

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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-Y2-	10+00 - 12+25.00	4 - 5
-Y3-	11+50 - 12+39.61	5
-Y4-	10+00 - 10+56.50	5
-Y5-	10+00 - 11+00.00	6
-Y7-	11+00 - 13+49.84	8
-Y8-	10+00 - 14+50.00	8
-Y9-	10+00 - 11+00.00	9
-Y10-	10+00 - 10+50.00	9
-Y11-	10+00 - 10+50.00	9
-Y12-	10+00 - 10+50.00	10
-Y13-	10+00 - 10+50.00	10
-Y14-	10+25 - 12+84.47	10
-Y15-	10+00 - 10+44.46	10
-Y16-	10+00 - 10+60.00	11
-Y17-	10+00 - 10+50.00	11
-Y18-	11+25 - 12+35.07	11
-Y19-	10+00 - 10+50.00	11
-Y20-	10+00 - 10+42.27	11
-Y21-	10+75 - 11+27.65	12
-Y22-	10+75 - 11+17.54	12
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-Y24-	10+75 - 11+30.41	13
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY RUTHERFORD
PROJECT DESCRIPTION US-221 A (CHARLOTTE ROAD
AND W/E MAIN ST.) FROM WEST COURT
STREET TO SR 2169 (OAKLAND ROAD)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0065	1	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT, AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

<u>HOWARD, J.</u>	<u>MARPLES, Z. J.</u>
<u>ZHENGWEN, Z.</u>	<u>HALVERSON, M.</u>
<u>DUGGINS, W. T.</u>	<u>PIAZZA, L.</u>
<u>YOUNG, W.</u>	<u>NICHOLSON, B.</u>
	<u>RAINEY, M.</u>

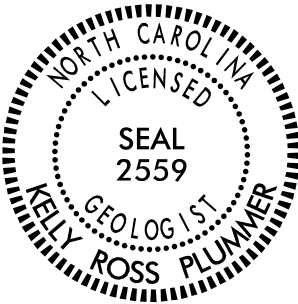
INVESTIGATED BY TERRACON

DRAWN BY FIELDS, W. D.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY PLUMMER, K. R.

DATE JULY 2025



DocuSigned by:
Kelly Plummer 9/8/2025
51340CC5FA2E414...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REFERENCE: HL-0065

PROJECT: 50685

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

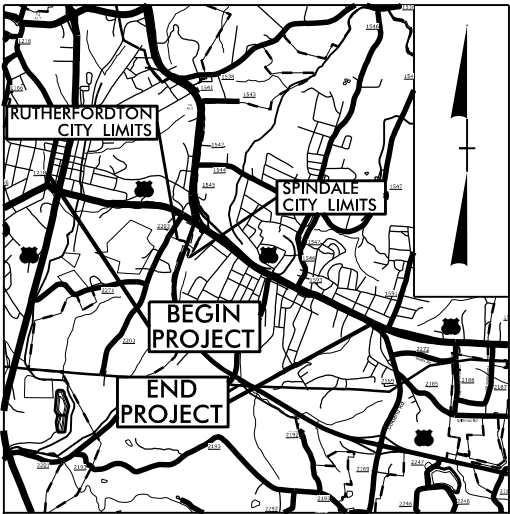
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																			
GENERAL CLASS.										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																			
GROUP CLASS.										COMPRESSIBILITY										VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.																			
SYMBOL										PERCENTAGE OF MATERIAL										SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.																			
%										GROUND WATER										MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.																			
MATERIAL PASSING #40 LL PI										MISCELLANEOUS SYMBOLS										MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>																			
GROUP INDEX										RECOMMENDATION SYMBOLS										SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>																			
USUAL TYPES OF MAJOR MATERIALS										ABBREVIATIONS										VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>																			
GEN. RATING AS SUBGRADE										EQUIPMENT USED ON SUBJECT PROJECT										COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										DRILL UNITS:										ROCK HARDNESS																			
CONSISTENCY OR DENSENESS										ADVANCING TOOLS:										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
PRIMARY SOIL TYPE										HAMMER TYPE:										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
COMPACTNESS OR CONSISTENCY										CORE SIZE:										MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.																			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										HAND TOOLS:										MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										INDURATION										SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
GENERAL										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.										VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.																			
GENERAL										FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																													
GENERAL										MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.																													
GENERAL										INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																													
GENERAL										EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																													
TEXTURE OR GRAIN SIZE																																							
U.S. STD. SIEVE SIZE OPENING (MM)																																							
BOULDER (BLDR.)																																							
COBBLE (COB.)																																							
GRAVEL (GR.)																																							
COARSE SAND (CSE. SD.)																																							
FINE SAND (F SD.)																																							
SILT (SL.)																																							
CLAY (CL.)																																							
GRAIN SIZE																																							
SOIL MOISTURE - CORRELATION OF TERMS																																							
SOIL MOISTURE SCALE (ATTERBERG LIMITS)																																							
FIELD MOISTURE DESCRIPTION																																							
GUIDE FOR FIELD MOISTURE DESCRIPTION																																							
LL - LIQUID LIMIT																																							
PL - PLASTIC LIMIT																																							
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT																																							
SL - SHRINKAGE LIMIT																																							
PLASTICITY																																							
NON PLASTIC																																							
SLIGHTLY PLASTIC																																							
MODERATELY PLASTIC																																							
HIGHLY PLASTIC																																							
COLOR																																							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																							

09/08/2025

TIP PROJECT: HL-0065

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

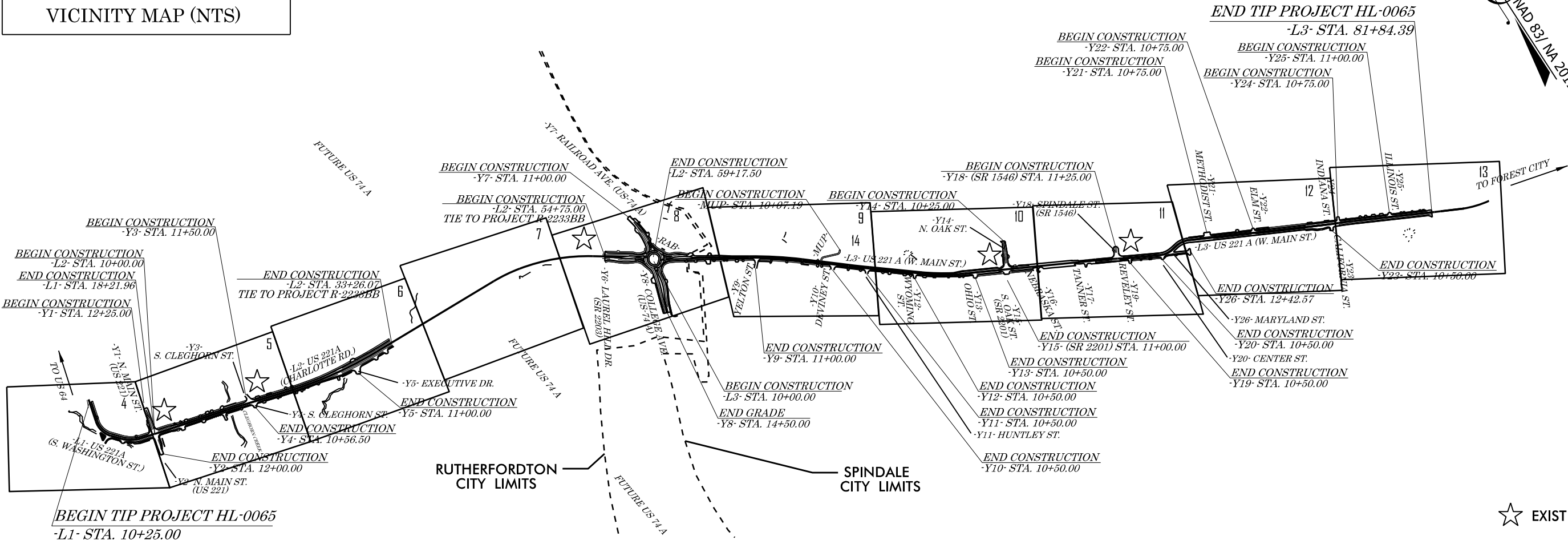
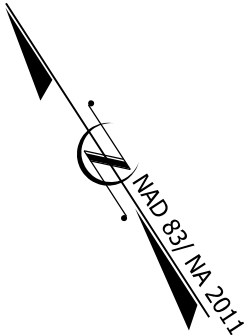
RUTHERFORD COUNTY

LOCATION: *US 221 A (CHARLOTTE RD AND W/E MAIN ST)
FROM W COURT ST TO SR 2169 (OAKLAND RD)*

TYPE OF WORK: *GRADING, PAVING, DRAINAGE*

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HL-0065	3	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
50685.1.1	5068501	PE	
50685.2.1	5068501	ROW	
50685.2.2	5068501	UTIL	
50685.3.1	5068501	CONST.	

Design Recommendation Plan Set
Plans Developed with OpenRoads

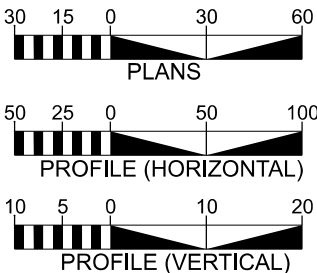


★ EXISTING SIGNAL

- NOTES:
1. CLEARING LIMITS ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.
 2. A PORTIONS OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF RUTHERFORDTON AND SPINDALE.
 3. THIS IS A NO CONTROL-OF-ACCESS PROJECT EXCEPT WITHIN THE LIMITS OF THE ROUNDABOUT.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2026 = 14,600
ADT 2046 = 21,400
K = 8 %
D = 52.5%
T = 5 % *
V = 40 MPH
* TTST = 1 DUAL = 4
FUNC CLASS =
MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT HL-0065 = 2.443 MILES
PROJECT LENGTH BASED ON
-L1-, -L2-, AND -L3-

HNTB

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 9, 2025

LETTING DATE:
SEPTEMBER 15, 2026

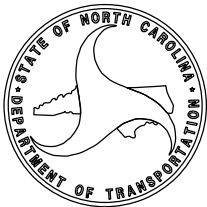
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PROJECT ENGINEER
ANDREW J. MCOMBER, PE
PROJECT DESIGN ENGINEER
HANNAH K. SMITH, PE
NC DOT DIVISION 13
SENIOR PLANNING ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





PROJECT REFERENCE NO.	SHEET NO.
HL-0065	3A

Date: July 25, 2025

WBS Number: 50685.1.1
TIP Number: HL-0065
County: Rutherford
Description: US 221A Construct Complete Street to Include Intersection Improvements, Multi-use Path, Sidewalks, and Improved Transit Facilities.

Subject: Roadway Geotechnical Report - Inventory

Project Description

This project will consist of complete street improvements along US 221A and the construction of a new roundabout intersection at US 221A and US 74 Alt (College Avenue) and in Rutherford County, North Carolina. The proposed project is approximately 2.443 miles in length and is located within the Town of Rutherfordton and the Town of Spindale. Types of work to be performed include widening, grading, paving, drainage and construction of a new roundabout intersection.

The geotechnical subsurface investigation was performed between September 2024 and January of 2025. The site was investigated with three (3) hand auger borings, thirty-eight (38) auger probes, and ten (10) standard penetration test (SPT) borings. Nine (9) auger probes performed in October of 2024 as part of the Pavement Design Investigation (PDI) for this project are also included in this report. The hand auger borings were advanced to depths of 0.1 to 6 feet beneath the ground surface. The SPT borings were advanced using a track mounted Geoprobe 312GT rotary drill rig equipped with a recently calibrated automatic hammer. The auger probes were performed using a track mounted Geoprobe 312GT track mounted rig and a Mobile B-29 truck mounted rig. The SPT borings were advanced using hollow stem augers to depths of 9.7 to 25.8 feet beneath the ground surface.

Representative soil samples were collected in the field for visual classification and selected samples were submitted for laboratory analysis by Terracon’s soil testing laboratory. Additionally, three bulk samples were collected during the PDI investigation for Proctor and California Bearing Ratio (CBR) testing. All laboratory testing was performed in a NCDOT materials and testing certified laboratory in accordance with the AASHTO Soil Classification System.

The following alignments were investigated by soil testing and visual reconnaissance:

Alignment	Stations (±)
-L1-	10+25 to 18+22
-L2-	10+00 to 33+26
-L2-	54+75 to 58+65
-L3-	10+60 to 81+84
-Y1-	12+75 to 15+25
-Y2-	10+00 to 12+25

Alignment	Stations (±)
-Y3-	11+50 to 12+40
-Y4-	10+00 to 10+57
-Y5-	10+00 to 11+00
-Y7-	11+00 to 13+50
-Y8-	10+00 to 14+50
-Y9-	10+00 to 11+00
-Y10-	10+00 to 10+50
-Y11-	10+00 to 10+50
-Y12-	10+00 to 10+50
-Y13-	10+00 to 10+50
-Y14-	10+25 to 12+84
-Y15-	10+00 to 10+44
-Y16-	10+00 to 10+60
-Y17-	10+00 to 10+50
-Y18-	11+25 to 12+35
-Y19-	10+00 to 10+50
-Y20-	10+00 to 10+42
-Y21-	10+75 to 11+28
-Y22-	10+75 to 11+17
-Y23-	10+00 to 10+60
-Y24-	10+75 to 11+30
-Y25-	11+00 to 11+39
-Y26-	10+00 to 12+41
-MUP-	10+00 to 12+45
-RAB-	10+00 to 13+75

Physiography and Geology

The site is located within the Blue Ridge Physiographic and Geologic Province of North Carolina in Rutherford County. The Blue Ridge Province is typically characterized by highly metamorphosed, mostly Pre-Cambrian-aged rocks, including gneisses, schists, and slates. The existing elevations along the investigated corridor range from approximately 1093 feet at the southeast end of the project to a low of 885 feet near the northwest end of the project. In general, the topography at this site is generally hilly, with gentle slopes.

