STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4410	1	29
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
33688.1.1	BRZ-1627(4)	P.E.	
		CONST.	

PROJECT: 33688.1.1 ID: B-4410

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

For Letting

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33688.1.1 I.D. NO. B-4410

F.A. PROJECT BRZ-1627(4)

COUNTY ANSON

PROJECT DESCRIPTION REPLACE BRIDGE NO. 307 OVER WINSTON-SALEM SOUTHBOUND RR ON SR 1627

SITE DESCRIPTION

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.

CONTENTS:

INVESTIGATED BY G LICAYAN/ T WELLS PERSONNEL D KITCHEN

CHECKED BY J VINSON A HAYES

SUBMITTED BY P WEAVER C HEUN

DATE 6/27/07 K LEE

DRAWN BY: DRK

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

7/24/07

SEAL

SIGNATURE

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4410	33688.1.1	2	29

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 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		51 MN 25 MX	50 MX 10 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 ($TONS/FT^2$)
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	<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	- 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
- 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
CI. - CAVE IN
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
C.T. - CORING TERMINATED
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
N/A - NOT APPLICABLE
NM - NOT MEASURED
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
- [ ] CME-45
- [ ] CME-55
- [ ] PORTABLE HOIST
- [ ] OTHER CME 850
- [x] OTHER ACKER MARK II

ADVANCING TOOLS:
- [ ] CLAY BITS
- [x] 6" CONTINUOUS FLIGHT AUGER
- [ ] 6" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE ____" STEEL TEETH
- [x] TRICONE 3⅞" - TUNG.-CARB.
- [x] CORE BIT
- [ ] OTHER ____

HAMMER TYPE:
- [ ] AUTOMATIC
- [x] MANUAL

CORE SIZE:
- [ ] -B____
- [x] -N 0
- [ ] -H 0

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 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 YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
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 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 BPF*
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 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 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 0.25 INCHES 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 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 GEOLOGISTS 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 FEET
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 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 OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (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: NCDOT BM #2: -BL- STA. 14+76, 45' RT, RR SPIKE IN 48" OAK

ELEVATION: 322.17'

NOTES:

REVISED 09/15/00

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ATTENTION: Mr. Njoroge W. Wainaina, P.E.
State Geotechnical Engineer

SUBMITTED BY: Trigon Engineering Consultants, Inc.
Post Office Box 18846
Greensboro, North Carolina 27419-8846
Trigon Project No. 071-07-020

DATE: June 27, 2007

STATE PROJECT: 33688.1.1

TIP : B-4410

FEDERAL PROJECT: BRZ-1627(4)

COUNTY: Anson

DESCRIPTION: Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627

SUBJECT: Geotechnical Report of Structure Subsurface Investigation

Thank you for our success.

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Geotechnical Report

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STATE PROJECT: 33688.1.1

TIP : B-4410

FEDERAL PROJECT: BRZ-1627(4)

COUNTY: Anson

DESCRIPTION: Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627

SUBJECT: Geotechnical Report of Structure Subsurface Investigation

Trigon Engineering Consultants, Inc. has completed the authorized geotechnical investigation for the above referenced project in Anson 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 northernmost portion of Anson County north of the town of Cedar Hill, North Carolina at the approximate location shown on the Site Vicinity Map (Drawing No. 1) attached behind this report. The site and project description of the proposed project is "Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627". Topographically, the site slopes steeply down toward the railroad from each end of the existing bridge. The ground surface in the vicinity of the proposed End Bents slopes gently down towards the north and south. The topography of the general site vicinity consists of gently rolling hills.

At the time of this investigation, a three-span bridge (existing Bridge No. 307) was present at the site of the proposed bridge. The existing bridge consists of a concrete deck on concrete girders with concrete abutments at the end bents. The existing bridge is approximately 190 feet in length and approximately 26 feet in width.

2.0 PROJECT DESCRIPTION

Proposed for construction is a new, three-span structure to replace the existing Bridge No. 307 on SR 1627 over the Winston-Salem Southbound Railroad. The proposed bridge will be a replacement-in-place of the existing bridge. Information for the proposed bridge structure was obtained from the Preliminary General Drawing provided to Trigon by the NCDOT. The proposed bridge will be 250 feet in length and approximately 31 feet in width (out to out) with a skew angle of 35°00'09"at each bent.

The proposed grade along the centerline of the proposed bridge will remain essentially unchanged at End Bent-1 and End Bent-2, while the proposed grade will be approximately 5 feet lower than the existing grade in the vicinity of Bent-1 and approximately 9 feet lower than the existing grade in the vicinity of Bent-2. The proposed excavation in the vicinity of Bent-1 is to accommodate a steeper abutment slope at End Bent-1 than currently exists, while the proposed excavation at Bent-2 is to accommodate a second track for the railroad in the future. The Preliminary General Drawing calls for locating the proposed End Bent-2 approximately 47 feet upstation of the existing End Bent-2. As part of this relocation, the existing End Bent-2 abutment and abutment slope, including the portion of the existing abutment slope where the proposed Bent-2 is to be located, are to be removed. Excavation of the existing End Bent-2 abutment will extend vertically a maximum of approximately 25 feet.

The Preliminary General Drawing is in English units with feet as the primary unit of length.

3.0 SCOPE OF INVESTIGATION

3.1 FIELD TESTING

The as-drilled boring locations were established by Trigon personnel using the existing bridge and landmarks shown on the Preliminary General Drawing as points of 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 Bench Mark No. 2 which was established by an NCDOT survey crew.

Trigon's subsurface investigation for the proposed bridge was conducted between May 2 and May 31, 2007. This exploration consisted of eight soil test borings with two borings at each proposed bent location. As-drilled soil test boring locations are shown on the Boring Identification Diagram (Drawing No. 2) following this report, and boring logs, coring logs, and core photographs are also included following this report.

All of the borings for this project were drilled using a truck-mounted Acker AD-II drilling machine equipped with a 140-pound manual hammer. Boring EB2-B and the first 55 feet of Boring EB1-A were advanced utilizing 0.5-foot (O.D.) continuous-flight hollow-stem auger techniques. The remaining borings and the portion of Boring EB1-A below 55 feet were advance via wash-drilling techniques utilizing a 0.33-foot tricone drill bit. The interior bent borings were performed though holes cored through the concrete bridge deck with casing extended from the bridge deck down to the existing ground surface. Pond water alone was used as the drilling fluid with the exception of Boring EB1-B which used a bentonite mud slurry as the drilling fluid.

Standard Penetration Tests were performed in the soil and weathered rock materials in the soil test borings 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 performed at the interior bent borings in order to evaluate the nature of the weathered rock/crystalline rock. The cored weathered rock/crystalline rock was returned to our laboratory for further classification and possible testing. The rock coring utilized an NQ size hollow double-tube core barrel with pond water alone was used as the drilling fluid during the rock coring.

3.2 LABORATORY TESTING

Laboratory soil testing was performed on seventeen 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 Limits, and grain size analysis with hydrometer. In addition, two Unconfined Compressive Strength (Qu only) tests were performed on selected samples of the recovered rock core. Laboratory tests were performed in general accordance with AASHTO and NCDOT specifications. The results of the soil and rock laboratory tests are included on Sheet 27 located behind this report. Laboratory results of the rock testing are also included under separate cover in Appendix A.

3.3 SITE GEOLOGY

The site of the proposed project is located in the Carolina Slate Belt of the Piedmont Physiographic province. Carolina Slate Belt rocks are comprised of metamorphosed sedimentary and volcanic rocks intruded by a variety of plutons (Butler et al., 1991).

According to the 1985 Geologic Map of North Carolina, the site is located in an area generally consisting of Metamudstone and Meta-Argillite interbedded with Metasandstone, Metaconglomerate, and Metavolcanic rock. The crystalline rock encountered in our test borings on the west (downstation) side of the railroad tracks generally consisted of moderately severely to very slightly weathered, medium hard to hard Metavolcanic rock, while the crystalline rock encountered on the east (upstation) side of the railroad tracks generally consisted of moderately to slightly weathered, moderately hard to hard Meta-Argillite and Metamudstone. The quality of the Metavolcanic rock encountered ranged from very poor to very good with the majority being poor to fair, while the quality of the Meta-Argillite encountered ranged from very poor to poor. Metamudstone crystalline rock was not cored. The overlying residual soils at the site are the product of 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 reviewed. For rock descriptions and stratification at a particular boring location, the respective Coring Log should be reviewed. The Boring Identification Diagram, Boring Logs, Coring Logs, and Core Photographs are located behind this report. Representative subsurface cross-sections at each bent location and a subsurface profile along the right side of the proposed structure are also included behind this report. The subsurface properties for the project site are described below.

Foundation materials encountered 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 borings, at Boring B2-B, and at Boring EB2-A. The roadway embankment fill extends to a depth of ±4 feet (Elevation ±324 feet) at Boring EB1-A, to a depth of ±16 feet (Elevation ±313 feet) at the Boring EB1-B, to a depth of ±14 feet (Elevation ±306 feet) at Boring B2-B, and to a depth of ±16 feet (Elevation

±312 feet) at Boring EB2-A. The roadway embankment fill encountered generally consists of soft to stiff, coarse to fine variably sandy, silty clay (A-6). Standard Penetration Resistance values within the fill material ranged from 3 to 14 blows per foot (bpf).

Residual soil was encountered underlying the roadway embankment fill at the End Bent-1 borings, at Boring B2-B, and at Boring EB2-A, and beginning at the existing ground surface at the remaining borings. The residual soil extends to depths ranging from ±63 feet to ±61 feet (Elevations ±265 feet to ±267 feet) at the End Bent-1 borings, to depths ranging from ±31 feet to ±37 feet (Elevations ±277 feet to ±271 feet) at the Bent-1 borings, to depths ranging from ±39 feet to ±33 feet (Elevations ±281 feet to ±287 feet) at the Bent-2 borings, and to depths ranging from ±21 feet to ±13 feet (Elevations ±307 feet to ±315 feet) at the End Bent-2 borings. The residuum generally consists of soft to hard, clayey, fine to coarse sandy silt (A-4 and A-5) and fine to coarse variably sandy, silty clay (A-6, A-7-5, and A-7-6). Standard Penetration Resistance values within the residual soil ranged from 3 to 86 bpf. Zones of residual soils sampling as coarse to fine sand (A-2-4) were encountered within the weathered rock and crystalline rock at Boring B2-A.

Weathered rock was encountered underlying the residual soil at all of the borings drilled for this project. The weathered rock at the End Bent-1 and Bent-1 borings generally consists of Metavolcanic rock, while the weathered rock at the Bent-2 and End Bent-2 borings generally consists of Metamudstone with Metasandstone encountered below the Metamudstone weathered rock at Boring B2-A. The top of the weathered rock was encountered at the following depths and elevations: ±63 feet to ±61 feet (Elevations ±265 feet to ±267) at the End Bent-1 borings, ±31 feet to ±37 feet (Elevations ±277 feet to ±271 feet) at the Bent-1 borings, ±39 feet to ±33 (Elevations ±281 feet to ±287 feet) at the Bent-2 borings, and ±21 feet to ±13 feet (Elevations ±307 feet to ±315 feet) at the End Bent-2 borings. Weathered rock was also encountered as a zone within the crystalline rock at Boring B1-B between depths of 52.7 feet and 53.9 feet (Elevations 255.3 feet and 254.1 feet), and at Boring B2-A between depths of 73.0 feet and 74.0 feet (Elevations 246.9 feet and 245.9 feet). Borings EB1-A, B2-B, and EB2-A were terminated within weathered rock.

