STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4629	1	29

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33804.1.1 TIP NO. B-4629

F.A. PROJECT BRSTP-2048(2)

COUNTY ROWAN

PROJECT DESCRIPTION REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048

SITE DESCRIPTION

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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.

PROJECT: 33804.1.1 ID: B-4629

CONTENTS:

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D. ZETTLE

INVESTIGATED BY M. TERRELL, J. FREGOSI

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SUBMITTED BY P. WEAVER

DATE 09/03/09

Structure Design

NORTH CAROLINA LICENSED SEAL 1500 GEOLOGIST PAUL M. WEAVER

10/14/05

DRAWN BY: SLK

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.

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4629	33804.1.1	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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. 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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
% PASSING #40	30 MX	50 MX	51 MN											
% PASSING #200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	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

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT (PLASTIC RANGE (PI))		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — 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, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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 IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 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 SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — 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 - CALIFORNIA BEARING RATIO 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, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
W - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B- 57
- [ ] BK-51
- [ ] CME-45
- [ ] CME-55
- [ ] PORTABLE HOIST
- [ ] CME 850
- [X] DIETRICH D-50

ADVANCING TOOLS:
- [ ] CLAY BITS
- [X] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE ___ " STEEL TEETH
- [X] TRICONE 3 7/8 " TUNG.-CARB.
- [X] CORE BIT
- [ ] ___

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B ___
- [X] -N Q
- [ ] -H ___

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

ROCK DESCRIPTION

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, 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 CONCRETIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 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 THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

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

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

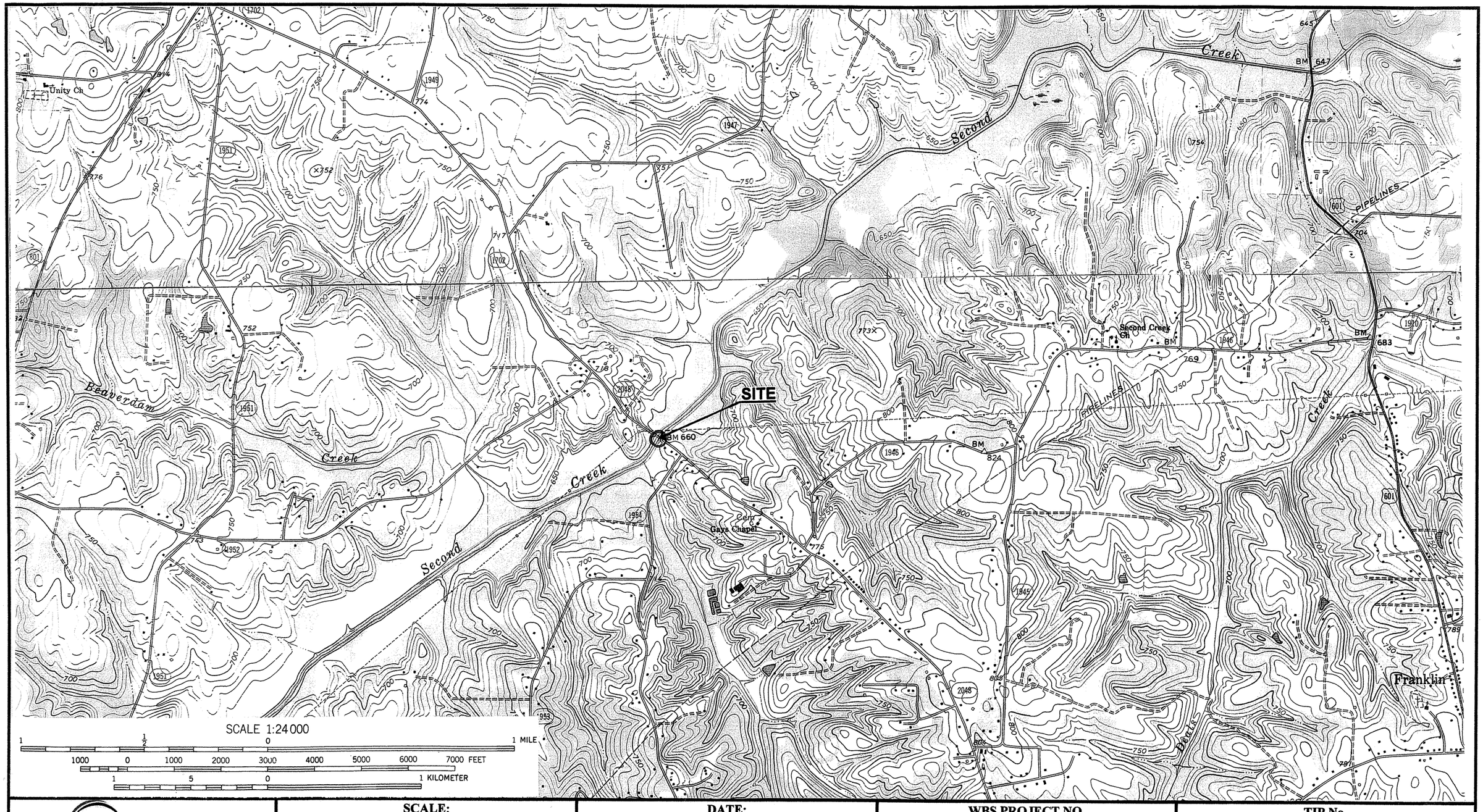
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-3, 10+02.46

