PROJECT: 8.1811201 ID: U-2408

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2408	1	25
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8.1811201	STP-274(1)	P.E.	
		CONST.	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.1811201 I.D. NO. U-2408

F.A. PROJECT STP-274(1)

COUNTY GASTON

PROJECT DESCRIPTION NC 274(BESSEMER CITY RD) FROM NC 275(DALLAS-BESSMER CITY RD) TO US 29/ 74(FRANKLIN BLVD.)

SITE DESCRIPTION WIDENING OF BRIDGE No. 57 OVER NORFOLK SOUTHERN RAILROAD ON NC 274 BETWEEN ISLEY DRIVE AND DELTA DRIVE

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS 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.

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3) SITE VICINITY MAP(DRAWING 1, SHEET 7)
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INVESTIGATED BY P ALTON PERSONNEL D KITCHEN

CHECKED BY J VINSON P BOND

SUBMITTED BY P WEAVER C HENN

DATE 6/3/04 R BRITTAIN

T WELLS

B SMALLWOOD

DRAWN BY: DRK

Project Services/Contracts

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

NORTH CAROLINA LICENSED SEAL 1500 GEOLOGIST PAUL M. WEAVER SEAL

SIGNATURE

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
U-2408	8.1811201	2	25

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. 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
LIQUID LIMIT	6 MX		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	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
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, 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
UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 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 SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- ● - SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S- BULK SAMPLE
SS- SPLIT SPOON SAMPLE
ST- SHELBY TUBE SAMPLE
RS- ROCK SAMPLE
RT- RECOMPACTED TRIAXIAL SAMPLE
CBR - CBR SAMPLE

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
FRAGS. - FRAGMENTS
MED. - MEDIUM
NM - NOT MEASURED
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B- 57
- [ ] BK-51
- [X] CME-55
- [ ] CME-57
- [ ] PORTABLE HOIST
- [ ] OTHER _____
- [X] OTHER CME-45

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 152 mm CONTINUOUS FLIGHT AUGER
- [ ] 203 mm HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 74.6 mm STEEL TEETH
- [ ] TRICONE _____ mm TUNG.-CARB.
- [ ] CORE BIT
- [ ] OTHER _____

HAMMER TYPE:
- [ ] AUTOMATIC [X] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H Q

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. 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 2.5 cm PER 50 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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.
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 2.5 cm. 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 ROCKS 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, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.*
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BLOWS PER 30 cm.*
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 GEOLOGISTS 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 6 mm DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENIMETERS 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 25 mm OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 3 m
WIDE	1 TO 3 m
MODERATELY CLOSE	30 TO 100 cm
CLOSE	5 TO 30 cm
VERY CLOSE	LESS THAN 5 cm

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 1 m
THICKLY BEDDED	0.5 - 1 m
THINLY BEDDED	0.05 - 0.5 m
VERY THINLY BEDDED	10 - 50 mm
THICKLY LAMINATED	2.5 - 10 mm
THINLY LAMINATED	< 2.5 mm

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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 WHICH 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, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 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 (S.R.Q.D.) - 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: PINC 9: -LBL- STA. 17+09.446

ELEVATION: 265.149m

NOTES:

REVISED 09/15/00

TRIGON
ENGINEERING CONSULTANTS, INC.

21st 1983-2004 Anniversary

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Trigon Project No. 071-04-005

DATE: June 3, 2004

STATE PROJECT: 8.1811201 (U-2408)

WBS ELEMENT : 34799.1.1

FEDERAL PROJECT: STP-274(1)

COUNTY: Gaston

DESCRIPTION: Widening of Bridge No. 57 Over Norfolk Southern Railroad on NC 274
Between Isley Drive and Delta Drive

SUBJECT: Geotechnical Report of Structure Subsurface Investigation

Thank you for our success.

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Appendix A – Supportive Documents (Issued Under Separate Cover)

1. FHWA Geotechnical Report Review Checklist
2. Boring Quantity Summation Sheet
3. Field Boring
4. Survey Notes
5. Property Owner Contact Report Sheet

TRIGON
ENGINEERING CONSULTANTS, INC.

21st 1983-2004 Anniversary

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STATE PROJECT: 8.1811201 (U-2408)

WBS ELEMENT : 34799.1.1

FEDERAL PROJECT: STP-274(1)

COUNTY: Gaston

DESCRIPTION: Widening of Bridge No. 57 Over Norfolk Southern Railroad on NC 274 Between Isley Drive and Delta Drive

SUBJECT: Geotechnical Report of Structure Subsurface Investigation

Trigon Engineering Consultants, Inc. has completed the authorized geotechnical investigation for the above referenced project in Gaston County, North Carolina. The purpose of this exploration was to investigate the subsurface conditions at the proposed bridge bent locations and to provide general construction considerations based on the subsurface conditions.

1.0 SITE DESCRIPTION

The project site is located in the western portion of Gaston County, at the approximate location shown on the Project Vicinity Map (Drawing No. 1) attached to this report. The project description of the proposed project is "NC 274 (Bessemer City Road) from NC 275 (Dallas-Bessemer City Road) to US 29-74 (Franklin Boulevard"), and the site description is "Widening of Bridge No. 57 over Norfolk Southern Railroad on NC 274 Between Isley Drive and Delta Drive". Topographically, the site slopes down towards the Norfolk

Southern Railroad line from each end of the existing bridge. The topography of the general site vicinity consists of gently rolling hills.

At the time of this exploration, a three-span bridge (existing Bridge No. 57) was present at the site. The existing bridge consists of a reinforced concrete deck on reinforced concrete girders. The existing end bents consist of reinforced concrete caps on steel piles, while the existing interior bents consist of reinforced concrete columns on steel piles. The existing bridge is approximately 72.4 meters in length and approximately 12.8 meters (out to out) in width. The bents of the bridge have a skew angle of 150°00'48".

2.0 PROJECT DESCRIPTION

Proposed for construction is widening of the existing Bridge No. 57 on NC 274 (Bessemer City Road) over the Norfolk Southern Railroad. Information for the proposed bridge structure was obtained from the Preliminary General Drawings dated December 18, 2003, which were provided to Trigon by the NCDOT. The centerline of -L- (NC 274) intersects the centerline of the Norfolk Southern Railroad tracks (-RR-) at Stations 20+57.6 (-L-) and 11+00.9 (-RR-), which is 223.8 meters west of Mile Post 403. The proposed bridge length and skew angle will remain unchanged from the existing bridge (72.4 meters and 150°00'48", respectively). The existing bridge is to be widened by 3.45 meters on the left side, and by 1.80 meters on the right side. New embankment fill will be required above the existing ground surface on the sides of the existing embankment fills at the end bents to accommodate the proposed wider roadway. Slopes for the widened embankment slopes are to match the existing embankment slopes which are on the order of 1.5(H):1(V).

The Preliminary General Drawings are in Metric units with meters as the primary unit of length.

3.0 SCOPE OF INVESTIGATION

3.1 FIELD TESTING

The as-drilled locations for the soil test borings were located by personnel from Trigon using the existing bridge for reference. Elevations at the as-drilled boring locations, along the existing ground surface at the bent locations, and along the structure profile were surveyed by personnel from Trigon using the PINC 9 benchmark elevation (Elevation 265.149m) established by an NCDOT survey crew as a reference point. The location of the PINC 9 benchmark is "-LBL- Sta. 17+09.446". As-drilled boring locations are shown on the Boring Identification Diagram (Drawing No. 2).

The subsurface exploration for the proposed bridge was conducted between April 14 and 30, 2004. This exploration consisted of eight soil test borings; two at each of the proposed bent locations. The borings for the proposed end bents were offset in towards the -L- centerline due to steep, inaccessible embankment slopes adjacent to the existing roadway. The Bent-2 borings were drilled from a platform lowered unto the existing embankment slopes using a crane.

The end bent borings and the borings at Bent-1 were drilled with a truck-mounted CME-55 drilling machine equipped with a 140-pound manual hammer. The Bent-2 borings were drilled with a skid-mounted CME 45 drilling machine equipped with a 140-pound manual hammer. All of the borings were advanced utilizing 0.33-foot tricone/wash-drilling techniques with either tap water alone, tap water plus polymer, or tap water plus bentonite as the drilling fluid. The mud density with bentonite or polymer additives ranged fro m 63 to 64 pounds per cubic foot.

Standard Penetration Tests were performed in the soil and weathered rock materials in general accordance with NCDOT guidelines. In conjunction with this testing, split-barrel soil and weathered rock samples were recovered for visual classification and potential laboratory testing.

Rock coring was not performed on this project.

3.2 LABORATORY TESTING

Laboratory soil testing was performed on eighteen representative split-barrel samples to aid in the assessment of AASHTO soil classification and to provide data for evaluation of engineering properties. The laboratory testing on the samples consisted of Natural Moisture Content, Atterberg Limit, and grain size analysis with hydrometer. Laboratory tests were performed in general accordance with AASHTO and NCDOT specifications. The results of the soil laboratory tests are included on Sheet 22.

3.3 SITE GEOLOGY

The site of the proposed project is located in the Kings Mountain Belt of the Piedmont Physiographic Province of North Carolina. According to The Geology of the Carolinas published by the Carolina Geological Society in 1991, the Kings Mountain Belt "includes metasedimentary sequences with interlayered quartzite, metaconglomerates, marble, schist derived from both sedimentary and volcanic protoliths", and several intrusive bodies which are mainly granitic in composition. The rocks of the Kings

Mountain Belt are intensely deformed, and are dominated by steeply dipping, northeast to north-northeast striking units "which are mainly a reflection of upright isoclinal folds". The High Shoals Granite, which is present at the subject site, is a porphyritic biotite granite, typically with strong foliation, forming a batholith-size pluton. The High Shoals Granite is typically coarse grained and strongly foliated. (Horton, J.W., and Zullo, V.A., *The Geology of the Carolinas*, 1991).

According to the 1985 Geologic Map of North Carolina, the site is located in an area generally consisting of megacrystic to equigranular, foliated to massive granitic rock of Pennsylvanian to Permian age. The weathered rock encountered in our test borings consisted granite. The overlying residual soils at the site are the product from the physical and chemical weathering of the underlying crystalline rock.

3.4 FOUNDATION MATERIALS

The generalized subsurface conditions indicated by the borings are described below. For soil descriptions and general stratification at a particular boring location, the respective Boring Log should be review ed. The Boring Identification Diagram and Boring Logs are included following this report. Representative subsurface cross-sections at each drilled bent location and a subsurface profile along the structure are also included following this report. The subsurface properties for the project site are described below.

Foundation materials encountered at the site included roadway embankment fill, residual soils, weathered rock, and crystalline rock.

Roadway embankment fill was encountered beginning at the existing ground surface at the End Bent-1, Bent-2, and End Bent-2 borings, and at Boring B1-A. Fill was not encountered at Boring B1-B. The fill extends to a depth of ±9m (Elevation ±257m) at End Bent-1, to a depth of ±2m (Elevation ±256m) at Boring B1-A, to a depth of ±1m (Elevation ±257m) at Bent-2, and to a depth of ±8m (Elevations ±258m to ±259m) at End Bent-2. The roadway embankment fill encountered generally consists of soft to very stiff, variably clayey, coarse to fine sandy silt (A-4) with a little mica. Approximately 1.4m of very loose, coarse to fine sand and gravel (A-1-b) was encountered underlying the pavement and overlying the A-4 fill material at Boring EB2-A. Standard Penetration Resistance values of 2 to 15 blows per foot (bpf) were encountered within the roadway embankment fill.

Residual soils were encountered underlying the roadway embankment fill at all of the borings drilled for this project with the exception of Boring B1-B at which the residual soil was encountered beginning at the existing

ground surface. The residual soils extend to at least the boring termination depths of ±24m to ±21m (Elevations ±242m to ±245m) at End Bent-1, to depths of ±23m to ±20m (Elevations ±235m to ±237m) at Bent-1, to a depth of ±21m (Elevation ±237m) at Bent-2, and to at least the boring termination depths of ±23m to ±24m (Elevations ±243m to ±242m) at End Bent-2. The residual soils generally consist of stiff to very stiff, coarse to fine sandy, silty, clay (A-7-5 and A-7-6), and variably clayey, coarse to fine sandy silt (A-4 and A-5); and of loose to very dense, silty, coarse to fine sand (A-2-4). Mica in concentrations varying from a trace to a little is present within much of the residual soil, and rock fragments are present within the resid ual soil at Boring B2-B between depths of ±12m and ±13m (Elevations ±246m and ±245m). Standard Penetration Resistance values within the residuum ranged from 7 and 73 bpf. The End Bent-1 and End Bent-2 borings were terminated within residual soil.