Crystalline rock was encountered underlying the weathered rock at Boring EB1-B, at the Bent-1 borings, at Boring B2-A, and at Boring EB2-B. Crystalline rock was not encountered within the depths explored at Borings EB1-A, B2-B, and EB2-A. The crystalline rock encountered at Boring EB1-B and at Bent-1 generally consists of Metavolcanic rock, while the crystalline rock encountered at Boring B2-A generally

consists of Meta-Argillite and the crystalline rock encountered at Boring EB2-B generally consists of Metamudstone. The top of the crystalline rock was encountered at the following depths and elevations: ±69 feet (Elevation ±260 feet) at Boring EB1-B, ±52 feet to ±47 feet (Elevations ±256 feet to ±261 feet) at the Bent-1 borings, ±69 feet (Elevation ±251 feet) at the Boring B2-A, and at a depth of ±21 feet (Elevation ±307 feet) at Boring EB2-B. As noted previously, a zones of weathered rock were encountered within the crystalline rock at Borings B1-B and B2-A. In addition, a zone of crystalline rock was encountered within the weathered rock at Boring B2-A between depths of 61.3 feet and 62.3 feet (Elevations 258.6 feet and 257.6 feet).

Between approximately 30 feet and 35 feet of weathered rock/crystalline rock was cored at the interior bent borings to evaluate the nature of the refusal materials. In general, the cored weathered rock is severely weathered, soft Metavolcanic rock with very close fracture spacing at Bent-1, and severely weathered, soft to moderately hard Meta-Argillite and Metamudstone interlayered with Metasandstone with very close to close fracture spacing at Bent-2. The strata recovery (REC) values within the weathered rock ranged from 1 to 80 percent. It should be noted that all of the material cored at Boring B2-B was weathered rock with no crystalline rock encountered within the depths cored. In general, the cored crystalline rock is moderately severely to very slightly weathered, medium hard to hard Metavolcanic rock with very close to moderately close fracture spacing at Bent-1, and moderately to slightly weathered, moderately hard to hard Meta-Argillite with very close to close fracture spacing at Boring B2-A. Strata recovery (REC) values within the Metavolcanic crystalline rock ranged from 88 to 100 percent and strata Rock Quality Designation (RQD) values within the Metavolcanic crystalline rock ranged from 0 to 100 percent indicating a very poor to very good quality rock. Strata recovery (REC) values within the Meta-Argillite crystalline rock ranged from 90 to 100 percent and strata Rock Quality Designation (RQD) values within the Meta-Argillite crystalline rock ranged from 0 to 44 percent indicating a very poor to poor quality rock.

3.5 GROUNDWATER

Groundwater was encountered at all of the borings drilled for this project, with the exception of Boring EB2-B. Groundwater was not encountered within the depths explored at Boring EB2-B. The groundwater elevations generally ranged from ±298 feet to ±303 feet. Fluctuation of groundwater surface levels can occur with seasonal and climatic variations.

4.0 CONSTRUCTION CONSIDERATIONS

Gravel and rock fragments are common within the roadway embankment fill and upper portions of residuum at the site.

5.0 CLOSURE

The geotechnical investigation, analysis, and general construction considerations included in this report are based on the Preliminary General Drawing 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 conditions 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

PMW/JRV:pmw

Attachments

NORTH CAROLINA LICENSED SEAL 1500 GEOLOGIST PAUL M. WEAVER

7/3/07

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

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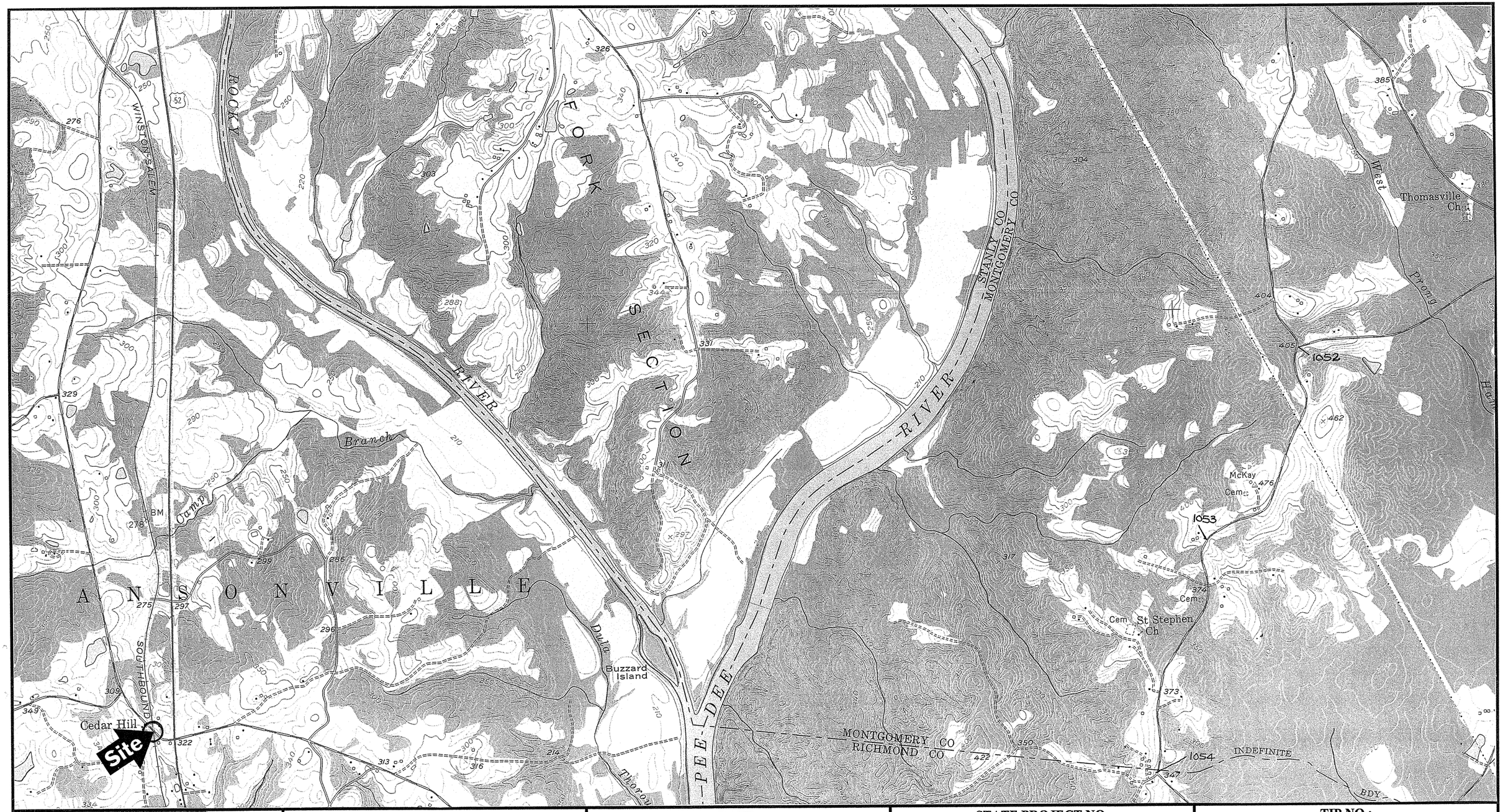


TRIGON Trigon Engineering Consultants, Inc. Greensboro North Carolina	SCALE: 1′ = 24,000′	DATE: 5/22/07	STATE PROJECT NO. 33688.1.1	TIP NO.: B-4410
	SITE VICINITY MAP Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627, Anson County, North Carolina			
	USGS Mount Gilead West Quadrangle	DRAWING NUMBER: 1		

POT -L- STA 15+21.87 =
POT -Y1- STA 17+66.21

15

15

WINSTON SALEM SOUTH BOUND RAILROAD

S

S

1½SBKD

NAD 83 / CORS 96

SAT DISH

ISBKD

15' GR

6' SOIL

(1) OREN F. HENDLEY
DB 182 PG 390

(2) GEORGE H. HILDRETH, JR.
LINA S. HILDRETH
MARY H. BRAMMER
CYNTHIA H. LITTLE
GEORGE W. HILDRETH
DB 162 PG 397
DB 176 PG 624
DB 178 PG 589
DB 555 PG 151

EBI-A

BI-A

B2-A

EB2-A

-L-

SR 1627 PINKSTON RIVER ROAD

GR

EBI-B

15

BI-B

-BL-

B2-B

EB2-B

W

2" PVC (ATUR)

GR

Note: Skew Angle for All Bents = 35°00'09"

8' SOIL

12' SOIL/GR

-Y1-

(1) OREN F. HENDLEY
DB 182 PG 390

(2) GEORGE H. HILDRETH, JR.
LINA S. HILDRETH
MARY H. BRAMMER
CYNTHIA H. LITTLE
GEORGE W. HILDRETH
DB 258 PG 074
DB 555 PG 151

RUINS

RUINS

SCALE IN FEET

0 20 40

HORZ. SCALE

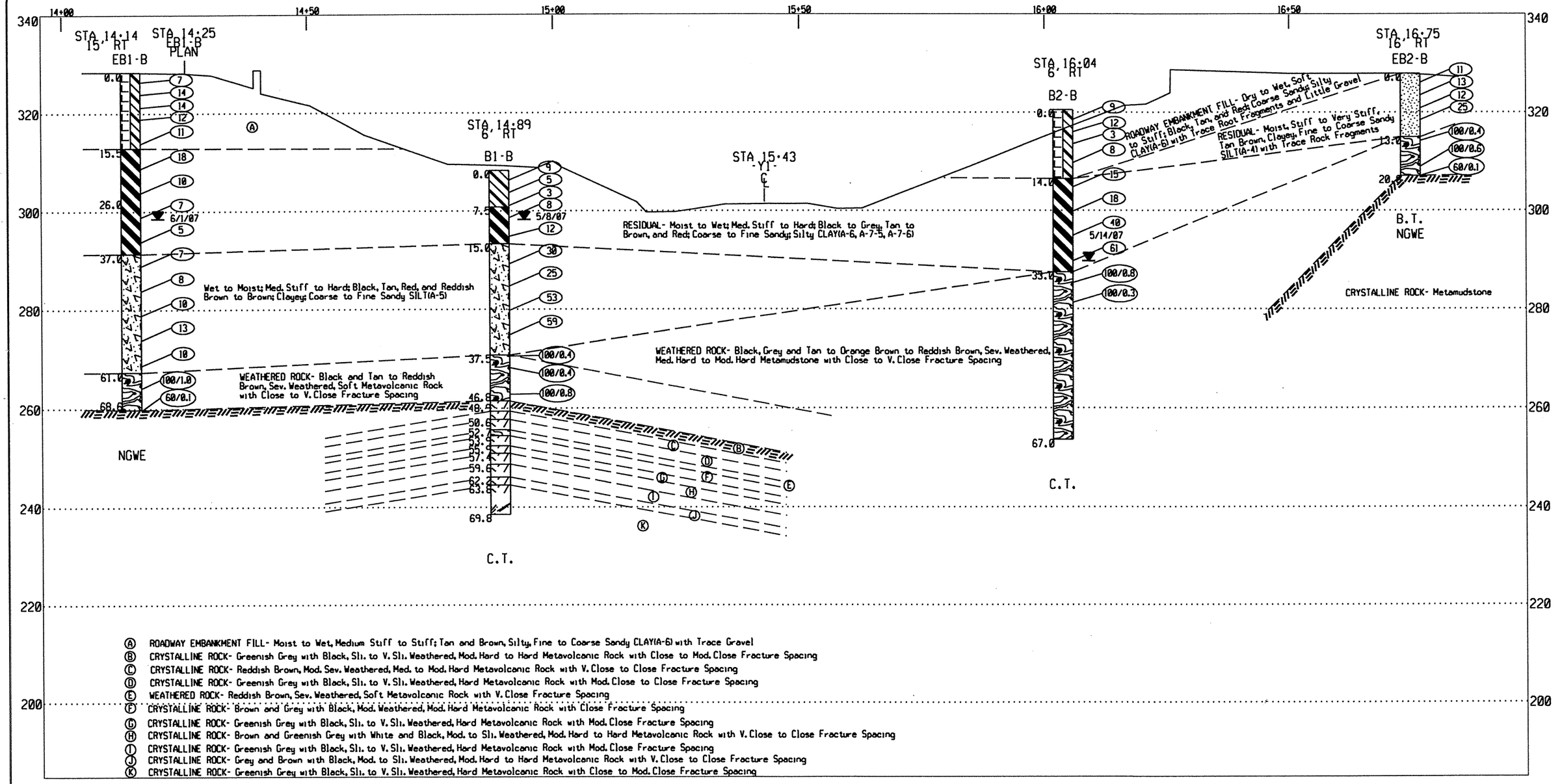
TRIGON
ENGINEERING CONSULTANTS, INC.

