0011DEL_P28

REFERENCE: P-5705B

PROJECT: 44475

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705B	1	24

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY MECKLENBURG

PROJECT DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENTS

SITE DESCRIPTION BRIDGE ON STATION TRACK 2 (-S2-) OVER WEST TRADE STREET BETWEEN WEST 4TH STREET AND WEST 5TH STREET

CONTENTS

CAUTION NOTICE

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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.

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5228073BBA4F482... DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

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.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [X] ACKER (TER92-0)
- [X] D-50 (TER373)
- [X] D-50 (TER346)

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2⅝ " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [X] DRAG BIT

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [X] -H 03
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	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.
SLIGHT (SLI.)	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.
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.
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. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
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. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
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.
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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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.
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.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

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 DISLODGED 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 (SRQD) - 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.

BENCH MARK: BM4: N-544,771; E-1,448,453
STATION 51+04.00 - 2' RIGHT CHISELED SQUARE (5TH STREET BRIDGE)
ELEVATION: 738.12 FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

PROJECT WAS DRAFTED USING NCDOT PROVIDED TIN FILE
FILE: p5705b_ls_tin (DATED: 01/12/2017)

DATE: 8-15-14

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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities

BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets

VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets

BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity

DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces

LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

A. *Thick bedded, very blocky sandstone*
The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.

B. *Sandstone with thin interlayers of siltstone*

C. *Sandstone and siltstone in similar amounts*

D. *Siltstone or silty shale with sandstone layers*

E. *Weak siltstone or clayey shale with sandstone layers*

C, D, E, and **G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H.**

F. *Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure*

G. *Undisturbed silty or clayey shale with or without a few very thin sandstone layers*

H. ***Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.***

→ Means deformation after tectonic disturbance

DATE: 8-19-16

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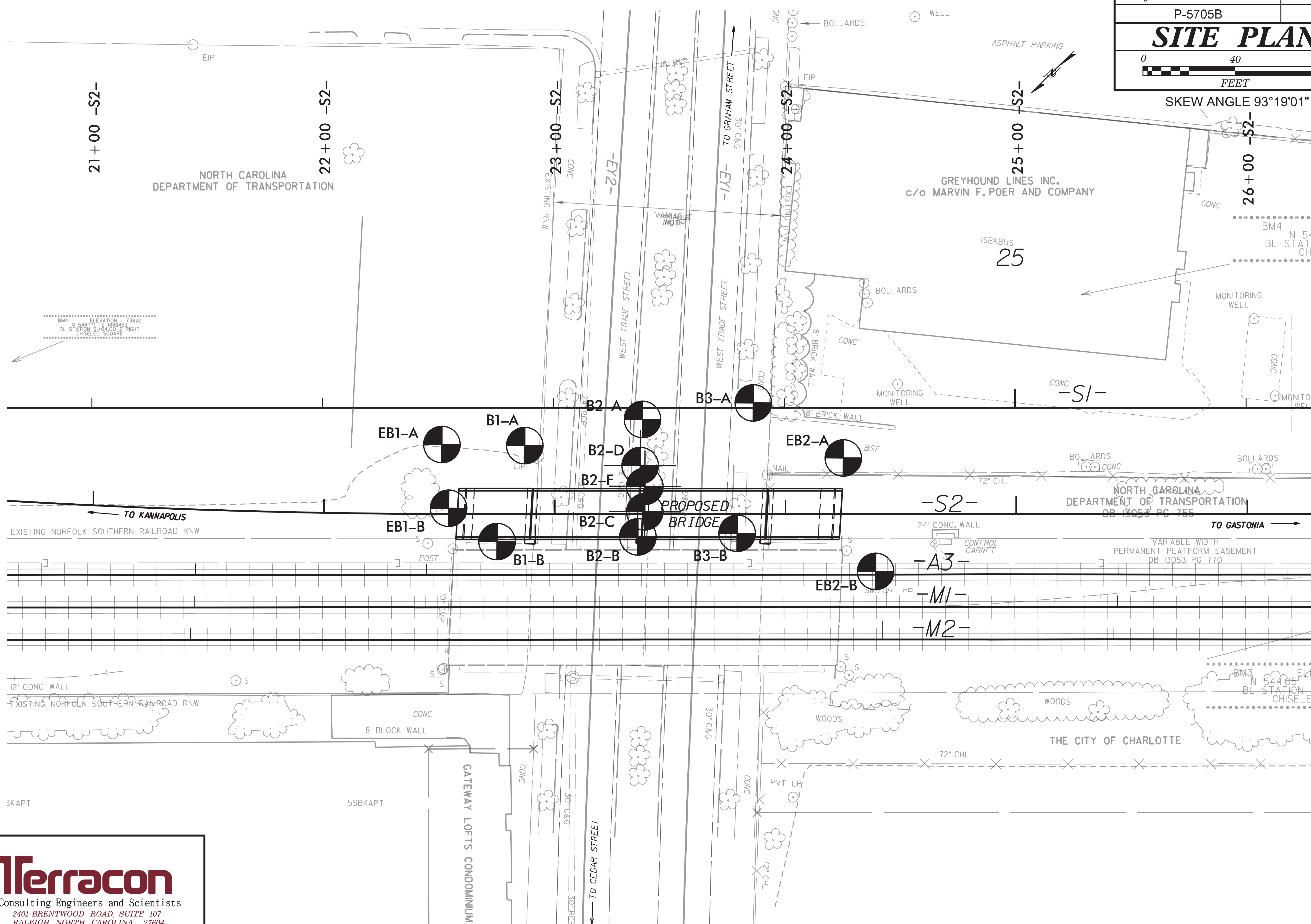
PROJECT REFERENCE NO.	SHEET NO.
P-5705B	3

SITE PLAN

0 40 80 FEET

SKEW ANGLE 93°19'01"



21+00 -S2-
22+00 -S2-
23+00 -S2-
24+00 -S2-
25+00 -S2-
26+00 -S2-
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GREYHOUND LINES INC. c/o MARVIN F. POER AND COMPANY
ISBKBUS
25
BOLLARDS
WELL
ASPHALT PARKING
EIP
WEST TRADE STREET
TO GRAHAM STREET
-EY2-
-EY1-
VARIABLE WIDTH
EXISTING R/W
MONITORING WELL
8' BRICK WALL
-S1-
-S2-
-A3-
-M1-
-M2-
EB1-A
EB1-B
B1-A
B1-B
B2-A
B2-B
B2-C
B2-D
B2-F
B3-A
B3-B
EB2-A
EB2-B
PROPOSED BRIDGE
TO KANNAPOLIS
TO GASTONIA
EXISTING NORFOLK SOUTHERN RAILROAD R\W
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DB 13053 PG 755
24" CONC. WALL
CONTROL CABNET
VARIABLE WIDTH PERMANENT PLATFORM EASEMENT DB 13053 PG 770
72" CHL
12" CONC WALL
8" BLOCK WALL
CONC
WOODS
THE CITY OF CHARLOTTE
GATEWAY LOFTS CONDOMINIUM
TO CEDAR STREET
PVT LP
30" C&G
30" RCP

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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	4