Based on previous mapping (N.C. Geologic Map 1985) and our knowledge of the local geology, the site is underlain by Cambrian amphibole gneiss, biotite gneiss, and mica schist. Based on our site visit and subsurface conditions encountered, the near surface soils appear to mainly consist of clays, transitioning to sandy silts and silty sands with depth. Residual soils underlie the soils that make up the roadway embankment materials and artificial fill materials.



PROJECT REFERENCE NO.	SHEET NO.
HL-0065	3B

Soil Properties

Soils encountered during this investigation are separated into four categories based on their origin. The soils encountered consists of roadway embankment fill, artificial fill, , and residual soil and rock materials.

The roadway embankment soils encountered along the existing roadway, appear to be derived from the on-site soils along the alignments. Roadway embankment fill was encountered up to a maximum depth of about 6 feet along existing roadways on US 221A. The roadway embankment soils predominately consist of loose, moist, non-plastic to moderately plastic, clayey fine to coarse sands and sandy gravel (A-2-6, A-2-7, A-1-b), and soft , moist, non-plastic to highly plastic sandy silts (A-4), sandy clays (A-6), and silty clays (A-7-5,A-7-6). The plastic index of the clayey and silty soils range from non-plastic to 32 percent. The percent fines passing the #200 sieve in these soils range from 32 to 63 percent. The natural moisture contents range from 13 to 32 percent, based on laboratory testing.

Artificial fill soils encountered were generally adjacent to the roadway pavement, parking lot fill and adjacent construction development. The artificial fill soil extends to depths of at least 12.5 feet beneath the ground surface. Artificial fill soils encountered consist of loose to medium dense, moist, silty fine to coarse sands and gravels (A-2-4, A-1-b), and soft to stiff, moist, non-plastic sandy silts (A-4) and moderately to highly plastic silty clays (A-7-5, A-7-6. The plastic index of the clayey and silty soils range from non-plastic to 33 percent. The percent fines passing the #200 sieve in these soils range from 44 to 67. The natural moisture contents range 19 to 34 percent, based on laboratory testing.

Residual soils are present at the surface along the shoulders, beneath the roadway embankment, and beneath artificial fill. The residual soils encountered generally consisted of near-surface clays that transition to silts with depth.

Residual soils encountered consist of very loose to dense, moist, silty and clayey fine to coarse sands (A-2-4, A-2-6). The cohesive soils consist of soft to very stiff, moist, non-plastic to slightly plastic sandy and clayey silts (A-4 and A-5) and moderately to highly plastic clays (A-7-5, A-7-6). The plasticity indices of the clayey and silty soils range from non-plastic to 44 percent with 33 to 81 percent passing the #200 sieve and natural moisture contents of 9 to 35 percent, based on laboratory testing.

Groundwater

Groundwater was only encountered at one locate at a depth of about 14.7 feet (elevation 882.8) along the project. Drainage flows to the south toward the Broad River which flows south. The depth of groundwater, beneath the ground surface, will fluctuate with seasonal precipitation and may occur at higher levels at other times of the year above less permeable clayey soils.

Areas of Special Geotechnical Interest

- 1) Plastic Soils – Highly plastic soils with plastic indices (PI) of 26 and greater were encountered at the following locations:

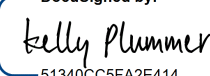
Alignment	Stations (±)
-L1-	11+75 to 13+75
-L2-	10+00 to 11+25
-L2-	18+25 to 22+75
-L2-	26+75 to 27+75
-L2-	31+25 to 33+26
-L3-	19+75 to 26+25
-L3-	28+75 to 31+75
-L3-	34+25 to 42+25
-L3-	53+75 to 71+75
-L3-	76+25 to 78+25
-Y1-	12+75 to 15+25
-Y2-	10+00 to 12+25
-MUP-	10+07 to 12+45

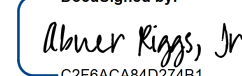
These highly plastic soils are discussed above in the section titled “Soil Properties,” and are indicated on the attached cross section graphics.

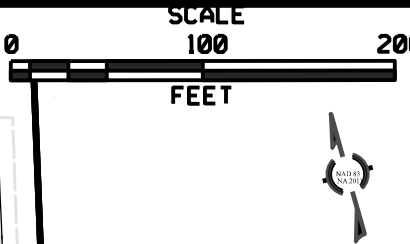
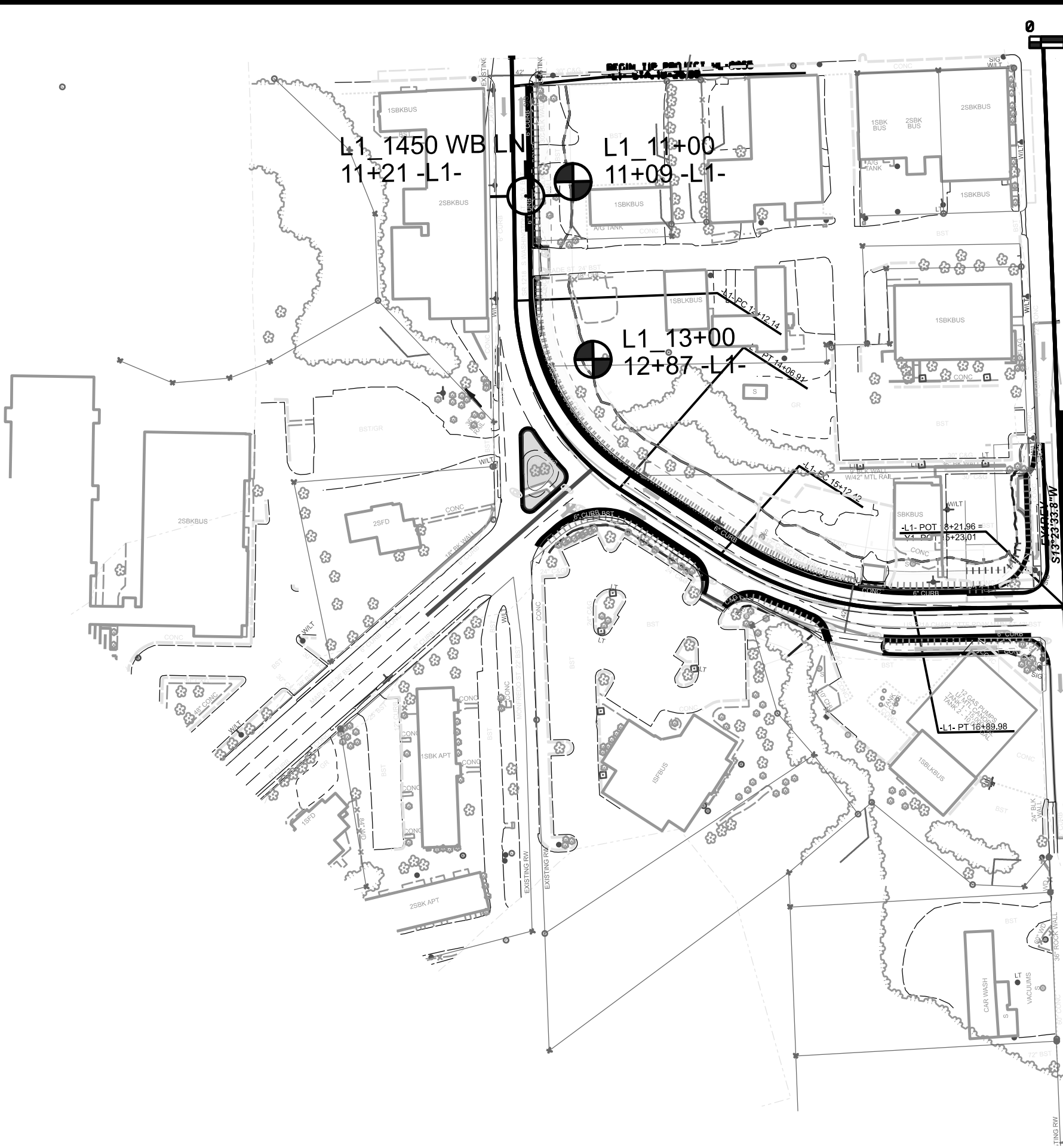
BULK SAMPLES

Sample No.	Location	Depth (ft)	Test
CBR - 1	30+76 -L2- 35’ LT	0.0 – 3.5	Proctor and CBR
CBR - 2	71+48 -L3- 40’ RT	0.0 – 4.0	Proctor and CBR
CBR - 3	11+16 -Y8- 61’ LT	0.0 – 4.0	Proctor and CBR

Sincerely,
Terracon Consultants, Inc.

DocuSigned by:

51340CC5EA2E414...
Kelly R. Plummer, PG
Project Geologist

DocuSigned by:

C2F8ACA84D274B1...
Abner F. Riggs, Jr., PE
Senior Geotechnical Engineer



MATCHLINE -L1- 18+21.96 (END ALIGNMENT) =
-L2- 10+00 (BEGIN ALIGNMENT SEE SHEET PLAN 5)

HL-0065

PSH 004

NORTH CAROLINA

DEPARTMENT

OF TRANSPORTATION

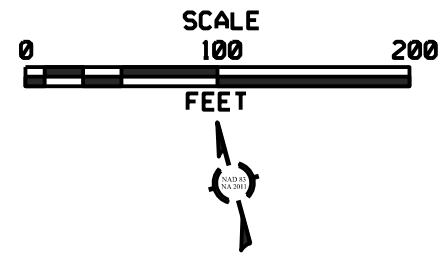
Prepared For:

TIP PROJECT: HL-0065

US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

GOTECHNICAL UNIT

PREPARED BY



HL-0065
PSH 00
NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

Prepared For:

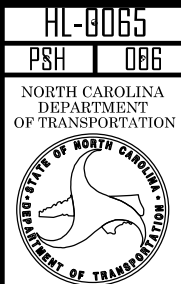
GEOTECHNICAL
UNITED STATES ARMY
CORPS OF ENGINEERS
FORT MONROE
VA

TIP PROJECT: HL-0065
US 221A (CHARLOTTE ROAD AND W/E MAIN
STREET) FROM WEST COURT STREET TO
SR 2169 (OAKLAND ROAD)

GOTECHNICAL
UNIT

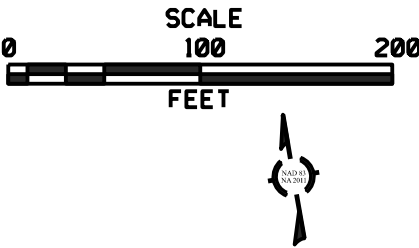
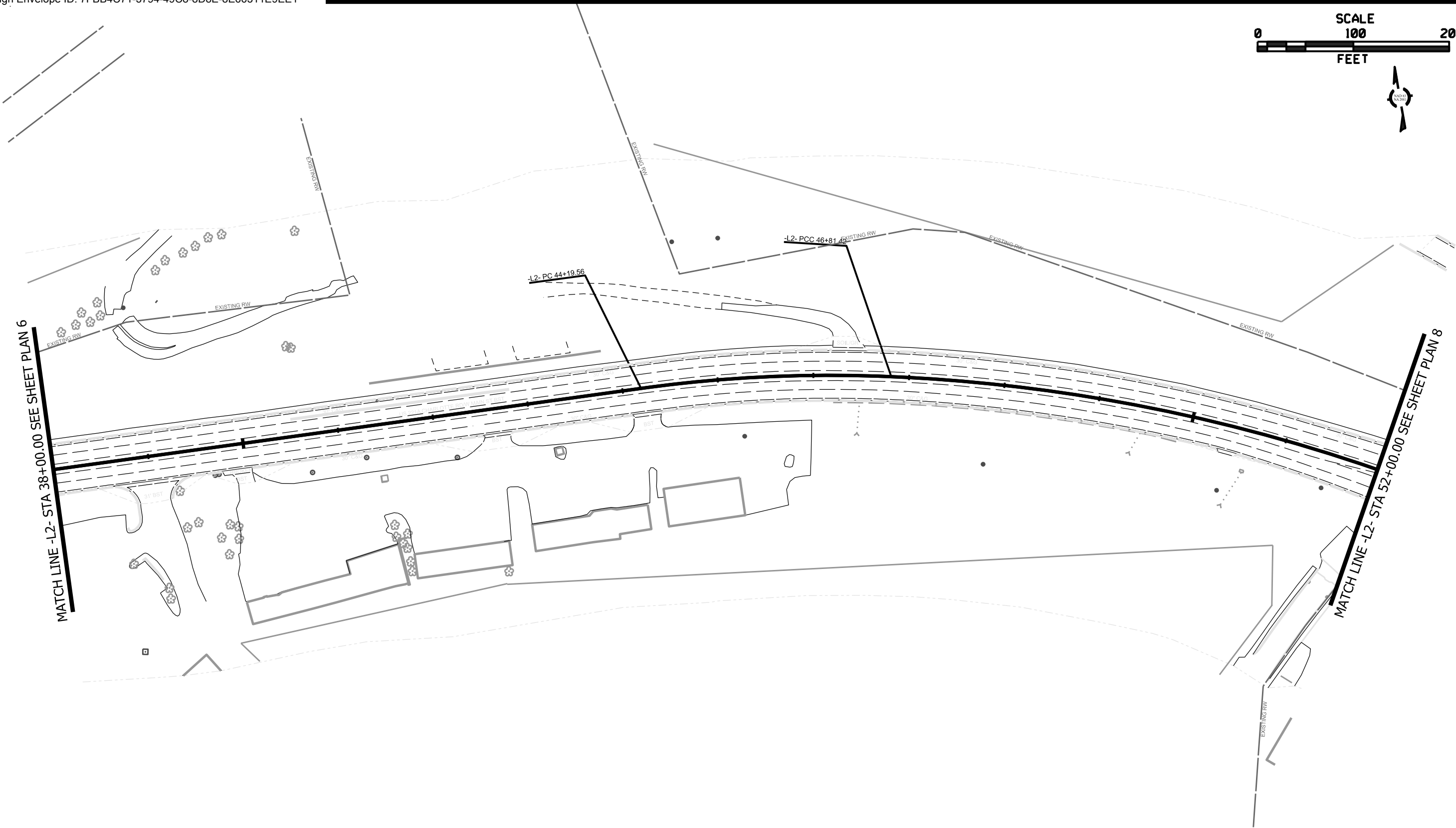
PREPARED BY