BORING IDENTIFICATION DIAGRAM

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale N/A
Date 5/23/07	Horiz. Scale 1" = 40'
Drawn by DRK	Drawing No. 2



SCALE IN FEET

0 10 20

VERT. SCALE

0 10 20

HORZ. SCALE

TRIGON

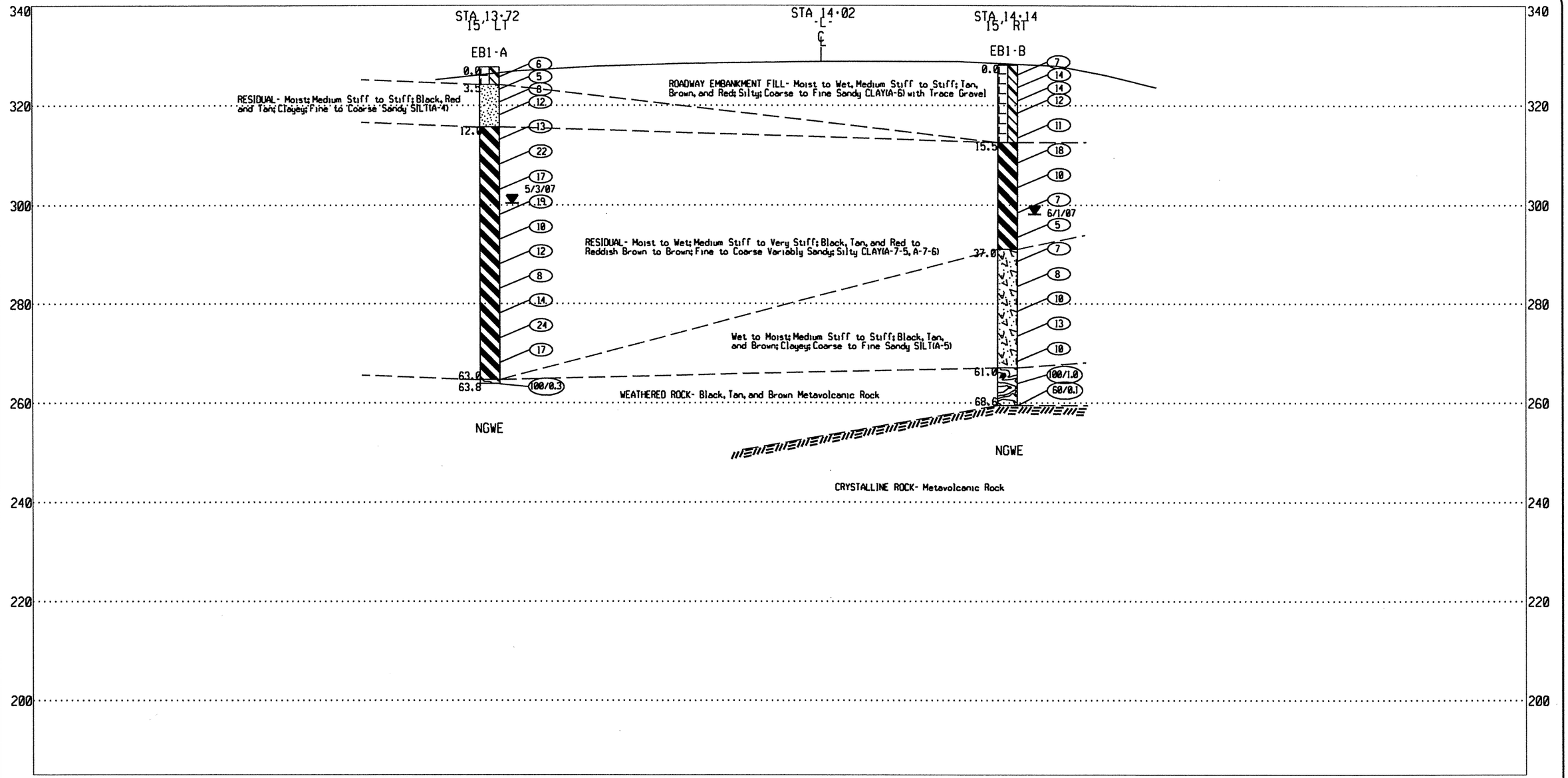
ENGINEERING CONSULTANTS, INC.

PROFILE 15' RIGHT OF -L-

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale 1" = 20'
Date 5/23/07	Horiz. Scale 1" = 20'
Drawn by DRK	Drawing No. 3



SCALE IN FEET

0 10 20

VERT. SCALE

0 5 10

HORZ. SCALE

TRIGON

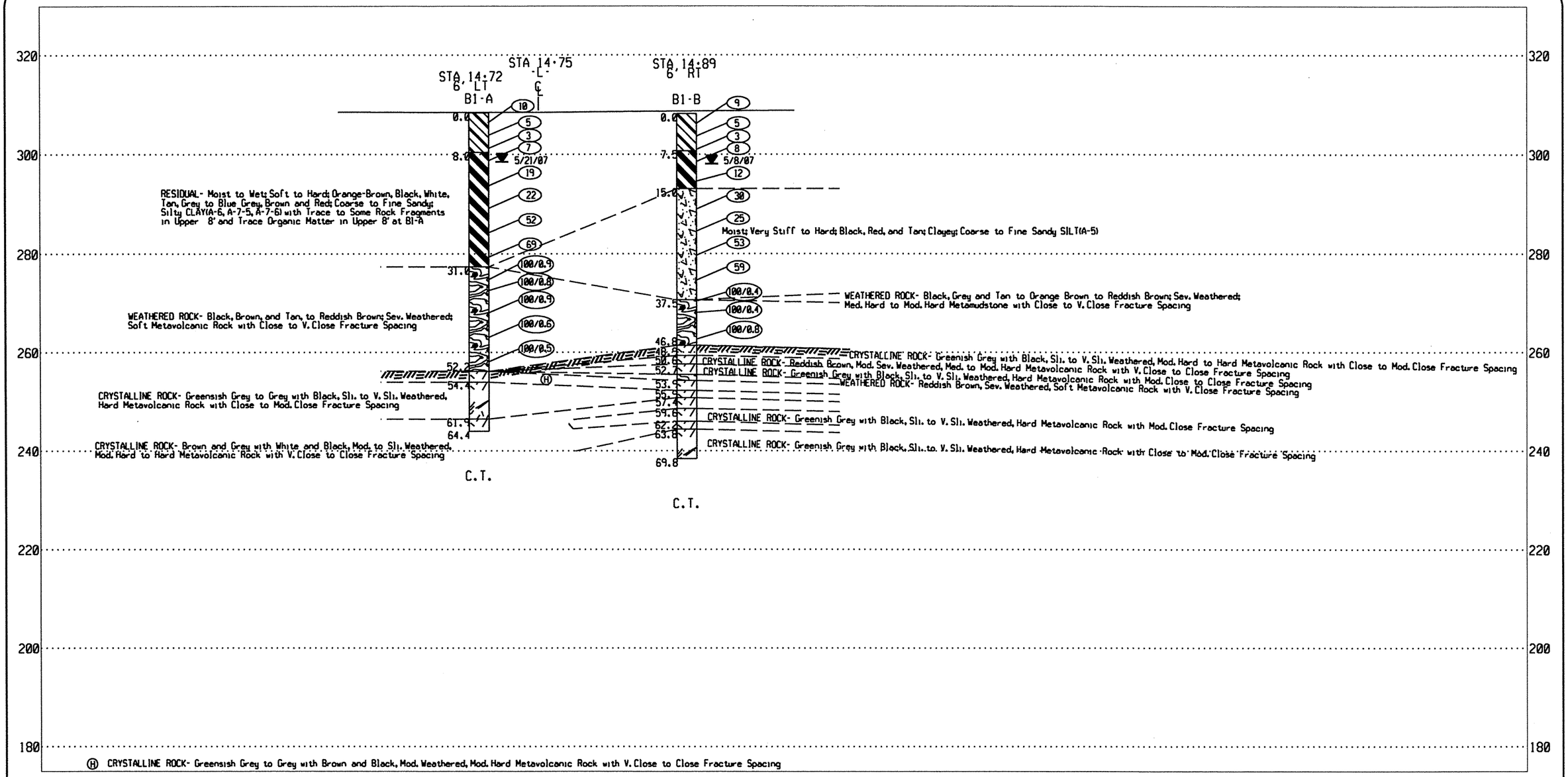
ENGINEERING CONSULTANTS, INC.

CROSS SECTION ALONG END BENT 1

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale 1" = 20'
Date 5/23/07	Horiz. Scale 1" = 10'
Drawn by DRK	Drawing No. 4