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0 10 20
FEET
VE-1:1

CROSS SECTION THROUGH END BENT 1 AT STA. 22+56 –S2–

℄

EB1-A
22+51
30' LT

EB1-B
22+54
2' LT

EXISTING GROUND

ARTIFICIAL FILL, RED TO BROWN, STIFF TO VERY STIFF, MOIST, FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS (A-6)

RESIDUAL, TAN AND WHITE, MEDIUM STIFF TO HARD, MOIST, FINE SANDY SILT AND CLAYEY SILT WITH TRACE TO SOME MANGANESE (A-4, A-5)

WEATHERED ROCK (META-GRANODIORITE)

RESIDUAL, TAN AND WHITE, HARD, MOIST, FINE SANDY SILT WITH TRACE OF MANGANESE (A-4)

	EB1-A	EB1-B
	10	19
	6	13
	14	6
	11	12
	27	10
	7	12
	20	13
	35	19
	60	33
	31	33
	100/0.9	66
	100/0.2	100/0.8
	100/0.9	41
	100/0.9	100/0.8
		100/0.5
	BT	BT

03/17 (EB1-A)

03/17 (EB1-B)

TYPICAL SKEW ANGLE 93°19'01"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b ls tin.tin (DATED 01/12/2017)

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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	5

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0 10 20
FEET
VE-1:1

CROSS SECTION THROUGH BENT 1 AT STA. 22+90 -S2-

℄

EXISTING GROUND

ARTIFICIAL FILL, RED TO BROWN, VERY STIFF, MOIST, FINE SANDY CLAY (A-6)

B1-A
22+87
30' LT

B1-B
22+75
12' RT

ARTIFICIAL FILL, BLACK AND RED, MEDIUM STIFF, MOIST, CLAYEY, FINE SAND WITH TRACE OF ORGANICS (A-2-6)

720 710 700 690 680 670 660 650 640

B1-A: 18, 19, 17, 16, 9, 16, 32, 26, 36, 64, 44, 85, 100/0.9, 100/0.2, 100/0.2, 100/0.3, 60/0.1

B1-B: 6, 8, 12, 10, 10, 32, 21, 28, 33, 44, 82, 100/0.9, 100/0.9, 100/0.9, 100/0.2, 100/0.3

RESIDUAL, TAN, MEDIUM DENSE, MOIST, SILTY FINE SAND (A-2-4)

TAN, ORANGE AND GRAY, STIFF, MOIST, SILTY CLAY (A-7-6)

03/17

TAN, ORANGE, AND WHITE, STIFF TO HARD, MOIST, FINE SANDY SILT WITH SOME MANGANESE AND TRACE OF ROCK FRAGMENTS (A-4)

TAN AND WHITE, MEDIUM DENSE TO VERY DENSE, MOIST, SILTY FINE SAND WITH TRACE OF MANGANESE (A-2-4)

WEATHERED ROCK (META-GRANODIORITE)

BT

CRYSTALLINE ROCK (META-GRANODIORITE)

AR

CAVED DRY @ 19' 03/17

TYPICAL SKEW ANGLE 93°19'01"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b ls tin.tin (DATED 01/12/2017)

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CROSS SECTION THROUGH BENT 2 AT STA. 23+38 -S2-

0 10 20
FEET
VE-1:1

PROJECT REFERENCE NO.	SHEET NO.
P-5705B	6

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B2-A 23+38 41' LT | B2-D 23+37 21' LT | B2-E 23+39 12' LT | B2-C 23+39 1' LT | ℄ | B2-B 23+36 10' RT

EXISTING GROUND

RESIDUAL, RED, TAN, BROWN, GRAY, WHITE, ORANGE-BROWN, AND LIGHT BROWN, MEDIUM STIFF TO HARD, TRACE MICA, TRACE MANGANESE (A-5, A-4)

ARTIFICIAL FILL, RED TO BROWN, LOOSE, MOIST, CLAYEY FINE SAND, TRACE ROCK FRAGMENTS (A-2-6).

RESIDUAL, TAN, AND WHITE, LOOSE TO MEDIUM DENSE, MOIST, CLAYEY FINE SAND AND SILTY FINE SAND, TRACE MANGANESE (A-2-6, A-2-4)

SILT AND FINE SANDY SILT, (META-GRANODIORITE)

CRYSTALLINE ROCK (META-GRANODIORITE)

CRYSTALLLINE ROCK, BROWN AND WHITE, MODERATELY SEVERE WEATHERING, MODERATELY HARD, CLOSELY FRACTURED, META-GRANODIORITE

WEATHERED ROCK (DIABASE)

03/17 09/17 09/17 09/17 03/17

AR BT BT BT BT

REC=26%
RQD=12%
GSI=40-50

REC=28%
RQD=11%
GSI=45-50

Ⓐ ARTIFICIAL FILL, BLACK AND GRAY, MEDIUM DENSE, MOIST, SILTY FINE SAND, TRACE GRAVEL (A-2-4)

Ⓑ ARTIFICIAL FILL, ORANGE-BROWN MEDIUM STIFF, MOIST, CLAYEY SILT (A-5, A-4)

Ⓒ ARTIFICIAL FILL, BROWN AND RED-BROWN, MEDIUM STIFF TO STIFF, MOIST, SILTY CLAY, LITTLE GRAVEL (A-7-6)

Ⓓ RESIDUAL, ORANGE AND LIGHT BROWN, MEDIUM DENSE, MOIST, SILTY FINE TO COARSE SAND (A-2-4)

Ⓔ WEATHERED ROCK (DIABASE)

Ⓕ RESIDUAL, BROWN AND WHITE, VERY DENSE, MOIST, SILTY FINE TO COARSE SAND (A-2-4)

Ⓖ CRYSTALLINE ROCK, BROWN AND WHITE, MODERATELY SEVERE WEATHERING, SOFT TO MEDIUM HARD, VERY CLOSELY FRACTURED, META-GRANODIORITE REC=0%, RQD=0%, GSI=30-40

Ⓗ WEATHERED ROCK (META-GRANODIORITE)

Ⓘ CRYSTALLINE ROCK, DARK GREEN, SLIGHT TO MODERATELY SEVERE WEATHERING, VERY SOFT TO HARD, VERY CLOSE TO CLOSELY FRACTURED, OLIVINE DIABASE REC=100%, RQD=85%, GSI=45-50

TYPICAL SKEW ANGLE 93°19'01"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b ls tin.tin (DATED 01/12/2017)

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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	7

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FEET
VE-1:1

CROSS SECTION THROUGH BENT 3 AT STA. 23+92 -S2-

℄

B3-A
23+86
48' LT

B3-B
23+79
9' RT

EXISTING GROUND

ARTIFICIAL FILL, RED, TAN AND BLACK, MEDIUM STIFF TO STIFF, MOIST, RESIDUAL, FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS (A-6)

RED AND TAN, MEDIUM STIFF, MOIST, CLAYEY SILT WITH TRACE OF MICA (A-5)

RESIDUAL, TAN, WHITE AND ORANGE, LOOSE TO VERY DENSE, MOIST, SILTY AND CLAYEY FINE SAND WITH TRACE OF MANGANESE (A-2-6, A-2-4)

RESIDUAL, TAN, VERY STIFF, MOIST, CLAYEY SILT (A-5)