ELEVATION: 657.42 FT.

NOTES:
-

REVISED 02/23/06

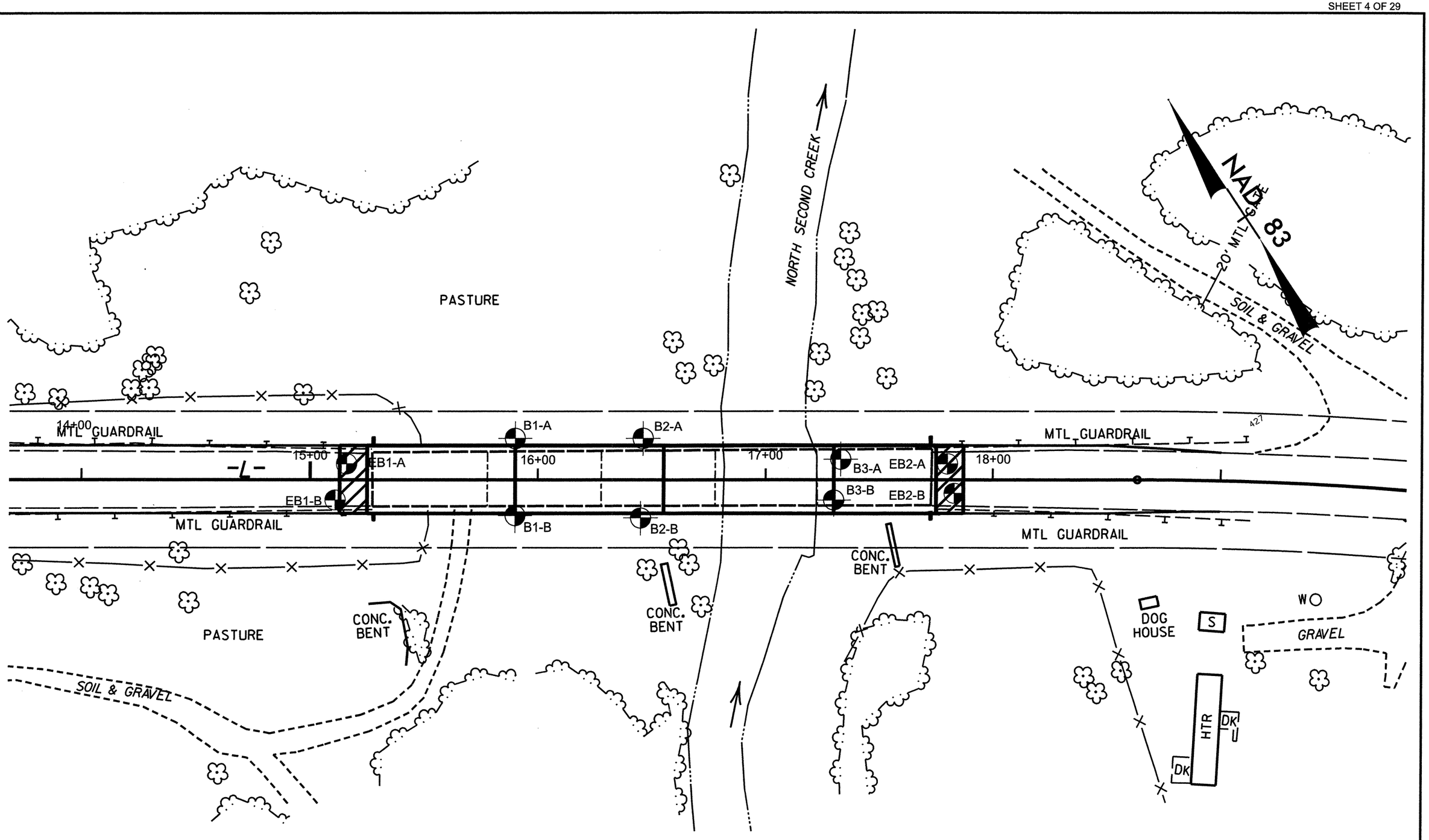


KLEINFELDER Bright People. Right Solutions. Kleinfelder Southeast, Inc. Greensboro North Carolina	**SCALE:** 1:24,000	**DATE:** 9/1/2009	**WBS PROJECT NO.** 33804.1.1	**TIP No.** B-4629
	SITE VICINITY MAP **Replace Bridge No. 25 over Second Creek on SR 2408, Rowan County, North Carolina**			
	USGS Quadrangle – Rowan Mills and Cooleemee, North Carolina		**SHEET NUMBER:** 3	

DRAWING NAME: 105194_b4629_rdy_psh.dgn

KLEINFELDER JOB NUMBER: 105194

OFFICE LOCATION: GREENSBORO



GRAPHIC SCALE

40 0 40 80

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	1" = 40'

