALUES HAVE BEEN COORDINATED WITH FIELD TESTING BY TERRACON, REFER TO PROJECT GEOTECHNICAL REPORT REFERENCED ABOVE. ALLOWABLE BEARING PRESSURE OF SOILS BELOW RETAINING WALLS AND INTERNAL FRICTION ANGLE AND UNIT WEIGHT OF BACKFILL SOILS SHALL BE VERIFIED BY SPECIAL INSPECTOR PRIOR TO PLACEMENT OF FOUNDATION CONCRETE AND BACKFILLING. IF PROBLEMS ARE ENCOUNTERED, THE GEOTECHNICAL ENGINEER SHOULD BE RETAINED TO EVALUATE THE CONDITIONS.

CONCRETE

CONCRETE SHALL BE PROPORTIONED, MIXED AND PLACED IN ACCORDANCE WITH ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", AND ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS". ANY ADMIXTURES MUST BE APPROVED BY THE STRUCTURAL ENGINEER.

CONCRETE SHALL BE SPECIFIED AND SUPPLIED TO MEET REQUIREMENTS FOR LOW CARBON CONCRETE. REFER TO SPECIFICATIONS FOR PERFORMANCE CRITERIA AND SUBMITTAL REQUIREMENTS.

CONCRETE REINFORCING SHALL HAVE THE FOLLOWING MINIMUM PROTECTIVE COVER:

CONCRETE POURED ON EARTH OR GROUND	3	IN
CONCRETE EXPOSED TO EARTH OR WEATHER		
#6 THROUGH #18 REBAR	2	IN
#5 BAR AND SMALLER	1-1/2	IN

ADMIXTURES CONTAINING CHLORIDE SALTS ARE NOT PERMITTED.

MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 3000 PSI. USE NORMAL WEIGHT CONCRETE FOR FOOTINGS AND SLABS ON GRADE.

CONCRETE EXPOSED TO EXTERIOR CONDITIONS SHALL BE AIR-ENTRAINED WITH A TOTAL AIR CONTENT OF 6 PERCENT (+/- 1.5%).

DO NOT CAST CONCRETE IN WATER OR ON FROZEN GROUND. FOR SLABS ON GRADE, LIGHTLY DAMPEN THE SUBGRADE BEFORE PLACING CONCRETE TO PREVENT THE SUBGRADE FROM ABSORBING WATER FROM THE CONCRETE MIX. APPLY WATER AT NEARLY THE SAME RATE IT SOAKS INTO THE SUBGRADE SURFACE.

CRACK CONTROL JOINTS SHALL BE PLACED IN SLABS ON GRADE IN SQUARE PATTERNS AT A MAXIMUM SPACING OF 12' FOR 4" SLABS AND 18' FOR 6" SLABS UNLESS NOTED OTHERWISE. PLACE CONTROL JOINTS TO AVOID REENTRANT CORNERS. MAKE SAWCUTS TO FORM WEAKENED PLANE CONTROL JOINTS AS SOON AFTER CONCRETE PLACEMENT AS POSSIBLE.

START CURING FOR SLABS ON GRADE AS SOON AS THE FINISHERS ARE DONE. APPLY THE CURING COMPOUND IN TWO COATS AT RIGHT ANGLES TO EACH OTHER AND NOT MORE THAN 300 SQUARE FEET PER GALLON, ABOUT 15 MINUTES APART. DURING HOT WEATHER, USE A FOG SPRAY TO KEEP THE SURFACE DAMP BEFORE APPLYING A CURING COMPOUND.

CONCRETE DURABILITY REQUIREMENTS

USE	WEIGHT	EPOSURE CATEGORY	MAX W/CM	MIN F_c' (PSI)	MAX AGG SIZE (IN)	AIR CONTENT
FOOTINGS	NORMAL	F0/S0/W0/C1	.58	3,000	1"	N/A
INT SOG	NORMAL	F0/S0/W0/C1	.58	4,000	1"	N/A
RET WALLS	NORMAL	F3/S0/W0/C1	.40	5,000	3/4"	6 ± 1.5%

CONCRETE MASONRY

CONCRETE MASONRY UNITS SHALL BE ERECTED AS LOAD BEARING CONCRETE MASONRY. COMPLY WITH THE REQUIREMENTS OF ACI 530.1 / ASCE 6 / TMS 602 SPECIFICATION FOR MASONRY STRUCTURES.

CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM SPECIFICATIONS FOR HOLLOW LOAD-BEARING CONCRETE MASONRY UNITS (ASTM C90, ASA A79.1). MORTAR SHALL CONFORM TO THE REQUIREMENTS OF ASTM STANDARD SPECIFICATIONS FOR MORTAR FOR UNIT MASONRY (ASTM C270), TYPE "M" OR "S". THE MINIMUM NET COMPRESSIVE STRENGTH OF MASONRY UNITS SHALL BE 2000 PSI (f'm = 2000 PSI FOR MASONRY SYSTEM).