WEATHERED ROCK (META-GRANODIORITE)

RESIDUAL, TAN AND WHITE, MOIST, SILTY FINE SAND (A-2-4)

DENSE,

CRYSTALLINE ROCK (META-GRANODIORITE)

03/17

AR

FIAD
03/17

AR

TYPICAL SKEW ANGLE 93°19'01"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b ls tin.tin (DATED 01/12/2017)

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CROSS SECTION THROUGH END BENT 2 AT STA. 24+26 -S2-

0 10 20
FEET
VE-1:1

PROJECT REFERENCE NO.	SHEET NO.
P-5705B	8

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EB2-A
24+25
24' LT

EB2-B
24+39
25' RT

EXISTING GROUND

RAILROAD BALLAST, CRUSHED STONE (A-1-b)

RAILROAD EMBANKMENT, RED AND TAN, CLAYEY FINE SAND

LOOSE TO MEDIUM DENSE, MOIST, WITH TRACE OF MICA AND ROCK FRAGMENTS (A-2-6)

RESIDUAL, RED AND BROWN, SILTY CLAY

MEDIUM STIFF, MOIST, (A-7-6)

RESIDUAL, TAN AND ORANGE, LOOSE TO MEDIUM DENSE, MOIST, CLAYEY FINE SAND (A-2-6)

03/17

GRAY, STIFF TO HARD, MOIST, CLAYEY SILT (A-5)

MOIST, SILTY FINE SAND (A-2-4, A-2-6)

GRAY, TAN, BROWN AND WHITE, MEDIUM DENSE TO VERY DENSE, AND CLAYEY FINE SAND WITH TRACE OF MANGANESE

WEATHERED ROCK (META-GRANODIORITE)

BT

FIAD
03/17

BT

(J) ROADWAY EMBANKMENT, PAVEMENT (ASPHALT AND STONE BASE)

TYPICAL SKEW ANGLE 93°19'01"

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b ls tin.tin (DATED 01/12/2017)

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 22+51	**OFFSET** 30 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 722.7 ft	**TOTAL DEPTH** 59.5 ft	**NORTHING** 544,431	**EASTING** 1,448,187	**24 HR.** 22.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/14/17	**COMP. DATE** 03/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725										722.7 GROUND SURFACE	0.0
	721.7	1.0	5	5	5	10		M		**ARTIFICIAL FILL** RED TO BROWN, FINE SANDY CLAY	
720	719.1	3.6	3	3	3	6		M		720.2 **RESIDUAL** TAN, FINE SANDY SILT WITH SOME MANGANESE	2.5
	717.1	5.6	4	6	8	14		M			
715	714.1	8.6	3	5	6	11		41%			
710	709.1	13.6	7	11	16	27		M			
705	704.1	18.6	2	2	5	7	SS-16	M		704.2 TAN AND WHITE, CLAYEY SILT WITH SOME MANGANESE	18.5
700	699.1	23.6	4	7	13	20		M			
695	694.1	28.6	14	16	19	35		M			
690	689.1	33.6	23	27	33	60		M			
685	684.1	38.6	13	14	17	31		M		681.7 **WEATHERED ROCK** (META-GRANODIORITE)	41.0
680	679.1	43.6	54	46/0.4		100/0.9					
675	674.1	48.6	100/0.2			100/0.2					
670	669.1	53.6	18	46	54/0.4	100/0.9					
665	664.1	58.6	57	43/0.4		100/0.9				663.2 Boring Terminated at Elevation 663.2 ft IN WEATHERED ROCK (META-GRANODIORITE)	59.5

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 22+54	**OFFSET** 3 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 726.7 ft	**TOTAL DEPTH** 64.1 ft	**NORTHING** 544,448	**EASTING** 1,448,165	**24 HR.** 22.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/14/17	**COMP. DATE** 03/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
730										726.7 GROUND SURFACE	0.0
	725.7	1.0	4	8	11	19		M		**ARTIFICIAL FILL** RED TO BROWN, FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS	
725	723.1	3.6	6	7	6	13		M		721.2 **RESIDUAL** TAN AND WHITE, FINE SANDY SILT WITH TRACE OF MANGANESE	5.5
720	721.1	5.6	2	2	4	6		M			
	718.1	8.6	3	5	7	12		M			
715	713.1	13.6	2	4	6	10		M			
710	708.1	18.6	4	5	7	12		M			
705	703.1	23.6	5	5	8	13		M			
700	698.1	28.6	6	7	12	19		M			
695	693.1	33.6	11	11	22	33		M			
690	688.1	38.6	13	15	18	33		M			
685	683.1	43.6	21	26	40	66		M			
680	678.1	48.6	54	46/0.3		100/0.8				678.2 **WEATHERED ROCK** (META-GRANODIORITE)	48.5
675	673.1	53.6	21	16	25	41				673.2 **RESIDUAL** TAN AND WHITE, FINE SANDY SILT WITH TRACE OF MANGANESE	53.5
670	668.1	58.6	54	46/0.3		100/0.8				668.2 **WEATHERED ROCK** (META-GRANODIORITE)	58.5
665	663.1	63.6	100/0.5			100/0.5				662.6 Boring Terminated at Elevation 662.6 ft IN WEATHERED ROCK (META-GRANODIORITE)	64.1

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 22+87	**OFFSET** 30 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.8 ft	**TOTAL DEPTH** 73.3 ft	**NORTHING** 544,406	**EASTING** 1,448,162	**24 HR.** 19.0 Caved
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/21/17	**COMP. DATE** 03/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
725												
720	719.8	1.0	5	7	11	18		M		GROUND SURFACE	720.8	0.0
	717.6	3.2	5	8	11	19		M		**ARTIFICIAL FILL** RED TO BROWN, FINE SANDY CLAY	718.3	2.5
715	715.6	5.2	5	7	10	17		M		**RESIDUAL** TAN, SILTY, FINE SAND		
	712.6	8.2	4	7	9	16		M				
710	707.6	13.2	3	3	6	9	SS-17	30%		TAN AND ORANGE, SILTY CLAY	709.8	11.0
705	702.6	18.2	5	8	8	16		M		TAN, ORANGE AND WHITE, FINE SANDY SILT WITH SOME MANGANESE AND TRACE OF ROCK FRAGMENTS	703.8	17.0
700	697.6	23.2	7	13	19	32		M				
695	692.6	28.2	10	11	15	26		M				
690	687.6	33.2	14	16	20	36	SS-18	19%				
685	682.6	38.2	21	31	33	64		M				
680	677.6	43.2	21	24	20	44		M				
675	672.6	48.2	17	42	43	85		M				
670	667.6	53.2	57	43/0.4		100/0.9				**WEATHERED ROCK** (META-GRANODIORITE)	667.8	53.0
665	662.6	58.2	100/0.2			100/0.2						
660	657.6	63.2	100/0.2			100/0.2						
655	652.6	68.2	100/0.3			100/0.3						
650	647.6	73.2	60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-GRANODIORITE)	647.6 647.5	73.2 73.3