Weathered rock was encountered underlying the residual soils at the Bent-1 and Bent-2 borings. Weathered rock was not encountered at the End Bent-1 or End Bent-2 borings within the depths explored. The weathered rock generally consists of weathered granite. The weathered rock was encountered at 22.70m and 20.43m (Elevations 234.81m and 237.44m) at Borings B1-A and B1-B, respectively; and at 20.58m and 20.88m (Elevations 237.59 and 237.31m) at Borings B2-A and B2-B, respectively. The Bent-1 borings and Boring B2-A were terminated within weathered rock.

Crystalline rock was encountered at Boring B2-B. Crystalline rock was not encountered within the depths explored at the remaining seven borings. The crystalline rock at Boring B2-B was encountered at a depth of 22.88m (Elevation 235.31m), and the boring was terminated on crystalline rock consisting of granite.

3.5 GROUNDWATER

Groundwater was encountered in all of the borings drilled for this project. The groundwater elevation ranged from ±249m to ±252m. It should be noted that fluctuation of groundwater surface levels can occur with seasonal and climatic variations, with the highest groundwater levels expected in late winter and early spring. Seasonal low groundwater levels are expected in late summer and early fall.

4.0 NOTES TO THE DESIGNER

Rock fragments are present within some of the soil present at the site. Buried fiber optic lines parallel the Norfolk Southern Railroad tracks, and lie in close proximity to the proposed Bent-1 and Bent-2 foundations. The center of the existing outside foundations at the interior bents, based on a review of the as-built drawings, is 1.52m from the edge of the existing bridge.

5.0 CLOSURE

The geotechnical investigation, analysis, and general foundation recommendations are based on the Preliminary General Drawings, and the data obtained from our field and laboratory-testing program. If the proposed location and geometry, or finished grades are changed or are different from those outlined above, or if subsurface conditions are encountered during construction which differ from those indicated by our borings, we will require the opportunity to review these changed conditions and make any necessary modifications to the general recommendations presented in this report.

Cross-sections and profiles are a generalized interpretation of soil conditions between borings and should not be considered accurate other than at the boring locations. Subsurface conditions between boring locations or elsewhere on the site may vary, and subsurface anomalies may exist which were not detected.

Trigon Engineering Consultants, Inc. appreciates the opportunity to be of service to the NCDOT on this project. Should you have any questions concerning this report, please feel free to contact the undersigned.

Respectfully submitted,

TRIGON ENGINEERING CONSULTANTS, INC.

Paul M. Weaver, P.G.
Registered North Carolina No. 1500

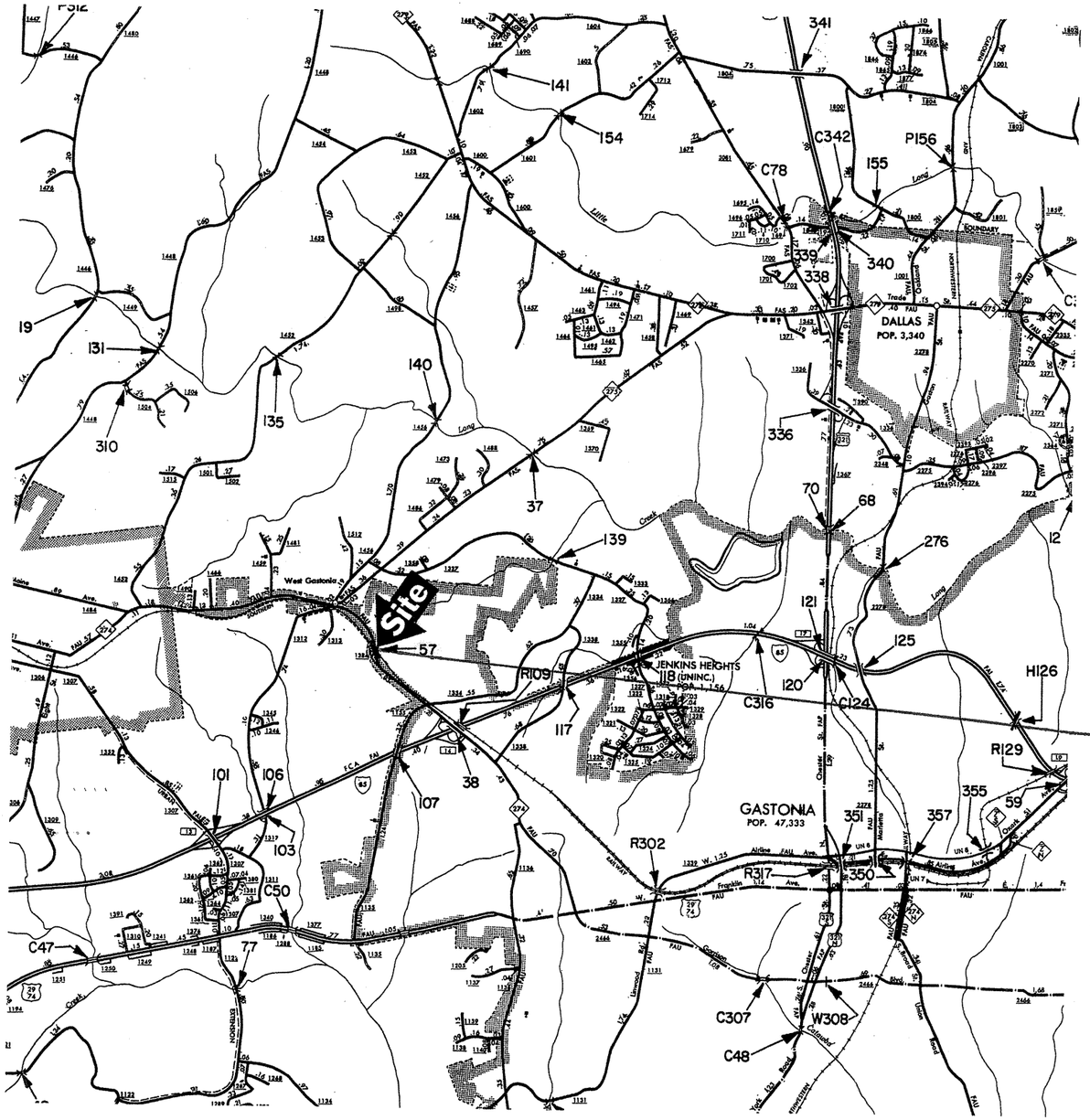
NORTH CAROLINA LICENSED 1500 GEOLOGIST PAUL M. WEAVER

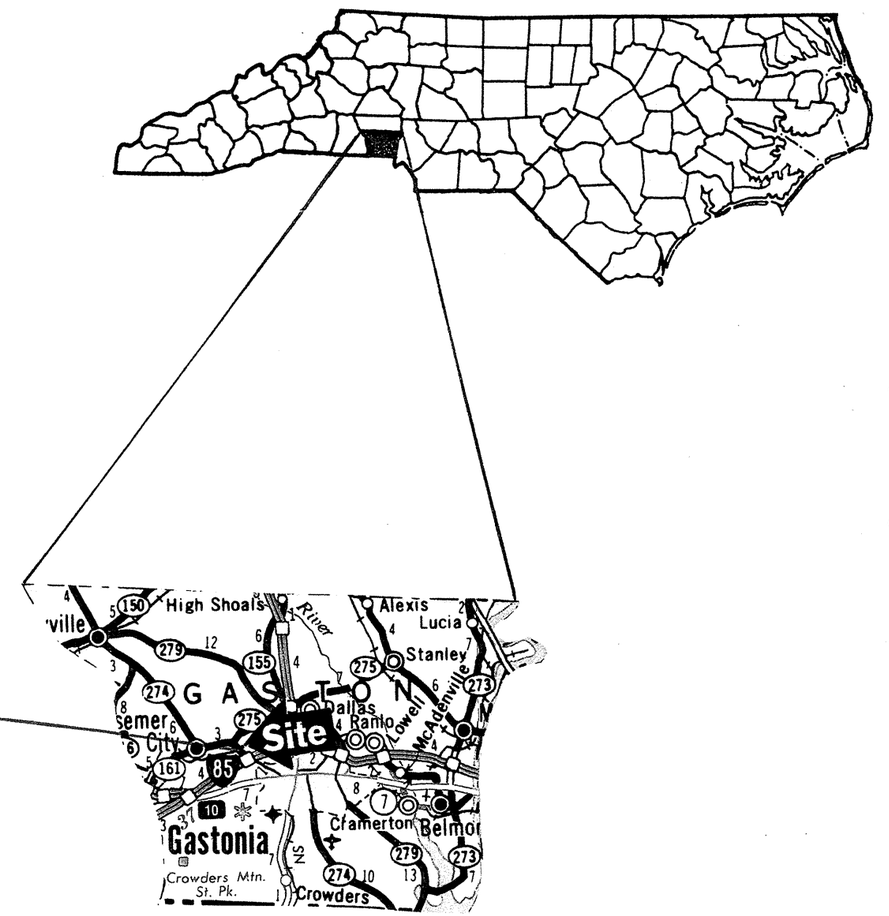
Jeffrey R. Vinson, P.G.
Senior Project Manager

PMW/JRV:keg

Attachments

s:\0710\projectss\2004\07104005\Bridge No. 57 over NSRR Report.doc





TRIGON Trigon Engineering Consultants, Inc. Greensboro North Carolina	SCALE: Not to Scale	DATE: 06/01/04	STATE PROJECT NO. 8.1811201	TIP NO.: U-2408
	SITE VICINITY MAP Widening of Bridge No. 57 Over Norfolk Southern Railroad on NC 274 Between Isley Drive and Delta Drive			
	Gaston County, North Carolina		DRAWING NUMBER: 1	

Note: Skew Angle for All Bents = 150°00'48"

HORZ. METERS

BORING IDENTIFICATION DIAGRAM

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale N/A
Date 6/3/04	Horiz. Scale 1:400
Drawn by DRK	Drawing No. 2