Terracon
2100 SPRING FOREST ROAD, SUITE 1030
DURHAM, NORTH CAROLINA 27704-3869
NC REG. RESIDENTS: 919-286-1000 • FAX: 919-286-9100



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HL-0065

PSH 087

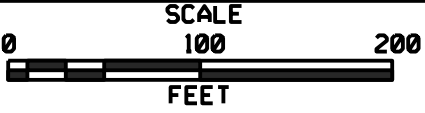
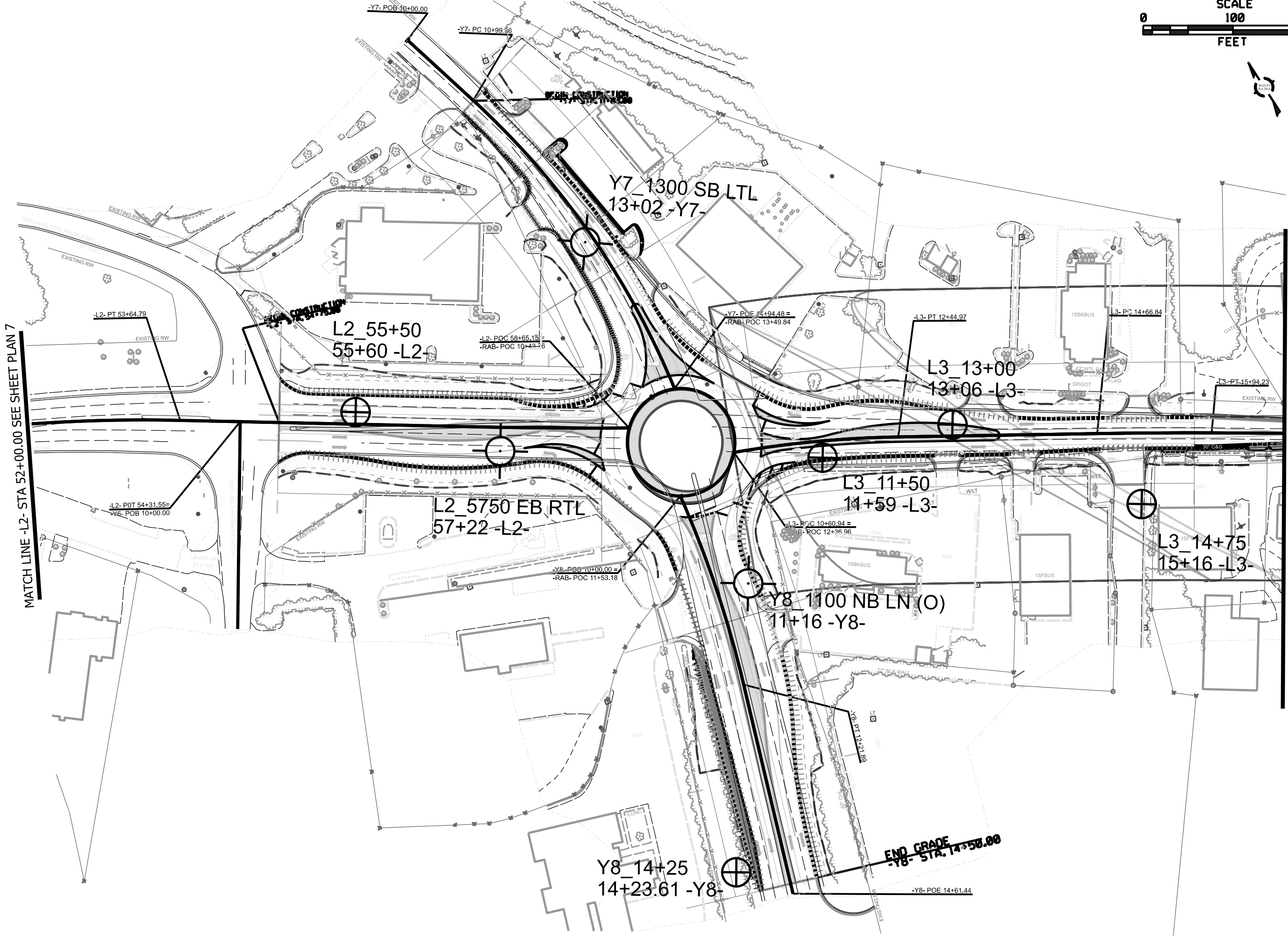
NORTH CAROLINA
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OF TRANSPORTATION

Prepared For:

TIP PROJECT: HL-0065
US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

GOTECHNICAL UNIT

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HL-0065
PSH 088

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OF TRANSPORTATION

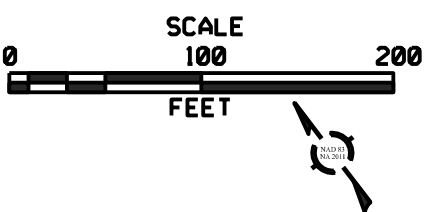
Prepared For:

TIP PROJECT: HL-0065
 US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

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HL-0065

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DEPARTMENT
OF TRANSPORTATION

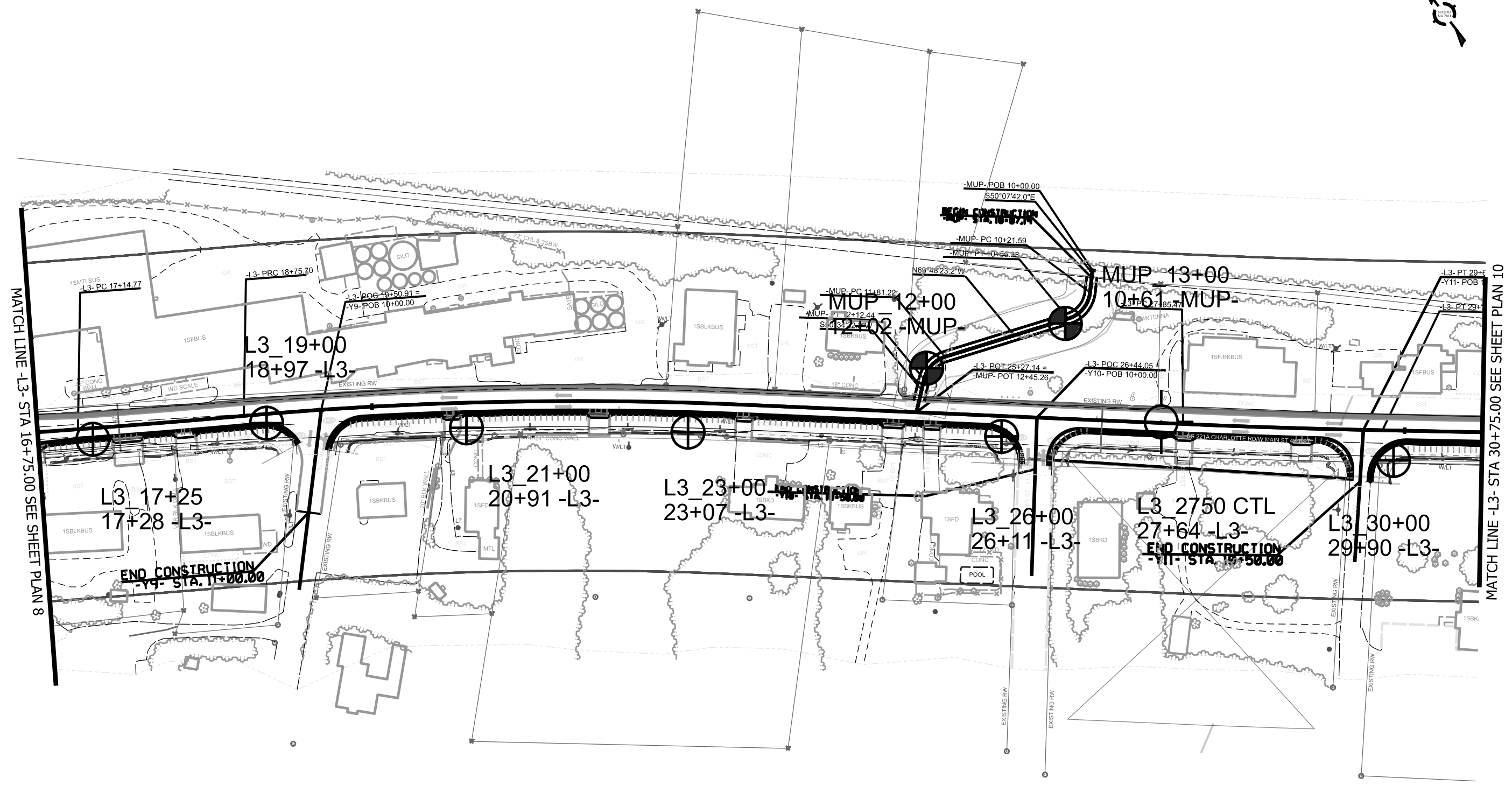
Prepared For:



TIP PROJECT: HL-0065
US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

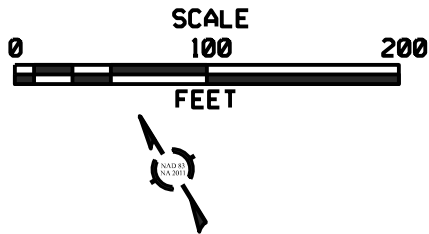
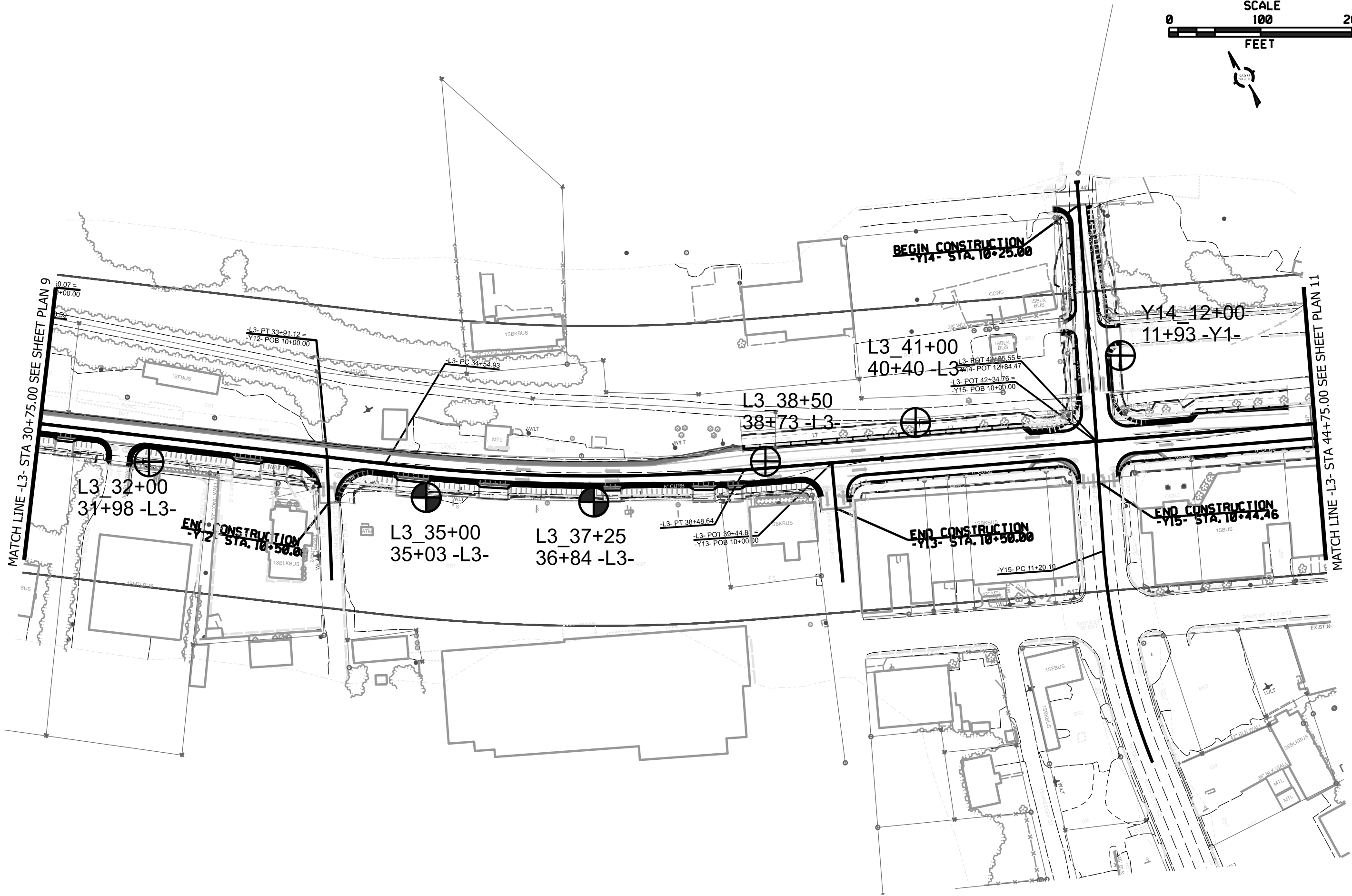
GOTECHNICAL
UNIT

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MATCH LINE -L3- STA 16+75.00 SEE SHEET PLAN 8

MATCH LINE -L3- STA 30+75.00 SEE SHEET PLAN 10



HL-0065

PSH Q40

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OF TRANSPORTATION

Prepared For:



TIP PROJECT: HL-0065

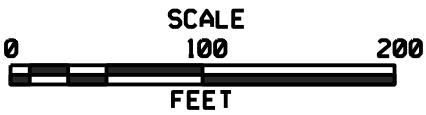
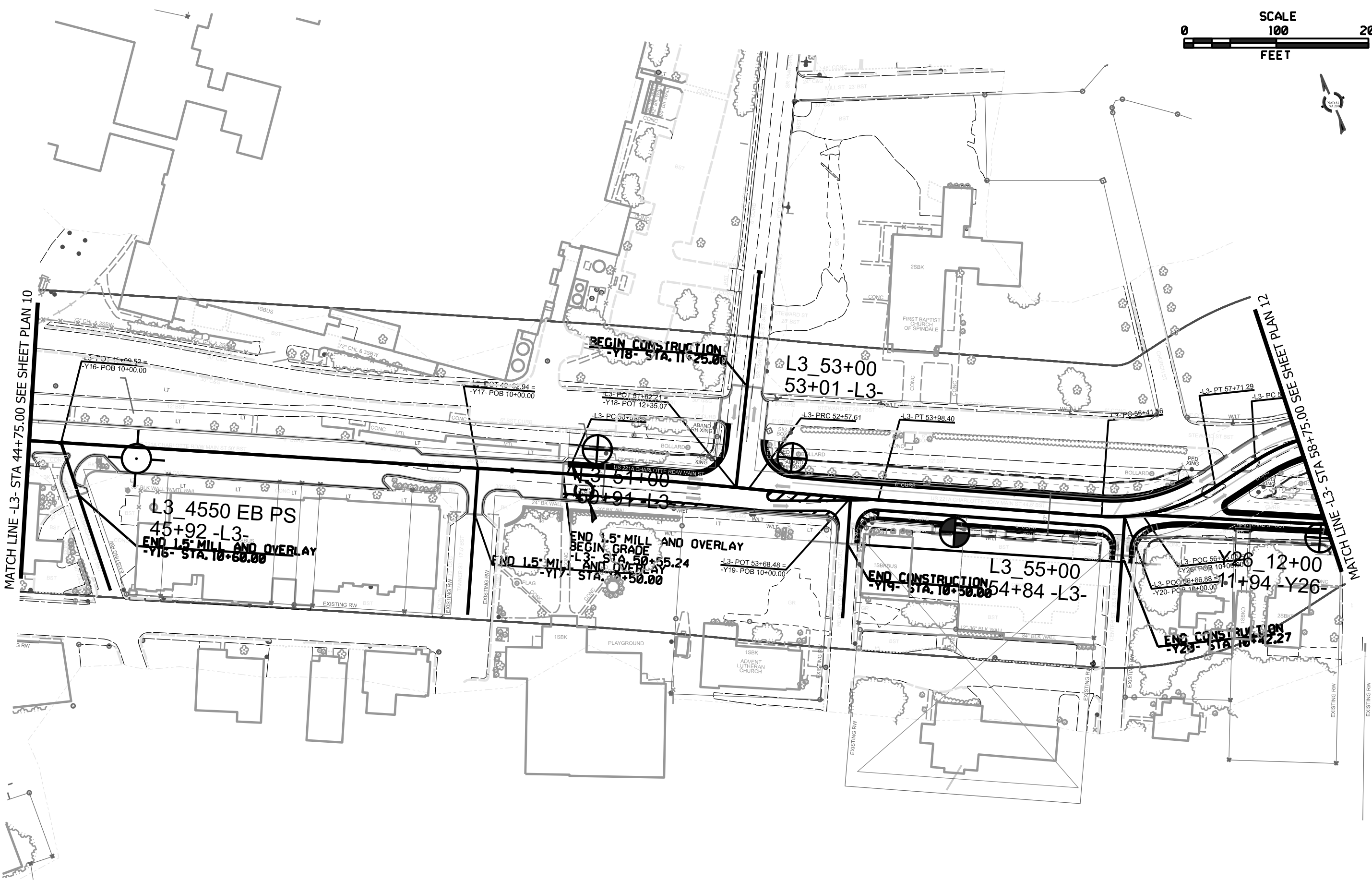
US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

GOTECHNICAL UNIT

PREPARED BY



5/26/20



HL-0065

PSH | GH

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

Prepared For:

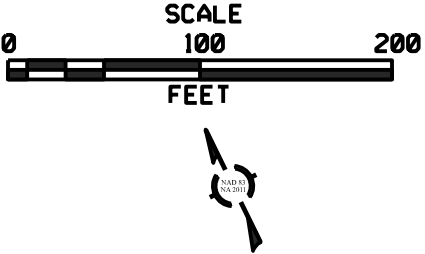


TIP PROJECT: HL-0065
US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

GOTECHNICAL
UNIT

PREPARED BY





HL-0065

PSH CH2

NORTH CAROLINA
DEPARTMENT
OF TRANSPORTATION

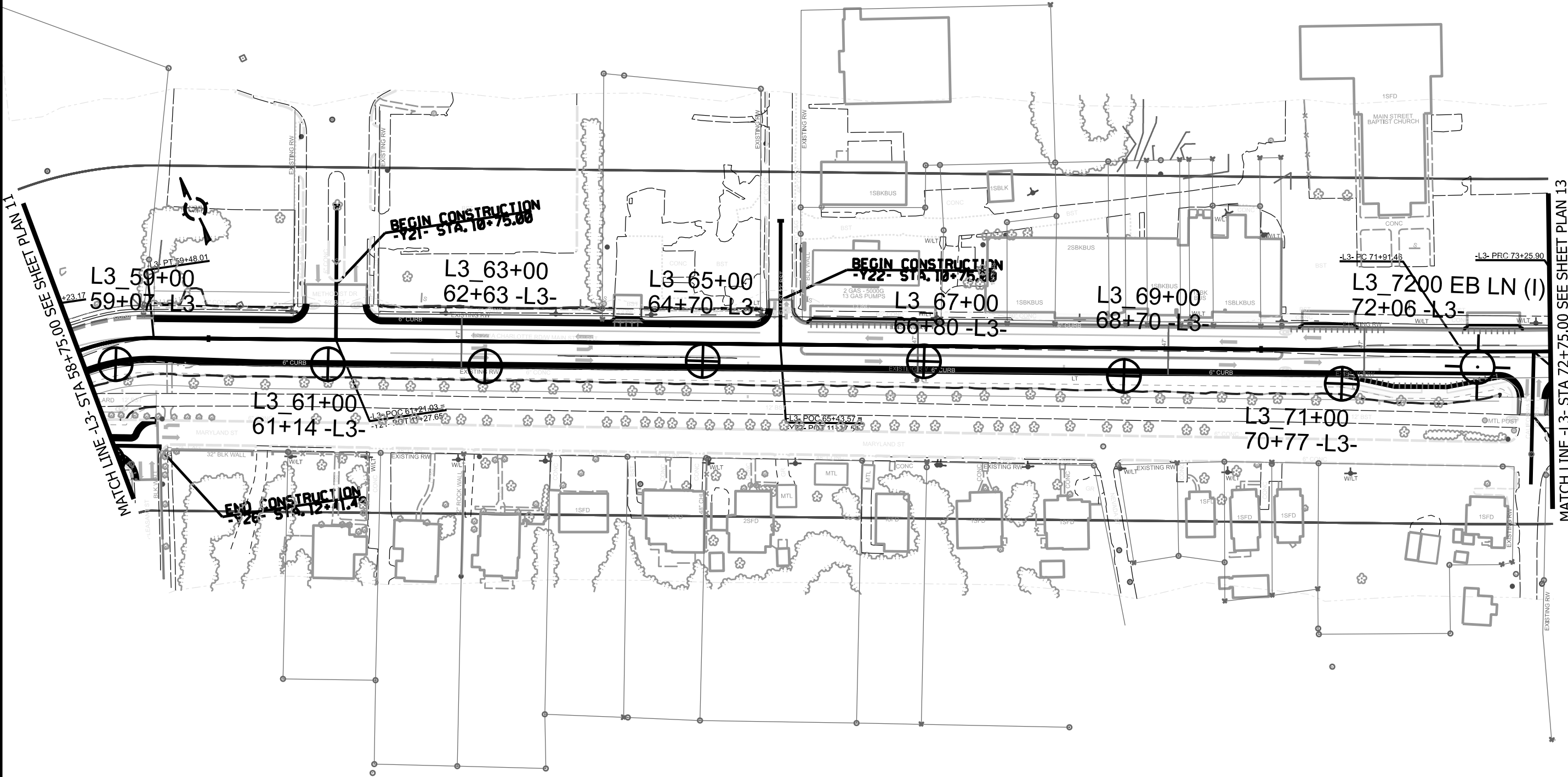
Prepared For:



TIP PROJECT: HL-0065
US 221A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM WEST COURT STREET TO SR 2169 (OAKLAND ROAD)

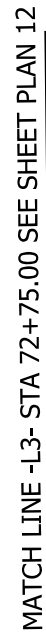
GOTECHNICAL
UNIT

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MATCH LINE - L3- STA 58+75.00 SEE SHEET PLAN 11

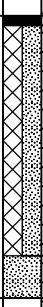
MATCH LINE - L3- STA 72+75.00 SEE SHEET PLAN 13



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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Marples Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L1_11+00			STATION 11+09			OFFSET 52 ft LT			ALIGNMENT -L1-			0 HR. Dry			
COLLAR ELEV. 906.9 ft			TOTAL DEPTH 14.7 ft			NORTHING 601,629			EASTING 1,118,053			24 HR. Dry			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER Piazza L.			START DATE 01/08/25			COMP. DATE 01/08/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
910															
905	905.9	1.0	2	3	4	7						M		906.9	0.0
	903.4	3.5	2	3	4	7					M	906.4		0.5	
	900.9	6.0	2	2	4						SS-3	29%		PAVEMENT (0.7" ASPHALT)	
900	898.7	8.2	2	2	3	6						M		ARTIFICIAL FILL	
						5								MEDIUM STIFF TO STIFF, BROWN, RED, SANDY SILT, MOIST (A-4)	
895														894.4	12.5
	893.7	13.2	2	3	3	6						M		892.2	14.7
RESIDUAL MEDIUM STIFF, BROWN, RED, SANDY SILT, MOIST (A-4)															
Boring Terminated at Elevation 892.2 ft IN RESIDUAL SANDY SILT															

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Marples Z.							
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)							
BORING NO. L1_13+00			STATION 12+87			OFFSET 43 ft LT			ALIGNMENT -L1-			0 HR. 15.5				
COLLAR ELEV. 897.5 ft			TOTAL DEPTH 19.8 ft			NORTHING 601,475			EASTING 1,118,028			24 HR. 14.7				
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER Piazza L.			START DATE 01/08/25			COMP. DATE 01/08/25			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
900																
895	896.5	1.0	2	2	3	5					SS-6	21%		897.5	0.0	
	894.0	3.5	2	2	4	6					SS-7	35%		894.5	3.0	
890	891.5	6.0	1	2	2	4						M		RESIDUAL MEDIUM STIFF, BROWN SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6) VERY SOFT TO MEDIUM STIFF, BROWN, TAN, SILTY CLAY, MICACEOUS, MOIST TO WET, HIGHLY PLASTIC (A-7-5)		
	889.2	8.3	2	3	3	6					M					
885	884.2	13.3	1	WOH	1	1										
	879.2	18.3	1	WOH	2	2					W		877.7	19.8		
Boring Terminated at Elevation 877.7 ft IN RESIDUAL SILTY CLAY																

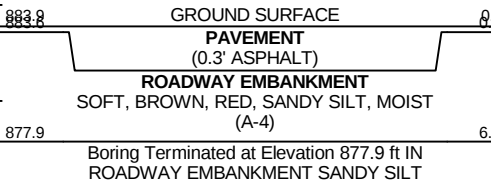
NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

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NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

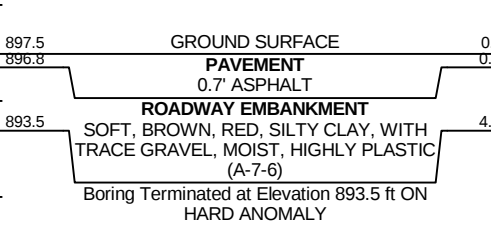
NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Marples Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)											GROUND WTR (ft)							
BORING NO. L2_17+00 offset						STATION 16+61			OFFSET 52 ft RT			ALIGNMENT -L2-			0 HR. Dry			
COLLAR ELEV. 883.9 ft						TOTAL DEPTH 6.0 ft			NORTHING 600,938			EASTING 1,118,993			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Piazza L.						START DATE 01/09/25			COMP. DATE 01/09/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100								
885																		
880											M							
																		
																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Marples Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)											GROUND WTR (ft)							
BORING NO. L2_18+90						STATION 18+89			OFFSET 2 ft LT			ALIGNMENT -L2-			0 HR. Dry			
COLLAR ELEV. 897.5 ft						TOTAL DEPTH 4.0 ft			NORTHING 600,931			EASTING 1,119,226			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Piazza L.						START DATE 01/09/25			COMP. DATE 01/09/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100								
900																		
895											S-7	21% M						
																		
																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Marples Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L2_21+00			STATION 21+14			OFFSET 5 ft RT			ALIGNMENT -L2-			0 HR. Dry			
COLLAR ELEV. 910.3 ft			TOTAL DEPTH 6.0 ft			NORTHING 600,859			EASTING 1,119,440			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Piazza L.			START DATE 01/09/25			COMP. DATE 01/09/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
915															
910														910.3	0.0
905															

NCDOT BORE SINGLE HL-0065_GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Halverson M.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)										GROUND WTR (ft)					
BORING NO. L2_24+75			STATION 24+73			OFFSET 67 ft LT			ALIGNMENT -L2-		0 HR. Dry				
COLLAR ELEV. 935.2 ft			TOTAL DEPTH 25.0 ft			NORTHING 600,839			EASTING 1,119,804		24 HR. Dry				
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Piazza L.			START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
940															
935														935.2	0.0
930	934.2	1.0	3	2	3										