SCALE IN FEET

0 10 20

VERT. SCALE

0 5 10

HORZ. SCALE

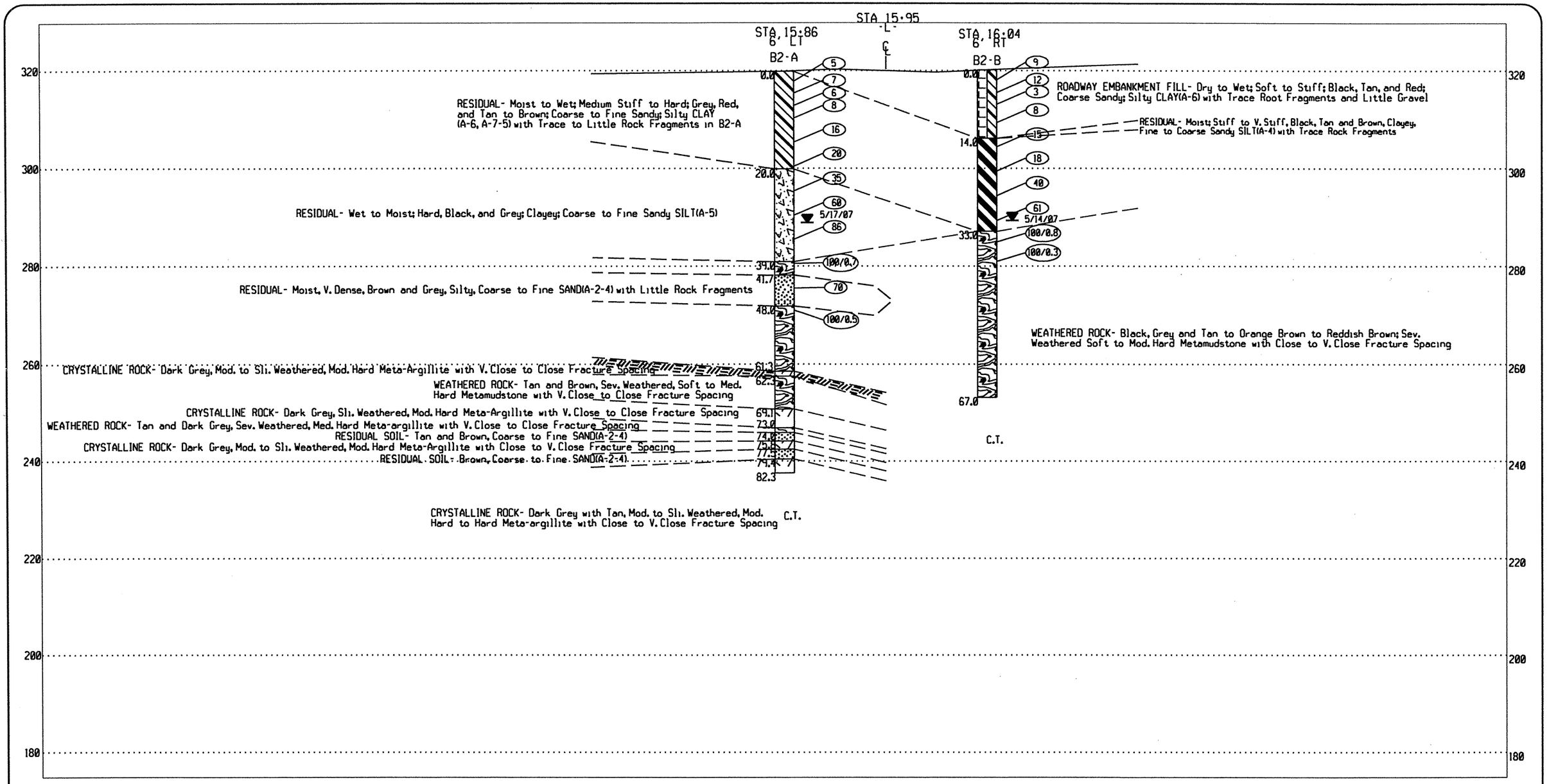
TRIGON
ENGINEERING CONSULTANTS, INC.

CROSS SECTION ALONG BENT 1

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale 1" = 20'
Date 5/23/07	Horiz. Scale 1" = 10'
Drawn by DRK	Drawing No. 5



SCALE IN FEET

0 10 20

VERT. SCALE

0 5 10

HORZ. SCALE

TRIGON

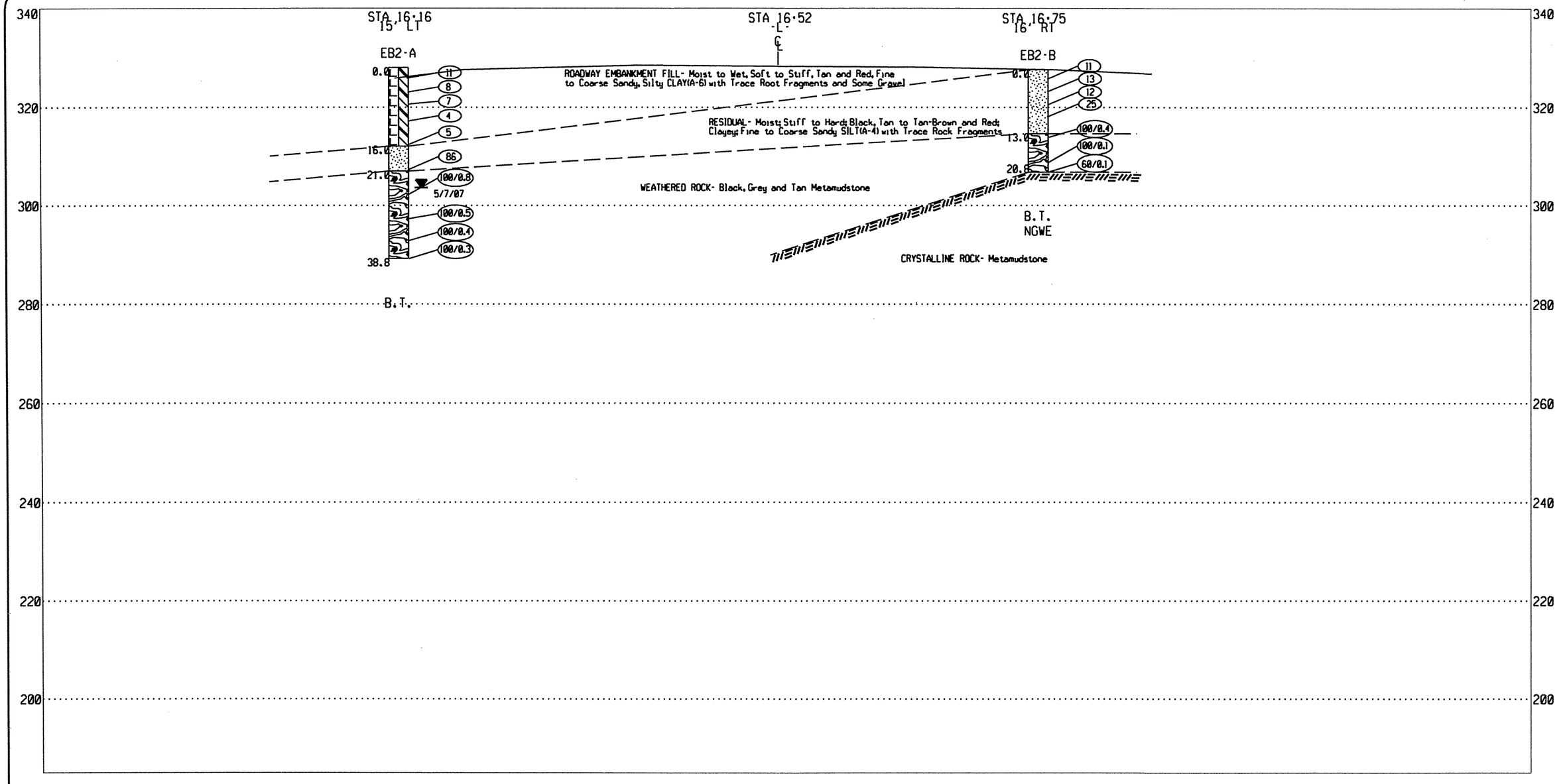
ENGINEERING CONSULTANTS, INC.

CROSS SECTION ALONG BENT 2

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale 1" = 20'
Date 5/23/07	Horiz. Scale 1" = 10'
Drawn by DRK	Drawing No. 6



SCALE IN FEET

0 10 20

VERT. SCALE

0 5 10

HORZ. SCALE

TRIGON
ENGINEERING CONSULTANTS, INC.

CROSS SECTION ALONG END BENT 2

Replace Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627 (Pinkston River Rd.)

Anson County, North Carolina

Project No. 33688.1.1	TIP No. B-4410
Federal No. BRZ-1627(4)	Vert. Scale 1" = 20'
Date 5/23/07	Horiz. Scale 1" = 10'
Drawn by DRK	Drawing No. 7

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 13+72	**OFFSET** 15ft LT	**ALIGNMENT** -L-	**0 HR.** 29.0
COLLAR ELEV. 327.7 ft	**TOTAL DEPTH** 63.8 ft	**NORTHING** 1,666,723	**EASTING** 509,146	**24 HR.** 27.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** HSA/Wash Rotary		**HAMMER TYPE** 140lb Manual	
START DATE 05/02/07	**COMP. DATE** 05/02/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

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)
330										
326.7	1.0								327.7	0.0
324.2	3.5	4	3	3	6		M		ROADWAY EMBANKMENT FILL: Medium Stiff, Tan and Red, Silty, Coarse to Fine Sandy CLAY with Trace Root Fragments and Gravel	
321.7	6.0	5	2	3	5 8		M		324.2	3.5
319.2	8.5	4	4	4		SS-1	17.5%		RESIDUAL: Medium Stiff to Stiff; Black, Red and Tan; Clayey; Fine to Coarse Sandy SILT	
314.2	13.5	3	7	5	12		M		315.7	12.0
309.2	18.5	8	6	7	13		M		RESIDUAL:Medium Stiff to Very Stiff; Black, Tan and Red; Variably Fine to Coarse Sandy; Silty CLAY	
304.2	23.5	6	10	12	22		M			
299.2	28.5	5	8	9	17	SS-2	41.8%			
294.2	33.5	8	10	9	19		W			
289.2	38.5	5	5	5	10		W			
284.2	43.5	5	6	6	12	SS-3	68.4%			
279.2	48.5	3	3	5	8		W			
274.2	53.5	5	8	6	14		W			
269.2	58.5	8	12	12	24		W			
264.2	63.5	4	7	10	17		W		264.7	63.0
		100/0.3			100/0.3				WEATHERED ROCK: Black and Tan Metavolcanic Rock 263.9	63.8

Boring Terminated at Elevation 263.9 ft. in Weathered Rock: Metavolcanic Rock

Note: Pond Water Alone Used as Drilling Fluid Below 55.0 ft. (Where Wash Rotary Started)

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** T.Wells	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 14+14	**OFFSET** 15ft RT	**ALIGNMENT** -L-	**0 HR.** 19.6
COLLAR ELEV. 328.1 ft	**TOTAL DEPTH** 68.6 ft	**NORTHING** 1,666,728	**EASTING** 509,094	**24 HR.** 30.0
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary		**HAMMER TYPE** 140lb Manual	
START DATE 05/31/07	**COMP. DATE** 05/31/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 68.6 ft	

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)
330										
327.1	1.0								328.1	0.0
324.6	3.5	5	4	3	7		M		ROADWAY EMBANKMENT FILL: Medium Stiff to Stiff, Tan and Brown, Silty, Fine to Coarse Sandy CLAY with Trace Gravel	
322.1	6.0	9	8	6	14		M			
319.6	8.5	5	7	7	14		M			
314.6	13.5	5	6	6	12		M			
309.6	18.5	3	4	7	11	SS-4	33.1%		312.6	15.5
304.6	23.5	7	7	11	18		▽		RESIDUAL: Very Stiff to Medium Stiff; Black, Tan and Reddish Brown to Brown; Fine to Coarse Sandy; Silty CLAY	
299.6	28.5	5	4	6	10		W		Note: Moisture Content for SS-5 = 66.1%	
294.6	33.5	3	3	4	7	SS-5	▼			
289.6	38.5	2	2	3	5		W			
284.6	43.5	2	3	4	7	SS-6	79.1%			
279.6	48.5	3	4	4	8		W			
274.6	53.5	4	4	6	10		W			
269.6	58.5	4	5	8	13		M			
264.6	63.5	3	4	6	10		M		267.1	61.0
259.6	68.5	25	75	100/1.0	100/1.0				WEATHERED ROCK: Tan and Brown Metavolcanic Rock	
		60/0.1			60/0.1				259.5	68.6

Boring Terminated with Standard Penetration Test Refusal at Elevation 259.5 ft. in Crystalline Rock: Metavolcanic Rock

Note: Pond Water and Bentonite Used as Drilling Fluid

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+72	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** 8.8
COLLAR ELEV. 308.4 ft	**TOTAL DEPTH** 64.4 ft	**NORTHING** 1,666,782	**EASTING** 509,065	**24 HR.** 10.0
DRILL MACHINE Acker AD-II	**DRILL METHOD** Mud Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/16/07	**COMP. DATE** 05/18/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 52.2 ft	