TRIGON
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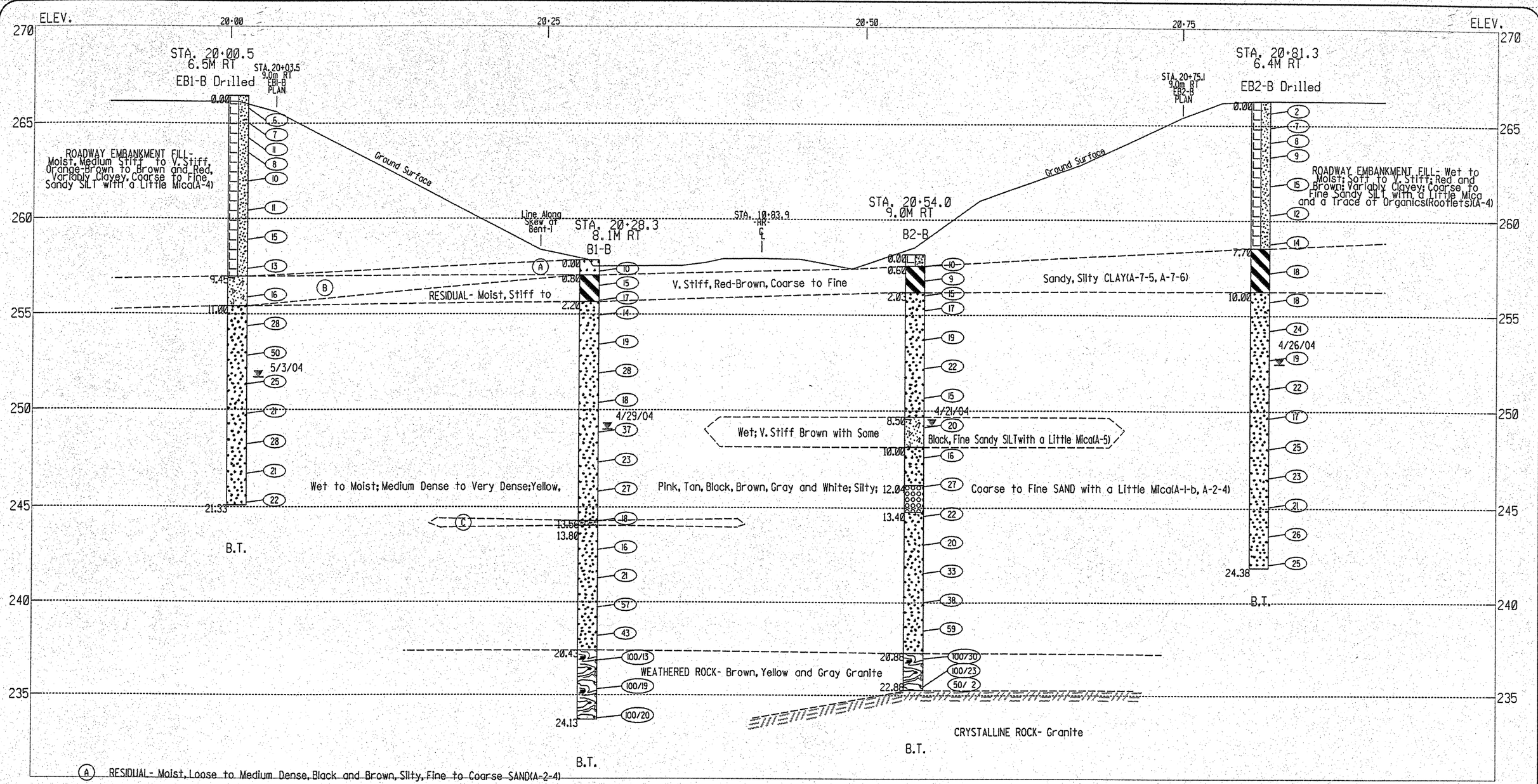


(A) RESIDUAL- Moist, Loose to Medium Dense, Black and Brown, Silty, Fine to Coarse SAND(A-2-4)

(B) RESIDUAL- Moist, V. Stiff, Red-Brown, Clayey, Coarse to Fine Sandy SILT with a Little Mica(A-5)

(C) Moist, V. Stiff, Red-Brown, Clayey, Coarse to Fine Sandy SILT(A-4)

0 2 4
VERT. METERS

0 3 6
HORZ. METERS

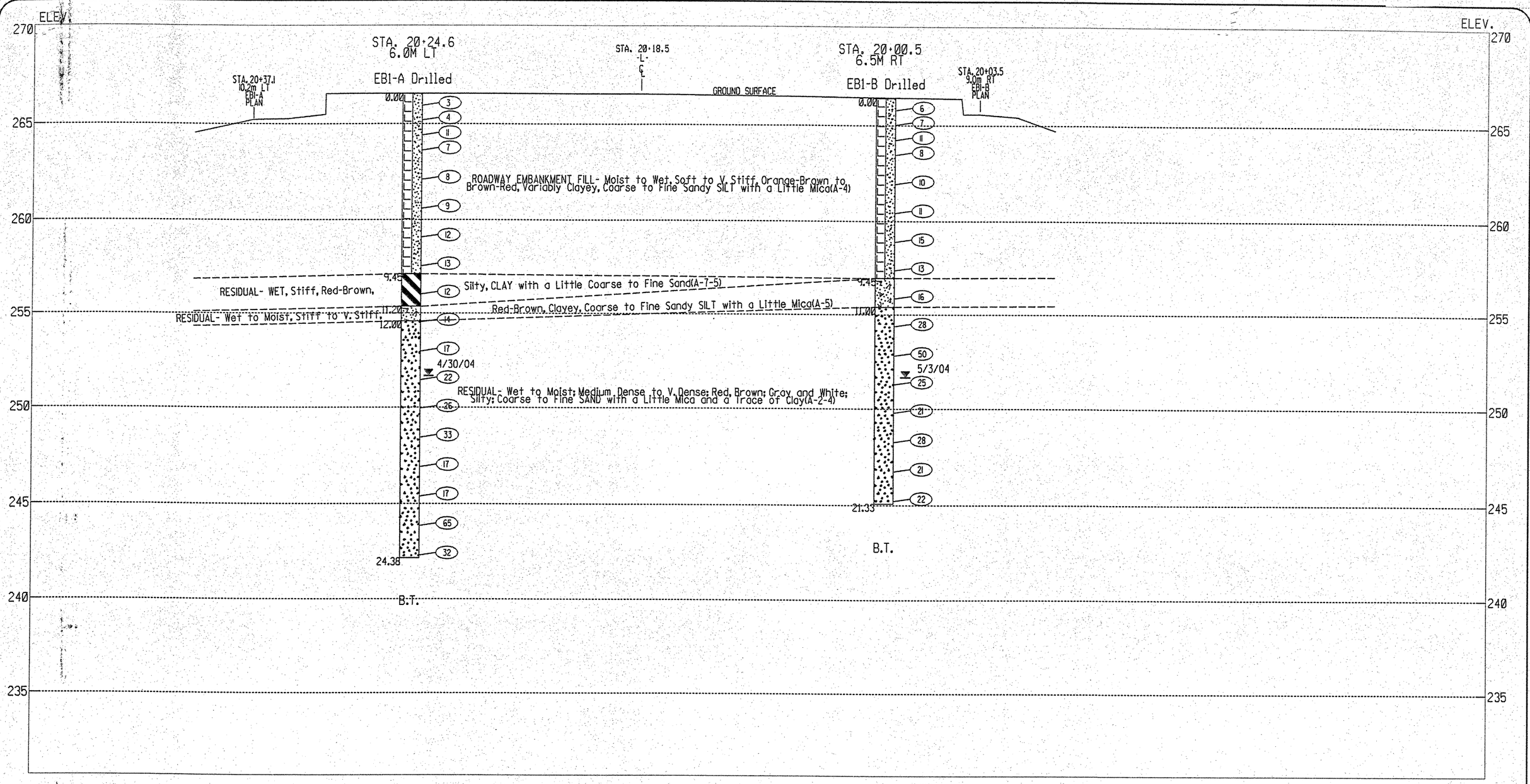
TRIGON
ENGINEERING CONSULTANTS, INC.

PROFILE 9.0m RIGHT OF -L-

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale 1:200
Date 6/3/04	Horiz. Scale 1:300
Drawn by DRK	Drawing No. 3



0 2 4
VERT. METERS

0 2 4
HORZ. METERS

TRIGON
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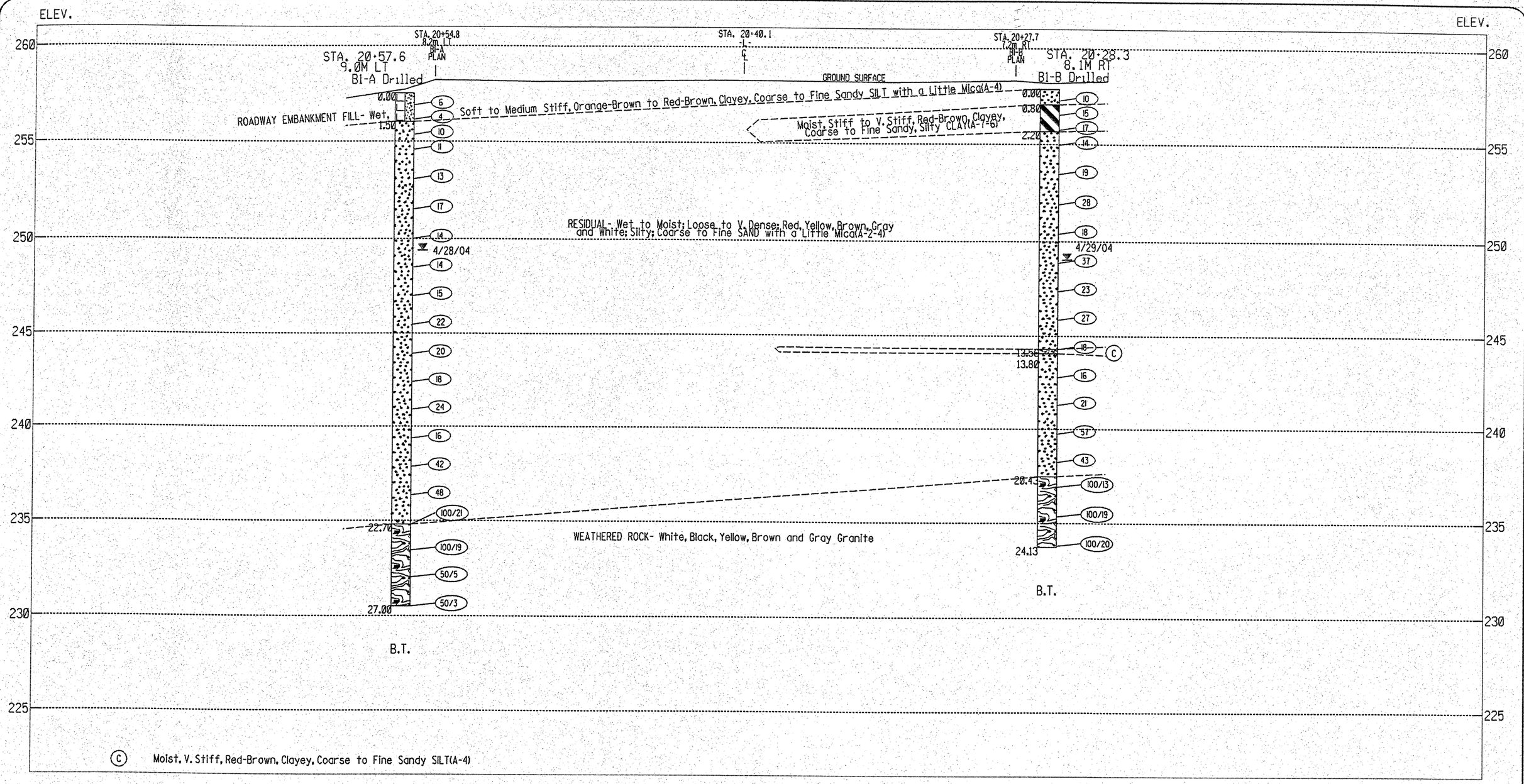
CROSS SECTION DIAGRAM AT END BENT-1

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale 1:200
Date 6/3/04	Horiz. Scale 1:200
Drawn by DRK	Drawing No. 4