ALL GROUT USED TO FILL REINFORCED MASONRY CAVITIES AND SHOWN AT OTHER LOCATIONS ON THE PLANS SHALL CONFORM TO ASTM C476 AND SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI.

PROVIDE HORIZONTAL JOINT REINFORCEMENT AT 16" O.C. IN ALL CMU WALLS UNLESS NOTED OTHERWISE ON THE DRAWINGS. USE LADDER TYPE DUR-O-WALL REINFORCEMENT, HOT DIP GALVANIZED AFTER FABRICATION. LONGITUDINAL WIRES SHALL BE A MINIMUM OF (2) NO. 9 GAGE. LOCATE JOINT REINFORCEMENT IN FIRST AND SECOND BED JOINTS, 8" APART IMMEDIATELY ABOVE LINTELS AND BELOW SILLS AT OPENINGS. REINFORCEMENT SHALL NOT EXTEND THROUGH VERTICAL MASONRY CONTROL JOINTS.

ALL STEEL BEARING SHALL BE ON A BOND BEAM OR SOLID BLOCK.

WHERE INTERIOR CONCRETE MASONRY PARTITIONS MEET OTHER INTERIOR PARTITIONS OR EXTERIOR WALLS, PROVIDE A CONTROL JOINT WITH METAL STRAP ANCHORS BETWEEN WALLS.

PROVIDE BOND BEAMS AT THE TOP OF MASONRY ELEVATIONS AS SHOWN ON THE DRAWINGS. BOND BEAMS TO HAVE (2) #5 BARS CONTINUOUS UNLESS OTHERWISE NOTED. WHERE THE BOND BEAM IS INTERSECTED BY A CONTROL JOINT, CHANGE THE BARS TO SMOOTH ROUND BARS AND GREASE ONE END SO THAT LATERAL MOVEMENT WILL NOT BE RESTRAINED.

BACKFILLING AGAINST MASONRY WALLS SHALL NOT BE PERMITTED UNTIL SUFFICIENT LATERAL SUPPORT IS PROVIDED.

MASONRY WALLS ARE TO BE LATERALLY BRACED DURING CONSTRUCTION IN ACCORDANCE WITH "STANDARD PRACTICE FOR BRACING MASONRY WALLS UNDER CONSTRUCTION" BY THE COUNCIL FOR MASONRY WALL BRACING AND THE MASON CONTRACTORS ASSOCIATION OF AMERICA. TEMPORARY BRACING SHALL REMAIN IN PLACE UNTIL PERMANENT SUPPORTING ELEMENTS OF THE STRUCTURE ARE IN PLACE.

REFER TO PLANS FOR LOCATIONS OF MASONRY CONTROL JOINTS. THE FOLLOWING GENERAL GUIDELINES SHALL BE USED TO LOCATE CONTROL JOINTS:

1. THE MAXIMUM HORIZONTAL SPACING BETWEEN VERTICAL CONTROL JOINTS IS:
   - A. EXTERIOR WALL - 20'-0"
   - B. INTERIOR WALL - 30'-0"
   - C. DISTANCE FROM CORNERS - 10'-0"

2. MASONRY CONTROL JOINTS SHOULD BE PLACED AT THE FOLLOWING TYPICAL LOCATIONS:
   - A. CHANGES IN WALL HEIGHT OR THICKNESS.
   - B. AT CONSTRUCTION JOINTS IN FOUNDATION, IN ROOF, AND IN FLOORS.
   - C. AT CHASES AND RECESSES FOR PIPING, COLUMNS, FIXTURES, ETC.
   - D. AT ABUTMENT OF WALL AND COLUMNS.
   - E. AT RETURN ANGLES IN "L", "T" AND "U" SHAPED STRUCTURES.
   - F. AT ONE OR BOTH SIDES OF WALL OPENINGS. (CONTROL JOINT TO BE PLACED NEAR THE OPENING, BEYOND THE END OF THE LINTEL, NOT AT THE EDGE OF THE OPENING).

STRUCTURAL STEEL

FABRICATE AND ERECT ALL STRUCTURAL STEEL IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR TRUCTURAL STEEL BUILDINGS (ANSI/AISC 360-10)".

STRUCTURAL STEEL SHALL RECEIVE ONE SHOP COAT OF RUST-INHIBITIVE PAINT. STEEL COLUMNS BELOW GRADE THAT ARE NOT ENCASED IN CONCRETE SHALL BE FIELD PAINTED WITH A WATERPROOF MASTIC COMPOUND TO PREVENT CORROSION.

ALL STRUCTURAL STEEL LINTELS FOR CONCRETE MASONRY SUPPORT, LOOSE ANGLE LINTELS FOR BRICK MASONRY VENEER SUPPORT, AND MISCELLANEOUS STRUCTURAL STEEL EXPOSED TO EXTERIOR CONDITIONS SHALL BE HOT DIP GALVANIZED.