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 22+87	**OFFSET** 30 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.8 ft	**TOTAL DEPTH** 73.3 ft	**NORTHING** 544,406	**EASTING** 1,448,162	**24 HR.** 19.0 Caved
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/21/17	**COMP. DATE** 03/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
645						Match Line				Boring Terminated with Standard Penetration Test Refusal at Elevation 647.5 ft IN CRYSTALLINE ROCK (META-GRANODIORITE) 24 Hr Water Level Caved Dry at 19.0'		

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

0011DEL_P28

Terracon
Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 22+75	**OFFSET** 12 ft RT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 721.2 ft	**TOTAL DEPTH** 68.4 ft	**NORTHING** 544,443	**EASTING** 1,448,140	**24 HR.** 21.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring		HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	**START DATE** 03/20/17	**COMP. DATE** 03/21/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
725										
	721.2	0.0								GROUND SURFACE
720	720.2	1.0	3	3	3	6		M		**ARTIFICIAL FILL**
	719.2	2.0								BLACK AND RED, CLAYEY SAND WITH TRACE OF ORGANICS
	718.1	3.1	3	4	4	8		M		**RESIDUAL**
715	716.1	5.1	3	4	8	12		M		TAN AND GRAY, SILTY CLAY
	713.1	8.1	3	4	6	10	SS-19	33%		
710	708.1	13.1	3	4	6	10		M		
705	703.1	18.1	8	12	20	32		M		TAN AND WHITE, SILTY FINE SAND WITH TRACE OF MANGANESE
700	698.1	23.1	5	8	13	21		M		
695	693.1	28.1	11	11	17	28		M		
690	688.1	33.1	10	15	18	33		M		
685	683.1	38.1	20	24	20	44		M		
680	678.1	43.1	26	36	46	82		M		
675	673.1	48.1	28	40	60/0.4	100/0.9				
	673.2	48.0								**WEATHERED ROCK** (META-GRANODIORITE)
670	668.1	53.1	31	65	35/0.4	100/0.9				
665	663.1	58.1	56	44/0.4		100/0.9				
660	658.1	63.1	100/0.2			100/0.2				
655	653.1	68.1	100/0.3			100/0.3				
	652.8	68.4								Boring Terminated at Elevation 652.8 ft IN WEATHERED ROCK (META-GRANODIORITE)

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

Terracon
Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 23+38	**OFFSET** 41 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 721.1 ft	**TOTAL DEPTH** 73.5 ft	**NORTHING** 544,361	**EASTING** 1,448,134	**24 HR.** 17.2
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/16/17	**COMP. DATE** 03/16/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725											
720	720.1	1.0	4	6	8	14		M		721.1 GROUND SURFACE	0.0
	717.7	3.4	4	6	7	13		M		720.1 **ARTIFICIAL FILL** BLACK AND GRAY, SILTY FINE SAND WITH SOME GRAVEL	1.0
715	715.7	5.4	3	5	6	11		M		**RESIDUAL** RED, TAN AND WHITE, CLAYEY SILT WITH TRACE OF MICA	
	712.7	8.4	5	5	4	9		M			
710	707.7	13.4	3	4	5	9	SS-21	28%			
705	702.7	18.4	6	10	14	24				704.6 TAN AND WHITE, FINE SANDY SILT WITH TRACE OF MICA AND MANGANESE	16.5
700	697.7	23.4	3	6	7	13		M			
695	692.7	28.4	6	7	13	20		M			
690	687.7	33.4	10	14	20	34		M			
685	682.7	38.4	8	10	12	22		M			
680	677.7	43.4	19	31	34	65		M			
675	672.7	48.4	15	21	32	53		M			
670	667.7	53.4	58	42/0.4		100/0.9				668.1 **WEATHERED ROCK** (META-GRANODIORITE)	53.0
665	662.7	58.4	100/0.3			100/0.3					
660	657.7	63.4	100/0.2			100/0.2					
655	652.7	68.4	60/0.1			60/0.1				652.7 **CRYSTALLINE ROCK** (META-GRANODIORITE)	68.4
650	647.7	73.4	60/0.1			60/0.1				647.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 647.6	73.5

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 23+38	**OFFSET** 41 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 721.1 ft	**TOTAL DEPTH** 73.5 ft	**NORTHING** 544,361	**EASTING** 1,448,134	**24 HR.** 17.2
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/16/17	**COMP. DATE** 03/16/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
645				Match Line				ft IN CRYSTALLINE ROCK (META-GRANODIORITE)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 23+36	**OFFSET** 10 ft RT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 719.7 ft	**TOTAL DEPTH** 78.7 ft	**NORTHING** 544,398	**EASTING** 1,448,099	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/22/17	**COMP. DATE** 03/23/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
720										GROUND SURFACE	719.7	0.0
	718.7	1.0	3	4	2	6		M		**ARTIFICIAL FILL** RED TO BROWN, CLAYEY FINE SAND WITH TRACE OF ROCK FRAGMENETS		
	716.3	3.4	3	2	3	5		M			714.7	5.0
715	714.3	5.4	3	3	3	6		M		**RESIDUAL** TAN, RED AND WHITE, CLAYEY FINE SAND		
	711.3	8.4	3	4	5	9		M				
710												
	706.3	13.4	4	6	10	16		M			706.7	13.0
705										TAN AND WHITE, SILTY FINE SAND WITH TRACE OF MANGANESE		
	701.3	18.4	8	10	11	21						
700												
	696.3	23.4	8	10	12	22		M				
695												
	691.3	28.4	10	11	16	27		M				
690												
	686.3	33.4	12	13	16	29	SS-22	26%			687.7	32.0
685										TAN AND WHITE, FINE SANDY SILT WITH TRACE OF MANGANESE		
	681.3	38.4	12	11	14	25		M				
680												
	676.3	43.4	20	25	42	67		M				
675												
	671.3	48.4	25	29	62	91		M				
670												
	666.3	53.4	29	30	26	56		M				
665												
	661.3	58.4	70	30/0.3		100/0.8				**WEATHERED ROCK** (META-GRANODIORITE)	661.7	58.0
660												
	656.3	63.4	100/0.5			100/0.5						
655												
	651.3	68.4	100/0.3			100/0.3						
650												
	646.3	73.4	100/0.5			100/0.5						
645												
	641.3	78.4	100/0.3			100/0.3					641.0	78.7
										Boring Terminated at Elevation 641.0 ft IN		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
640						Match Line				WEATHERED ROCK (META-GRANODIORITE)		