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)
310									
									308.4 0.0
307.4	1.0						M		RESIDUAL: Stiff to Soft, Orange Brown to Tan and Brown, Clayey, Coarse to Fine Sandy, Silty CLAY with Trace of Organic Matter and some Rock Fragments
304.9	3.5	4	5	5	10				
302.4	6.0	2	2	3	5	SS-7	26.7%		
299.9	8.5	2	1	2	3		W		
									300.4 8.0
294.9	13.5	2	3	4	7				Medium Stiff to Hard; White, Black, Tan and Blue Grey; Silty; Fine to Coarse Sandy CLAY
290.5	17.9	5	6	13	19	SS-8	32.4%		
285.5	22.9	6	9	13	22		M		
280.5	27.9	12	25	27	52		M		
275.5	32.9	19	33	36	69		M		
									277.4 31.0
273.5	34.9	40	60/0.4		100/0.9				WEATHERED ROCK: Black, Brown and Tan; Severely Weathered Metavolcanic Rock
268.5	39.9	27	53	47/0.3	100/0.8				
263.5	44.9	40	60/0.4		100/0.9				
258.5	49.9	35	65/0.1		100/0.6				
		100/0.5			100/0.5				256.2 52.2
						RS-1			CRYSTALLINE ROCK: Greenish Grey with Brown and Black, Moderately Weathered, Moderately Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
									254.0 54.4
									CRYSTALLINE ROCK: Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing
									246.5 61.9
									CRYSTALLINE ROCK: Brown and Grey with Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
									244.0 64.4
									Coring Terminated at Elevation 244.0 ft. in Crystalline Rock: Metavolcanic Rock

Note: Pond Water Alone Used as Drilling Fluid

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+72	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** 8.8
COLLAR ELEV. 308.4 ft	**TOTAL DEPTH** 64.4 ft	**NORTHING** 1,666,782	**EASTING** 509,065	**24 HR.** 10.0
DRILL MACHINE Acker AD-II	**DRILL METHOD** Mud Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/16/07	**COMP. DATE** 05/18/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 52.2 ft	
CORE SIZE NQ	**TOTAL RUN** 27.3 ft		**DRILLER** C. Heun	

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
274.6										ELEV. (ft) DEPTH (ft)
										Begin Coring @ 33.8 ft
274.6	33.8	1.1	:34/0.1	(0.0)			(0.2)			274.6 WEATHERED ROCK: Black, Brown and Tan; Severely Weathered Metavolcanic Rock 33.8
273.5	34.9		3:20	0%			1%			
272.2	36.2		N=100/0.8							
		3.7	5:51|0.7 7:13 6:22 3:10	(0.0) 0%						
268.5	39.9		N=100/0.9							
267.6	40.8									
		4.1	0:27/0.1 5:53 5:03 5:13 4:15	(0.0) 0%						
263.5	44.9									
262.9	45.5		N=100/0.6							
		4.4	1:48/0.4 4:00 3:54 2:54 3:47	(0.2) 5%						
258.5	49.9									
258.0	50.4		N=100/0.5							
		4.0	3:30/0.5 7:06 2:41 4:47	(2.0) 50%	(0.7) 18%		(2.0) 91%	(0.7) 32%		256.2 52.2
254.0	54.4									CRYSTALLINE ROCK: Greenish Grey with Brown and Black, Moderately Weathered, Moderately Hard Metavolcanic Rock with Very Close to Close Fracture Spacing 254.0 54.4
		5.0	17:24/0.5 8:36 7:25 5:10 10:13	(4.8) 96%	(3.1) 62%	RS-1	(7.3) 97%	(5.6) 75%		Very Broken at Beginning and End of Strata
249.0	59.4		9:05							3 Joints at 10°-20° with Some Heavy Iron Staining 2 Joints at 60°-70° with Heavy Iron Staining
		5.0	5:43 7:15 6:15 4:37 6:25	(5.0) 100%	(3.4) 68%					CRYSTALLINE ROCK: Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing 246.5 61.9
244.0	64.4						(2.5) 100%	(0.9) 36%		Majority of Joints at 0° to 10° Very Broken From 57.8 ft. to 58.2 ft. (0.2 ft. Core Loss)
										CRYSTALLINE ROCK: Brown and Grey with Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing 244.0 64.4
										6 Joints at 10° to 20° 4 Joints at 30° to 40°
										Coring Terminated at Elevation 244.0 ft. in Crystalline Rock: Metavolcanic Rock

Note: Pond Water Alone Used as Drilling Fluid
Note: Run #5 Cut Short Due to Loss of Water at 54.4 ft.

NCDOT CORE SINGLE COPY OF 071-07-020CNEW.GPJ NC_DOT.GDT 7/23/07

CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B1-A

Box 1 of 2
(SCALE = 1:4)

Box 2 of 2
(SCALE = 1:4)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson		**GEOLOGIST** G.Licayan/P.Weaver
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+89	**OFFSET** 6ft RT	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 308.0 ft	**TOTAL DEPTH** 69.8 ft	**NORTHING** 1,666,784	**EASTING** 509,044	**24 HR.** 10.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/03/07	**COMP. DATE** 05/07/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 46.8 ft	

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
310									ELEV. (ft) / DEPTH (ft)
307.0	1.0								308.0 / 0.0
304.5	3.5	5	4	5	9		M		RESIDUAL: Stiff to Soft, Tan to Grey and Red, Coarse to Fine Sandy, Silty CLAY with Trace Rock Fragments
302.0	6.0	3	2	3	5	SS-9	28.1%		
299.5	8.5	3	2	1	3		W		300.5 / 7.5
295.5	12.5	3	3	5	8	SS-10			Medium Stiff to Stiff, Tan and Grey, Coarse to Fine Sandy, Silty CLAY
290.1	17.9	4	5	7	12		M		Note: Moisture Content for SS-10 = 34.5%
285.5	22.5	8	12	18	30		M		293.0 / 15.0
280.5	27.5	7	10	15	25		M		Very Stiff to Hard; Black, Red and Tan; Clayey; Coarse to Fine Sandy SILT
275.5	32.5	16	18	35	53		M		
270.5	37.5	14	23	36	59		M		270.5 / 37.5
268.2	39.8	100/0.4			100/0.4				WEATHERED ROCK: Black and Tan to Reddish Brown, Severely Weathered, Soft Metavolcanic Rock with Close to Very Close Fracture Spacing
263.2	44.8	100/0.4			100/0.4				261.2 / 46.8
		48	52/0.3		100/0.8				CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing (259.1 / 48.9 – 257.4 / 50.6)
									CRYSTALLINE ROCK: Reddish Brown, Moderately Severely Weathered, Medium to Moderately Hard Metavolcanic Rock with Very Close to Close Fracture Spacing (255.3 / 52.7 – 254.1 / 53.9 – 252.1 / 55.9)
									CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close to Close Fracture Spacing (250.6 / 57.4 – 248.4 / 59.6)
									WEATHERED ROCK: Reddish Brown, Severely Weathered, Soft Metavolcanic Rock with Very Close Fracture Spacing (245.8 / 62.2 – 244.2 / 63.8)
									CRYSTALLINE ROCK: Brown and Grey with Black, Moderately Weathered, Moderately Hard Metavolcanic Rock with Close Fracture Spacing
									CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close Fracture Spacing (238.2 / 69.8)
									CRYSTALLINE ROCK: Brown and Greenish Grey with White and Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing

SHEET 18 OF 29

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson		**GEOLOGIST** G.Licayan/P.Weaver
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+89	**OFFSET** 6ft RT	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 308.0 ft	**TOTAL DEPTH** 69.8 ft	**NORTHING** 1,666,784	**EASTING** 509,044	**24 HR.** 10.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/03/07	**COMP. DATE** 05/07/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 46.8 ft	

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
230					Match Line				ELEV. (ft) / DEPTH (ft)
									CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close Fracture Spacing
									CRYSTALLINE ROCK: Grey and Brown with Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
									CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing
									Coring Terminated at Elevation 238.2 ft. in Crystalline Rock: Metavolcanic Rock
									Note: Pond Water Alone Used as Drilling Fluid

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+89	**OFFSET** 6ft RT	**ALIGNMENT** -L- — **0 HR.** 9.0
COLLAR ELEV. 308.0 ft	**TOTAL DEPTH** 69.8 ft	**NORTHING** 1,666,784	**EASTING** 509,044 — **24 HR.** 10.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual
START DATE 05/03/07	**COMP. DATE** 05/07/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 46.8 ft
CORE SIZE NQ	**TOTAL RUN** 30.7 ft	**DRILLER** C. Heun	

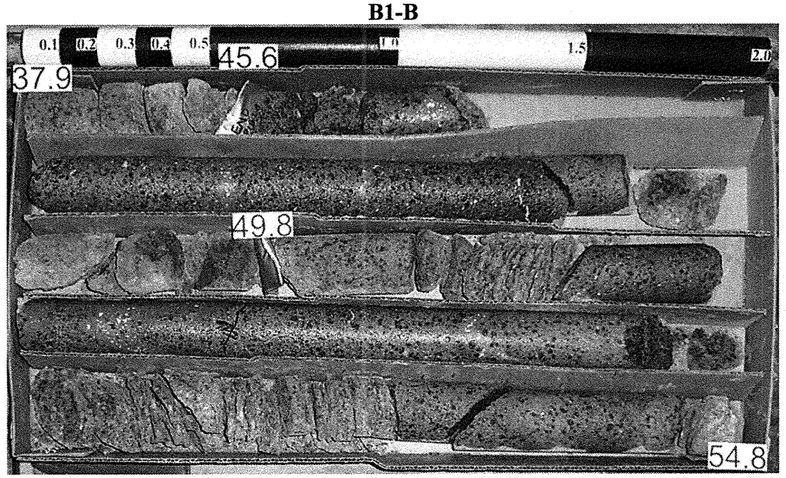
ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
270.1										Begin Coring @ 37.9 ft
270.1	37.9	1.9	5:09	(0.6)			(0.8)			WEATHERED ROCK: Black and Tan to Reddish Brown, Severely Weathered, Soft Metavolcanic Rock with Close to Very Close Fracture Spacing
268.2	39.8		4:16/0.9	32%			8%			
267.8	40.2		*N=100/0.4*							
		4.6	5:48/0.6	(0.0)						
			7:22	0%						
			7:24							
			7:09							
263.2	44.8		6:06							
262.4	45.6		*N=100/0.8*							
		4.2	4:48/0.2	(2.9)	(1.3)		(2.1)	(1.3)		CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing
			10:17	69%	31%		100%	62%		
258.2	49.8		10:28							
			15:51				(1.6)	(0.3)		
			15:28				94%	18%		
		5.0	8:01	(4.6)	(2.8)		(2.1)	(2.1)		Moderately Severely Weathered, Very Close Fracture Spacing from 46.8 ft. to 47.0 ft.
			8:26	92%	56%		100%	100%		1 Joint at 30°
253.2	54.8		8:17							1 Joint at 80°
			8:38				(0.8)	(0.3)		
			10:10				67%	15%		
		5.0	8:32	(4.9)	(2.7)		(2.0)	(1.5)		CRYSTALLINE ROCK: Reddish Brown, Moderately Severely Weathered, Medium to Moderately Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
			8:21	98%	54%		100%	100%		
248.2	59.8		14:22							Fabric and Joint Faces Heavily Iron Stained
			16:50				(1.5)	(1.2)		
			6:55				100%	55%		
		5.0	14:05	(4.8)	(3.5)		(2.1)	(2.6)		CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close to Close Fracture Spacing
			15:15	96%	70%		95%	100%		
243.2	64.8		14:50							No Natural Fractures
			10:45				(2.6)	(0.0)		
			8:25				100%	0%		
		5.0	6:34	(5.0)	(5.0)		(1.4)	(6.0)		WEATHERED ROCK: Reddish Brown, Severely Weathered, Soft Metavolcanic Rock with Very Close Fracture Spacing
			6:23	100%	100%		88%	100%		
			4:59				(6.0)			CRYSTALLINE ROCK: Brown and Grey with Black, Moderately Weathered, Moderately Hard Metavolcanic Rock with Close Fracture Spacing
			6:15				100%			
238.2	69.8		6:46							3 Joints at 70° to 80° with Heavy Iron Staining
										3 Joints at 30° with Heavy Iron Staining
										CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close Fracture Spacing
										No Natural Fractures
										CRYSTALLINE ROCK: Brown and Greenish Grey with White and Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
										4 Joints at 30°
										1 Joint at 45°
										Very Broken 58.1ft to 58.8 ft.
										CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Moderately Close Fracture Spacing
										No Natural Fractures
										CRYSTALLINE ROCK: Grey and Brown with Black, Moderately to Slightly Weathered, Moderately Hard to Hard Metavolcanic Rock with Very Close to Close Fracture Spacing
										4 Joints at 0° to 10°
										3 Joints at 70° to 80°
										CRYSTALLINE ROCK: Greenish Grey with Black, Slightly to Very Slightly Weathered, Hard Metavolcanic Rock with Close to Moderately Close Fracture Spacing
										2 Joints at 10° to 20°
										Coring Terminated at Elevation 238.2 ft. in Crystalline Rock: Metavolcanic Rock
										Note: Pond Water Alone Used as Drilling Fluid