0 2 4
VERT. METERS

0 2 4
HORZ. METERS

TRIGON
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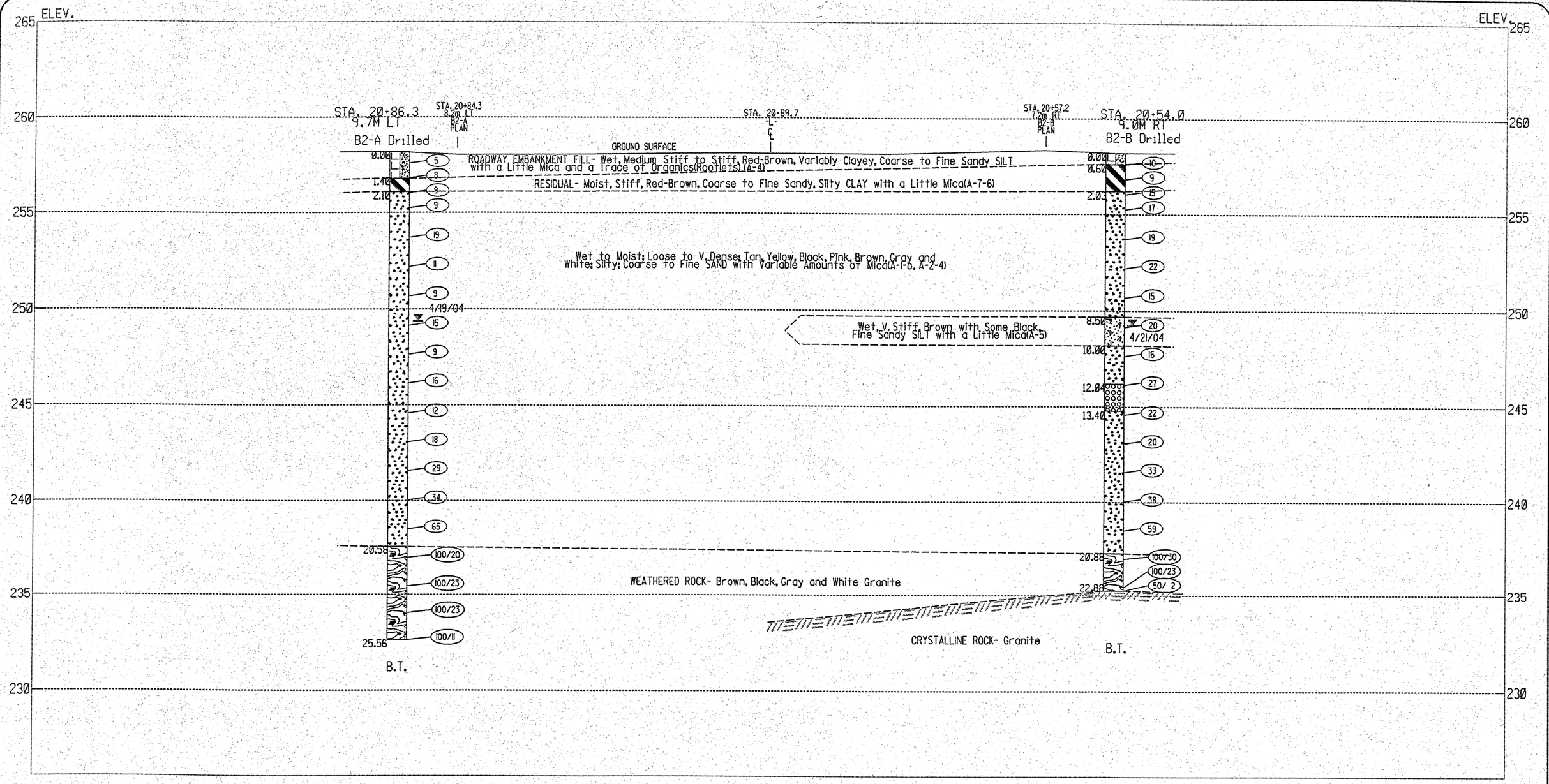
CROSS SECTION DIAGRAM AT BENT-1

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale 1:200
Date 6/3/04	Horiz. Scale 1:200
Drawn by DRK	Drawing No. 5



0 2 4
VERT. METERS

0 2 4
HORZ. METERS

TRIGON
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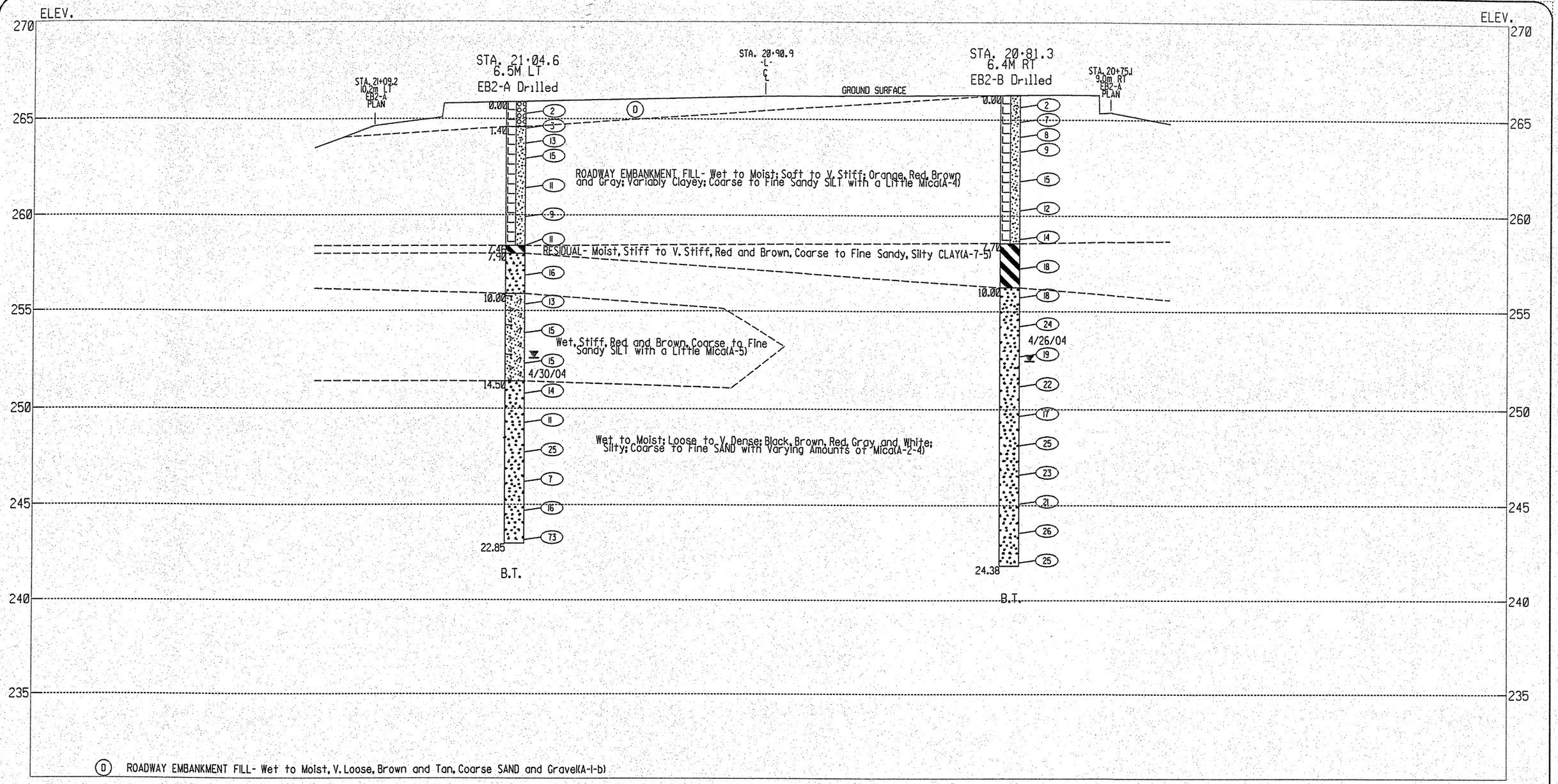
CROSS SECTION DIAGRAM AT BENT-2

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale 1:200
Date 6/3/04	Horiz. Scale 1:200
Drawn by DRK	Drawing No. 6



0 2 4
VERT. METERS

0 2 4
HORZ. METERS

TRIGON
ENGINEERING CONSULTANTS, INC.

CROSS SECTION DIAGRAM AT END BENT-2

Widening of Bridge No. 57
Over NSRR on NC 274

Gaston County, North Carolina

Project No. 8.1811201	TIP No. U-2408
Federal No. STP-274(1)	Vert. Scale 1:200
Date 6/3/04	Horiz. Scale 1:200
Drawn by DRK	Drawing No. 7

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. EB1-A	BORING LOCATION 20+24.6	OFFSET 6.0m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.57 m	NORTHING 172505.68	EASTING 405917.65	24 HR. 14.94
TOTAL DEPTH 24.38 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/29/04	COMPLETED 4/29/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
266.57									266.57 0.00
266.27	0.30						M		ROADWAY EMBANKMENT FILL: Soft to Stiff, Orange-Brown, Variably Clayey, Coarse to Fine Sandy SILT with a Little Mica
265.50	1.07	2	1	2	3		M		
264.74	1.83	2	2	2	4		M		
263.98	2.59	4	6	5	11		M		
262.46	4.11	3	3	4	7		M		
260.93	5.64	5	3	5	8	SS-1	27.9%		
259.41	7.16	4	4	5	9		M		
257.88	8.69	5	5	7	12		M		
256.36	10.21	4	6	7	13		W		
254.83	11.74	8	5	7	12	SS-2	41.4%		
253.31	13.26	4	6	8	14		W		
251.79	14.78	5	7	10	17		M		
250.26	16.31	6	9	13	22		M		
248.74	17.83	6	10	16	26		M		
		5	13	20	33		M		257.12 9.45 RESIDUAL: Stiff, Red-Brown, Silty CLAY with a Little Coarse to Fine Sand
									255.37 11.20 Stiff, Red-Brown, Fine Sandy, Clayey SILT
									254.57 12.00 Medium Dense to Dense; Brown, Red, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. EB1-A	BORING LOCATION 20+24.6	OFFSET 6.0m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.57 m	NORTHING 172505.68	EASTING 405917.65	24 HR. 14.94
TOTAL DEPTH 24.38 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/29/04	COMPLETED 4/29/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
247.57					Continued from previous page				
247.21	19.36	6	7	10	17		M		Medium Dense to Dense; Brown, Red, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica *(continued)*
245.69	20.88	7	8	9	17	SS-3	M		
244.17	22.40	5	22	43	65		M		
242.64	23.93	8	12	20	32		M		242.19 24.38 Boring Terminated at Elevation 242.19m in Residual Soil: Dense, Silty, Coarse to Fine SAND (A-2-4)

Note: Bentonite and city water used as drilling fluid; Density = 63.5 lbs./cu. ft.

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver	
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274				GROUND WATER (m)
BORING NO. EB1-B	BORING LOCATION 20+00.5	OFFSET 6.5m RT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.42 m	NORTHING 172527.88	EASTING 405902.03		24 HR. 14.78
TOTAL DEPTH 21.33 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/30/04	COMPLETED 4/30/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
266.42									266.42 0.00
266.12	0.30								ROADWAY EMBANKMENT FILL: Medium Stiff to Very Stiff, Orange-Brown to Brown and Red, Variably Clayey, Coarse to Fine Sandy SILT with a Little Mica
265.35	1.07	3	3	3	6		M		
264.59	1.83	4	3	4	7		M		
263.83	2.59	4	5	6	11		M		
262.31	4.11	3	3	5	8		M		
260.78	5.64	3	5	5	10	SS-4	27.0%		
259.26	7.16	5	5	6	11		M		
257.73	8.69	6	7	8	15		M		
256.21	10.21	5	6	7	13		M		
254.68	11.74	6	6	10	16	SS-5	37.2%		
253.16	13.26	14	14	14	28	SS-6	M		
251.64	14.78	13	21	29	50		W		
250.11	16.31	10	11	14	25		W		
248.59	17.83	6	9	12	21		W		
		8	11	17	28		M		
									256.97 9.45
									RESIDUAL: Very Stiff, Brown-Red, Clayey, Coarse to Fine Sandy SILT with a Little Mica
									255.42 11.00
									Medium Dense to Very Dense; Red, Brown, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica and with a Trace of Clay

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver	
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274				GROUND WATER (m)
BORING NO. EB1-B	BORING LOCATION 20+00.5	OFFSET 6.5m RT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.42 m	NORTHING 172527.88	EASTING 405902.03		24 HR. 14.78
TOTAL DEPTH 21.33 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/30/04	COMPLETED 4/30/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
247.42					Continued from previous page				
247.06	19.36	7	9	12	21		M		Medium Dense to Very Dense; Red, Brown, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica and with a Trace of Clay *(continued)*
245.54	20.88	7	9	13	22		M		
									245.09 21.33
									Boring Terminated at Elevation 245.09m in Residual Soil: Medium Dense, Silty, Coarse to Fine SAND (A-2-4)
									Note: Polymer and city water used as drilling fluid; Density = 63.0 lbs./cu. ft.