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

Terracon
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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 23+39	**OFFSET** 1 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.0 ft	**TOTAL DEPTH** 91.4 ft	**NORTHING** 544,388	**EASTING** 1,448,105	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/14/17	**COMP. DATE** 09/18/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
720										720.0 GROUND SURFACE 0.0
	719.0	1.0								**ARTIFICIAL FILL**
			4	5	4	9		W		BROWN AND RED-BROWN, SILTY CLAY,
	716.5	3.5								LITTLE GRAVEL
715			3	2	5	7		W		
	714.0	6.0								713.5 6.5
			4	4	5	9		M		**RESIDUAL**
	711.5	8.5								RED-BROWN TO BROWN, FINE TO
710			4	5	6	11		M		COARSE SANDY SILT, WITH CLAYEY
										SAND LAYERS
	706.5	13.5								
			3	2	3	5				
705								▼		
	702.0	18.0								
			5	5	5	10		M		
700										
	697.0	23.0								
			6	8	10	18		M		
695										
	692.0	28.0								
			6	7	11	18		M		
690										
	687.0	33.0								686.5 33.5
			18	30	70	100/1.0		M		BROWN AND WHITE, SILTY FINE TO
685										COARSE SAND
	682.0	38.0								
			12	16	44	60		M		
680										
	677.0	43.0								
			25	40	60	100/1.0		M		
675										
	672.0	48.0								
			20	37	63/0.3	100/0.8				671.0 49.0
670										670.0 **WEATHERED ROCK** 50.0
										(BROWN, META-GRANODIORITE)
665										**WEATHERED ROCK**
										(BROWN, META-GRANODIORITE)
	663.0	57.0								
			16	30	44	74		M		**RESIDUAL**
660										BROWN AND WHITE, SILTY FINE TO
	658.0	62.0								COARSE SAND
			100/0.4			100/0.4				658.0 62.0
655										**WEATHERED ROCK**
	652.6	67.4								(BROWN AND WHITE,
			36	64/0.4		100/0.9				META-GRANODIORITE)
650										
645	644.5	75.5								
			100/0.2			100/0.2				
640										

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

0011DEL_P28

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 23+39	**OFFSET** 1 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.0 ft	**TOTAL DEPTH** 91.4 ft	**NORTHING** 544,388	**EASTING** 1,448,105	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/14/17	**COMP. DATE** 09/18/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
640						Match Line				
	639.3	80.7								639.3 80.7
			60/0.1			60/0.1				**CRYSTALLINE ROCK**
635										BROWN AND WHITE,
	634.2	85.8								META-GRANODIORITE
			100/0.3			100/0.3				634.2 85.8
630										**WEATHERED ROCK**
										631.9 (BROWN, META-GRANODIORITE) 88.1
										CRYSTALLINE ROCK
										629.9 (DARK GREEN, OLIVINE DIABASE) 90.1
										628.6 **WEATHERED ROCK** 91.4
										(BROWN, OLIVINE DIABASE)
										Boring Terminated at Elevation 628.6 ft IN
										WEATHERED ROCK (BROWN, OLIVINE
										DIABASE)

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

Terracon Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 23+39	**OFFSET** 1 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.0 ft	**TOTAL DEPTH** 91.4 ft	**NORTHING** 544,388	**EASTING** 1,448,105	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/14/17	**COMP. DATE** 09/18/17	**SURFACE WATER DEPTH** N/A	
CORE SIZE HQ3	**TOTAL RUN** 34.2 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
670											Begin Coring @ 50.0 ft
	670.0	50.0	2.0	3:42/1.0 2:07/1.0	(1.6) 80%	(0.0) 0%		(1.9) 27%			670.0 **WEATHERED ROCK** 50.0 (BROWN, META-GRANODIORITE)
	668.0	52.0									
665			5.0	2:33/1.0 2:08/1.0 2:25/1.0 3:55/1.0 4:50/1.0	(0.3) 6%	(0.0) 0%					
	663.0	57.0		N=74							663.0 57.0
660											**RESIDUAL** BROWN AND WHITE, SILTY FINE TO COARSE SAND
	657.6	62.4									658.0 62.0
			5.0	N=100/0.4 2:50/1.0 3:01/1.0 2:16/1.0 2:39/1.0 2:08/1.0	(0.0) 0%	(0.0) 0%		(0.0) 0%			**WEATHERED ROCK** (BROWN AND WHITE, META-GRANODIORITE)
655	652.6	67.4									
	651.7	68.3		N=100/0.9							
650			2.7	2:01/0.7 2:40/1.0 2:38/1.0	(0.0) 0%	(0.0) 0%					
	649.0	71.0									
			4.5	4:08/1.0 5:16/1.0 5:05/1.0 8:16/1.0 4:32/0.5	(0.0) 0%	(0.0) 0%					
645	644.5	75.5									
	644.3	75.7	5.0	N=100/0.2 3:41/1.0 4:04/1.0 4:19/1.0 4:25/1.0 5:15/1.0	(0.0) 0%	(0.0) 0%					
640	639.3	80.7									639.3 80.7
	639.2	80.8	5.0	N=60/0.1 4:17/1.0 4:26/1.0 4:21/1.0 4:46/1.0 7:02/1.0	(0.0) 0%	(0.0) 0%		(0.0) 0%	(0.0) 0%		**CRYSTALLINE ROCK** BROWN AND WHITE, MODERATELY SEVERE WEATHERING, SOFT TO MEDIUM HARD, VERY CLOSELY FRACTURED, META-GRANODIORITE GSI 30 - 40
635	634.2	85.8									634.2 85.8
	633.9	86.1	5.0	N=100/0.3 6:46/1.0 3:39/1.0 5:38/1.0 3:30/1.0 4:05/1.0	(3.8) 76%	(1.7) 34%		(1.2) 52%			**WEATHERED ROCK** (BROWN, META-GRANODIORITE)
											631.9 88.1
630								(2.0) 100%	(1.7) 85%		**CRYSTALLINE ROCK** DARK GREEN, SLIGHT TO MODERATELY SEVERE WEATHERING, VERY SOFT TO HARD, VERY CLOSE TO CLOSELY FRACTURED, OLIVINE DIABASE GSI 45 - 50
											629.9 90.1
	628.9	91.1						(0.6) 46%			628.6 91.4
											WEATHERED ROCK (BROWN, OLIVINE DIABASE)
											Boring Terminated at Elevation 628.6 ft IN WEATHERED ROCK (BROWN, OLIVINE DIABASE)

CORE PHOTOGRAPHS

Project No. 44475.1.2 (P-5705B)
Charlotte Gateway Station- W. Trade Street Bridge -S2-

B2-C
BOX 1: 50.0 - 91.4 FEET

0 1 2

FEET

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** DENICOLA, J.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 23+37	**OFFSET** 21 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.3 ft	**TOTAL DEPTH** 82.5 ft	**NORTHING** 544,376	**EASTING** 1,448,121	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/06/17	**COMP. DATE** 09/13/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
725										
720										720.3 GROUND SURFACE 0.0
	716.8	3.5						M		**ARTIFICIAL FILL** ORANGE-BROWN, CLAYEY SILT, TRACE GRAVEL
715	714.3	6.0	2	2	3	5		M		713.8 6.5
	711.8	8.5	3	4	7	11 13		M		**RESIDUAL** ORANGE-BROWN AND GRAY, CLAYEY SILT
710			4	6	7					
	707.3	13.0								
705			3	6	7	13				
	702.3	18.0						M		
700			6	9	14	23				
	697.3	23.0								
695			5	5	12	17		M		
	692.3	28.0								693.8 26.5
690			5	9	13	22		M		BROWN AND WHITE, SILTY FINE TO COARSE SAND
	687.3	33.0								
685			5	10	15	25		M		
	682.3	38.0								
680			13	26	32	58		M		
	677.3	43.0								
675			12	17	42	59		M		
	672.3	48.0								671.8 48.5
670			11	43	57/0.3	100/0.8		M		**WEATHERED ROCK** (BROWN AND WHITE, META-GRANODIORITE)
	669.5	50.8								669.5 50.8
665										**WEATHERED ROCK** (BROWN AND WHITE, META-GRANODIORITE)
	664.5	55.8	49	51/0.2		100/0.7				
660										
	658.8	61.5	100/0.2			100/0.2				
655										
	653.6	66.7	100/0.4			100/0.4				
650										
	648.2	72.1	60/0.0			60/0.0				647.9 72.4
645										