ELEV (ft)	DEPTH (ft)
270.1	
261.2	46.8
259.1	48.9
257.4	50.6
255.3	52.7
254.1	53.9
252.1	55.9
250.6	57.4
248.4	59.6
245.8	62.2
244.2	63.8
238.2	69.8

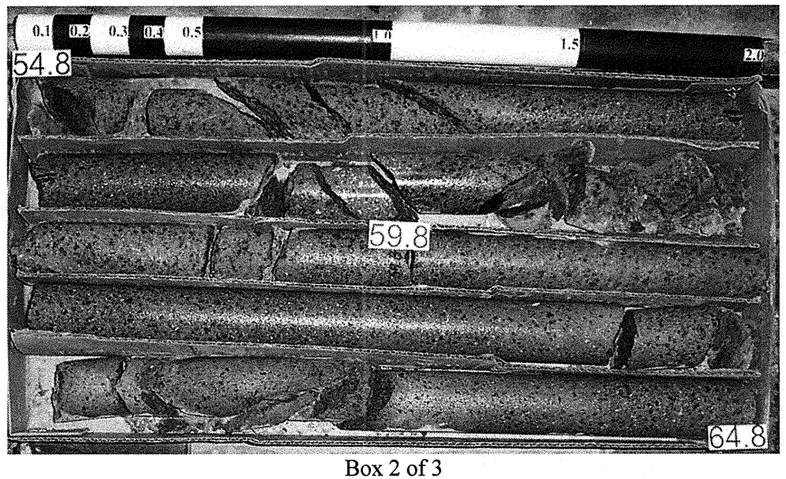
CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B1-B



Box 1 of 3

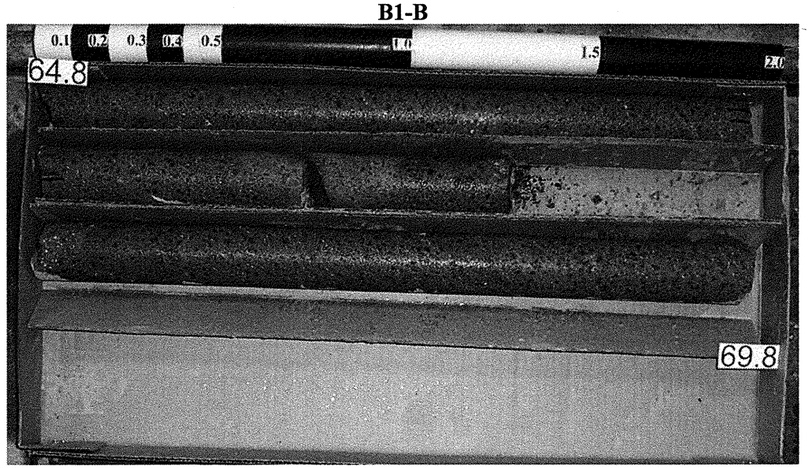


Box 2 of 3
(SCALE = 1:4)

CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B1-B



Box 3 of 3
(SCALE = 1:4)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 15+86	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** 16.7
COLLAR ELEV. 319.9 ft	**TOTAL DEPTH** 82.3 ft	**NORTHING** 1,666,858	**EASTING** 508,979	**24 HR.** 20.8
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/14/07	**COMP. DATE** 05/16/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 61.3 ft	

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)
320										
318.9	1.0								319.9	0.0
316.4	3.5	2	2	3	5 7	SS-11	25.4%		RESIDUAL: Medium Stiff to Very Stiff,Red and Brown, Coarse Sandy, Silty CLAY with Trace to Little Rock Fragments	
313.9	6.0	3	4	3	8		M			
311.4	8.5	2	3	3	6		W			
306.4	13.5	5	3	5	8		W			
301.4	18.5	4	6	10	16		W			
296.4	23.5	6	8	12	20		▽		299.9	20.0
291.4	28.5	9	11	24	35	SS-12	32.0%		Hard; Black, Tan and Grey; Clayey; Coarse to Fine Sandy SILT	
286.4	33.5	12	24	36	60		W			
281.4	38.5	29	41	45	86		M			
276.9	43.0	28	78	22/0.2	100/0.7		M		280.9	39.0
271.4	48.5	39	29	41	70		M		WEATHERED ROCK: Brown and Grey, Severely Weathered, Soft to Medium Hard Metamudstone with Very Close Fracture Spacing	
		100/0.5			100/0.5				278.2	41.7
									RESIDUAL: Very Dense, Brown and Grey, Silty, Coarse to Fine SAND with Little Rock Fragments	
									271.9	48.0
									WEATHERED ROCK: Tan and Brown, Severely Weathered, Soft to Medium Hard Metasandstone with Very Close Fracture Spacing	
									258.6	61.3
									257.6 CRYSTALLINE ROCK: Dark Grey, Moderately to Slightly Weathered, Moderately Hard Meta-Argillite with Very Close to Close Fracture Spacing	62.3
									WEATHERED ROCK: Tan and Brown, Severely Weathered, Soft to Medium Hard Metasandstone with Very Close to Close Fracture Spacing	
									250.8	69.1
						RS-2			CRYSTALLINE ROCK: Dark Grey, Slightly Weathered, Moderately Hard Meta-Argillite with Very Close to Close Fracture Spacing	
									246.9	73.0
									245.9 WEATHERED ROCK: Tan and Dark Grey, Severely Weathered, Medium Hard Meta-Argillite with Very Close to Close Fracture Spacing	74.0
									244.1	75.8
									242.4	77.5
									240.4 RESIDUAL SOIL: Tan and Brown, Coarse to Fine SAND	79.5

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 15+86	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** 16.7
COLLAR ELEV. 319.9 ft	**TOTAL DEPTH** 82.3 ft	**NORTHING** 1,666,858	**EASTING** 508,979	**24 HR.** 20.8
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/14/07	**COMP. DATE** 05/16/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 61.3 ft	

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)
240					Match Line				237.6	82.3
									CRYSTALLINE ROCK: Dark Grey, Moderately to Slightly Weathered, Moderately Hard Meta-Argillite with Close to Very Close Fracture Spacing	
									RESIDUAL SOIL- Brown, Coarse to Fine SAND	
									CRYSTALLINE ROCK: Dark Grey with Tan, Moderately to Slightly Weathered, Moderately Hard to Hard Meta-Argillite with Close to Very Close Fracture Spacing *(continued)*	
									Coring Terminated at Elevation 237.6 ft. in Crystalline Rock: Meta-Argillite	
									Note: Pond Water Alone Used as Drilling Fluid	

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 15+86	**OFFSET** 6ft LT	**ALIGNMENT** -L- — **0 HR.** 16.7
COLLAR ELEV. 319.9 ft	**TOTAL DEPTH** 82.3 ft	**NORTHING** 1,666,858	**EASTING** 508,979 — **24 HR.** 20.8
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual
START DATE 05/14/07	**COMP. DATE** 05/16/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 61.3 ft
CORE SIZE NQ	**TOTAL RUN** 36.6 ft	**DRILLER** C. Heun	

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
280.2										Begin Coring @ 39.7 ft
280.2	39.7	3.3	3:15 3:50 12:54 9:36/0.3	(1.2) 36%			(1.2) 60%			280.2 WEATHERED ROCK: Brown and Grey, Severely Weathered, Soft to Medium Hard Metamudstone with Very Close Fracture Spacing 278.2 39.7 41.7
276.9	43.0		*N=70*				(0.0) 0%			RESIDUAL: Very Dense, Brown and Grey, Silty, Coarse to Fine SAND with Little Rock Fragments Note: Loss of Water at 42.2 ft.
270.9	49.0		*N=100/0.5*							271.9 48.0
		3.3	1:00/0.3 7:10 26:50 9:08	(0.7) 21%			(5.1) 40%			WEATHERED ROCK: Tan and Brown, Severely Weathered, Soft to Medium Hard Metasandstone with Very Close Fracture Spacing Abundant Low to High Angle Fractures with Iron Staining
267.6	52.3									
		5.0	9:57 9:10 9:25 7:15	(3.9) 78%						
262.6	57.3		9:11							258.6 61.3
		5.0	5:28 4:45 4:48 5:24	(1.4) 28%	(0.0) 0%					
257.6	62.3		7:21				(0.9) 90%	(0.0) 0%		257.6 CRYSTALLINE ROCK: Dark Grey, Moderately to Slightly Weathered, Moderately Hard Meta-Argillite with Very Close to Close Fracture Spacing 62.3
		5.0	4:38 6:00 4:55 5:13	(3.7) 74%			(4.7) 69%			Abundant High Angle Fractures with Iron Staining WEATHERED ROCK: Tan and Brown, Severely Weathered, Soft to Medium Hard Metasandstone with Very Close to Close Fracture Spacing
252.6	67.3		6:15							250.8 69.1
		4.1	10:25 7:50 8:45 10:45	(3.3) 80%	(1.7) 41%		(3.8) 97%	(1.7) 44%		CRYSTALLINE ROCK: Dark Grey, Slightly Weathered, Moderately Hard Meta-Argillite with Very Close to Close Fracture Spacing
248.5	71.4					*RS-2*				
247.6	72.3	0.9	6:08/0.1	(0.8)	(0.0)					246.9 8 Joints at 20° to 30° 2 Joints at 45° 73.0
		3.0	5:15/0.9 8:20 11:39	89% (2.7) 90%	0% (0.0) 0%		(0.8) 80%			245.9 WEATHERED ROCK: Tan and Dark Grey, Severely Weathered, Medium Hard Meta-Argillite with Very Close to Close Fracture Spacing 74.0
244.6	75.3		23:02							244.1 75.8
		2.0	7:50 10:40	(1.4) 70%	(0.0) 0%		(1.2) 67%	(0.0) 0%		242.4 RESIDUAL SOIL: Tan and Brown, Coarse to Fine SAND 77.5
242.6	77.3	5.0	9:50 9:39 7:18 8:51	(3.5) 70%	(0.5) 10%		(1.6) 94%			240.4 CRYSTALLINE ROCK: Dark Grey, Moderately to Slightly Weathered, Moderately Hard Meta-Argillite with Close to Very Close Fracture Spacing 79.5
							(0.5) 25%	(0.5) 18%		RESIDUAL SOIL- Brown, Coarse to Fine SAND
237.6	82.3		10:35				(2.8) 100%			237.6 CRYSTALLINE ROCK: Dark Grey with Tan, Moderately to Slightly Weathered, Moderately Hard to Hard Meta-Argillite with Close to Very Close Fracture Spacing 82.3
										Majority is Very Broken Coring Terminated at Elevation 237.6 ft. in Crystalline Rock: Meta-Argillite