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B1-A	BORING LOCATION 20+57.6	OFFSET 9.0m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 257.51 m	NORTHING 172493.21	EASTING 405922.40		24 HR. 8.22
TOTAL DEPTH 27.00 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/27/04	COMPLETED 4/27/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
257.51									257.51 0.00
257.21	0.30								ROADWAY EMBANKMENT FILL: Soft to Medium Stiff, Orange-Brown to Red-Brown, Clayey, Coarse to Fine Sandy SILT with a Little Mica
256.44	1.07	2	2	4	6	SS-7	22.1%		
255.68	1.83	2	2	2	4		W		256.01 1.50
254.92	2.59	3	4	6	10		M		RESIDUAL: Loose to Dense; Brown, Grey, and White; Silty; Fine to Coarse SAND with a Little Mica
253.40	4.11	5	4	7	11		M		
251.87	5.64	5	5	8	13		M		
250.35	7.16	5	7	10	17		M		
248.82	8.69	5	6	8	14		W		
247.30	10.21	5	6	8	14		W		
245.77	11.74	6	6	9	15		W		
244.25	13.26	8	9	13	22	SS-8	W		
242.73	14.78	7	9	11	20		W		
241.20	16.31	6	8	10	18		W		
239.68	17.83	7	11	13	24		W		
		6	8	8	16		W		

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B1-A	BORING LOCATION 20+57.6	OFFSET 9.0m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 257.51 m	NORTHING 172493.21	EASTING 405922.40		24 HR. 8.22
TOTAL DEPTH 27.00 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/27/04	COMPLETED 4/27/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
238.51					Continued from previous page				
238.15	19.36	8	15	27	42		M		RESIDUAL: Loose to Dense; Brown, Grey, and White; Silty; Fine to Coarse SAND with a Little Mica *(continued)*
236.63	20.88	12	23	25	48		M		
235.11	22.40	26	38	62/06	100/21				234.81 22.70
233.58	23.93	70	30/4		100/19				WEATHERED ROCK: White, Black, Brown, and Grey Granite
232.06	25.45	50/5			50/5				
230.54	26.97	50/3			50/3				230.51 27.00
									Boring Terminated at Elevation 230.51m in Weathered Rock: Granite

Note: Bentonite and city water used as drilling fluid; Density = 64.0 lbs./cu. ft.

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

PAGE 1 OF 2

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B1-B	BORING LOCATION 20+28.3	OFFSET 8.1m RT	ALIGNMENT -L-
COLLAR ELEV. 257.87 m	NORTHING 172473.38	EASTING 405925.08	24 HR. 8.84
TOTAL DEPTH 24.13 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/28/04	COMPLETED 4/28/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
257.87									257.87 0.00
257.57	0.30	3	4	6	10		M		RESIDUAL: Loose to Medium Dense, Black and Brown, Silty, Fine to Coarse SAND
256.80	1.07	3	6	9	15	SS-9	27.8%		257.07 0.80 Stiff to Very Stiff, Red-Brown, Coarse to Fine Sandy, Silty CLAY
256.04	1.83	5	7	10	17		M		255.67 2.20
255.28	2.59	4	6	8	14		M		Medium Dense to Dense; Red, Yellow, Grey, and Brown; Silty; Coarse to Fine SAND with a Little Mica
253.76	4.11	6	9	10	19		M		
252.23	5.64	7	10	18	28		M		
250.71	7.16	7	8	10	18		W		
249.18	8.69	13	20	17	37	SS-10			
247.66	10.21	6	10	13	23		W		
246.13	11.74	7	12	15	27		M		
244.61	13.26	5	7	11	18		M		244.31 13.56 244.07 13.80 Very Stiff, Red-Brown, Clayey, Coarse to Fine Sandy SILT
243.09	14.78	8	6	10	16		M		Medium Dense to Very Dense; Grey, White, Brown, and Black; Silty; Coarse to Fine SAND with a Little Mica
241.56	16.31	10	8	13	21		M		
240.04	17.83	19	19	38	57		M		

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

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WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B1-B	BORING LOCATION 20+28.3	OFFSET 8.1m RT	ALIGNMENT -L-
COLLAR ELEV. 257.87 m	NORTHING 172473.38	EASTING 405925.08	24 HR. 8.84
TOTAL DEPTH 24.13 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/28/04	COMPLETED 4/28/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
238.87					Continued from previous page				
238.51	19.36	12	13	30	43		M		Medium Dense to Very Dense; Grey, White, Brown, and Black; Silty; Coarse to Fine SAND with a Little Mica *(continued)*
236.99	20.88	100/13			100/13				237.44 20.43 WEATHERED ROCK: Brown, Yellow, and Grey Granite
235.47	22.40	70	30/4		100/19				
233.94	23.93	60	40/5		100/20				233.74 24.13 Boring Terminated at Elevation 233.74m in Weathered Rock: Granite

Note: Bentonite and city water used as drilling fluid; Density = 64.0 lbs./cu. ft.

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B2-A	BORING LOCATION 20+86.3	OFFSET 9.7m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 258.17 m	NORTHING 172445.04	EASTING 405929.63	24 HR. 8.83
TOTAL DEPTH 25.56 m	DRILL MACHINE CME-45	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/15/04	COMPLETED 4/16/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
258.17									258.17 0.00
257.87	0.30	1	3	2	5		W		ROADWAY EMBANKMENT FILL: Medium Stiff to Stiff, Red-Brown, Coarse to Fine Sandy SILT with a Little Mica
257.10	1.07	2	3	5	8		W		256.77 1.40
256.34	1.83	3	4	5	9		M		RESIDUAL: Stiff, Red-Brown, Coarse to Fine Sandy, Silty CLAY with a Little Mica
255.58	2.59	3	4	5	9		M		256.07 2.10
254.06	4.11	6	9	10	19		M		RESIDUAL: Loose to Very Dense; Pink, Yellow, Black, Brown, and White; Silty; Coarse to Fine SAND
252.53	5.64	3	5	6	11		M		
251.01	7.16	2	3	6	9		W		
249.48	8.69	4	7	8	15		W		
247.96	10.21	2	3	6	9		W		
246.43	11.74	6	7	9	16		M		
244.91	13.26	3	5	7	12	SS-11	M		
243.39	14.78	4	8	10	18		M		
241.86	16.31	7	12	17	29		M		
240.34	17.83	10	16	18	34		M		

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. B2-A	BORING LOCATION 20+86.3	OFFSET 9.7m LT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 258.17 m	NORTHING 172445.04	EASTING 405929.63	24 HR. 8.83
TOTAL DEPTH 25.56 m	DRILL MACHINE CME-45	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual
DATE STARTED 4/15/04	COMPLETED 4/16/04	SURFACE WATER DEPTH NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
239.17					Continued from previous page				
238.81	19.36	12	25	40	65				RESIDUAL: Loose to Very Dense; Pink, Yellow, Black, Brown, and White; Silty; Coarse to Fine SAND *(continued)*
237.29	20.88	77	23/5		100/20				237.59 20.58
235.77	22.40	53	47/8		100/23				WEATHERED ROCK: Black and White Granite
234.24	23.93	35	65/8		100/23				
232.72	25.45	100/11			100/11				232.61 25.56
									Boring Terminated at Elevation 232.61m in Weathered Rock: Granite

Note: City water used alone as drilling fluid

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	**ID No.** U-2408	**COUNTY** Gaston	**GEOLOGIST** P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			**GROUND WATER (m)**
BORING NO. B2-B	**BORING LOCATION** 20+54.0	**OFFSET** 9.0m RT	**ALIGNMENT** -L- — **0 HR.** NM
COLLAR ELEV. 258.19 m	**NORTHING** 172474.52	**EASTING** 405906.68	**24 HR.** 8.99
TOTAL DEPTH 22.88 m	**DRILL MACHINE** CME-45	**DRILL METHOD** Wash Rotary	**HAMMER TYPE** 63.5 kg Manual
DATE STARTED 4/19/04	**COMPLETED** 4/20/04	**SURFACE WATER DEPTH** NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
258.19									258.19 — 0.00
257.89	0.30								ROADWAY EMBANKMENT FILL: Stiff, Red-Brown, Clayey, Coarse to Fine Sandy SILT with a Little Mica and with a Trace of Organics (Rootlets) — 257.59 — 0.60
257.12	1.07	3	5	5	10		W		RESIDUAL: Stiff Red-Brown, Coarse to Fine Sandy, Silty CLAY
256.36	1.83	2	3	6	9	SS-12	28.6%		256.16 — 2.03
255.60	2.59	6	7	8	15		M		Medium Dense; Tan, White, Pink, Brown, and Black; Silty; Coarse to Fine SAND with a Little Mica
254.08	4.11	6	7	10	17		M		
252.55	5.64	5	8	11	19		M		
251.03	7.16	5	9	13	22		M		
249.50	8.69	4	6	9	15		M		249.69 — 8.50
247.98	10.21	6	8	12	20	SS-13	38.8%		Very Stiff, Brown with Some Black, Fine Sandy SILT with a Little Mica
246.45	11.74	4	6	10	16		W		248.19 — 10.00
244.93	13.26	10	14	13	27		M		Medium Dense, Brown and Black, Silty, Coarse to Fine SAND
243.41	14.78	6	10	12	22		M		246.15 — 12.04
241.88	16.31	5	8	12	20		M		Medium Dense, White and Brown, Fine to Coarse SAND with Some Rock Fragments
240.36	17.83	9	13	20	33		M		244.79 — 13.40
		11	16	22	38		M		Medium Dense to Very Dense; Brown, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	**ID No.** U-2408	**COUNTY** Gaston	**GEOLOGIST** P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			**GROUND WATER (m)**
BORING NO. B2-B	**BORING LOCATION** 20+54.0	**OFFSET** 9.0m RT	**ALIGNMENT** -L- — **0 HR.** NM
COLLAR ELEV. 258.19 m	**NORTHING** 172474.52	**EASTING** 405906.68	**24 HR.** 8.99
TOTAL DEPTH 22.88 m	**DRILL MACHINE** CME-45	**DRILL METHOD** Wash Rotary	**HAMMER TYPE** 63.5 kg Manual
DATE STARTED 4/19/04	**COMPLETED** 4/20/04	**SURFACE WATER DEPTH** NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
239.19					Continued from previous page				
238.83	19.36	18	22	37	59		M		Medium Dense to Very Dense; Brown, Grey, and White; Silty; Coarse to Fine SAND with a Little Mica *(continued)*
237.31	20.88	42	55/15		100/30				237.31 — 20.88
235.79	22.40	57	43/8		100/23				WEATHERED ROCK: Brown and Grey Granite
235.33	22.86	50/2			50/2				235.31 — 22.88
									Boring Terminated with SPT Refusal at Elevation 235.31m on Crystalline Rock: Granite
									Note: City water alone used as drilling fluid

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	**ID No.** U-2408	**COUNTY** Gaston	**GEOLOGIST** P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			**GROUND WATER (m)**
BORING NO. EB2-A	**BORING LOCATION** 21+04.6	**OFFSET** 6.5m RT	**ALIGNMENT** -L-
COLLAR ELEV. 265.89 m	**NORTHING** 172426.49	**EASTING** 405928.91	**24 HR.** 13.40
TOTAL DEPTH 22.85 m	**DRILL MACHINE** CME-55	**DRILL METHOD** Wash Rotary	**HAMMER TYPE** 63.5 kg Manual
DATE STARTED 4/29/04	**COMPLETED** 4/29/04	**SURFACE WATER DEPTH** NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
265.89									265.89 0.00
265.59	0.30								ROADWAY EMBANKMENT FILL: Very Loose, Brown and Tan, Coarse SAND and Gravel
264.82	1.07	1	1	1	2		W		
264.06	1.83	2	1	2	3		M		264.49 1.40 ROADWAY EMBANKMENT FILL: Soft to Stiff; Orange, Brown, and Grey; Clayey; Coarse to Fine Sandy SILT with a Little Mica
263.30	2.59	4	6	7	13		M		
261.78	4.11	4	8	7	15	SS-14	28.8%		
260.25	5.64	4	5	6	11		M		
258.73	7.16	5	4	5	9		M		
257.20	8.69	5	4	7	11		M		258.43 7.46 RESIDUAL: Stiff, Red and Brown, Coarse to Fine Sandy, Silty, CLAY 257.99 7.90 Medium Dense, Red and Brown, Silty, Coarse to Fine SAND
255.68	10.21	5	7	9	16		M		
254.15	11.74	4	5	8	13		W		255.89 10.00 Stiff, Red and Brown, Coarse to Fine Sandy SILT with a Little Mica
252.63	13.26	4	6	9	15	SS-15	47.0%		
251.11	14.78	4	7	8	15				251.39 14.50 Loose to Very Dense; Red, Brown, and Grey; Silty; Coarse to Fine SAND with a Little Mica
249.58	16.31	4	6	8	14		M		
248.06	17.83	4	5	6	11		M		
		8	12	13	25		M		