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** DENICOLA, J.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 23+37	**OFFSET** 21 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.3 ft	**TOTAL DEPTH** 82.5 ft	**NORTHING** 544,376	**EASTING** 1,448,121	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/06/17	**COMP. DATE** 09/13/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
645						Match Line				
	642.9	77.4	60/0.1			60/0.1				**CRYSTALLINE ROCK** BROWN AND WHITE, META-GRANODIORITE *(continued)*
640										637.8 82.5
										Boring Terminated at Elevation 637.8 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)

Terracon Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** DENICOLA, J.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. B2-D	**STATION** 23+37	**OFFSET** 21 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.3 ft	**TOTAL DEPTH** 82.5 ft	**NORTHING** 544,376	**EASTING** 1,448,121	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	**START DATE** 09/06/17	**COMP. DATE** 09/13/17	**SURFACE WATER DEPTH** N/A
CORE SIZE HQ3	**TOTAL RUN** 30.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
669.5											Begin Coring @ 50.8 ft
	669.5	50.8	5.0	1:50/1.0 5:30/1.0 3:22/1.0 2:37/1.0 2:25/1.0	(1.0) 20%	(0.9) 18%		(1.0) 5%			669.5 **WEATHERED ROCK** 50.8 (BROWN AND WHITE, META-GRANODIORITE)
665	664.5 663.8	55.8 56.5		N=100/0.7							
			5.0	2:01/1.0 3:36/1.0 4:30/1.0 5:25/1.0 2:52/1.0	(0.0) 0%	(0.0) 0%					
660	658.8 658.6	61.5 61.7		N=100/0.2							
			5.0	2:48/1.0 3:22/1.0 2:50/1.0 3:47/1.0 3:37/1.0	(0.0) 0%	(0.0) 0%					
655	653.6 653.2	66.7 67.1		N=100/0.4							
			5.0	2:39/1.0 2:18/1.0 2:30/1.0 2:56/1.0 2:39/1.0	(0.0) 0%	(0.0) 0%					
650	648.2 647.9	72.1 72.4		N=60/0.0							647.9 72.4
			5.0	3:16/1.0 3:39/1.0 3:31/1.0 3:48/1.0 3:19/1.0	(0.0) 0%	(0.0) 0%		(2.6) 26%	(1.2) 12%		**CRYSTALLINE ROCK** BROWN AND WHITE, MODERATELY SEVERE WEATHERING, MODERATELY HARD, CLOSELY FRACTURED, META-GRANODIORITE GSI 40 - 50
645	642.9 642.8	77.4 77.5		N=60/0.1							
			5.0	3:26/1.0 3:18/1.0 3:38/1.0 3:41/1.0 3:31/1.0	(2.6) 52%	(1.2) 24%					
640	637.8	82.5									637.8 82.5
											Boring Terminated at Elevation 637.8 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)

CORE PHOTOGRAPHS

Project No. 44475.1.2 (P-5705B)
Charlotte Gateway Station- W. Trade Street Bridge -S2-

B2-D
BOX 1: 50.8 - 82.5 FEET

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Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-E	**STATION** 23+39	**OFFSET** 12 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.4 ft	**TOTAL DEPTH** 86.9 ft	**NORTHING** 544,381	**EASTING** 1,448,113	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/13/17	**COMP. DATE** 09/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725											
720	719.4	1.0	6	5	2	7		M		720.4 GROUND SURFACE	0.0
	716.9	3.5								**ARTIFICIAL FILL** RED-BROWN, SILTY CLAY, LITTLE GRAVEL	
715	714.4	6.0	2	2	2	4		M		715.4	5.0
	712.1	8.3	3	3	4	7		M		**RESIDUAL** BROWN, CLAYEY SILT	
710	707.4	13.0	5	5	6	11		M		712.4 ORANGE AND LIGHT BROWN, SILTY FINE TO COARSE SAND	8.0
	702.4	18.0	5	6	7	13		M		706.4 BROWN AND WHITE, FINE TO COARSE SANDY SILT	14.0
705	697.4	23.0	3	5	6	11		M		699.4 BROWN AND WHITE, SILTY FINE TO COARSE SAND	21.0
700	692.4	28.0	5	8	16	24		M			
695	687.4	33.0	9	16	24	40		M			
690	682.4	38.0	9	11	18	29		M			
685	677.4	43.0	9	11	14	25		M			
680	671.6	48.8	22	52	48/0.2	100/0.7				676.9 **WEATHERED ROCK** (BROWN, DIABASE)	43.5
675	665.3	55.1	28	47	53/0.3	100/0.8				670.3 **WEATHERED ROCK** (BROWN, DIABASE)	50.1
670	659.7	60.7	22	78/0.4		100/0.9				661.7 **WEATHERED ROCK** (BROWN, META-GRANODIORITE)	58.7
665	654.4	66.0	100/0.3			100/0.3					
660	649.1	71.3	100/0.3			100/0.3					
655						100/0.3					
650											
645											

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B2-E	**STATION** 23+39	**OFFSET** 12 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.4 ft	**TOTAL DEPTH** 86.9 ft	**NORTHING** 544,381	**EASTING** 1,448,113	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER EKLUND, M.A.	**START DATE** 09/13/17	**COMP. DATE** 09/14/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
645						Match Line					
640	643.8	76.6	60/0.1			60/0.1				643.8 **CRYSTALLINE ROCK** BROWN AND WHITE, META-GRANODIORITE	76.6
	638.7	81.7	60/0.1			60/0.1					
635	633.6	86.8	60/0.1			60/0.1				633.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 633.5 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)	86.9