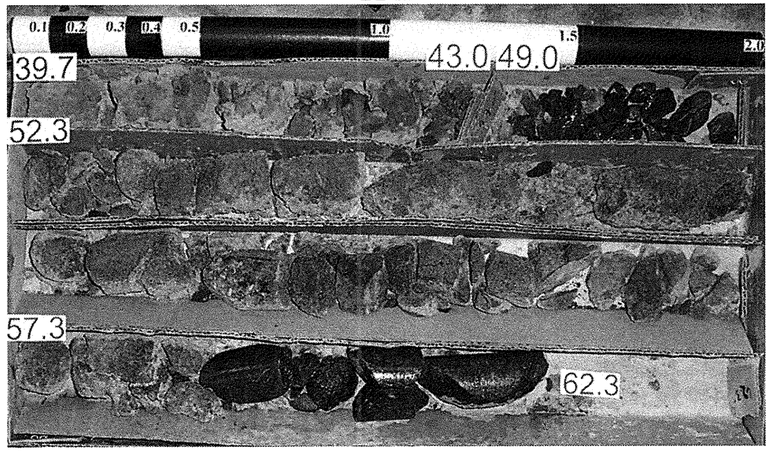
Note: Pond Water Alone Used as Drilling Fluid
Note: Run #6 Cut Short Due to Core Block
Run #7 Completed Run #6
Run#8 Cut Short Due to Core Block
Run #9 Completed Run #8

NCDOT CORE SINGLE COPY OF 071-07-020CNEW.GPJ NC_DOT.GDT 7/23/07

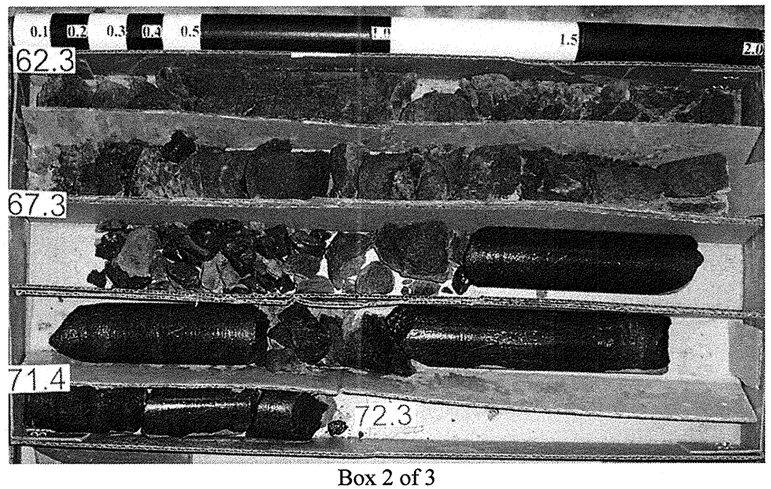
CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B2-A



Box 1 of 3

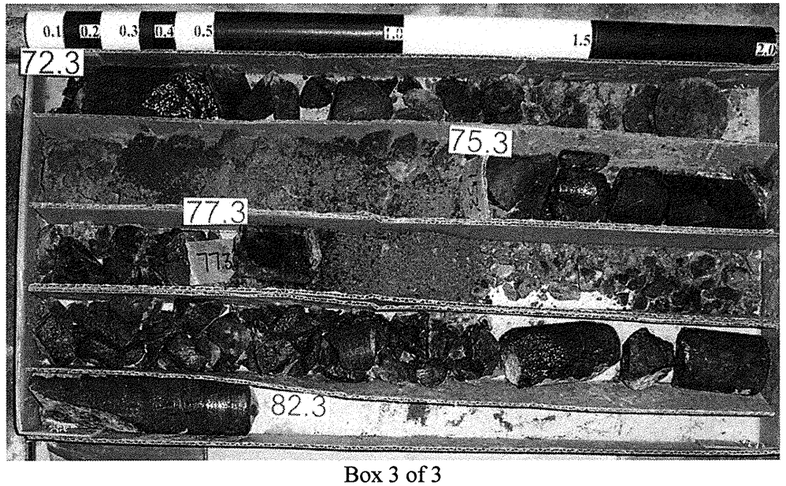


Box 2 of 3
(SCALE = 1:4)

CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B2-A



Box 3 of 3
(SCALE = 1:4)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 16+04	**OFFSET** 6ft RT	**ALIGNMENT** -L-	**0 HR.** 16.5
COLLAR ELEV. 320.2 ft	**TOTAL DEPTH** 67.0 ft	**NORTHING** 1,666,860	**EASTING** 508,958	**24 HR.** 20.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/08/07	**COMP. DATE** 05/11/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

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)
325									
									320.2 0.0
319.2	1.0								ROADWAY EMBANKMENT FILL: Soft to Stiff; Black, Tan and Red; Coarse Sandy; Silty CLAY with Trace Root Fragments and Little Gravel
316.4	3.8	7	5	4	9 12		D		
314.2	6.0	7	6	6	12	SS-13	26.4%		
310.5	9.7	3	1	2	3		W		
305.5	14.7	3	4	4	8		W		
300.5	19.7	5	6	9	15	SS-14	▽		306.2 14.0
295.5	24.7	6	7	11	18				RESIDUAL: Stiff to Hard; Grey, Red and Tan; Silty, Coarse to Fine Sandy CLAY
290.5	29.7	15	19	21	40		M		Note: Moisture Content for SS-14 = 37.6%
285.5	34.7	20	26	35	61		M		
281.2	39.0	56	44/0.3		100/0.8				287.2 33.0
		100/0.3			100/0.3				WEATHERED ROCK: Black, Grey and Tan to Orange Brown to Reddish Brown; Severely Weathered; Medium Hard to Moderately Hard Metamudstone with Close to Very Close Fracture Spacing
									253.2 67.0
									Coring Terminated at Elevation 253.2 ft. in Weathered Rock: Metamudstone
									Note: Pond Water Alone Used as Drilling Fluid

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan/P.Weaver	
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 16+04	**OFFSET** 6ft RT	**ALIGNMENT** -L-	**0 HR.** 16.5
COLLAR ELEV. 320.2 ft	**TOTAL DEPTH** 67.0 ft	**NORTHING** 1,666,860	**EASTING** 508,958	**24 HR.** 20.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140lb Manual	
START DATE 05/08/07	**COMP. DATE** 05/11/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	
CORE SIZE NQ	**TOTAL RUN** 30.8 ft	**DRILLER** C. Heun		

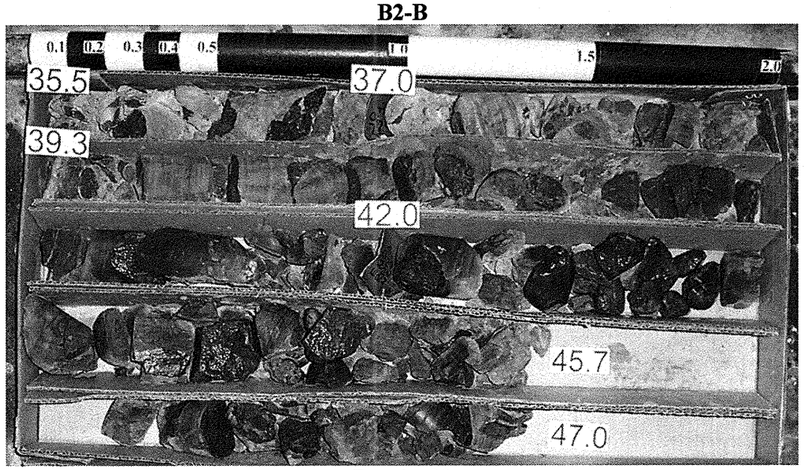
ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
284.7										ELEV. (ft) DEPTH (ft)
										Begin Coring @ 35.5 ft
284.7	35.5	1.5	28:11	(0.9)			(16.3)			284.7 WEATHERED ROCK: Black, Grey and Tan to Orange Brown to Reddish Brown; Severely Weathered; Medium Hard to Moderately Hard Metamudstone with Close to Very Close Fracture Spacing 35.5
283.2	37.0		15:12/0.5	60%			53%			
		2.0	25:57	(1.0)						Majority is Very Broken
281.2	39.0		21:04	50%						Run#2 Cut Short Due to Core Block
280.8	39.3	2.7	N=100/0.3							Run#3 Completed Run #2
			35:37/0.7	(2.7)						Run#4 Cut Short Due to Core Block
278.2	42.0		46:51	100%						Run#5 Completed Run #4
		3.7	41:04							Run#7 Cut Short Due to Core Block
			39:32	(2.3)						Run#8 Completed Run #7
			45:29	62%						Run #9 Cut Short Due to Core Block
274.5	45.7		43:43							Run#10 Completed Run #9
			33:19/0.7							Run#11 Cut Short Due to Core Block
273.2	47.0	1.3	5:49/0.3	(1.3)	(1.0)					Run#12 Completed Run #11
		5.0	44:31	100%	77%					
			28:36	(0.7)						
			33:32	14%						
			34:44							
			23:16							
268.2	52.0		37:16							
267.8	52.4									
		2.2	24:50/0.6	(0.9)						
265.6	54.6		48:38	41%						
		2.4	14:34/0.6							
			21:53/0.4	(1.7)						
263.2	57.0		49:39	71%						
		4.0	49:03							
			55:37	(2.0)						
			55:49	50%						
			28:43							
259.2	61.0		17:08							
258.2	62.0	1.0	17:44	(0.8)						
		2.0	16:00	80%						
256.2	64.0		16:15							
		3.0	17:11	(0.9)						
			25:12	45%						
253.2	67.0		28:47	(1.4)						
				47%						253.2 67.0
										Coring Terminated at Elevation 253.2 ft. in Weathered Rock: Metamudstone
										Note: Pond Water Alone Used as Drilling Fluid
										Boring Terminated at Elevation 253.2 ft

NCDOT CORE SINGLE COPY OF 071-07-020CNEW.GPJ NC_DOT.GDT 7/23/07

CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B2-B



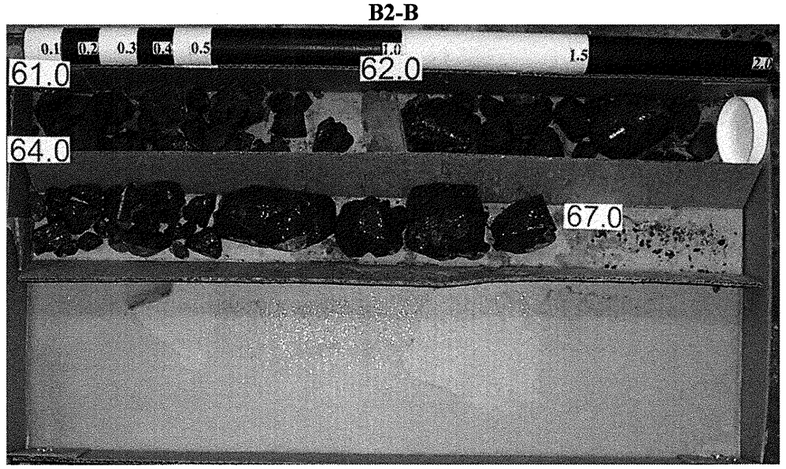
Box 1 of 3

Box 2 of 3
(SCALE = 1:4)