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT

BORING LOG

WBS ELEMENT NO. 8.1811201	**ID No.** U-2408	**COUNTY** Gaston	**GEOLOGIST** P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			**GROUND WATER (m)**
BORING NO. EB2-A	**BORING LOCATION** 21+04.6	**OFFSET** 6.5m RT	**ALIGNMENT** -L-
COLLAR ELEV. 265.89 m	**NORTHING** 172426.49	**EASTING** 405928.91	**24 HR.** 13.40
TOTAL DEPTH 22.85 m	**DRILL MACHINE** CME-55	**DRILL METHOD** Wash Rotary	**HAMMER TYPE** 63.5 kg Manual
DATE STARTED 4/29/04	**COMPLETED** 4/29/04	**SURFACE WATER DEPTH** NA	

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
246.89					Continued from previous page				
246.53	19.36								Loose to Very Dense; Red, Brown, and Grey; Silty; Coarse to Fine SAND with a Little Mica *(continued)*
245.01	20.88	5	3	4	7		M		
243.49	22.40	2	7	9	16		M		
		22	30	43	73		M		243.04 22.85 Boring Terminated at Elevation 243.04m in Residual Soil: Very Dense, Silty, Coarse to Fine SAND (A-2-4) Note: Bentonite and city water used as drilling fluid; Density = 63.5 lbs./cu. ft.

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. EB2-B	BORING LOCATION 20+81.3	OFFSET 6.4m RT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.26 m	NORTHING 172447.82	EASTING 405912.91		24 HR. 13.87
TOTAL DEPTH 24.38 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/21/04	COMPLETED 4/22/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
266.26									
									266.26 0.00
265.96	0.30								ROADWAY EMBANKMENT FILL: Soft to Very Stiff, Red and Brown, Variably Clayey, Coarse to Fine Sandy SILT with a Little Mica
265.19	1.07	2	1	1	2		W		
264.43	1.83	3	3	4	7	SS-16	28.4%		
263.67	2.59	2	3	5	8		M		
262.15	4.11	3	3	6	9		M		
260.62	5.64	5	6	9	15		M		
259.10	7.16	4	5	7	12		M		
257.57	8.69	5	6	8	14		M		
256.05	10.21	7	8	10	18	SS-17	32.0%		
254.52	11.74	6	8	10	18		M		
253.00	13.26	7	9	15	24		W		
251.48	14.78	6	8	11	19		W		
249.95	16.31	8	11	11	22		W		
248.43	17.83	7	7	10	17	SS-18	M		
		7	10	15	25		M		
									258.56 7.70
									RESIDUAL: Very Stiff, Brown and Red, Coarse to Fine Sandy, Silty CLAY
									256.26 10.00
									Medium Dense; Brown, Black, Grey, and White; Silty; Fine to Coarse SAND

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

WBS ELEMENT NO. 8.1811201	ID No. U-2408	COUNTY Gaston	GEOLOGIST P. Alton/P. Weaver
SITE DESCRIPTION Widening of Bridge No. 57 Over NSRR on NC 274			GROUND WATER (m)
BORING NO. EB2-B	BORING LOCATION 20+81.3	OFFSET 6.4m RT	ALIGNMENT -L-	0 HR. NM
COLLAR ELEV. 266.26 m	NORTHING 172447.82	EASTING 405912.91		24 HR. 13.87
TOTAL DEPTH 24.38 m	DRILL MACHINE CME-55	DRILL METHOD Wash Rotary	HAMMER TYPE 63.5 kg Manual	
DATE STARTED 4/21/04	COMPLETED 4/22/04	SURFACE WATER DEPTH NA		

ELEV. (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
247.26					Continued from previous page				
246.90	19.36								
245.38	20.88	6	9	14	23		M		Medium Dense; Brown, Black, Grey, and White; Silty; Fine to Coarse SAND *(continued)*
243.86	22.40	6	8	13	21		M		
242.33	23.93	7	12	14	26		M		
		8	10	15	25		M		
									241.88 24.38
									Boring Terminated at Elevation 241.88m in Residual Soil: Medium Dense, Silty, Coarse to Fine SAND (A-2-4)

Note: Bentonite and city water used as drilling fluid; Density = 63.5 lbs./cu. ft.

NCDOT BORE SINGLE 07104005.GPJ NC_DOT.GDT 6/16/04

State Project No. 8.1811201
TIP No. U-2408 WBS Element No. 34799.1.1
Widening of Bridge No. 57 over Norfolk Southern Railroad on NC 274 Between Isley Drive and Delta Drive
Gaston County, North Carolina
SUMMARY OF LABORATORY TEST DATA

						Atterberg Limits			Gradation Results							
Boring Number	Sample Depth (m)	Sample No.*	Natural Moisture Content (%)	AASHTO Class (Group Index)	N-Value (blows/ ft.)	L.L.	P.L.	P.I.	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Retained #270 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
EB1-A	4.11-4.56	SS-1	27.9	A-4 (0)	8	34	NP	NP	97	84	43	61	25	35	21	19
EB1-A	10.21-10.66	SS-2	41.4	A-7-5 (23)	12	56	36	20	100	97	90	11	4	7	22	67
EB1-A	20.88-21.33	SS-3	-	A-2-4 (0)	17	28	NP	NP	96	67	35	69	41	27	26	6
EB1-B	4.11-4.56	SS-4	27.0	A-4 (1)	10	38	33	5	97	84	51	53	22	30	23	25
EB1-B	10.21-10.66	SS-5	37.2	A-5 (5)	16	51	43	8	100	87	60	42	20	22	22	36
EB1-B	11.74-12.19	SS-6	-	A-2-4 (0)	28	33	NP	NP	97	67	31	74	42	32	17	9
B1-A	0.30-0.75	SS-7	22.1	A-4 (0)	6	34	27	7	97	73	43	61	35	24	19	22
B1-A	11.74-12.19	SS-8	-	A-2-4 (0)	22	39	NP	NP	92	62	25	79	46	31	19	4
B1-B	1.07-1.52	SS-9	27.8	A-7-6 (18)	15	56	29	27	97	87	68	35	16	17	32	35
B1-B	8.69-9.14	SS-10	-	A-2-4 (0)	10	28	NP	NP	99	73	21	83	42	41	15	2
B2-A	13.26-13.71	SS-11	-	A-2-4 (0)	12	34	NP	NP	100	90	32	74	27	47	23	3
B2-B	1.07-1.52	SS-12	28.6	A-7-6 (8)	9	44	28	16	97	84	58	45	21	23	43	13
B2-B	8.69-7.14	SS-13	38.8	A-5 (0)	20	42	NP	NP	100	99	37	76	3	72	19	6
EB2-A	2.59-3.04	SS-14	28.8	A-4 (0)	15	36	NP	NP	99	84	46	59	22	36	18	24
EB2-A	11.74-12.19	SS-15	47.0	A-5 (0)	15	50	NP	NP	100	94	46	61	15	46	32	7
EB2-B	1.07-1.52	SS-16	28.4	A-4 (1)	7	38	29	9	97	76	44	60	31	28	18	23
EB2-B	8.69-9.14	SS-17	32.0	A-7-5 (22)	18	60	34	26	100	89	76	26	15	12	27	46
EB2-B	16.31-16.76	SS-18	-	A-2-4 (0)	17	40	NP	NP	93	66	29	74	42	30	22	6

* SS = Split-Spoon Sample (ASTM-D-1586)
** G = Grab Sample
***ST=Shelby Tube (Undisturbed) Sample
NP -- Non Plastic NA-- Non Applicable

TRIGON ENGINEERING CONSULTANTS, INC.
GREENSBORO, NORTH CAROLINA
Trigon Job Number: 071-04-004
Page: 1 of 1

SITE PHOTOGRAPHS

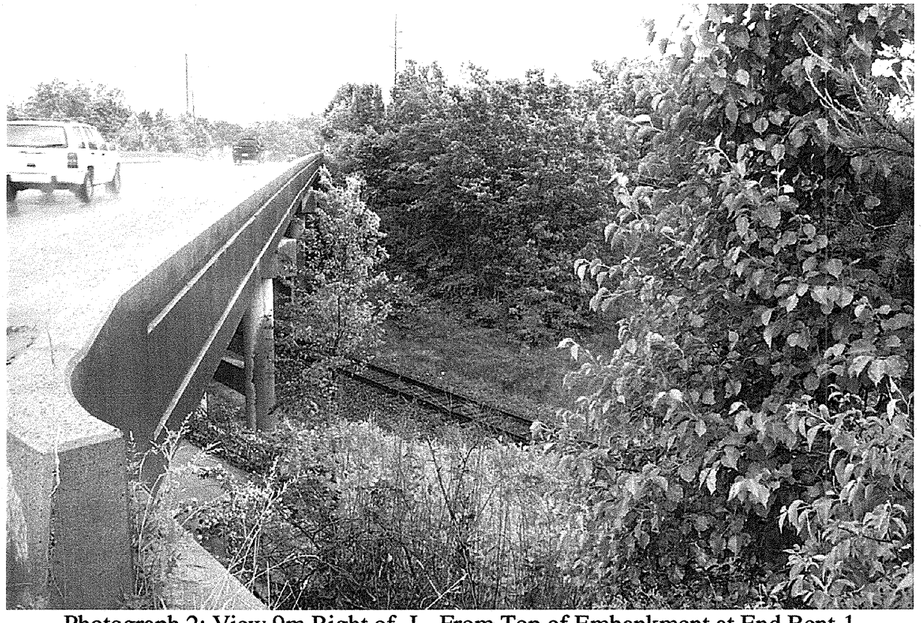
Page 1 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1