THE STEEL USED SHALL HAVE THE FOLLOWING MINIMUM YIELD STRESS:

WIDE FLANGE SHAPES ('W' SHAPES)	50 KSI (A992)
CHANNELS, ANGLES, PLATES, MISC. SHAPES	36 KSI (A36)
HSS TUBE SHAPES	46 KSI (A500, B)

USE 3/4" DIAMETER A-325N BOLTS FOR ALL STEEL TO STEEL CONNECTIONS U.N.O. BOLTS SHALL BE TIGHTENED TO THE SNUG TIGHT CONDITION UNLESS NOTED OTHERWISE. THE SNUG TIGHT CONDITION IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN ALL PLIES IN A JOINT ARE IN FIRM CONTACT.

USE F1554 (GRADE 36) BOLTS FOR ALL ANCHOR BOLTS U.N.O. HEADED WELD STUDS SHALL BE MADE OF MATERIAL CONFORMING TO ASTM A108. USE E-70 ELECTRODES FOR ALL SHOP AND FIELD WELDING.

THE STEEL SUPPLIER SHALL DESIGN ALL STEEL STAIRS AND LADDERS IN ACCORDANCE WITH THE N.C. STATE BUILDING CODE. STAIR SHOP DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA.

FOR MISCELLANEOUS STEEL NOT SHOWN ON THESE DRAWINGS, SEE ARCHITECTURAL AND OTHER ENGINEERING DRAWINGS.

CONNECTIONS BETWEEN STRUCTURAL STEEL MEMBERS SHALL BE AS SHOWN ON STRUCTURAL DRAWING DETAILS. ALTERNATE CONNECTION DETAILS MUST BE APPROVED IN WRITING, BY THE STRUCTURAL ENGINEER OF RECORD, PRIOR TO THE SUBMITTAL OF SHOP DRAWINGS.

SUBMIT ERECTION AND SHOP DRAWINGS TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION.

REINFORCING STEEL

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE LATEST "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315.

REINFORCING BARS SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615, GRADE 60. CLEAR CONCRETE COVER OVER BARS SHALL BE 3" FOR FOOTINGS CAST AGAINST GROUND.

LIGHT DUTY SLABS ON GRADE SHALL BE REINFORCED WITH 6 x 6 W 1.4 x W 1.4 W.W.F. SUPPORT THE MESH AS REQUIRED TO INSURE THAT IT WILL BE LOCATED IN THE UPPER THIRD OF THE SLAB THICKNESS. HEAVY DUTY SLABS ON GRADE SHALL BE REINFORCED ACCORDING PER 11/S301.

PROVIDE CORNER BARS OF EQUAL SIZE AND SPACING TO HORIZONTAL REINFORCING FULLY LAPPED ON EACH END AT ALL FOOTING STEPS AND CORNERS.

LAP ALL SPLICES IN CAST-IN-PLACE CONCRETE PER 2/SS301.

LAP ALL SPLICES IN MASONRY 48 BAR DIAMETERS MINIMUM, UNLESS NOTED OTHERWISE.

PROVIDE DOWELS IN WALL FOOTINGS EQUIVALENT IN SIZE AND NUMBER TO VERTICAL STEEL PER SECTIONS, FULLY EMBED DOWELS INTO FOOTING AND LAP WITH WALL REBAR UNLESS NOTED OTHERWISE.

SUBMIT SHOP DRAWINGS TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION.

METAL DECK

DESIGN, FABRICATION AND ERECTION OF METAL DECK SHALL CONFORM TO THE STEEL DECK INSTITUTE "DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS AND ROOF DECKS".

METAL ROOF DECK SHALL BE 22 GAGE, TYPE "B" BY VULCRAFT, WIDE RIB STEEL WITH 1 1/2" NOMINAL CORRUGATION DEPTH, OR APPROVED EQUAL. THE MINIMUM YIELD STRESS SHALL BE 33 KSI.

FASTEN METAL ROOF DECK TO LIGHT GAGE STEEL TRUSSES IN A 36/4 FASTENER PATTERN, AS SPECIFIED BY VULCRAFT: FOUR #12 TEK SCREWS AT EACH SUPPORT MEMBER WITH (1) #10 TEK SCREW SIDELAP PER DECK SPAN. LOCATE SCREW FASTENERS WITH A 12" MAXIMUM SPACING AT THE DIAPHRAGM PERIMETER.

SUSPENDED CEILINGS, LIGHT FIXTURES, DUCTS, AND OTHER UTILITIES OR FINISHES SHALL NOT BE SUPPORTED BY THE METAL DECK.

ALL DECK SHALL BE GALVANIZED IN CONFORMANCE WITH ASTM A653-94, G60 MINIMUM.

SUBMIT ERECTION DRAWINGS TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION.

LIGHT GAGE STEEL TRUSSES

THE TRUSS FABRICATOR SHALL PROVIDE A DESIGN SUBMITTAL AND CALCULATIONS FOR ALL TRUSS TYPES, SEALED BY A N.C. PROFESSIONAL ENGINEER, FOR REVIEW BY THE PROJECT STRUCTURAL ENGINEER OF RECORD PRIOR TO FABRICATION.