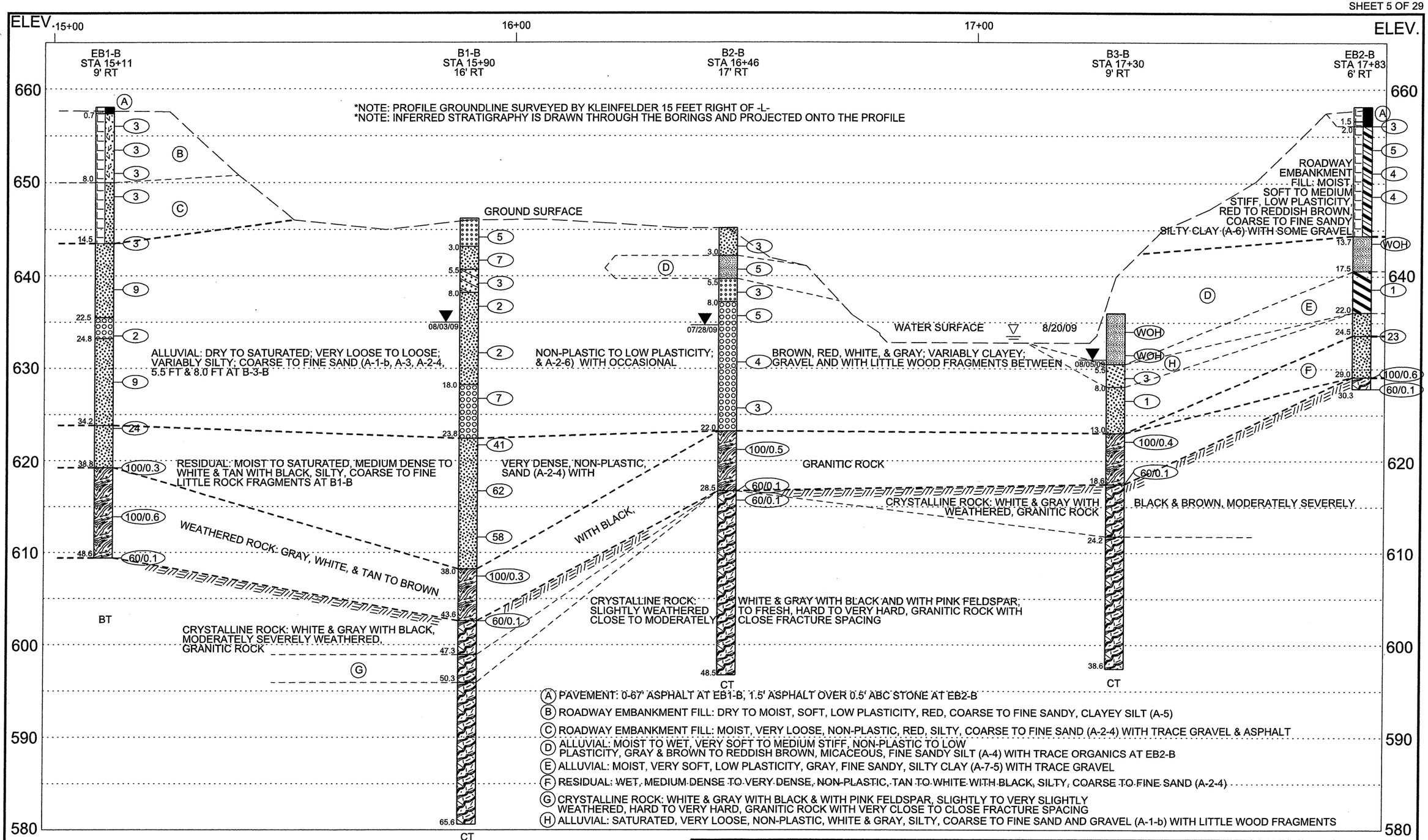
SITE PLAN

REPLACE BRIDGE NO.25 OVER SECOND CREEK ON SR 2048

TIP NO. B-4629 FEDERAL NO. BRSTP-2048 (2)

ROWAN COUNTY
NORTH CAROLINA

SHEET NO. **4**



(A) PAVEMENT: 0-67' ASPHALT AT EB1-B, 1.5' ASPHALT OVER 0.5' ABC STONE AT EB2-B

(B) ROADWAY EMBANKMENT FILL: DRY TO MOIST, SOFT, LOW PLASTICITY, RED, COARSE TO FINE SANDY, CLAYEY SILT (A-5)

(C) ROADWAY EMBANKMENT FILL: MOIST, VERY LOOSE, NON-PLASTIC, RED, SILTY, COARSE TO FINE SAND (A-2-4) WITH TRACE GRAVEL & ASPHALT

(D) ALLUVIAL: MOIST TO WET, VERY SOFT TO MEDIUM STIFF, NON-PLASTIC TO LOW PLASTICITY, GRAY & BROWN TO REDDISH BROWN, MICACEOUS, FINE SANDY SILT (A-4) WITH TRACE ORGANICS AT EB2-B

(E) ALLUVIAL: MOIST, VERY SOFT, LOW PLASTICITY, GRAY, FINE SANDY, SILTY CLAY (A-7-5) WITH TRACE GRAVEL

(F) RESIDUAL: WET, MEDIUM DENSE TO VERY DENSE, NON-PLASTIC, TAN TO WHITE WITH BLACK, SILTY, COARSE TO FINE SAND (A-2-4)

(G) CRYSTALLINE ROCK: WHITE & GRAY WITH BLACK & WITH PINK FELDSPAR, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, GRANITIC ROCK WITH VERY CLOSE TO CLOSE FRACTURE SPACING

(H) ALLUVIAL: SATURATED, VERY LOOSE, NON-PLASTIC, WHITE & GRAY, SILTY, COARSE TO FINE SAND AND GRAVEL (A-1-b) WITH LITTLE WOOD FRAGMENTS

FILE NAME: 105194_profiles.dgn

0 10 20 40
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10' HORIZONTAL 1" = 20'