NCDOT BORE SINGLE HL-0065_GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Marples Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)										GROUND WTR (ft)					
BORING NO. L2_25+50			STATION 25+73			OFFSET 61 ft LT			ALIGNMENT -L2-		0 HR. Dry				
COLLAR ELEV. 937.1 ft			TOTAL DEPTH 20.2 ft			NORTHING 600,826			EASTING 1,119,901		24 HR. Dry				
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Piazza L.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
940															
	936.1	1.0													
935			2	2	1							M			
	933.6	3.5		1	1							M			
	931.1	6.0										M			
930			3	7	6							M			
	928.4	8.7										M			
			2	1	2						SS-35	M			
925															
	923.4	13.7		3	4							M			
920															
	918.4	18.7		5	6							M			
														Boring Terminated at Elevation 916.9 ft IN RESIDUAL SILTY SAND	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Marples Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)										GROUND WTR (ft)					
BORING NO. L2_27+50 LT			STATION 27+44			OFFSET 82 ft LT			ALIGNMENT -L2-		0 HR. Dry				
COLLAR ELEV. 931.7 ft			TOTAL DEPTH 25.8 ft			NORTHING 600,803			EASTING 1,120,067		24 HR. Dry				
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Piazza L.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
935															
930	930.7	1.0												931.7 GROUND SURFACE 0.0	
925	928.2	3.5	3	4	6						SS-38	28%		STIFF, BROWN, RED, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)	
	925.7	6.0	3	4	6						SS-39	23%		MEDIUM STIFF TO HARD, BROWN, RED, SILTY CLAY, MOIST (A-7-5)	
920	922.4	9.3	3	3	3							M			
			2	3	3							M			
915	917.4	14.3										M			
			3	4	4							M			
910	912.4	19.3										M			
			3	4	7							M			
	907.4	24.3										M			
			15	24	22									905.9 Boring Terminated at Elevation 905.9 ft IN RESIDUAL SILTY CLAY 25.8	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

WBS 50685.1.1				TIP HL-0065				COUNTY RUTHERFORD				GEOLOGIST Marples Z.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)												GROUND WTR (ft)					
BORING NO. L2_29+00				STATION 28+95				OFFSET 44 ft RT				ALIGNMENT -L2-				0 HR. Dry	
COLLAR ELEV. 920.9 ft				TOTAL DEPTH 2.9 ft				NORTHING 600,659				EASTING 1,120,199				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)								DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Piazza L.				START DATE 01/09/25				COMP. DATE 01/09/25				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
925																	
920																	
												M		920.9	GROUND SURFACE	0.9	
														918.0	PAVEMENT 0.3' ASPHALT		
															ROADWAY EMBANKMENT SOFT, RED, BROWN, SANDY SILT, MOIST (A-4)	2.9	
															Boring Terminated at Elevation 918.0 ft ON HARD ANOMALY		

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST HOWARD, J.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)					
BORING NO. L2_3050 EB RTL						STATION 30+76				OFFSET 32 ft RT				ALIGNMENT -L2-				0 HR. N/A	
COLLAR ELEV. 922.6 ft						TOTAL DEPTH 5.0 ft				NORTHING 600,655				EASTING 1,120,383				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT (23215)									DRILL METHOD Core Boring					HAMMER TYPE Automatic					
DRILLER PIAZZA, L.						START DATE 10/27/24				COMP. DATE 10/27/24				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION					
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)					
925																			
920														922.6	GROUND SURFACE		0.0		
														921.8	PAVEMENT(ASPHALT)		0.8		
														920.1	ROADWAY EMBANKMENT		2.5		
											S-5A	23%			RED, BROWN, SILTY CLAY, MOIST, MODERATELY PLASTIC (A-7-6)				
											S-6	25%				RESIDUAL		5.0	
															GRAY, BROWN, CLAYEY SILT, MOIST (A-5)				
															Boring Terminated at Elevation 917.6 ft IN RESIDUAL CLAYEY SILT				

NCDOT BORE SINGLE HL-0065 GEO_PD1.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Marples Z.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)					
BORING NO. L2_33+00						STATION 33+04				OFFSET 48 ft LT				ALIGNMENT -L2-				0 HR. Dry	
COLLAR ELEV. 931.8 ft						TOTAL DEPTH 6.0 ft				NORTHING 600,727				EASTING 1,120,614				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A					
DRILLER Piazza L.						START DATE 01/09/25				COMP. DATE 01/09/25				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION					
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)					
935																			
930														931.8	GROUND SURFACE		0.0		
											S-5	18% M			RESIDUAL				
														928.8	SOFT, RED, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)		3.0		
														925.8	SOFT, BROWN, TAN, SANDY CLAY, MOIST (A-6)		6.0		
															Boring Terminated at Elevation 925.8 ft IN RESIDUAL SANDY CLAY				

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Halverson M.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L2_55+50						STATION 55+60			OFFSET 13 ft LT			ALIGNMENT -L2-			0 HR. Dry			
COLLAR ELEV. 1,068.1 ft						TOTAL DEPTH 6.0 ft			NORTHING 600,244			EASTING 1,122,780			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1070																		
1065											S-10	14% M		1,068.1 GROUND SURFACE 0.0 1,067.5 0.6 PAVEMENT 0.6' ASPHALT RESIDUAL SOFT, BROWN, SANDY SILT, MOIST (A-4) 1,062.1 6.0 Boring Terminated at Elevation 1,062.1 ft IN RESIDUAL SANDY SILT				

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST HOWARD, J.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L2_5750 EB RTL						STATION 57+22			OFFSET 12 ft RT			ALIGNMENT -L2-			0 HR. N/A			
COLLAR ELEV. 1,072.0 ft						TOTAL DEPTH 5.0 ft			NORTHING 600,120			EASTING 1,122,892			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT (23215)									DRILL METHOD Core Boring					HAMMER TYPE Automatic				
DRILLER PIAZZA, L.						START DATE 10/27/24			COMP. DATE 10/27/24			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1075																		
1070												M		1,072.0 GROUND SURFACE 0.0 1,071.5 0.5 PAVEMENT (PAVEMENT) ROADWAY EMBANKMENT BROWN, FINE TO COARSE SAND, TRACE GRAVEL MOIST (A-1-b) 1,070.3 1.7 RESIDUAL BROWN, FINE TO COARSE SANDY SILT, MOIST (A-4) 1,067.0 5.0 Boring Terminated at Elevation 1,067.0 ft IN ROADWAY EMBANKMENT SANDY SILT				

NCDOT BORE SINGLE HL-0065 GEO_PDI.GPJ NC_DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)												GROUND WTR (ft)					
BORING NO. L3_19+00				STATION 18+97			OFFSET 9 ft RT			ALIGNMENT -L3-			0 HR. Dry				
COLLAR ELEV. 1,073.3 ft				TOTAL DEPTH 6.0 ft			NORTHING 599,534			EASTING 1,123,818			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)								DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.				START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft) DEPTH (ft)		
1075																	
1070												M			1,073.3 GROUND SURFACE 0.0 1,072.6 PAVEMENT 0.7 ROADWAY EMBANKMENT SOFT, RED, BROWN, SILTY CLAY, MOIST, MODERATELY PLASTIC (A-7-6) 1,067.3 6.0 Boring Terminated at Elevation 1,067.3 ft IN ROADWAY EMBANKMENT SILTY CLAY		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)												GROUND WTR (ft)					
BORING NO. L3_21+00				STATION 20+91			OFFSET 24 ft RT			ALIGNMENT -L3-			0 HR. Dry				
COLLAR ELEV. 1,076.0 ft				TOTAL DEPTH 4.0 ft			NORTHING 599,413			EASTING 1,123,969			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)								DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.				START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft) DEPTH (ft)		
1080																	
1075												M			1,076.0 GROUND SURFACE 0.0 1,075.2 PAVEMENT 0.8 (0.3' ASPHALT, 0.5' CONCRETE) ROADWAY EMBANKMENT SOFT, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6) 1,072.0 4.0 Boring Terminated at Elevation 1,072.0 ft IN ROADWAY EMBANKMENT SILTY CLAY		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_23+00			STATION 23+07			OFFSET 29 ft RT			ALIGNMENT -L3-			0 HR.	Dry		
COLLAR ELEV. 1,081.0 ft			TOTAL DEPTH 6.0 ft			NORTHING 599,272			EASTING 1,124,137			24 HR.	Dry		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers			HAMMER TYPE N/A						
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1085															
1080														1,081.0	0.0
											S-15	28% M		GROUND SURFACE ARTIFICIAL FILL SOFT, RED, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-5)	
1075														1,075.0	6.0
														Boring Terminated at Elevation 1,075.0 ft IN ARTIFICIAL FILL SILTY CLAY	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_26+00			STATION 26+11			OFFSET 20 ft RT			ALIGNMENT -L3-			0 HR.	Dry		
COLLAR ELEV. 1,087.1 ft			TOTAL DEPTH 6.0 ft			NORTHING 599,093			EASTING 1,124,376			24 HR.	FIAD		
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Piazza L.			START DATE 01/13/25			COMP. DATE 01/13/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1090															
1085														1,087.1	0.0
														1,086.1	1.0
														GROUND SURFACE	
														PAVEMENT	
														0.2' ASPHALT, 0.8' CONCRETE	
														ROADWAY EMBANKMENT	
														SOFT, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)	
														1,081.1	6.0
														Boring Terminated at Elevation 1,081.1 ft IN ROADWAY EMBANKMENT SILTY CLAY	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO PDI.GPJ NC DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT.GDT 4/23/25

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_38+50			STATION 38+73			OFFSET 8 ft LT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,091.4 ft			TOTAL DEPTH 6.0 ft			NORTHING 598,360			EASTING 1,125,400			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers			HAMMER TYPE N/A						
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1095															
1090															

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_41+00			STATION 40+40			OFFSET 37 ft LT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,092.0 ft			TOTAL DEPTH 6.0 ft			NORTHING 598,301			EASTING 1,125,562			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1095															
														1,092.0	0.0
														1,091.4	0.6
1090												M		GROUND SURFACE	
														PAVEMENT	
														0.6' ASPHALT	
														ROADWAY EMBANKMENT	
														SOFT, BROWN, SILTY CLAY, HIGHLY	
														PLASTIC MOIST (A-7-6)	
														1,086.0	6.0
														Boring Terminated at Elevation 1,086.0 ft IN ROADWAY EMBANKMENT SILTY CLAY	

NCDOT BORE SINGLE HL-0065_GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST HOWARD, J.								
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)								
BORING NO. L3_4550 EB PS			STATION 45+96			OFFSET 19 ft RT			ALIGNMENT -L3-			0 HR. N/A					
COLLAR ELEV. 1,097.5 ft			TOTAL DEPTH 5.0 ft			NORTHING 598,005			EASTING 1,126,031			24 HR. FIAD					
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT (23215)						DRILL METHOD Core Boring				HAMMER TYPE Automatic							
DRILLER PIAZZA, L.			START DATE 10/27/24			COMP. DATE 10/27/24			SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
1100																	
1095														1,097.5	GROUND SURFACE	0.0	
														1,096.7	PAVEMENT (ASPHALT)		0.8
											S-23	20%		RESIDUAL			
														RED, BROWN, SILTY CLAY, TRACE GRAVEL, MOIST (A-7-6)			
														1,092.5	Boring Terminated at Elevation 1,092.5 ft IN RESIDUAL SILTY CLAY		5.0

NCDOT BORE SINGLE HL-0065_GEO_PDI.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Halverson M.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L3_51+00						STATION 50+91			OFFSET 28 ft LT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,093.5 ft						TOTAL DEPTH 6.0 ft			NORTHING 597,813			EASTING 1,126,493			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1095														1,093.5 GROUND SURFACE 0.0				
1090											S-11	15% M		RESIDUAL SOFT, RED, BROWN, SANDY SILT, MOIST (A-4)				
														1,087.5 6.0				
Boring Terminated at Elevation 1,087.5 ft IN RESIDUAL SANDY SILT																		
0-0.3' TOP SOIL																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Halverson M.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L3_53+00						STATION 53+01			OFFSET 28 ft LT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,090.2 ft						TOTAL DEPTH 6.0 ft			NORTHING 597,720			EASTING 1,126,683			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1095														1,090.2 GROUND SURFACE 0.0				
1090														RESIDUAL SOFT, RED, BROWN, SANDY CLAY, MOIST (A-6)				
1085											M			1,084.2 6.0				
Boring Terminated at Elevation 1,084.2 ft IN RESIDUAL SANDY CLAY																		
0-0.5' TOP SOIL																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Halverson M.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_55+00			STATION 54+84			OFFSET 29 ft RT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,089.2 ft			TOTAL DEPTH 10.0 ft			NORTHING 597,575			EASTING 1,126,812			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT TRACK (23215)						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER Piazza L.			START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1090														1,089.2	0.0
	1,088.2	1.0	5	5	6						SS-11	21%		1,088.6	0.6
1085	1,085.7	3.5	5	7	9							M		0.2' ASPHALT, 0.4 ABC	5.0
	1,083.2	6.0	3	3	4						SS-13	24%		ARTIFICIAL FILL	0.6
	1,080.7	8.5	2	3	4							M		STIFF, RED, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)	5.5
1080														1,079.2	10.0
														Boring Terminated at Elevation 1,079.2 ft IN RESIDUAL CLAYEY SILT	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_59+00			STATION 59+07			OFFSET 22 ft RT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,084.8 ft			TOTAL DEPTH 6.0 ft			NORTHING 597,490			EASTING 1,127,220			24 HR. Dry			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1085														1,084.8	0.0
1080						<									

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

WBS 50685.1.1				TIP HL-0065		COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)											GROUND WTR (ft)				
BORING NO. L3_63+00				STATION 62+63			OFFSET 24 ft RT			ALIGNMENT -L3-			0 HR. Dry		
COLLAR ELEV. 1,086.1 ft				TOTAL DEPTH 6.0 ft			NORTHING 597,335			EASTING 1,127,535			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)							DRILL METHOD H.S. Augers				HAMMER TYPE N/A				
DRILLER Duggins W.				START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.		LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					DEPTH (ft)
1090															
1085														1,086.1	0.0
														1,085.4	0.7
											S-20	26% M		PAVEMENT 0.7' ASPHALT	
														1,080.1	6.0
														Boring Terminated at Elevation 1,080.1 ft IN ROADWAY EMBANKMENT SILTY CLAY	