CALCULATIONS SHALL INCLUDE COMPONENT SECTION PROPERTIES AND FASTENER CAPACITIES FOR ALL COMPONENTS USED.

THE SUPPLIER SHALL DESIGN ALL TRUSS TYPES FOR THE DESIGN LOADS LISTED ON THE GENERAL NOTES SHEET AND THE LOADING DIAGRAM SHOWN ON THE STRUCTURAL LOADING SHEET.

1

STRUCTURAL DRAWINGS SHOW STANDARD LIGHT GAGE METAL SECTIONS FOR METAL TRUSSES. THE TRUSS FABRICATOR MAY USE ANY PROPRIETARY LIGHT GAGE METAL SECTIONS FOR TRUSS CHORDS AND WEBS. TRUSS TOP AND BOTTOM CHORDS SHALL UTILIZE A MINIMUM 16 GAGE THICKNESS. TRUSS WEBS MAY UTILIZE MATERIAL THINNER THAN 16 GAGE, PROVIDED THAT THE WEBS AND CONNECTIONS ARE CAPABLE OF SUPPORTING THE REQUIRED FORCES AS DETERMINED BY THE TRUSS SUPPLIER.

THE DESIGN AND FABRICATION OF THE METAL TRUSSES SHALL COMPLY WITH THE AISI "COLD FORMED STEEL DESIGN MANUAL". ALL TRUSSES MUST BE SECURELY BRACED BOTH DURING ERECTION AND AFTER PERMANENT INSTALLATION.

THE TRUSS FABRICATOR SHALL SHOW ALL RECOMMENDED BRACING, BOTH TEMPORARY AND PERMANENT, ON THE TRUSS SHOP DRAWINGS. ALSO, THE DRAWINGS MUST SHOW ALL RECOMMENDED DETAILS FOR CONNECTING THE TRUSSES TO EACH OTHER AND/OR THEIR SUPPORTS.

TRUSS MEMBERS AND COMPONENTS SHALL NOT BE CUT, DRILLED, NOTCHED, SPLICED, OR OTHERWISE ALTERED IN ANY WAY WITHOUT WRITTEN PERMISSION FROM THE TRUSS DESIGN ENGINEER.

SUBMIT ERECTION DRAWINGS AND CALCULATIONS FOR THE STEEL TRUSSES TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION.

ERECTION DRAWINGS SHALL INCLUDE SECTIONS, PLANS OR ELEVATIONS DEPICTING COMPONENT LOCATION AND CONNECTION DETAILS SHOWING SCREW TYPES AND LOCATIONS, WELD LENGTHS AND LOCATIONS, OR OTHER RELATED FASTENER REQUIREMENTS.

SEE MECHANICAL PLANS FOR LOCATIONS & WEIGHTS OF SUSPENDED HVAC EQUIPMENT & DUCTS SUPPORTED FROM ROOF TRUSS BOTTOM CHORDS. SUPPORT FROM (2) TRUSSES MINIMUM. 2/S104

TRUSSES SUPPORTING ALTERNATE ROOF FRAMING SECTION (REF) SHALL HAVE ADDITIONAL BRIDGING AT ALL TOP CHORD PANEL POINTS. ADDITIONAL BRIDGING IS REQUIRED TO LATERALLY BRACE THE TOP CHORD DUE TO THE ABSENCE OF ROOF DECK IN THESE AREAS.

BRICK MASONRY

THE BRICK ON THIS PROJECT IS A NON-STRUCTURAL VENEER. REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ALL REQUIREMENTS.

BRICK VENEER SHALL BE OF A QUALITY AT LEAST EQUAL TO THAT REQUIRED BY ASTM SPECIFICATIONS (C216). THE COMPRESSIVE STRENGTH OF BRICK UNITS SHALL BE 4500 PSI MINIMUM.

REFER TO THE ARCHITECTURAL PLANS FOR LOCATIONS OF BRICK EXPANSION JOINTS, OR IF NOT SHOWN, COORDINATE WITH ARCHITECT. IN GENERAL, CONTROL JOINTS SHOULD BE LOCATED WITH A MAXIMUM SPACING OF 30'-0".