Photograph 1: View 9m Right of -L- from North of End Bent-1



Photograph 2: View 9m Right of -L- From Top of Embankment at End Bent-1

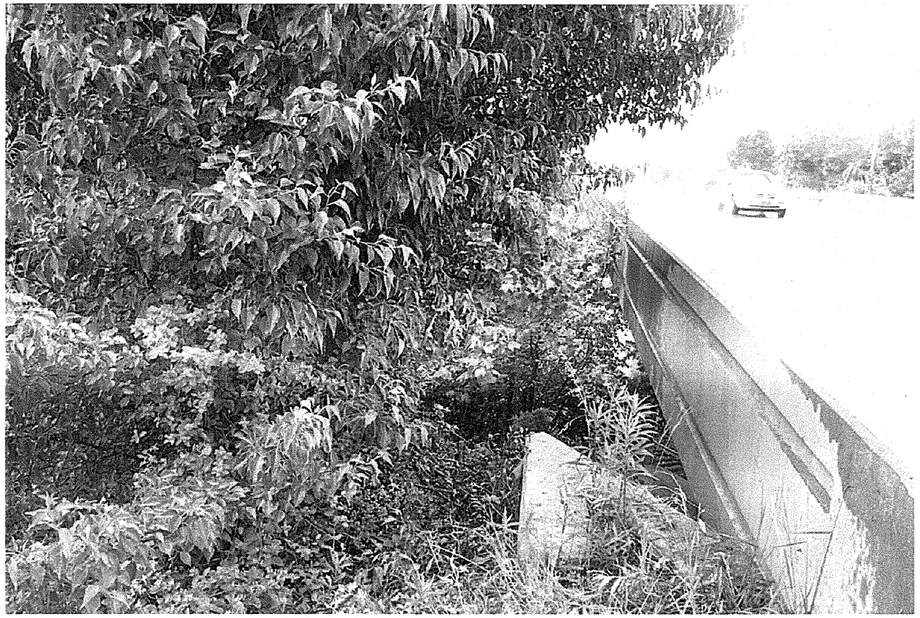
SITE PHOTOGRAPHS

Page 2 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1



Photograph 3: View 9m Right of -L- From End Bent-2

Photograph 4: View Along End Bent-1 From Edge of Road Toward EB1-A Plan

SITE PHOTOGRAPHS

Page 3 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1

Photograph 5: View Along End Bent-1 From Edge of Road Towards EB1-B Plan

Photograph 6: View Along Bent-1 From Left to Right

SITE PHOTOGRAPHS

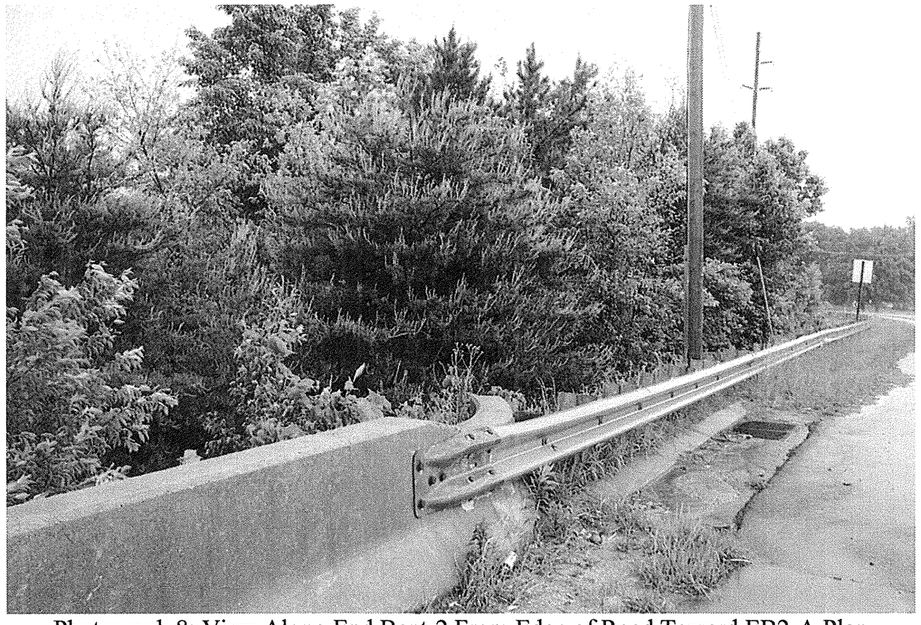
Page 4 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1

Photograph 7: View Along Bent-2 From Left to Right



Photograph 8: View Along End Bent-2 From Edge of Road Toward EB2-A Plan

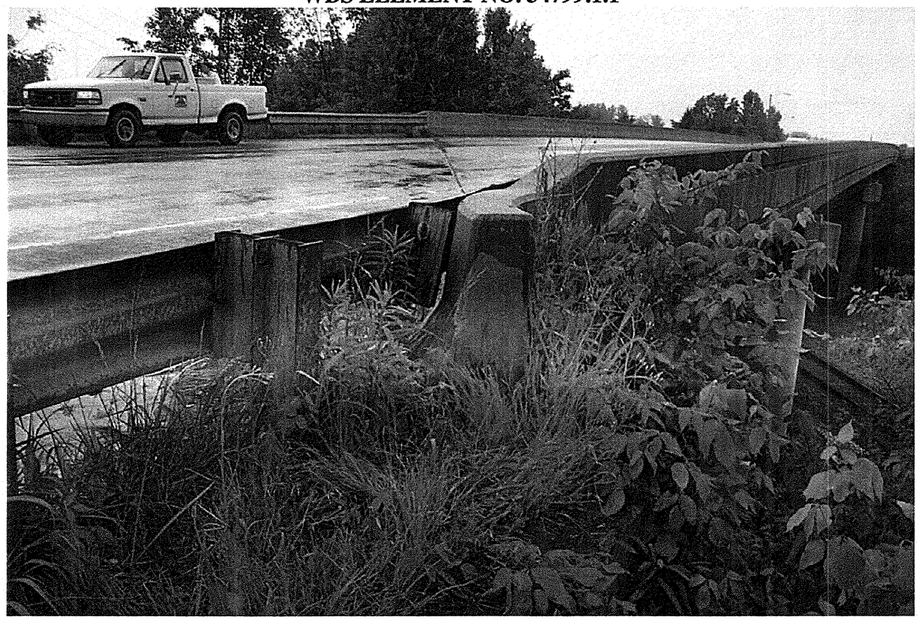
SITE PHOTOGRAPHS

Page 5 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1



Photograph 9: View Along End Bent-2 From Left to Right

Photograph 10: View Along End Bent-2 From Edge of Road Towards EB2-B Plan

SITE PHOTOGRAPHS

Page 6 of 6

Widening of Bridge No. 57 over NSRR on NC 274 between Isley Drive and Delta Drive

STATE PROJECT NO. 8.1811201 (U-2408)

WBS ELEMENT NO. 34799.1.1

Photograph 11: View of Existing Bridge Looking South

PROJECT: 8.1811201 ID. U-2408

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

METRIC

ALL DIMENSIONS ARE IN METERS AND /OR MILLIMETERS UNLESS OTHERWISE NOTED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2408	1	6
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

STATE PROJECT 8.1811201 I.D. NO. U-2408

F.A. PROJECT STP-274 (1)

COUNTY GASTON

PROJECT DESCRIPTION NC 274 (BESSEMER CITY RD.) FROM NC 275 (DALLAS-BESSEMER CITY RD.) TO US 29-74 (FRANKLIN BLVD.)

SITE DESCRIPTION RETAINING WALL STA. 51+82 to 52+60 -L- 13.8m RT.

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS 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.

INVESTIGATED BY J.P. ROGERS PERSONNEL R.W. TODD

CHECKED BY C.B. LITTLE J.E. ESTEP

SUBMITTED BY C.B. LITTLE M.L. SMITH

DATE SEPTEMBER 2002

DRAWN BY: J.P. ROGERS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

NORTH CAROLINA LICENSED SEAL 1104 GEOLOGIST CLINTON B. LITTLE

SEAL

SIGNATURE

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
U-2408	8.1811201	2	6

METRIC

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. 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
LIQUID LIMIT PLASTIC INDEX	6 MX		N.P.	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 A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (kN/m^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<25
	SOFT	2 TO 4	25 TO 50
	MEDIUM STIFF	4 TO 8	50 TO 100
	STIFF	8 TO 15	100 TO 200
	VERY STIFF	15 TO 30	200 TO 400
	HARD	>30	>400

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, 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

UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED).

GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 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 SEEPAGE

MISCELLANEOUS SYMBOLS

ROADWAY EMBANKMENT WITH SOIL DESCRIPTION

SOIL SYMBOL

ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS

INFERRED SOIL BOUNDARIES

INFERRED ROCK LINE

ALLUVIAL SOIL BOUNDARY

25/025 - DIP/DIP DIRECTION OF ROCK STRUCTURES

SOUNDING ROD

SPT, CPT, DPT, DMT, VST, PMT - TEST BORING

AUGER BORING

CORE BORING

MONITORING WELL

PIEZOMETER INSTALLATION

SLOPE INDICATOR INSTALLATION

SPT N-VALUE

SPT REFUSAL

SAMPLE DESIGNATIONS

S- BULK SAMPLE

SS- SPLIT SPOON SAMPLE

ST- SHELBY TUBE SAMPLE

RS- ROCK SAMPLE

RT- RECOMPACTED TRIAXIAL SAMPLE

CBR - CBR SAMPLE

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
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] OTHER _____
- [ ] OTHER _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 152 mm CONTINUOUS FLIGHT AUGER
- [X] 203 mm HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____ mm STEEL TEETH
- [ ] TRICONE _____ mm TUNG.-CARB.
- [ ] CORE BIT
- [ ] OTHER _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. 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 2.5 cm PER 50 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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.
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 2.5 cm. 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 ROCKS 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, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.*
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BLOWS PER 30 cm.*
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 GEOLOGISTS 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 6 mm DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS 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 25 mm OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 3 m
WIDE	1 TO 3 m
MODERATELY CLOSE	30 TO 100 cm
CLOSE	5 TO 30 cm
VERY CLOSE	LESS THAN 5 cm

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 1 m
THICKLY BEDDED	0.5 - 1 m
THINLY BEDDED	0.05 - 0.5 m
VERY THINLY BEDDED	10 - 50 mm
THICKLY LAMINATED	2.5 - 10 mm
THINLY LAMINATED	< 2.5 mm

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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 WHICH 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, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL WHICH 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, WHICH 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) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION:

NOTES:

REVISED 09/15/00

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MIKE F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

September 25, 2002

STATE PROJECT: 8.1811201 (U-2408)
FEDERAL PROJECT: STPNHF-274(1)
COUNTY: Gaston
DESCRIPTION: NC 274 (Bessemer City Rd.) from NC 275 to (Dallas-Bessemer City Rd.) to US 29-74 (Franklin Boulevard).

SUBJECT: Retaining Wall from 51+82 to 52+60 –L-, 13.80m Right

SITE DESCRIPTION

The Retaining Wall on the above mentioned project is located at 51+82 to 52+60 –L-, 13.80 meters right and will be approximately 3.0m in height at its tallest point. The Geotechnical Unit performed a total of three Standard Penetration Test (SPT) borings at this site. Two of these borings were offset 6.0 – 8.0m from the wall due to problems with access. Alluvial soils and/or rock were not encountered in any of the three borings.

Artificial fill soils encountered in these borings are approximately 2.0 – 4.0m in thickness and consist of loose to medium dense clayey sand (A-2-6) and very loose to loose silty sand (A-2-4). Organic debris was encountered at the borings performed at 52+20 –L- and 51+85 –L-. In addition, a 0.40m thick boulder was encountered at the boring performed at 52+60 –L-. Residual soils present consist of medium stiff sandy clays (A-6) and loose to dense silty sand (A-2-4, A-2-5).

Respectfully submitted,

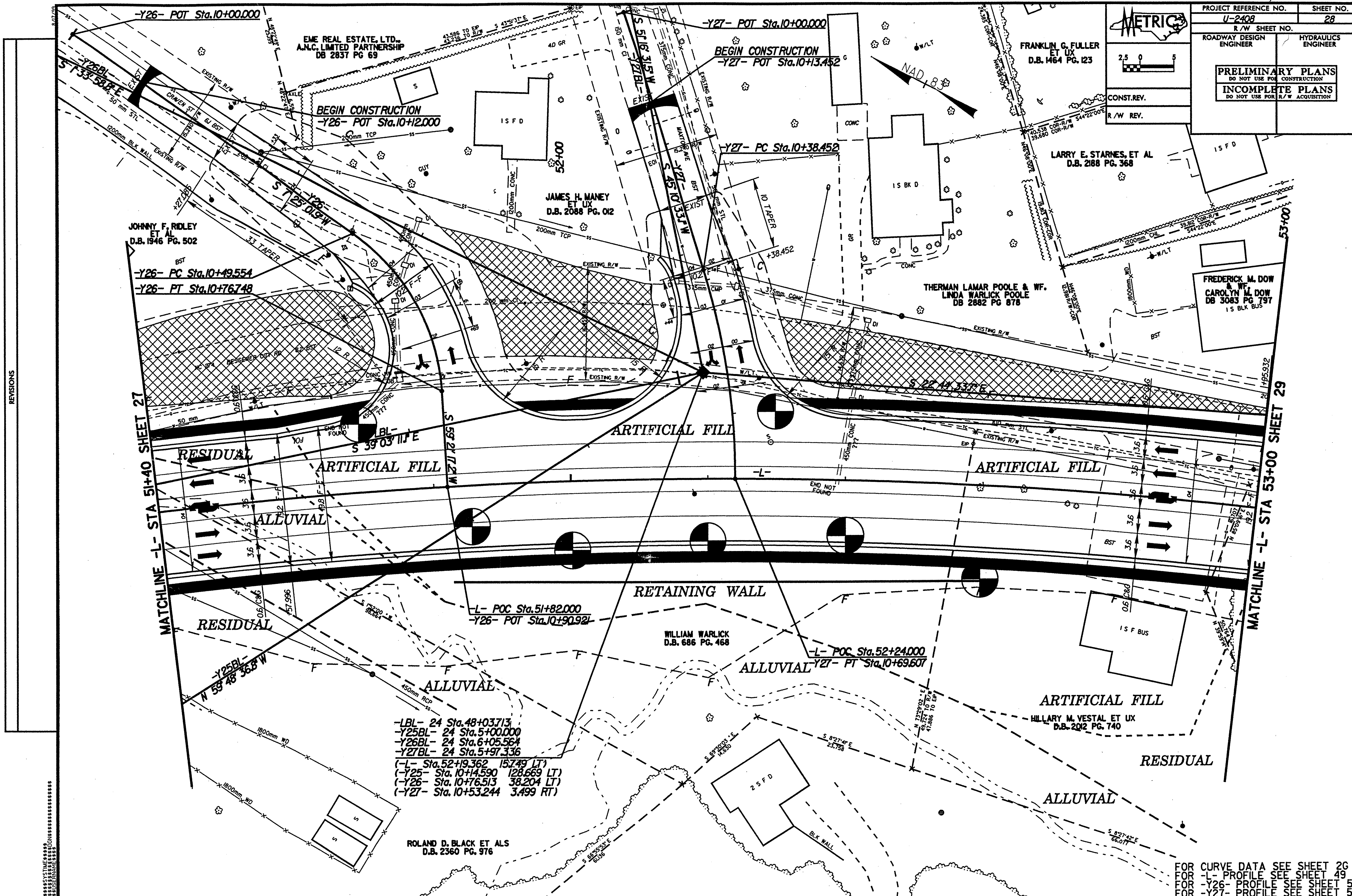
JP Rogers

J. P. Rogers, Project Geologist
Geotechnical Unit, Matthews Field Office

Attachments (6)