Terracon Consulting Engineers & Scientists

GEOTECHNICAL BORING REPORT
CORE LOG

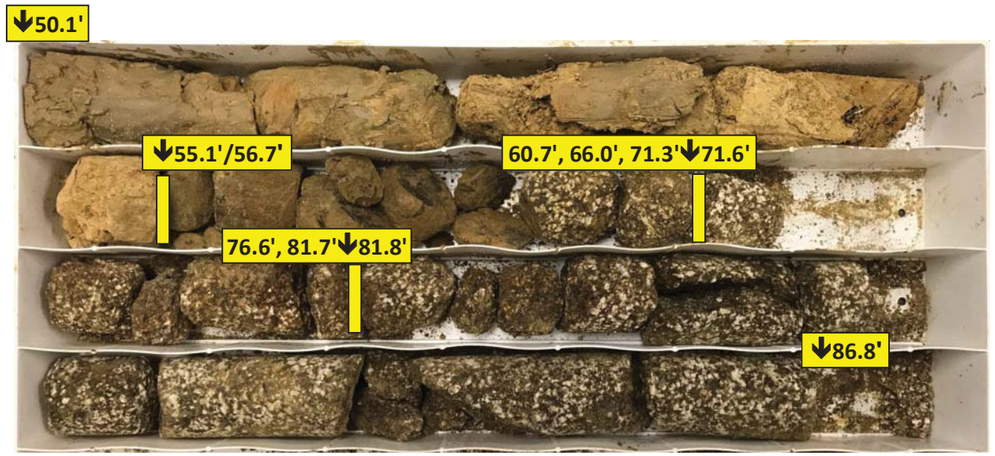
WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** SCHLEMM, T.S.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. B2-E	**STATION** 23+39	**OFFSET** 12 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 720.4 ft	**TOTAL DEPTH** 86.9 ft	**NORTHING** 544,381	**EASTING** 1,448,113	**24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	**START DATE** 09/13/17	**COMP. DATE** 09/14/17	**SURFACE WATER DEPTH** N/A
CORE SIZE HQ3	**TOTAL RUN** 34.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											Begin Coring @ 50.1 ft
670	670.3	50.1	5.0	3:47/1.0 4:01/1.0 3:57/1.0 4:33/1.0 3:02/1.0	(2.5) 50%	(0.0) 0%		(3.2) 37%			670.3 **WEATHERED ROCK** (BROWN, DIABASE) 50.1
665	665.3	55.1		N=100/0.9							
	663.7	56.7	4.0	4:26/1.0 4:36/1.0 2:54/1.0 3:55/1.0	(1.1) 28%	(0.0) 0%					661.7 58.7
660	659.7	60.7						(1.3) 7%			**WEATHERED ROCK** (BROWN, META-GRANODIORITE)
	659.4	61.0	5.0	N=100/0.3 1:58/1.0 2:43/1.0 3:27/1.0 3:27/1.0 3:15/1.0	(0.0) 0%	(0.0) 0%					
655	654.4	66.0									
	654.1	66.3	5.0	N=100/0.3 3:17/1.0 2:49/1.0 3:20/1.0 3:32/1.0 3:53/1.0	(0.0) 0%	(0.0) 0%					
650	649.1	71.3									
	648.8	71.6	5.0	N=100/0.3 3:00/1.0 2:31/1.0 2:38/1.0 3:39/1.0 2:31/1.0	(0.9) 18%	(0.0) 0%					
645	643.8	76.6									643.8 76.6
	643.7	76.7	5.0	N=60/0.1 4:31/1.0 4:49/1.0 5:30/1.0 5:20/1.0 5:42/1.0	(0.0) 0%	(0.0) 0%		(2.9) 28%	(1.1) 11%		**CRYSTALLINE ROCK** BROWN AND WHITE, MODERATELY SEVERE WEATHERING, MODERATELY HARD, CLOSELY FRACTURED, META-GRANODIORITE GSI 45 - 50
640	638.7	81.7									
	638.6	81.8	5.0	N=60/0.1 4:51/1.0 4:17/1.0 4:29/1.0 4:03/1.0 3:55/1.0	(2.9) 58%	(1.1) 22%					
635	633.6	86.8		N=60/0.1							633.5 86.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 633.5 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)

CORE PHOTOGRAPHS

Project No. 44475.1.2 (P-5705B)
Charlotte Gateway Station- W. Trade Street Bridge -S2-

B2-E
BOX 1: 50.1 - 86.8 FEET



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FEET

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 23+86	**OFFSET** 48 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 721.6 ft	**TOTAL DEPTH** 78.7 ft	**NORTHING** 544,322	**EASTING** 1,448,106	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/28/17	**COMP. DATE** 03/28/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
725										
	721.6	0.0								GROUND SURFACE
720	720.6	1.0	5	7	5	12		M		**ARTIFICIAL FILL** RED AND BLACK, FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS
	717.6	4.0								
	717.5	4.1	4	4	7	11		M		**RESIDUAL** TAN, ORANGE AND WHITE, CLAYEY FINE SAND WITH TRACE OF MANGANESE
715	715.5	6.1	5	5	6	11		M		
	712.9	8.7	4	5	8	13		M		
710	707.9	13.7	6	10	12	22		M		
705	702.9	18.7	5	10	12	22		M		
700	697.9	23.7	11	18	29	47		M		
695	692.9	28.7	12	20	27	47		M		
690	687.9	33.7	10	12	15	27		M		
685	684.6	37.0								TAN AND WHITE, SILTY FINE SAND
	682.9	38.7	10	18	14	32		M		
680	677.9	43.7	9	10	15	25		M		
675	672.9	48.7	13	15	19	34		M		
670	667.9	53.7	22	23	24	47		M		
665	662.9	58.7	17	23	23	46		M		
660	658.1	63.5								**WEATHERED ROCK** (META-GRANODIORITE)
	657.9	63.7	69	31/0.4		100/0.9				
655	653.1	68.5								**RESIDUAL** TAN AND WHITE, SILTY FINE SAND
	652.9	68.7	15	10	28	38		M		
650	648.1	73.5								**WEATHERED ROCK** (META-GRANODIORITE)
	647.9	73.7	100/0.3			100/0.3				
645										

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

0011DEL_P28

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.	
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 23+86	**OFFSET** 48 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 721.6 ft	**TOTAL DEPTH** 78.7 ft	**NORTHING** 544,322	**EASTING** 1,448,106	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 03/28/17	**COMP. DATE** 03/28/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
645						Match Line				
	642.9	78.7	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 642.9 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

0011DEL_P28

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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 23+79	**OFFSET** 8 ft RT	**ALIGNMENT** -S2- / **0 HR.** N/A
COLLAR ELEV. 719.4 ft	**TOTAL DEPTH** 68.4 ft	**NORTHING** 544,366	**EASTING** 1,448,070 / **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic
DRILLER TURNAGE, J. R.	**START DATE** 03/29/17	**COMP. DATE** 03/29/17	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
720										719.4 GROUND SURFACE 0.0
	718.4	1.0	2	2	4	6		M		**ARTIFICIAL FILL** RED AND TAN, FINE SANDY CLAY
	716.1	3.3	2	3	3	6		M		715.4 4.0
715	714.1	5.3	2	3	3	6		M		**RESIDUAL** RED AND TAN, CLAYEY SILT WITH OF TRACE MICA
	710.9	8.5	2	3	5	8		M		711.9 7.5 TAN AND WHITE, SILTY FINE SAND WITH TRACE OF MANGANESE
710										
	706.1	13.3	2	3	5	8		M		
705										
	701.1	18.3	2	2	6	8		M		
700										
	696.1	23.3	4	7	9	16		M		
695										
	691.1	28.3	3	3	5	8		M		
690										
	686.1	33.3	4	8	17	25		M		687.4 32.0 TAN, CLAYEY FINE SAND WITH TRACE OF MANGANESE
685										
	681.1	38.3	31	36	32	68		M		
680										
	676.1	43.3	88	12/0.4		100/0.9		M		676.9 42.5 **WEATHERED ROCK** (META-GRANODIORITE)
675										
	671.1	48.3	49	51/0.4		100/0.9		M		
670										
	666.1	53.3	6	7	12	19		M		666.9 52.5 **RESIDUAL** TAN, CLAYEY SILT
665										
	661.1	58.3	34	49	51/0.3	100/0.8		M		660.1 59.3 **WEATHERED ROCK** (META-GRANODIORITE)
660										
	656.1	63.3	100/0.2			100/0.2		M		
655										
	651.1	68.3	60/0.1			60/0.1		M		651.0 68.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 651.0 ft IN CRYSTALLINE ROCK (META-GRANODIORITE)