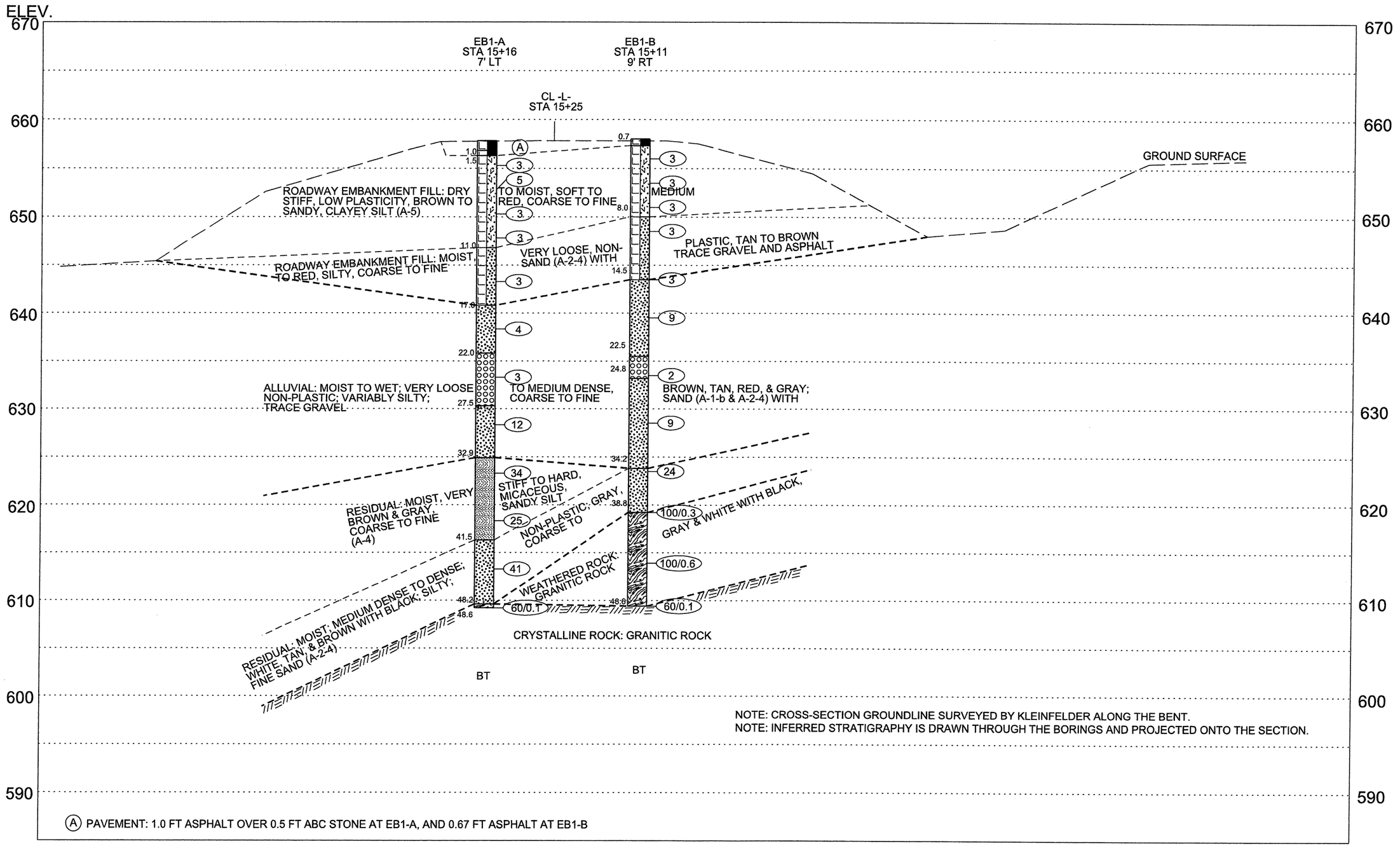
PROFILE AT 15' RIGHT OF -L-

REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048

TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**

ROWAN COUNTY NORTH CAROLINA

SHEET NO. **5**



NOTE: CROSS-SECTION GROUNDLINE SURVEYED BY KLEINFELDER ALONG THE BENT.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ONTO THE SECTION.