SLAB ON GRADE CONSTRUCTION

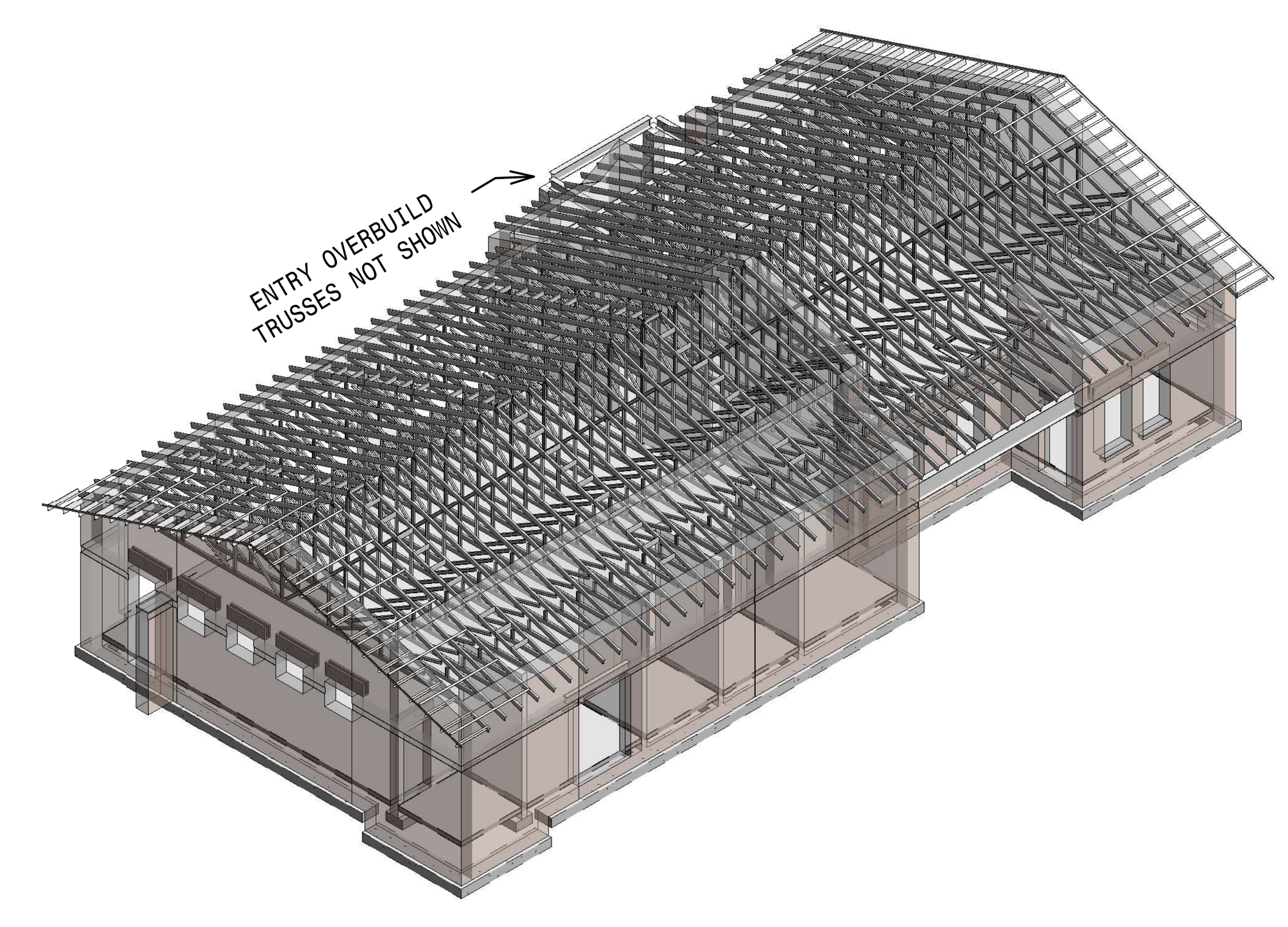
CONCRETE SHALL BE DESIGNED TO MEET THE DURABILITY REQUIREMENTS LISTED IN THE CONCRETE NOTES.

CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 0.05% CHLORIDE IONS ARE NOT PERMITTED. FLY ASH, SLAG, AND BOTTOM ASH ARE NOT PERMITTED.