NCDOT BORE SINGLE P5705B_GEO_BRDG3_TRADE ST_S2.GPJ NC_DOT.GDT 12/6/17

Terracon
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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WERITZ, M. A.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 24+25	**OFFSET** 24 ft LT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 722.6 ft	**TOTAL DEPTH** 73.2 ft	**NORTHING** 544,311	**EASTING** 1,448,062	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 94% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER DUGGINS, W. T.	**START DATE** 03/29/17	**COMP. DATE** 03/29/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
725										722.6 PAVEMENT SURFACE	0.0
	721.6	1.0	4	4	3	7		M		721.4 **PAVEMENT** 0.5' ASPHALT AND 0.7' STONE BASE	1.2
720	719.6	3.0	2	3	4	7		M		**RESIDUAL** RED AND BROWN, SILTY CLAY	
	716.6	6.0	2	2	4	6		M			
715	714.6	8.0	2	2	4	6		M		712.6 GRAY, CLAYEY SILT	10.0
710	709.6	13.0	3	5	8	13		M			
705	704.6	18.0	5	20	22	42		M		696.6 GRAY, BROWN AND WHITE, SILTY FINE SAND	26.0
700	699.6	23.0	28	35	36	71		M			
695	694.6	28.0	2	4	6	10		M			
690	689.6	33.0	2	3	7	10		M			
685	684.6	38.0	9	10	10	20		M			
680	679.6	43.0	7	21	31	52		M			
675	674.6	48.0	14	23	29	52		M			
670	669.6	53.0	14	28	44	72		M			
665	664.6	58.0	10	22	34	56		M			
660	659.6	63.0	100/0.5			100/0.5				661.6 **WEATHERED ROCK** (META-GRANODIORITE)	61.0
655	654.6	68.0	77	23/0.1		100/0.6					
650	649.6	73.0	100/0.2			100/0.2				649.4 Boring Terminated at Elevation 649.4 ft IN WEATHERED ROCK (META-GRANODIORITE)	73.2

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 44475.1.2	**TIP** P-5705B	**COUNTY** MECKLENBURG	**GEOLOGIST** WEAVER, L. A.
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST TRADE STREET BRIDGE -S2-			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 24+39	**OFFSET** 25 ft RT	**ALIGNMENT** -S2-	**0 HR.** N/A
COLLAR ELEV. 738.5 ft	**TOTAL DEPTH** 67.8 ft	**NORTHING** 544,335	**EASTING** 1,448,017	**24 HR.** 19.8
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
DRILLER TURNAGE, J. R.	**START DATE** 05/02/17	**COMP. DATE** 05/02/17	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
740										738.5 GROUND SURFACE	0.0
	736.2	2.3	3	2	3	5		M		**RAILROAD BALLAST** CRUSHED STONE	
735	733.0	5.5								735.5	3.0
	731.5	7.0	3	6	6	12		M		**RAILROAD EMBANKMENT** RED AND TAN, CLAYEY FINE SAND WITH TRACE OF MICA AND ROCK FRAGMENTS	
730			3	5	7	12		M			
725	726.1	12.4	3	3	6	9		M			
720	721.1	17.4	3	4	6	10				722.5 **RESIDUAL** TAN AND ORANGE, CLAYEY FINE SAND	16.0
715	716.1	22.4	4	7	8	15		M		717.5 TAN AND GRAY, SILTY FINE SAND WITH TRACE OF MANGANESE	21.0
710	711.1	27.4	6	9	15	24		M			
705	706.1	32.4	13	11	15	26		M			
700	701.1	37.4	17	18	21	39		M			
695	696.1	42.4	12	12	13	25		M		695.0 TAN, CLAYEY FINE SAND WITH TRACE OF MANGANESE	43.5
690	691.1	47.4	11	16	16	32		M			
685	686.1	52.4	7	12	22	34		M			
680	681.1	57.4	100/0.3			100/0.3				681.5 **WEATHERED ROCK** (META-GRANODIORITE)	57.0
675	676.1	62.4	33	48	52/0.3	100/0.8					
	671.1	67.4	100/0.4			100/0.4				670.7 Boring Terminated at Elevation 670.7 ft IN WEATHERED ROCK (META-GRANODIORITE)	67.8

0011DEL_P28

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 44475.1.2 **TIP:** P-5705B **COUNTY:** MECKLENBURG

DESCRIPTION: Charlotte Gateway Station and Track and Safety Improvements - West Trade Street Bridge on -S2-

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic	Ave. Wet Unit Wt. (pcf)	Shear Strength Values			
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200				Total Cohesion (psf)	Total Friction (ϕ)	Effective Cohesion (psf)	Effective Friction (ϕ')
SS-16	-S2-	EB1-A	30' LT	18.6-20.1	A-5 (1)	42	9	38.7	23.1	25.8	12.4	0	95	67	42	40.6	N/D	N/D	N/D	N/D	N/D	N/D
SS-17	-S2-	B1-A	30' LT	13.2-14.7	A-7-6 (3)	42	12	37.5	20.7	26.4	15.4	0	96	69	46	29.9	N/D	N/D	N/D	N/D	N/D	N/D
SS-18	-S2-	B1-A	30' LT	33.2-34.7	A-4 (0)	34	5	43.8	24.4	21.3	10.5	0	95	64	36	18.8	N/D	N/D	N/D	N/D	N/D	N/D
SS-19	-S2-	B1-B	12' RT	8.1-9.6	A-7-6 (13)	51	23	21.6	21.5	36.3	20.6	0	98	83	62	33.2	N/D	N/D	N/D	N/D	N/D	N/D
SS-21	-S2-	B2-A	41' LT	13.4-14.9	A-5 (2)	42	9	34.9	21.5	29.5	14.1	0	96	70	48	27.7	N/D	N/D	N/D	N/D	N/D	N/D
SS-22	-S2-	B2-B	10' RT	33.4-34.9	A-4 (6)	34	9	15.0	19.8	48.1	17.1	0	100	92	71	26.2	N/D	N/D	N/D	N/D	N/D	N/D

N/D - NOT DETERMINED

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

SITE PHOTOGRAPHS
CHARLOTTE GATEWAY STATION AND TRACK IMPROVEMENTS - WEST TRADE STREET BRIDGE ON -S2-

PHOTOGRAPH NO. 1: EAST APPROACH TO END BENT NO. 1 ON -S2- ALIGNMENT, LOOKING WEST

PHOTOGRAPH NO. 2: ON WEST TRADE STREET MEDIAN, SOUTHEAST OF -S2- ALIGNMENT, LOOKING NORTHWEST

PHOTOGRAPH NO. 3: ON WEST TRADE MEDIAN, NORTHWEST OF -S2- ALIGNMENT, LOOKING SOUTHEAST

PHOTOGRAPH NO. 4: WEST APPROACH TO END BENT NO.2 ON -S2- ALIGNMENT, LOOKING EAST