(A) PAVEMENT: 1.0 FT ASPHALT OVER 0.5 FT ABC STONE AT EB1-A, AND 0.67 FT ASPHALT AT EB1-B

FILE NAME: 105194_profiles.dgn

0 5 10 20
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10' HORIZONTAL 1" = 10'

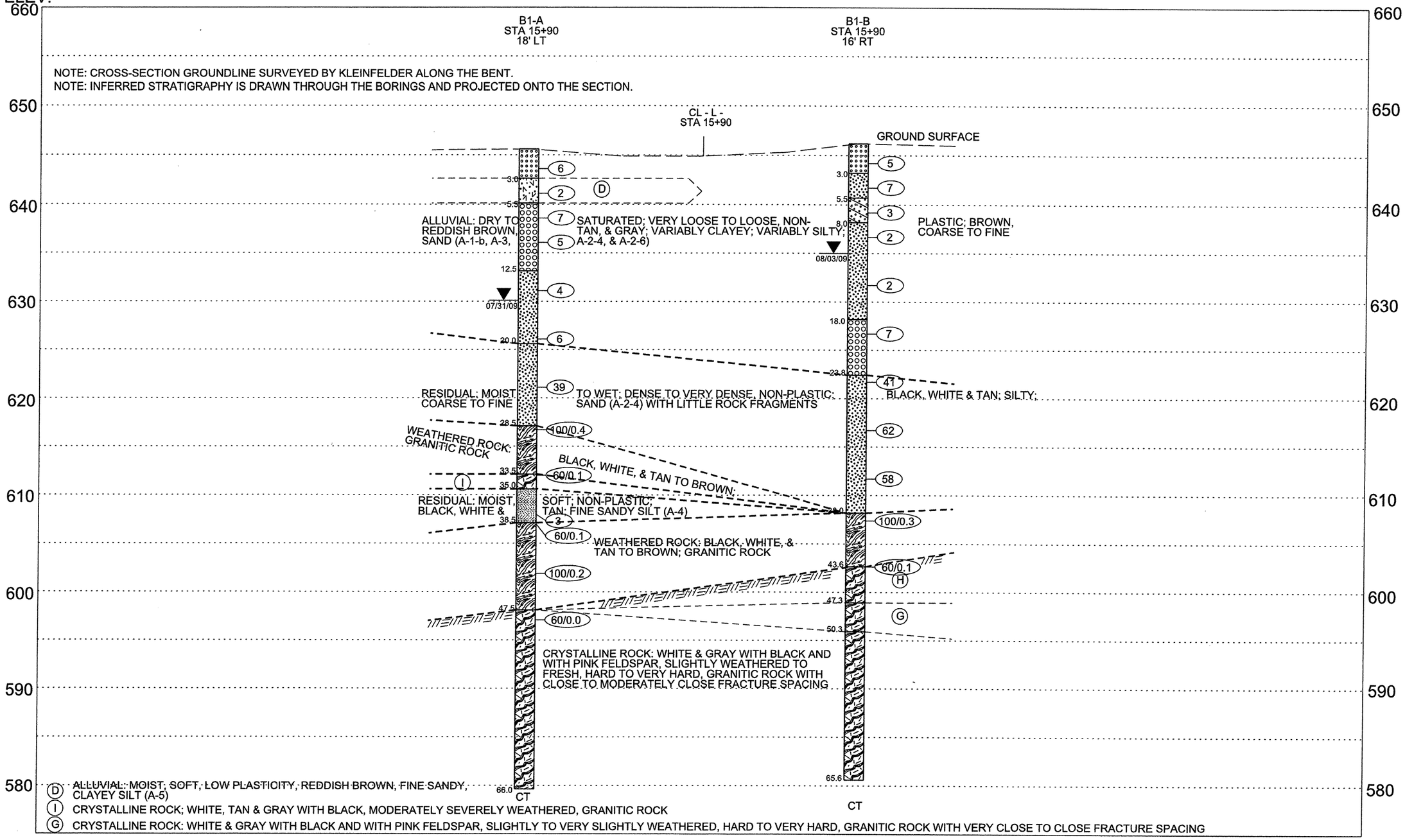
CROSS-SECTION AT END BENT - 1

REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048

TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**

ROWAN COUNTY NORTH CAROLINA

SHEET NO. **6**



FILE NAME: 105194_profiles.dgn

0 5 10 20
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10'
	HORIZONTAL 1" = 10'