cc: Division 12 Engineer

13/34


PROJECT REFERENCE NO.
SHEET NO.
U-2408
28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
METRIC
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
NAD 83
REVISIONS
-Y26- POT Sta.10+00.000
-Y27- POT Sta.10+00.000
BEGIN CONSTRUCTION
-Y27- POT Sta.10+13.452
BEGIN CONSTRUCTION
-Y26- POT Sta.10+12.000
-Y27- PC Sta.10+38.452
-Y26- PC Sta.10+49.554
-Y26- PT Sta.10+76.748
EME REAL ESTATE, LTD., A.N.C. LIMITED PARTNERSHIP DB 2837 PG 69
FRANKLIN G. FULLER ET UX D.B. 1464 PG. 123
LARRY E. STARNES, ET AL D.B. 2188 PG. 368
JAMES H. MANEY ET UX D.B. 2088 PG. 012
JOHNNY F. RIDLEY ET AL D.B. 1946 PG. 502
THERMAN LAMAR POOLE & WF. LINDA WARLICK POOLE DB 2682 PG 878
FREDERICK M. DOW & WF. CAROLYN M. DOW DB 3083 PG 797
WILLIAM WARLICK D.B. 686 PG. 468
HILLARY M. VESTAL ET UX D.B. 2012 PG. 740
ROLAND D. BLACK ET ALS D.B. 2360 PG. 976
ARTIFICIAL FILL
RESIDUAL
ALLUVIAL
RETAINING WALL
MATCHLINE -L- STA 51+40 SHEET 27
MATCHLINE -L- STA 53+00 SHEET 29
-L- POC Sta.51+82.000
-Y26- POT Sta.10+90.921
-L- POC Sta.52+24.000
-Y27- PT Sta.10+69.607
-LBL- 24 Sta.48+03.713
-Y25BL- 24 Sta.5+00.000
-Y26BL- 24 Sta.6+05.564
-Y27BL- 24 Sta.5+97.336
(-L- Sta.52+19.362 157.49 LT)
(-Y25- Sta.10+14.590 128.669 LT)
(-Y26- Sta.10+76.513 38.204 LT)
(-Y27- Sta.10+53.244 3.499 RT)
FOR CURVE DATA SEE SHEET 2G
FOR -L- PROFILE SEE SHEET 49
FOR -Y26- PROFILE SEE SHEET 57
FOR -Y27- PROFILE SEE SHEET 58

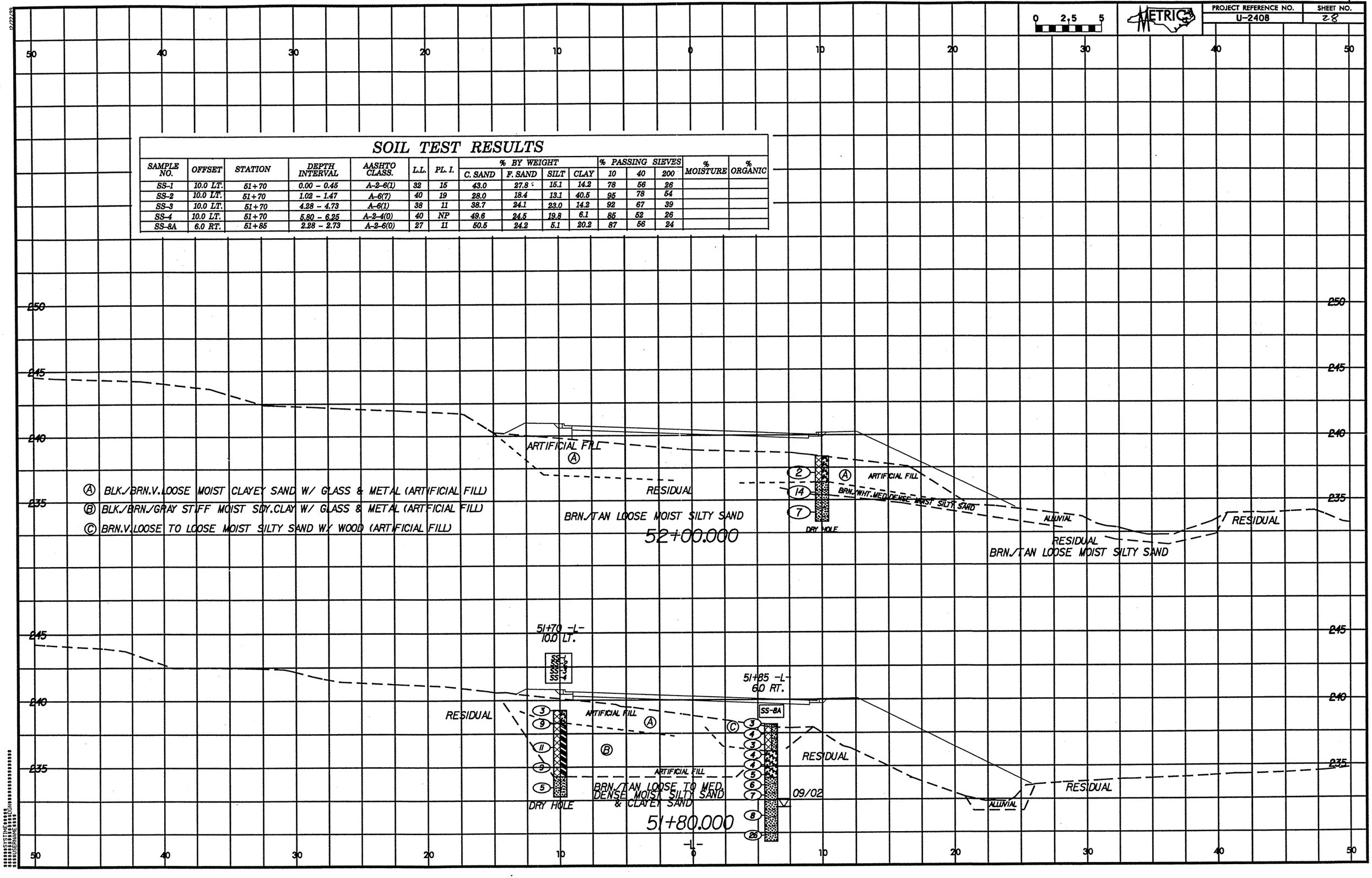
PROJECT REFERENCE NO.	SHEET NO.
U-2408	28

0 2.5 5

METRIC

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	PL. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	10.0 LT.	51+70	0.00 – 0.45	A-2-6(1)	32	15	43.0	27.8	15.1	14.2	78	56	26		
SS-2	10.0 LT.	51+70	1.02 – 1.47	A-6(7)	40	19	28.0	18.4	13.1	40.5	95	78	54		
SS-3	10.0 LT.	51+70	4.28 – 4.73	A-6(1)	38	11	38.7	24.1	23.0	14.2	92	67	39		
SS-4	10.0 LT.	51+70	5.80 – 6.25	A-2-4(0)	40	NP	49.6	24.5	19.8	6.1	85	52	26		
SS-8A	6.0 RT.	51+85	2.28 – 2.73	A-2-6(0)	27	11	50.5	24.2	5.1	20.2	87	56	24		



PROJECT REFERENCE NO.	SHEET NO.
U-2408	29

0 2.5 5

METRIC

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	PL. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-6	10.0 LT.	52+30	0.00 – 0.45	A-4(0)	31	7	34.4	27.8	17.5	20.3	92	73	40		
SS-7	8.0 RT.	52+40	0.00 – 0.45	A-2-6(1)	35	14	40.7	22.5	14.5	22.3	78	57	32		
SS-8	8.0 RT.	52+40	2.86 – 3.31	A-7-5(3)	42	12	27.8	30.8	13.1	28.4	100	83	48		
SS-9	8.0 RT.	52+40	7.42 – 7.87	A-2-5(0)	47	NP	44.2	34.7	15.1	6.1	91	61	26		
SS-5A	9.0 RT.	52+20	0.00 – 0.45	A-2-4(0)	32	8	42.8	28.1	12.9	16.2	80	58	27		
SS-6A	9.0 RT.	52+20	1.24 – 1.71	A-2-4(0)	35	10	46.9	20.4	16.6	16.2	85	55	30		
SS-7A	9.0 RT.	52+20	3.52 – 3.97	A-2-5(0)	42	NP	46.3	33.5	12.1	8.1	93	61	25		

245 240 235 250 245 240 235

Ⓐ BLK./BRN.V.LOOSE MOIST CLAYEY SAND W/ GLASS & METAL (ARTIFICIAL FILL)
Ⓑ BLK./BRN./GRAY STIFF MOIST SANDY SILT W/ GLASS & METAL (ARTIFICIAL FILL)
Ⓒ BLK./BRN./GRAY MED.STIFF MOIST SANDY CLAY W/ GLASS & METAL (ARTIFICIAL FILL)
Ⓓ RED/BRN.LOOSE MOIST SILTY SAND W/ WOOD (ARTIFICIAL FILL)

SS-7
SS-8
SS-9

240.33

22 5 7 4 5 8

Ⓐ ARTIFICIAL FILL

Ⓒ RESIDUAL

52+40.000

DRY HOLE

Ⓐ

Ⓒ

BRN/TAN LOOSE MOIST SILTY SAND

52+30 -L- 100 LT.

SS-6

5 9 8

DRY HOLE

SS-5A
SS-6A
SS-7A

Ⓑ ARTIFICIAL FILL

RESIDUAL

4 4 3 7 7 6 4 40 36

Ⓓ ARTIFICIAL FILL

09/02

BRN/TAN LOOSE MOIST SILTY SAND

52+20.000

ALLUVIAL SAND

RESIDUAL

RESIDUAL

-L-

50 40 30 20 10 0 10 20 30 40 50

SYSTIMES$$$$
SYSDATE$$$$
USERNAME$$$$

0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
U-2408	~~X-48~~

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	PL. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	13.5	53+60	0.00 - 0.45	A-2-6(0)	36	13	38.6	25.9	13.3	22.3	72	54	29		
SS-2	13.5	53+60	1.31 - 1.76	A-2-4(0)	26	8	53.9	16.4	13.5	16.2	73	43	23		
SS-3	13.5	53+60	2.83 - 3.28	A-2-4(0)	39	4	41.3	31.7	14.9	12.1	90	65	29		
SS-4	13.5	53+60	4.65 - 4.80	A-6(0)	38	11	41.8	24.3	13.7	20.2	96	66	36