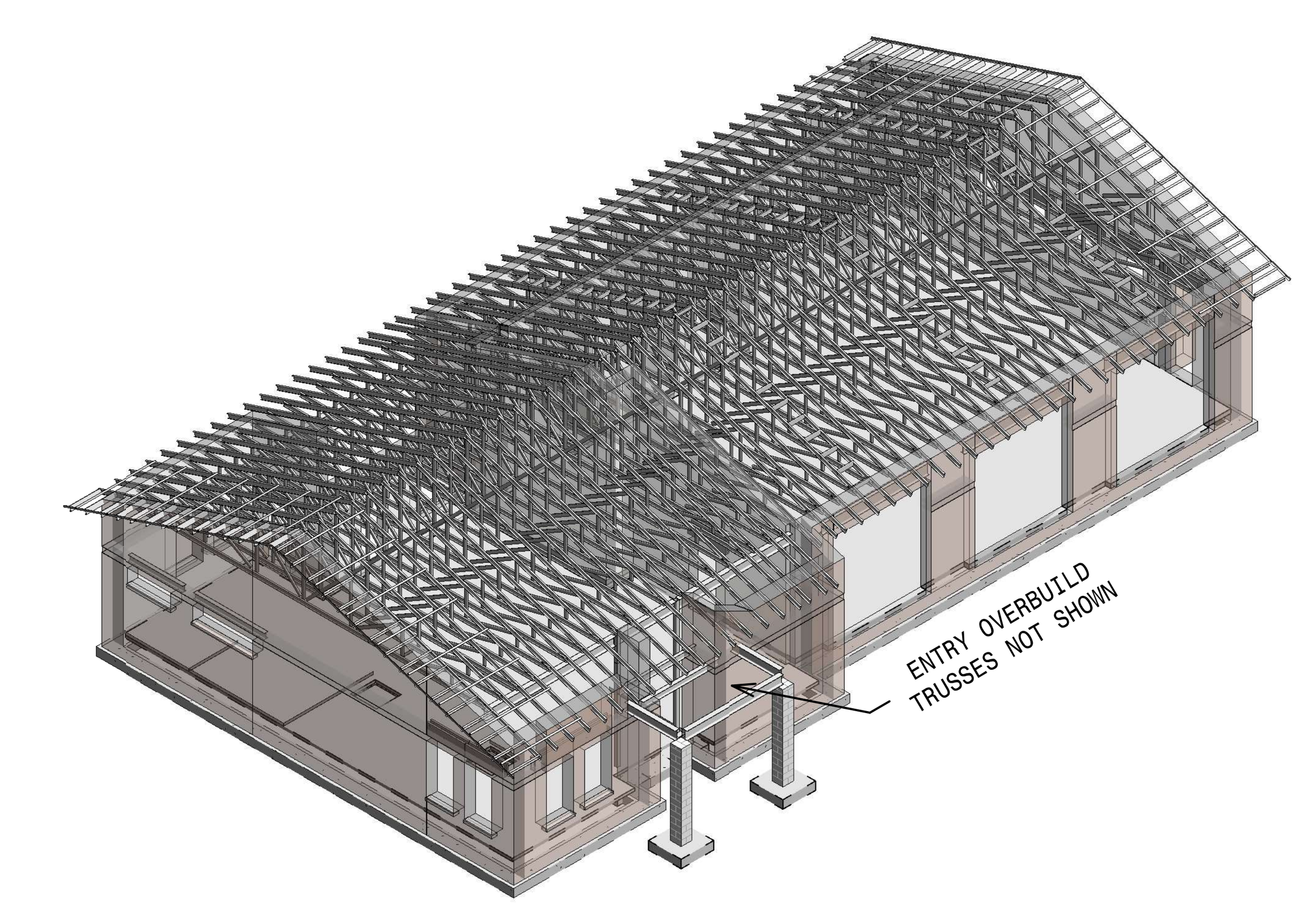
PLACE FLOOR SLAB ON A WELL COMPACTED BASE. THE SUBGRADE SHALL BE GRANULAR, NON-EXPANSIVE SOIL (THAT IS, WITHOUT CLAY) WHICH HAS BEEN COMPACTED TO AT LEAST 95% AND VERIFIED BY ON-SITE TESTING.

STRUCTURAL ABBREVIATIONS

@	AT
AB	ANCHOR BOLT
ADDL	ADDITIONAL
ARCH	ARCHITECTURAL
BOT	BOTTOM
CIP	CAST IN PLACE
CJ	CONTRACTION OR CONSTRUCTION JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CONT	CONTINUOUS
DEPR	DEPRESSION
DET	DETAIL
DIM	DIMENSION
EA	EACH
EFW	EXTERIOR FACE OF WALL
EJ	EXPANSION JOINT
EL	ELEVATION
EQ	EQUAL
EMBED	EMBEDDED
EODP	EDGE OF DEPRESSION
EOO	EDGE OF OPENING
EW	EACH WAY
FF	FINISHED FLOOR
FLR	FLOOR CONSTRUCTION
FTG	FOOTING
FX	FOOTING DESIGNATION
GC	GENERAL CONTRACTOR
GL	GRID LINE
IF	INSIDE FACE
INT	INTERIOR
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OP	OPENING
OPH	OPPOSITE HAND
OPP	OPPOSITE
PDF	POWDER DRIVEN FASTENER
PLF	POUNDS PER LINEAR FOOT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
REF	REFERENCE
REINF	REINFORCED OR REINFORCING
REQD	REQUIRED
REV	REVISION
SIM	SIMILAR
SOG	SLAB ON GRADE
SPEC	SPECIFICATION
STD	STANDARD
STIR	STIRRUP
SW	SHEAR WALL
THK	THICK
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOJ	TOP OF JOIST
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
VWA	VERIFY WITH ARCHITECT
W/	WITH
W/O	WITHOUT
WP	WORK POINT
WWF	WELDED WIRE FABRIC