CORE PHOTOGRAPHS

NCDOT Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 over Winston-Salem Southbound Railroad on SR 1627

B2-B



Box 3 of 3
(SCALE = 1:4)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** G.Licayan
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 16+16	**OFFSET** 15ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 328.0 ft	**TOTAL DEPTH** 38.8 ft	**NORTHING** 1,666,884	**EASTING** 508,963	**24 HR.** 24.5
DRILL MACHINE Acker AD-II	**DRILL METHOD** Wash Rotary		**HAMMER TYPE** 140lb Manual	
START DATE 05/04/07	**COMP. DATE** 05/04/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

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
330									ELEV. (ft) DEPTH (ft)
327.0	1.0								328.0 0.0
324.5	3.5	5	5	6	11		M		ROADWAY EMBANKMENT FILL: Soft to Stiff, Tan and Red, Fine to Coarse Sandy, Silty CLAY with Trace Root Fragments and Some Gravel
322.0	6.0	5	4	4	8		M		
319.5	8.5	5	5	2	7	SS-15	25.8%		
314.5	13.5	3	2	2	4		W		
309.5	18.5	3	2	3	5	SS-16	30.9%		
304.5	23.5	29	44	42	86		M		312.0 16.0 RESIDUAL: Hard; Black, Tan and Red; Clayey; Coarse to Fine Sandy SILT with Rock Fragments at Bottom of Sampler
299.5	28.5	46	54/0.3		100/0.8				307.0 21.0 WEATHERED ROCK: Black, Grey and Tan Metamudstone
294.5	33.5	100/0.5			100/0.5				
289.5	38.5	100/0.4			100/0.4				
		100/0.3			100/0.3				289.2 38.8 Boring Terminated at Elevation 289.2 ft. in Weathered Metamudstone

Note: Pond Water Alone Used as Drilling Fluid

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33688.1.1	**ID.** B-4410	**COUNTY** Anson	**GEOLOGIST** T.Wells
SITE DESCRIPTION Replace Bridge No. 307 Over Winston-Salem Southbound RR on SR 1627			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 16+75	**OFFSET** 16ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 327.6 ft	**TOTAL DEPTH** 20.8 ft	**NORTHING** 1,666,900	**EASTING** 508,898	**24 HR.** Dry
DRILL MACHINE Acker AD-II	**DRILL METHOD** HSA		**HAMMER TYPE** 140lb Manual	
START DATE 05/31/07	**COMP. DATE** 05/31/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

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
330									ELEV. (ft) DEPTH (ft)
326.6	1.0								327.6 0.0
324.1	3.5	5	6	5	11		M		RESIDUAL: Stiff to Very Stiff, Tan Brown, Clayey, Fine to Coarse Sandy SILT with Trace Rock Fragments
321.6	6.0	5	5	8	13		M		
319.1	8.5	4	5	7	12	SS-17	14.4%		
314.1	13.5	5	15	10	25		M		314.6 13.0 WEATHERED ROCK: Black and Tan Metamudstone
309.1	18.5	100/0.4			100/0.4				
306.9	20.7	65	35/0.1		100/0.6				306.8 20.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 306.8 ft. on Crystalline Rock: Metamudstone
		60/0.1			60/0.1				

NCDOT BORE SINGLE 071-07-020NEW.GPJ NC_DOT.GDT 7/20/07

State Project No. 33688.1.1
TIP No. B-4410 F.A. No. BRZ-1627 (4)
Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627
Anson County, North Carolina
SUMMARY OF LABORATORY TEST DATA

						Atterberg Limits			Gradation Results							
Boring Number	Sample Depth (ft.)	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	6.0-7.5	SS-1	17.5	A-4 (1)	8	35	30	5	100	65	55	47	39	8	28	25
EB1-A	23.5-25.0	SS-2	41.8	A-7-5 (25)	17	59	39	20	100	99	93	9	2	7	25	66
EB1-A	43.5-45.0	SS-3	68.4	A-7-5 (11)	8	65	41	24	100	81	54	49	27	22	16	35
EB1-B	13.5-15.0	SS-4	33.1	A-6 (6)	11	39	27	12	92	69	61	40	28	6	25	41
EB1-B	28.5-30.0	SS-5	66.1	A-7-5 (20)	7	56	36	20	100	95	83	21	6	15	39	40
EB1-B	38.5-40.0	SS-6	79.1	A-5 (1)	7	59	NP	NP	100	87	50	56	23	33	31	13
B1-A	3.5-5.0	SS-7	26.7	A-6 (7)	5	38	26	12	76	69	64	36	11	5	42	42
B1-A	13.5-15.0	SS-8	32.4	A-7-6 (3)	19	42	29	13	100	75	45	49	34	25	15	26
B1-B	3.5-5.0	SS-9	28.1	A-6 (8)	5	34	22	12	90	85	77	24	7	8	49	36
B1-B	8.5-10.0	SS-10	34.5	A-7-6 (27)	8	51	23	28	99	97	88	13	4	8	19	69
B2-A	1.0-2.5	SS-11	25.4	A-6 (7)	5	36	25	11	93	79	73	28	18	5	27	50
B2-A	23.5-25.0	SS-12	32.0	A-5 (5)	35	42	32	10	100	86	59	45	23	22	23	32
B2-B	3.8-5.3	SS-13	26.4	A-6 (6)	12	35	24	11	81	71	66	34	15	4	39	42
B2-B	14.7-16.3	SS-14	37.6	A-7-5 (7)	15	42	30	12	99	88	65	37	16	20	22	42
EB2-A	6.0-7.5	SS-15	25.8	A-6 (7)	7	38	20	18	72	59	55	45	20	4	37	39
EB2-A	13.5-15.0	SS-16	30.9	A-6 (7)	5	40	27	13	90	77	63	38	19	12	23	46
EB2-B	6.0-7.5	SS-17	14.4	A-4 (0)	12	30	25	5	97	49	39	61	54	6	13	27

* SS = Split-Barrel 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: 071-07-020
Page: 1 of 1

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 33688.1.1
TIP NO.: B-4410
F.A. NO.: BRZ-1627 (4)
COUNTY: Anson
DESCRIPTION: Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627

Sample #	Boring #	Depth (ft.)	Rock Type	Geologic Map Unit	Run RQD	Length (ft.)	Diameter (ft.)	Dry Density (lbs/cu. ft.)	Unconfined Compressive Strength (psi)	Maximum Load (lbs.)	Loading Rate (in./min.)
RS-1	B1-A	55.8-56.1	Metavolcanic Rock	$\mathbb{C}Zmd_2$	62%	0.3408	0.1667	154.7	12,427	39,020	0.009
RS-2	B2-A	69.8-70.1	Meta-Argillite	$\mathbb{C}Zmd_2$	41%	0.2917	0.1667	168.6	10,548	33,120	0.009

SITE PHOTOGRAPHS
State Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627
Anson County, North Carolina
Page 1 of 4

Photograph 1 – View Approximately 15' Rt. of -L-
Looking Upstation from EB1-B

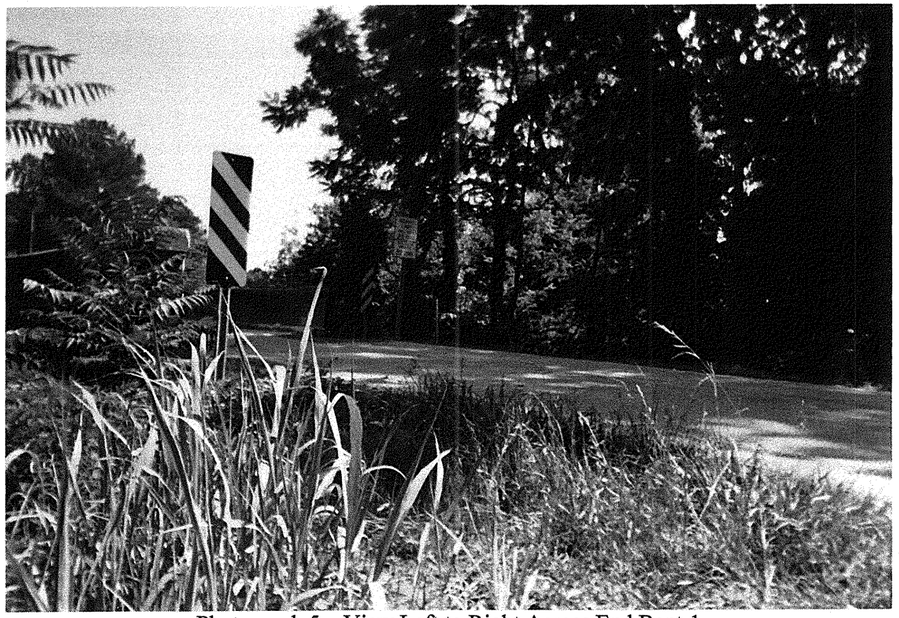
Photograph 2 – View Approximately 15' Right of -L-
Looking Downstation from Railroad

SITE PHOTOGRAPHS
State Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627
Anson County, North Carolina
Page 2 of 4

Photograph 3 – View Approximately 15' Rt. of -L-
Looking Upstation from Railorad

Photograph 4 – View Approximately 15' Rt. of -L-
Looking Downstation from EB2-B

SITE PHOTOGRAPHS
State Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627
Anson County, North Carolina
Page 3 of 4



Photograph 5 – View Left to Right Across End Bent-1

Photograph 6 – View Left to Right Across Bent-1

SITE PHOTOGRAPHS
State Project No. 33688.1.1 TIP No. B-4410
Bridge No. 307 Over Winston-Salem Southbound Railroad on SR 1627
Anson County, North Carolina
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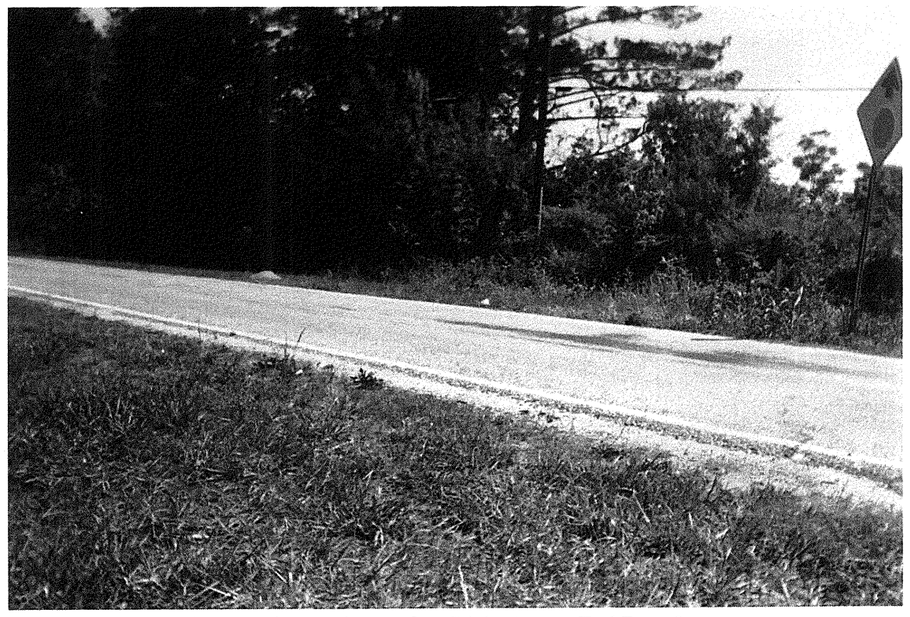
Photograph 7 – View Left to Right Across Bent-2



Photograph 8 – View Left to Right Across End Bent-2