WBS 50685.1.1					TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Zhengwen Z.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)			
BORING NO. L3_67+00				STATION 66+80				OFFSET 15 ft RT				ALIGNMENT -L3-				0 HR. Dry	
COLLAR ELEV. 1,090.3 ft				TOTAL DEPTH 6.0 ft				NORTHING 597,165				EASTING 1,127,912				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)								DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.					START DATE 01/14/25				COMP. DATE 01/14/25				SURFACE WATER DEPTH N/A				
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)	DEPTH (ft)
1095																	
1090																	
1085						</											

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L3_69+00						STATION 68+70			OFFSET 26 ft RT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,090.6 ft						TOTAL DEPTH 6.0 ft			NORTHING 597,062			EASTING 1,128,077			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1095																		
1090														1,090.6 GROUND SURFACE 0.0				
1085											S-25	25% M		ARTIFICIAL FILL SOFT, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)				
														1,084.6 6.0				
Boring Terminated at Elevation 1,084.6 ft IN ARTIFICIAL FILL SILTY CLAY																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD					GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)														GROUND WTR (ft)				
BORING NO. L3_71+00						STATION 70+77			OFFSET 32 ft RT			ALIGNMENT -L3-			0 HR. Dry			
COLLAR ELEV. 1,089.7 ft						TOTAL DEPTH 6.0 ft			NORTHING 596,965			EASTING 1,128,260			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers					HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)				
1090																		
1085														1,089.7 GROUND SURFACE 0.0				
												M		ARTIFICIAL FILL SOFT, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)				
														1,083.7 6.0				
Boring Terminated at Elevation 1,083.7 ft IN ARTIFICIAL FILL SILTY CLAY																		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO PDI.GPJ NC DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_77+00			STATION 77+10			OFFSET 29 ft RT			ALIGNMENT -L3-			0 HR.	Dry		
COLLAR ELEV. 1,090.9 ft			TOTAL DEPTH 6.0 ft			NORTHING 596,690			EASTING 1,128,830			24 HR.	Dry		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers			HAMMER TYPE N/A						
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1095															
1090														1,090.9	GROUND SURFACE 0.0
												M		ARTIFICIAL FILL SOFT, BROWN, SILTY CLAY, MOIST, HIGHLY PLASTIC (A-7-6)	
1085														1,084.9	6.0
														Boring Terminated at Elevation 1,084.9 ft IN ARTIFICIAL FILL SILTY CLAY	

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST Zhengwen Z.						
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)						
BORING NO. L3_79+00			STATION 78+88			OFFSET 26 ft RT			ALIGNMENT -L3-			0 HR.	Dry		
COLLAR ELEV. 1,089.3 ft			TOTAL DEPTH 6.0 ft			NORTHING 596,613			EASTING 1,128,990			24 HR.	Dry		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)						DRILL METHOD H.S. Augers				HAMMER TYPE N/A					
DRILLER Duggins W.			START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
1090														1,089.3	GROUND SURFACE 0.0
1085															

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT

BORE LOG

[illegible]

WBS 50685.1.1			TIP HL-0065			COUNTY RUTHERFORD			GEOLOGIST HOWARD, J.							
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)									GROUND WTR (ft)							
BORING NO. Y7_1300 SB LTL			STATION 13+02			OFFSET 10 ft RT			ALIGNMENT -Y7-			0 HR. N/A				
COLLAR ELEV. 1,078.0 ft			TOTAL DEPTH 5.0 ft			NORTHING 600,264			EASTING 1,123,098			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT (23215)						DRILL METHOD Core Boring			HAMMER TYPE Automatic							
DRILLER PIAZZA, L.			START DATE 10/27/24			COMP. DATE 10/27/24			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
1080																
														1,078.0	GROUND SURFACE	0.0
														1,077.1	PAVEMENT (ASPHALT)	0.9
1075														1,076.3	ROADWAY EMBANKMENT	1.7
															GRAY, FINE TO COARSE SAND, TRACE GRAVEL, MOIST (A-1-b)	
											S-20A	22%		1,073.0	RESIDUAL	5.0
											RED, BROWN, SILTY CLAY, MOIST (A-7-6)					
						Boring Terminated at Elevation 1,073.0 ft IN RESIDUAL SILTY CLAY										

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST HOWARD, J.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)												GROUND WTR (ft)						
BORING NO. Y8_1100 NB LN (O)			STATION 11+16			OFFSET 36 ft LT			ALIGNMENT -Y8-			0 HR. N/A						
COLLAR ELEV. 1,071.6 ft			TOTAL DEPTH 5.0 ft			NORTHING 599,846			EASTING 1,123,044			24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE GEOPROBE 3126GT (23215)								DRILL METHOD Core Boring				HAMMER TYPE Automatic						
DRILLER PIAZZA, L.				START DATE 10/27/24			COMP. DATE 10/27/24			SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)		
1075																		
1070															1,071.6	0.0		
															1,071.0	0.6		
															1,069.4	2.2		
															1,066.6	5.0		
												S-15A	24%		ROADWAY EMBANKMENT GRAY, FINE TO COARSE SAND, TRACE GRAVEL, (MOIST)			
												RESIDUAL RED, BROWN, CLAYEY SILT, MOIST (A-5) Boring Terminated at Elevation 1,066.6 ft IN RESIDUAL CLAYEY SILT						

NCDOT BORE SINGLE HL-0065 GEO_PD1.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Halverson M.					
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)												GROUND WTR (ft)						
BORING NO. Y8_14+25			STATION 14+24			OFFSET 56 ft RT			ALIGNMENT -Y8-			0 HR. Dry						
COLLAR ELEV. 1,054.3 ft			TOTAL DEPTH 6.0 ft			NORTHING 599,583			EASTING 1,122,858			24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)								DRILL METHOD H.S. Augers				HAMMER TYPE N/A						
DRILLER Duggins W.				START DATE 01/15/25			COMP. DATE 01/15/25			SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)		
1055																		
1050															1,054.3	0.0		
															S-8	20%	ROADWAY EMBANKMENT SOFT, BROWN, SILTY CLAY, MOIST (A-7-5)	
															M			
																1,048.3		6.0
												Boring Terminated at Elevation 1,048.3 ft IN ROADWAY EMBANKMENT SILTY CLAY 0-0.5' TOP SOIL						

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)											GROUND WTR (ft)						
BORING NO. Y14_12+00						STATION 11+93			OFFSET 33 ft LT			ALIGNMENT -Y14-			0 HR. Dry		
COLLAR ELEV. 1,092.1 ft						TOTAL DEPTH 6.0 ft			NORTHING 598,253			EASTING 1,125,791			24 HR. Dry		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers				HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)			
1095																	
1090																	
											S-13	25%		1,092.1 GROUND SURFACE 0.0			
												M		ARTIFICIAL FILL SOFT, BROWN, SILTY CLAY, MOIST, MODERATELY PLASTIC (A-7-6)			
														1,086.1 6.0			
															Boring Terminated at Elevation 1,086.1 ft IN ARTIFICIAL FILL SILTY CLAY		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 50685.1.1						TIP HL-0065			COUNTY RUTHERFORD				GEOLOGIST Zhengwen Z.				
SITE DESCRIPTION US-221 A (CHARLOTTE RD. AND W/E MAIN ST.) FROM W COURT ST. TO SR 2169 (OAKLAND RD.)											GROUND WTR (ft)						
BORING NO. Y26_12+00						STATION 11+94			OFFSET 15 ft RT			ALIGNMENT -Y26-			0 HR. Dry		
COLLAR ELEV. 1,086.9 ft						TOTAL DEPTH 6.0 ft			NORTHING 597,418			EASTING 1,127,173			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE MOBILE B-29 TRUCK (2019003)									DRILL METHOD H.S. Augers				HAMMER TYPE N/A				
DRILLER Duggins W.						START DATE 01/14/25			COMP. DATE 01/14/25			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft) DEPTH (ft)			
1090																	
1085																	
											S-23	17%		1,086.9 GROUND SURFACE 0.0			
												M		PAVEMENT 0.6' ASPHALT			
														1,080.9 6.0			
															Boring Terminated at Elevation 1,080.9 ft IN ROADWAY EMBANKMENT SANDY SILT		

NCDOT BORE SINGLE HL-0065 GEO_RDWY.GPJ NC_DOT.GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT GDT 4/23/25

NCDOT BORE SINGLE HL-0065 GEO RDWY.GPJ NC DOT.GDT 4/23/25

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 50685.1.1

TIP: HL-0065

COUNTY: RUTHERFORD

DESCRIPTION: US-221 A (CHARLOTTE ROAD AND W/E MAIN STREET) FROM W COURT STREET TO SR 2169 (OAKLAND ROAD)

Sample No.	Station	Alignment	Offset (feet)	Northing	Easting	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
										Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
S-12	11+21	-L1-	10 LT	601,628	1,118,010	1.1 - 5.0	A-7-6 (10)	48	20	20.9	23.4	20.3	35.4	2	95	84	57	26.3	--
SS-3	11+09	-L1-	52 LT	601,629	1,118,053	6.0 - 7.5	A-4 (0)	NP	NP	17.3	36.9	30.0	15.8	0	100	92	51	29.3	--
SS-6	12+87	-L1-	43 LT	601,475	1,118,028	1.0 - 2.5	A-7-6 (16)	55	30	20.9	15.2	13.5	50.4	6	91	79	60	21.2	--
SS-7	12+87	-L1-	43 LT	601,475	1,118,028	3.5 - 5.0	A-7-5 (16)	69	29	20.4	23.3	15.2	41.1	2	97	85	58	34.7	--
S-9A	11+50	-L2-	10 LT	601,147	1,118,519	0.8 - 1.0	A-2-7 (2)	44	19	30.1	25.2	8.5	36.2	20	73	59	35	27.4	--
S-5A	30+76	-L2-	32 RT	600,655	1,120,383	0.9 - 2.5	A-7-6 (5)	44	19	24.2	26.1	9.4	40.3	2	83	71	45	23.3	--
CBR-1	30+76	-L2-	35 LT	600,723	1,120,387	0.0 - 3.5'	A-7-6 (9)	48	24	23.5	21.3	16.8	38.4	4	87	75	50	20.9	--
S-6	30+76	-L2-	32 RT	600,655	1,120,383	2.5 - 5.0	A-5 (1)	45	8	25.6	36.2	19.7	18.5	0	98	83	43	24.7	--
S-13	57+22	-L2-	12 RT	600,120	1,122,892	1.7 - 5.0	A-4 (0)	39	8	38.6	25.9	19.2	16.3	1	97	70	39	19.6	--
S-1	13+40	-L2-	21 RT	601,050	1,118,690	2.0 - 3.0	A-2-6 (1)	37	16	46.2	20.6	6.6	26.6	2	91	62	32	12.6	--
S-7	18+89	-L2-	2 LT	600,931	1,119,226	1.0 - 2.0	A-7-6 (6)	50	28	27.9	20.2	7.0	44.9	19	74	60	40	20.6	--
SS-1	24+73	-L2-	67 LT	600,839	1,119,804	1.0 - 2.5	A-2-4 (0)	NP	NP	40.7	26.8	14.8	17.7	0	96	71	35	--	--
SS-4	24+73	-L2-	67 LT	600,839	1,119,804	8.5 - 10.0	A-2-4 (0)	NP	NP	33.1	38.3	19.2	9.4	0	99	81	33	--	--
SS-35	25+73	-L2-	61 LT	600,826	1,119,901	8.7 - 10.2	A-2-4 (0)	NP	NP	38.0	32.5	21.8	7.7	0	97	73	34	--	--
SS-38	27+44	-L2-	82 LT	600,803	1,120,067	1.0 - 2.5	A-7-6 (15)	53	28	22.5	18.3	9.9	49.3	1	98	84	60	28.2	--
SS-39	27+44	-L2-	82 LT	600,803	1,120,067	3.5 - 5.0	A-7-5 (5)	48	15	27.8	23.9	20.5	27.8	1	96	79	50	22.5	--
S-5	33+04	-L2-	48 LT	600,727	1,120,614	1.0 - 2.0	A-7-6 (14)	52	30	26.3	19.9	10.4	43.4	0	99	82	56	17.9	--
S-10	55+60	-L2-	13 LT	600,244	1,122,780	1.0 - 2.0	A-4 (0)	34	6	32.7	30.0	14.8	22.5	7	85	68	36	13.7	--
S-21	27+69	-L3-	5 RT	599,002	1,124,507	0.9 - 5.0	A-7-6 (13)	46	24	20.1	17.4	5.3	57.2	1	96	84	63	32.4	--
S-23A	45+96	-L3-	19 RT	598,005	1,126,031	0.8 - 5.0	A-7-6 (3)	42	16	31.2	24.0	17.7	27.1	7	88	69	43	19.5	--
S-26	71+48	-L3-	22 RT	596,923	1,128,383	1.6 - 5.0	A-7-6 (8)	45	21	25.2	21.8	16.3	36.7	1	96	80	53	21.4	--
CBR-2	71+48	-L3-	40 RT	596,910	1,128,376	0.0 - 4.0'	A-6 (4)	37	15	27.3	22.4	16.5	33.8	2	88	72	47	20.5	--
S-9	11+59	-L3-	19 RT	599,919	1,123,190	1.0 - 2.0	A-6 (3)	40	17	29.5	21.8	15.0	33.7	10	79	63	41	15.1	--
S-16	17+28	-L3-	11 RT	599,624	1,123,675	1.0 - 2.0	A-7-6 (9)	41	21	20.8	23.2	16.4	39.6	1	98	85	58	23.0	--
S-15	23+07	-L3-	29 RT	599,272	1,124,137	1.0 - 2.0	A-7-5 (21)	68	30	20.8	13.1	19.7	46.4	0	99	85	67	27.5	--
SS-16	35+03	-L3-	28 RT	598,514	1,125,064	1.0 - 2.5	A-7-6 (15)	52	26	21.9	17.0	14.7	46.4	0	99	85	63	17.4	--
SS-14	36+84	-L3-	28 RT	598,413	1,125,217	6.0 - 7.5	A-4 (0)	NP	NP	29.4	29.7	30.4	10.5	0	100	81	45	21.5	--
S-11	50+91	-L3-	28 LT	597,813	1,126,493	1.0 - 2.0	A-4 (0)	24	10	37.8	28.4	9.4	24.4	0	98	74	37	15.2	--
SS-11	54+84	-L3-	29 RT	597,575	1,126,812	1.0 - 2.5	A-7-6 (15)	52	26	22.2	16.5	12.9	48.4	0	100	86	63	21.0	--
SS-13	54+84	-L3-	29 RT	597,575	1,126,812	6.0 - 7.5	A-5 (6)	50	9	26.8	12.2	45.8	15.2	0	99	80	62	23.7	--
S-18	59+07	-L3-	22 RT	597,490	1,127,220	2.0 - 3.0	A-7-6 (18)	54	33	20.5	19.2	7.0	53.3	0	99	86	62	22.9	--
S-20	62+63	-L3-	24 RT	597,335	1,127,535	2.0 - 3.0	A-7-6 (17)	60	32	22.5	17.8	11.0	48.7	3	95	81	59	25.9	--
S-25	68+70	-L3-	26 RT	597,062	1,128,077	1.0 - 2.0	A-7-6 (14)	53	28	22.8	17.2	12.8	47.2	1	93	78	58	24.9	--
S-27	74+89	-L3-	43 LT	596,853	1,128,665	2.0 - 3.0	A-7-6 (4)	42	16	29.1	20.9	18.3	31.7	5	81	64	44	19.4	--
S-30	81+16	-L3-	26 RT	596,511	1,129,194	2.0 - 3.0	A-7-6 (7)	47	21	32.3	17.0	13.7	37.0	2	93	71	50	21.8	--
SS-20	10+61	-MUP-	4 LT	599,142	1,124,491	1.0 - 2.5	A-7-6 (19)	57	30	18.1	12.9	16.0	53.0	7	92	82	65	34.2	--
SS-23	10+61	-MUP-	4 LT	599,142	1,124,491	8.9 - 10.4	A-4 (0)	22	7	31.7	31.0	13.1	24.2	6	87	70	37	9.0	--
SS-29	12+02	-MUP-	2 RT	599,189	1,124,358	8.9 - 10.4	A-4 (0)	37	2	29.1	27.6	29.7	13.6	1	99	82	47	15.3	--
S-1A	14+46	-Y1-	34 LT	601,224	1,118,417	1.0 - 2.0	A-7-5 (40)	77	44	7.8	11.6	10.2	70.4	0	99	95	81	34.2	--
S-13	11+93	-Y14-	33 LT	598,253	1,125,791	1.0 - 2.0	A-7-6 (14)	53	25	26.8	12.7	16.5	44.0	0	98	78	61	24.5	--
S-23	11+94	-Y26-	15 RT	597,418	1,127,173	1.0 - 2.0	A-4 (0)	NP	NP	35.3	28.9	25.7	10.1	0	99	79	39	17.3	--
S-20A	13+03	-Y7-	10 RT	600,264	1,123,098	1.7 - 5.0	A-7-6 (10)	46	19	19.4	22.8	16.4	41.4	0	98	87	60	21.7	--
S-15A	11+16	-Y8-	36 LT	599,846	1,123,044	2.2 - 5.0	A-5 (3)	44	10	20.9	33.2	22.3	23.6	0	98	88	49	24.3	--
CBR-3	11+16	-Y8-	61 LT	599,840	1,123,065	0.0 - 4.0	A-2-7 (0)	47	12	33.4	32.1	20.4	14.1	25	69	55	27	18.2	--
S-8	14+24	-Y8-	56 RT	599,583	1,122,858	1.0 - 2.0	A-7-5 (1)	41	11	34.4	26.8	15.7	23.1	6	88	68	38	20.3	--