2 PROJECT OVERVIEW 2



1 PROJECT OVERVIEW 1

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WAKE COUNTY EMS 2

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08/01/25

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FIRM NO. C-0621

PROJECT INFORMATION

PROJECT NO.:	14577
PHASE:	BID / PERMIT
DATE:	07/21/2025
DRAWN BY:	BLL
CHECKED BY:	ABT

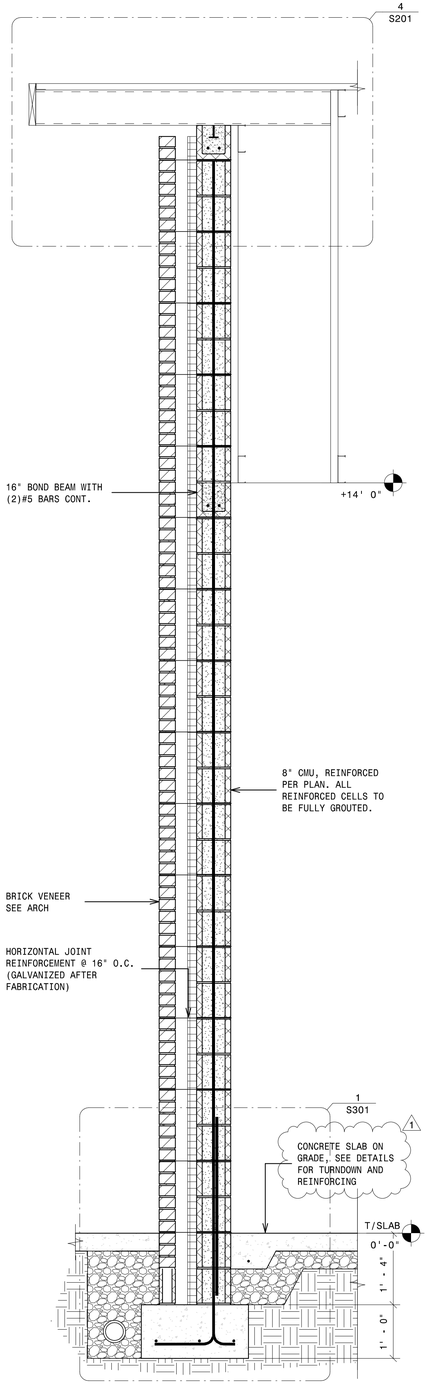
REVISIONS

NO.	DESCRIPTION	DATE
1	ADDENDUM 1	08/01/2025

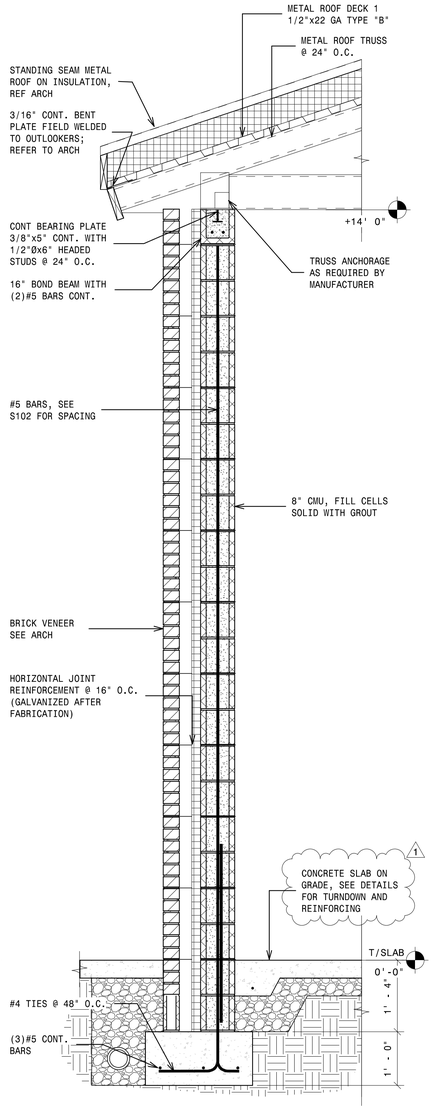
SHEET INFORMATION

S001