NP - NON-PLASTIC

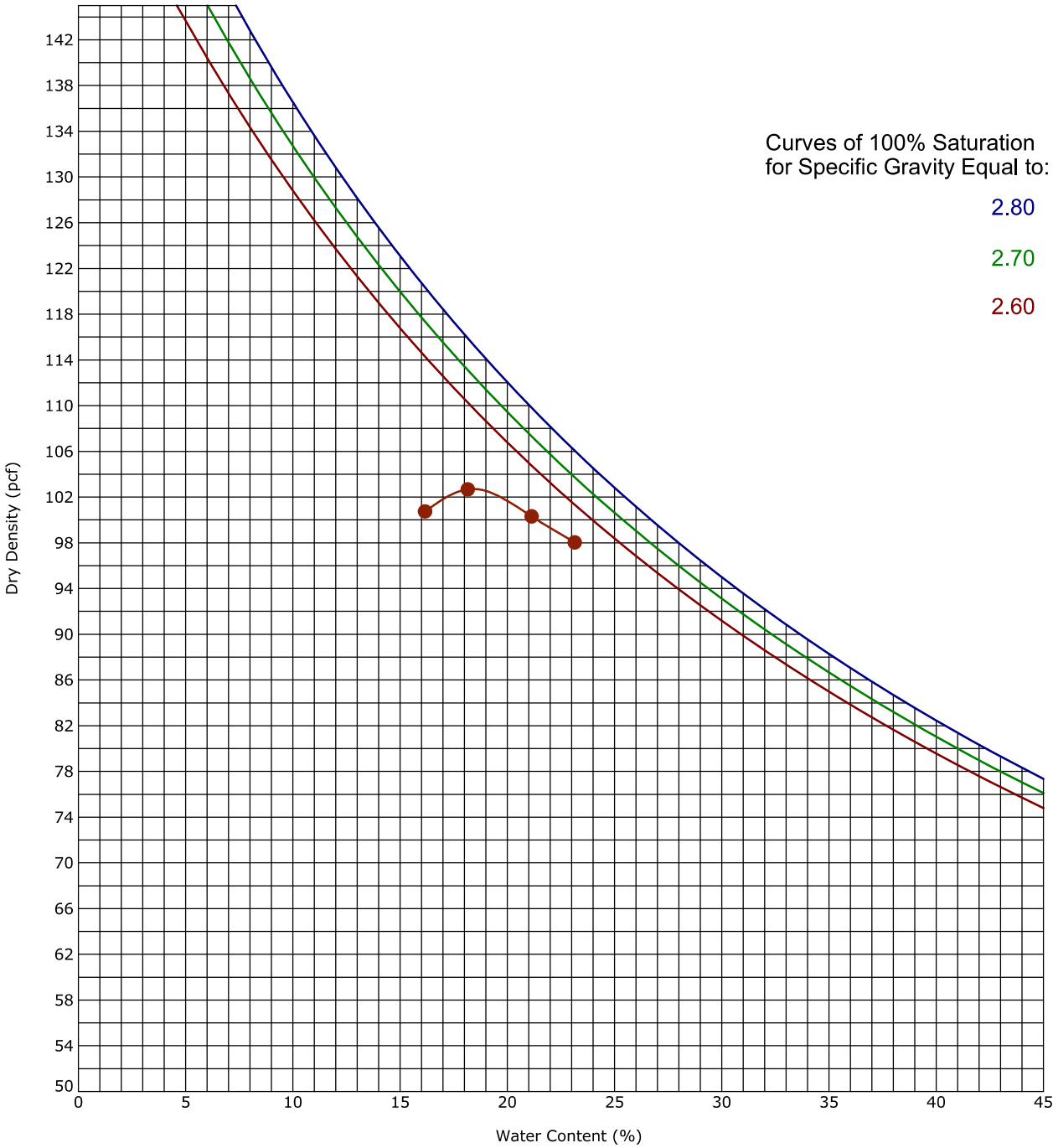
Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

Moisture-Density Relationship
AASHTO T99-Method A



Boring ID		Depth (Ft)		Description of Materials			
CBR-1		0 - 3.5		AASHTO A-7-6 (9)			
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
50	0.0	48	24	24	AASHTO T99-Method A	102.7	18.3

Specific Gravity (SG) = 2.704

REPORT FOR CALIFORNIA BEARING RATIO

Service Date: 11/20/24
Report Date: 12/04/24

Client

HNTB North Carolina PC
Attn: Jeff Hess
343 East Six Forks Road
Suite 200
Raleigh, North Carolina 27609

Project

HL-0065 (US 221A)
US 221A
Rutherfordon, North Carolina

Project No. 7024P159

SAMPLE INFORMATION

Sample Number:	CBR-1	Proctor Method:	AASHTO T99 - Method A
Boring Number:	CBR-1	Maximum Dry Density (pcf):	102.7
Sample Location:	Station 30+76 -L2- 35' LT	Optimum Moisture:	18.3
Depth:	0 - 3.5'	Liquid Limit:	48
Material Description:	Orange-Brown Silty Clay - AASHTO A-7-6 (9)	Plasticity Index:	24

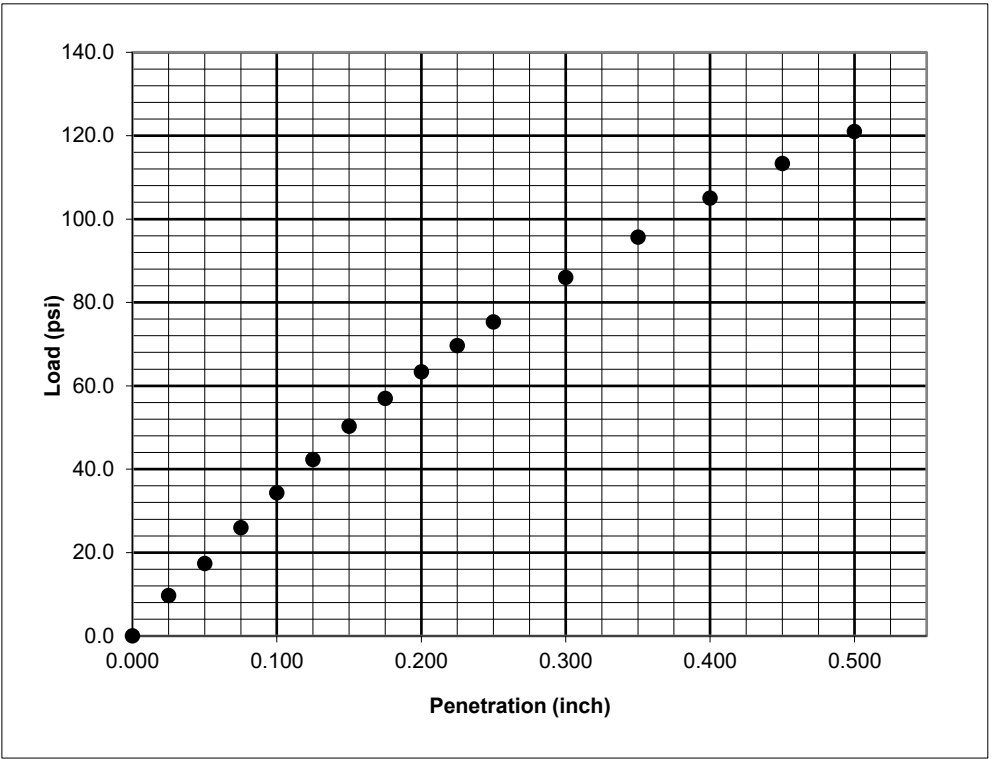
CBR TEST DATA

CBR Value at 0.100 inch	3.4
CBR Value at 0.200 inch	4.2

Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	2.3

DENSITY DATA	
Dry Density Before Soaking (pcf)	102.2
Compaction of Proctor (%)	99.5

MOISTURE DATA	
Before Compaction (%)	18.3
After Compaction (%)	17.8
Top 1" After Soaking (%)	29.0
Average After Soaking (%)	22.8



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

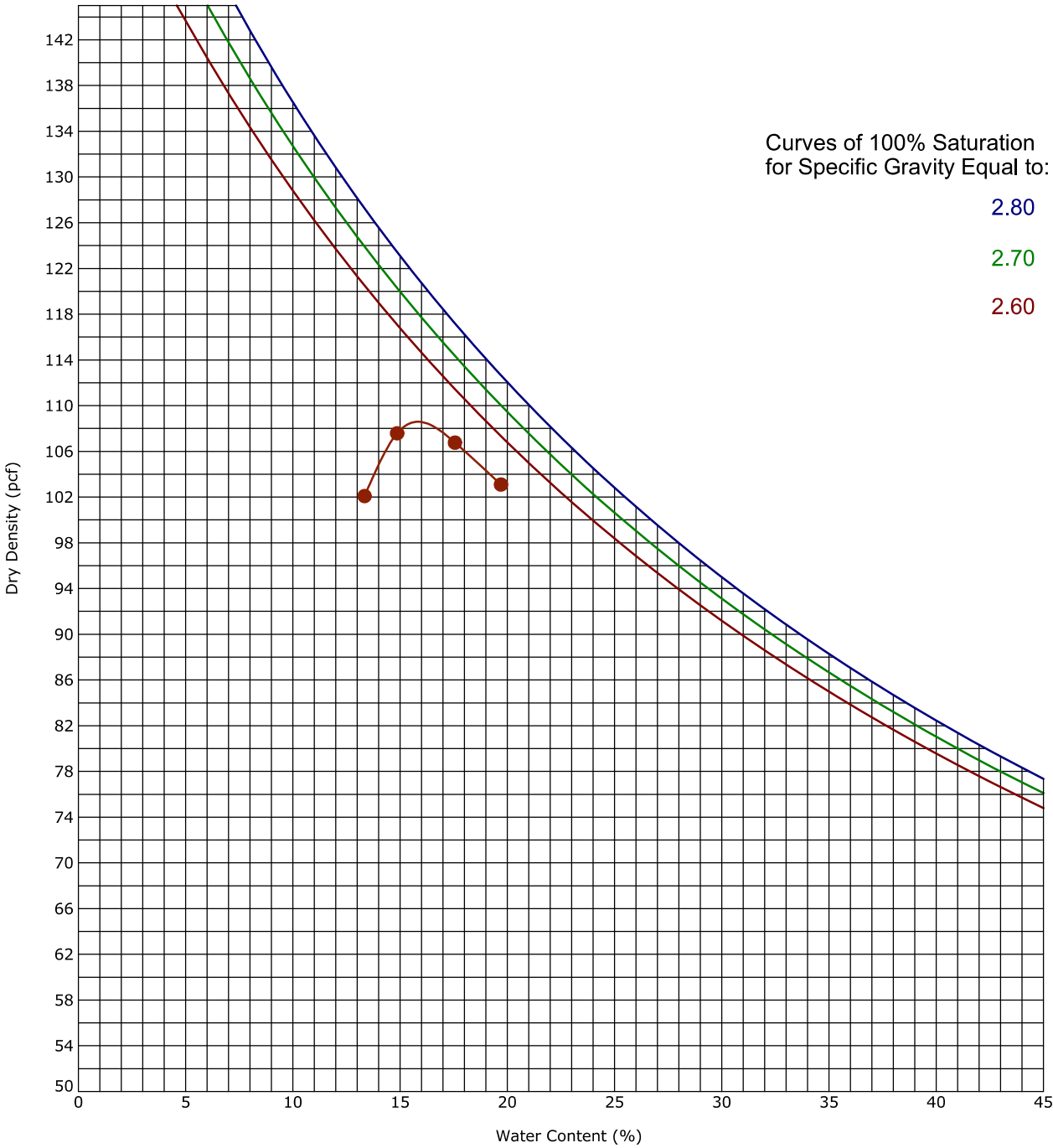
Terracon Rep: Stephanie Huffman
Reported To: Kelly Plummer
Contractor:
Report Distribution

DocuSigned by:
Kelly Plummer
51340CC5EA2E414
Reviewed by: Kelly R. Plummer
Geotechnical Project Manager

Test Methods: AASHTO T193

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written approval of Terracon. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Moisture-Density Relationship
AASHTO T99-Method A



Boring ID		Depth (Ft)		Description of Materials			
CBR-2		0 - 4		AASHTO A-6 (4)			
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
47	0.0	37	22	15	AASHTO T99-Method A	108.6	15.9

Specific Gravity (SG) = 2.664

REPORT FOR CALIFORNIA BEARING RATIO

Service Date: 11/13/24
Report Date: 11/25/24

Client

HNTB North Carolina PC
Attn: Jeff Hess
343 East Six Forks Road
Suite 200
Raleigh, North Carolina 27609

Project

HL-0065 (US 221A)
US 221A
Rutherfordon, North Carolina

Project No. 7024P159

SAMPLE INFORMATION

Sample Number:	CBR-2	Proctor Method:	AASHTO T99 - Method A
Boring Number:	CBR-2	Maximum Dry Density (pcf):	108.6
Sample Location:	Station 71+48 -L3- 40' RT	Optimum Moisture:	15.9
Depth:	0.0 - 4.0'	Liquid Limit:	37
Material Description:	Orange-Brown Sandy Clay - AASHTO A-6 (4)	Plasticity Index:	15

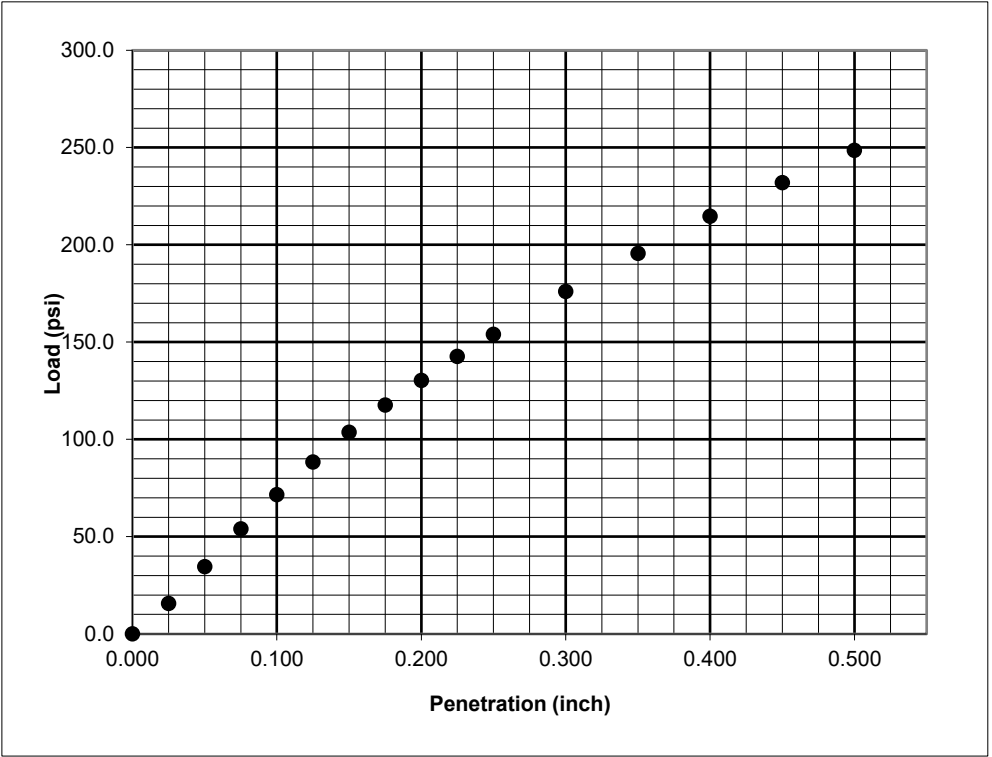
CBR TEST DATA

CBR Value at 0.100 inch	7.2
CBR Value at 0.200 inch	8.7

Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	0.8

DENSITY DATA	
Dry Density Before Soaking (pcf)	107.5
Compaction of Proctor (%)	99.0

MOISTURE DATA	
Before Compaction (%)	15.6
After Compaction (%)	15.3
Top 1" After Soaking (%)	18.9
Average After Soaking (%)	18.1



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Kelly Plummer
Contractor:

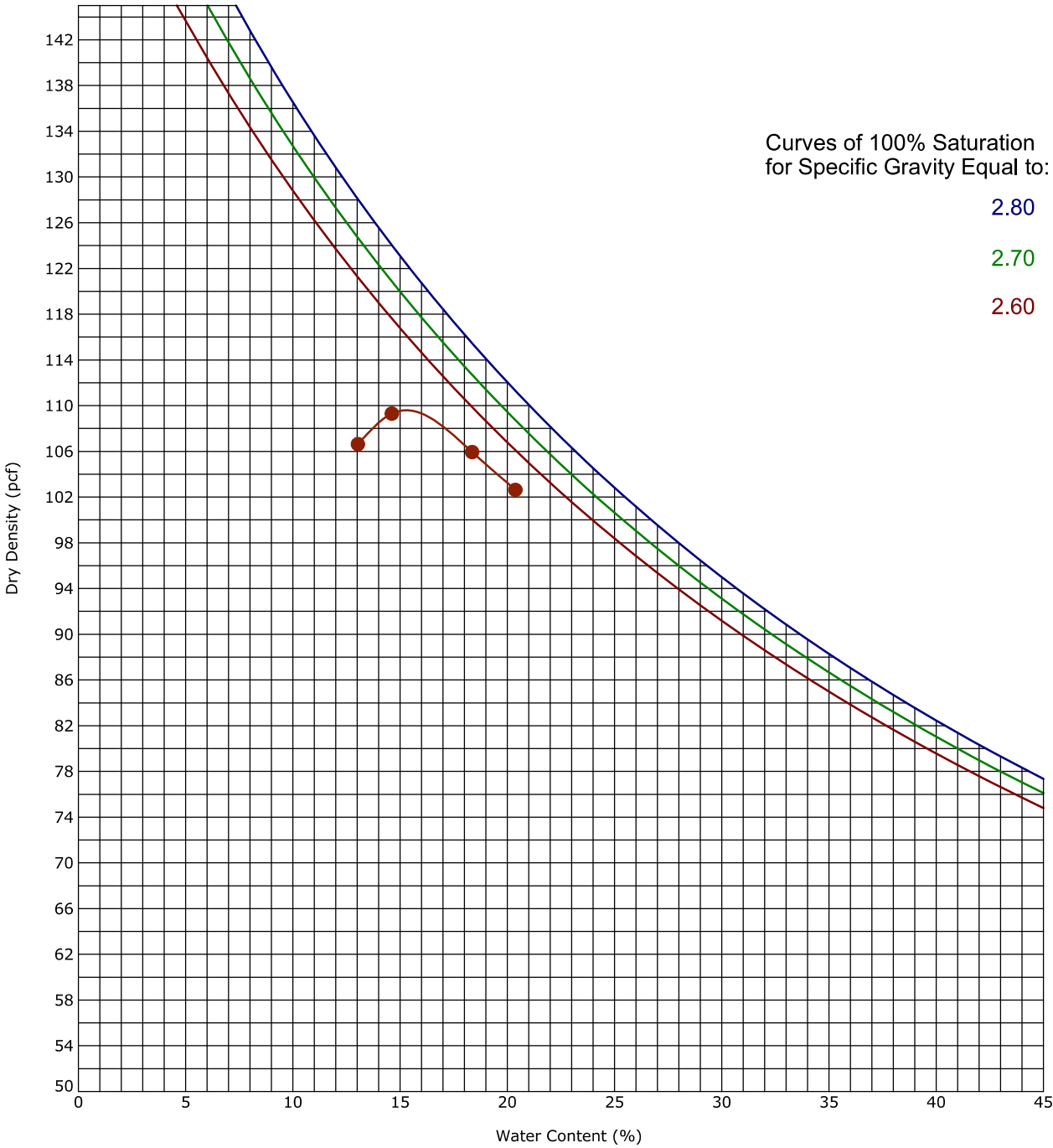
Report Distribution

DocuSigned by:
Kelly Plummer
Reviewed by: Kelly R. Plummer
Geotechnical Project Manager

Test Methods: AASHTO T193

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written approval of Terracon. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Moisture-Density Relationship
AASHTO T99-Method D



Boring ID		Depth (Ft)		Description of Materials				
CBR-3		0 - 4		AASHTO A-2-7 (0)				
Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)	
27	0.0	47	35	12	AASHTO T99-Method D	109.6	15.2	

Specific Gravity (SG) = 2.674

REPORT FOR CALIFORNIA BEARING RATIO

Service Date: 11/13/24
Report Date: 11/25/24

Client

HNTB North Carolina PC
Attn: Jeff Hess
343 East Six Forks Road
Suite 200
Raleigh, North Carolina 27609

Project

HL-0065 (US 221A)
US 221A
Rutherfordon, North Carolina

Project No. 7024P159

SAMPLE INFORMATION

Sample Number:	CBR-3	Proctor Method:	AASHTO T99 - Method D
Boring Number:	CBR-3	Maximum Dry Density (pcf):	109.6
Sample Location:	Station 11+16 -Y8- 61' LT	Optimum Moisture:	15.2
Depth:	0.0 - 4.0'	Liquid Limit:	47
Material Description:	Brown Clayey Sand - AASHTO A-2-7 (0)	Plasticity Index:	12

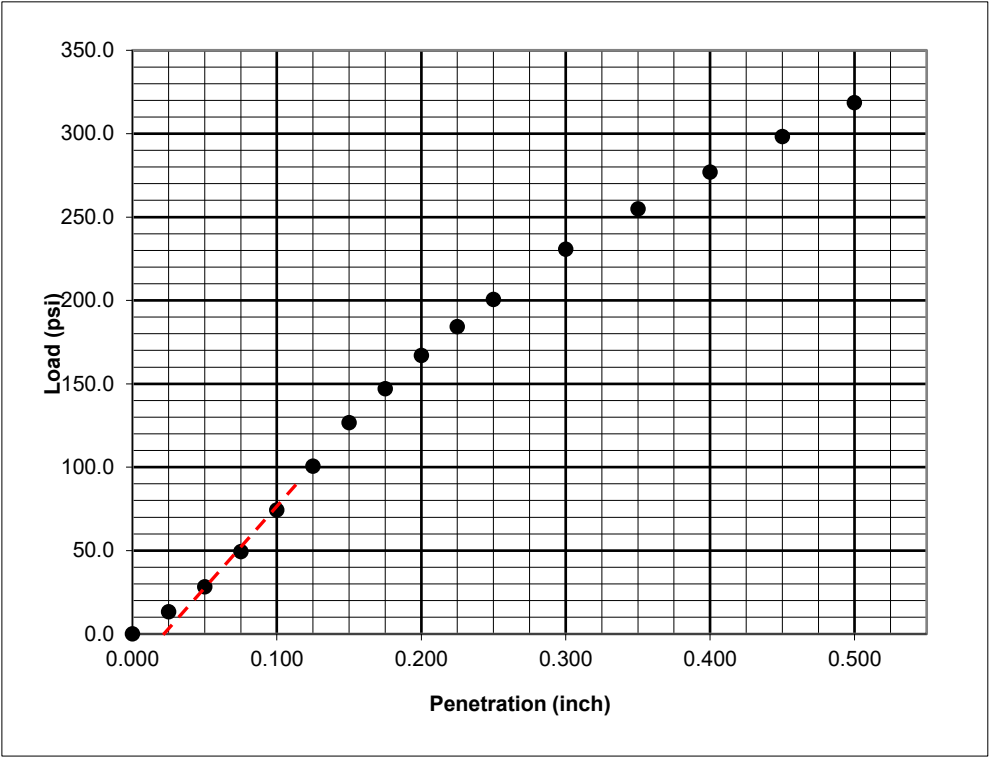
CBR TEST DATA

CBR Value at 0.100 inch 10.0
CBR Value at 0.200 inch 12.3

Surcharge Weight (lbs) 10
Soaking Condition Soaked
Length of Soaking (hours) 96
Swell (%) 1.5

DENSITY DATA
Dry Density Before Soaking (pcf) 107.6
Compaction of Proctor (%) 98.2

MOISTURE DATA
Before Compaction (%) 15.4
After Compaction (%) 15.6
Top 1" After Soaking (%) 20.1
Average After Soaking (%) 20.1



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Kelly Plummer
Contractor:

Report Distribution

DocuSigned by:
Reviewed by: Kelly R. Plummer
51340CC5EA2E414
Kelly R. Plummer
Geotechnical Project Manager

Test Methods: AASHTO T193

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written approval of Terracon. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.