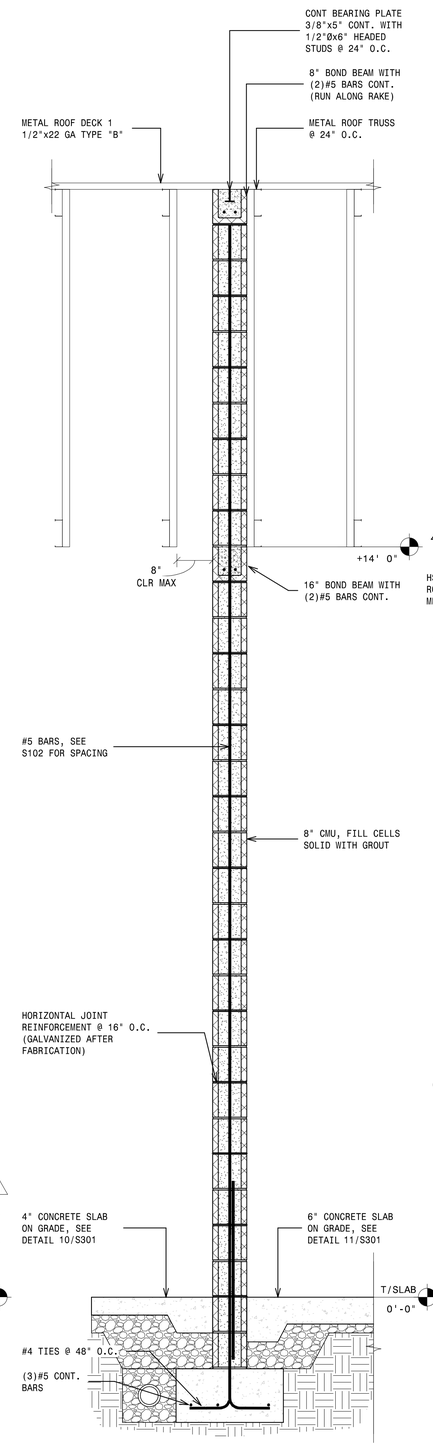
GENERAL STRUCTURAL NOTES



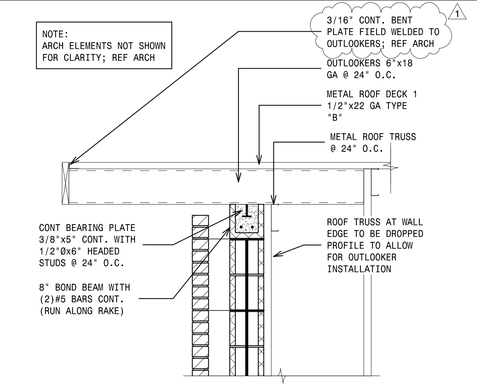
- 1 - WALL SECTION 1
3/4" = 1'-0"



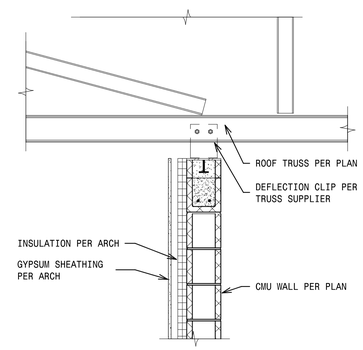
- 2 - WALL SECTION 2
3/4" = 1'-0"



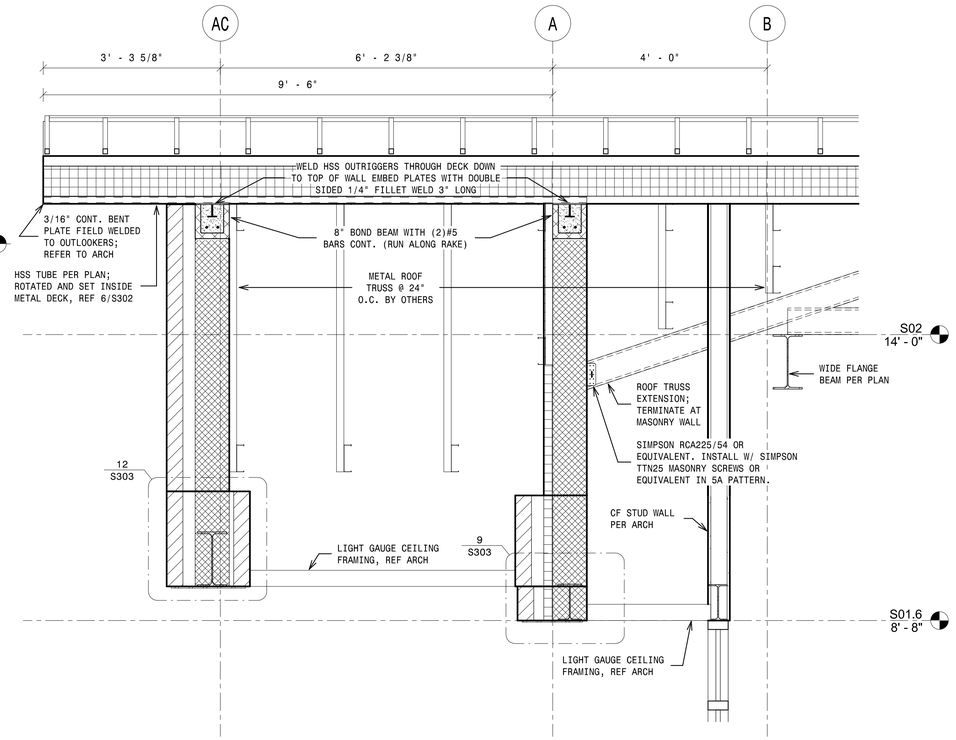
- 3 - WALL SECTION 3
3/4" = 1'-0"



- 4 - OUTLOOKERS AT END WALL
3/4" = 1'-0"



- 5 - TRUSS TO NON-BEARING WALL
3/4" = 1'-0"



- 6 - OVERBUILD ROOF SECTION
3/4" = 1'-0"

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SHEET INFORMATION

S201
WALL SECTIONS