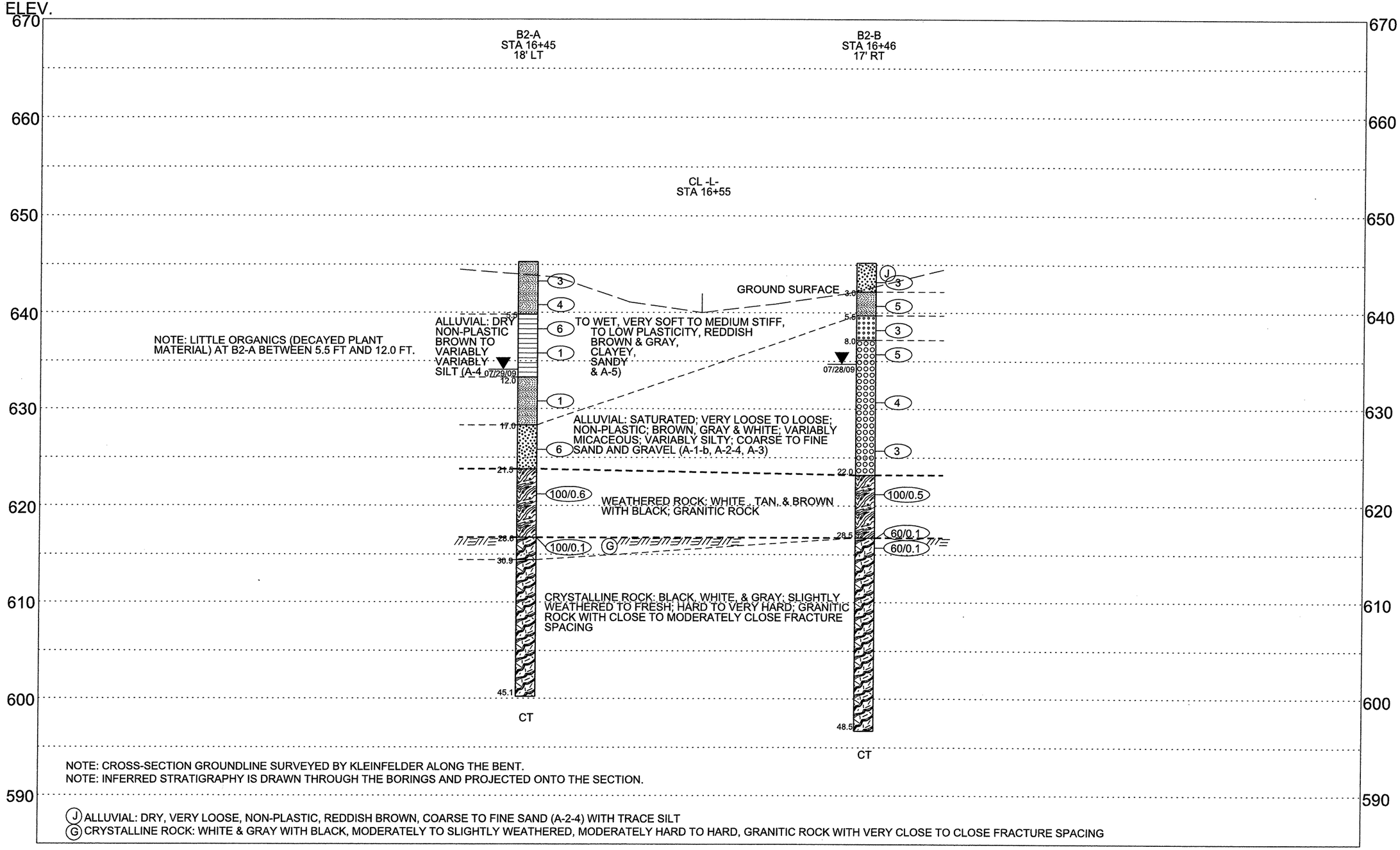
CROSS-SECTION AT BENT - 1

REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048

TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**

ROWAN COUNTY NORTH CAROLINA

SHEET NO. **7**



FILE NAME: 105194_profiles.dgn

0 5 10 20
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10' HORIZONTAL 1" = 10'

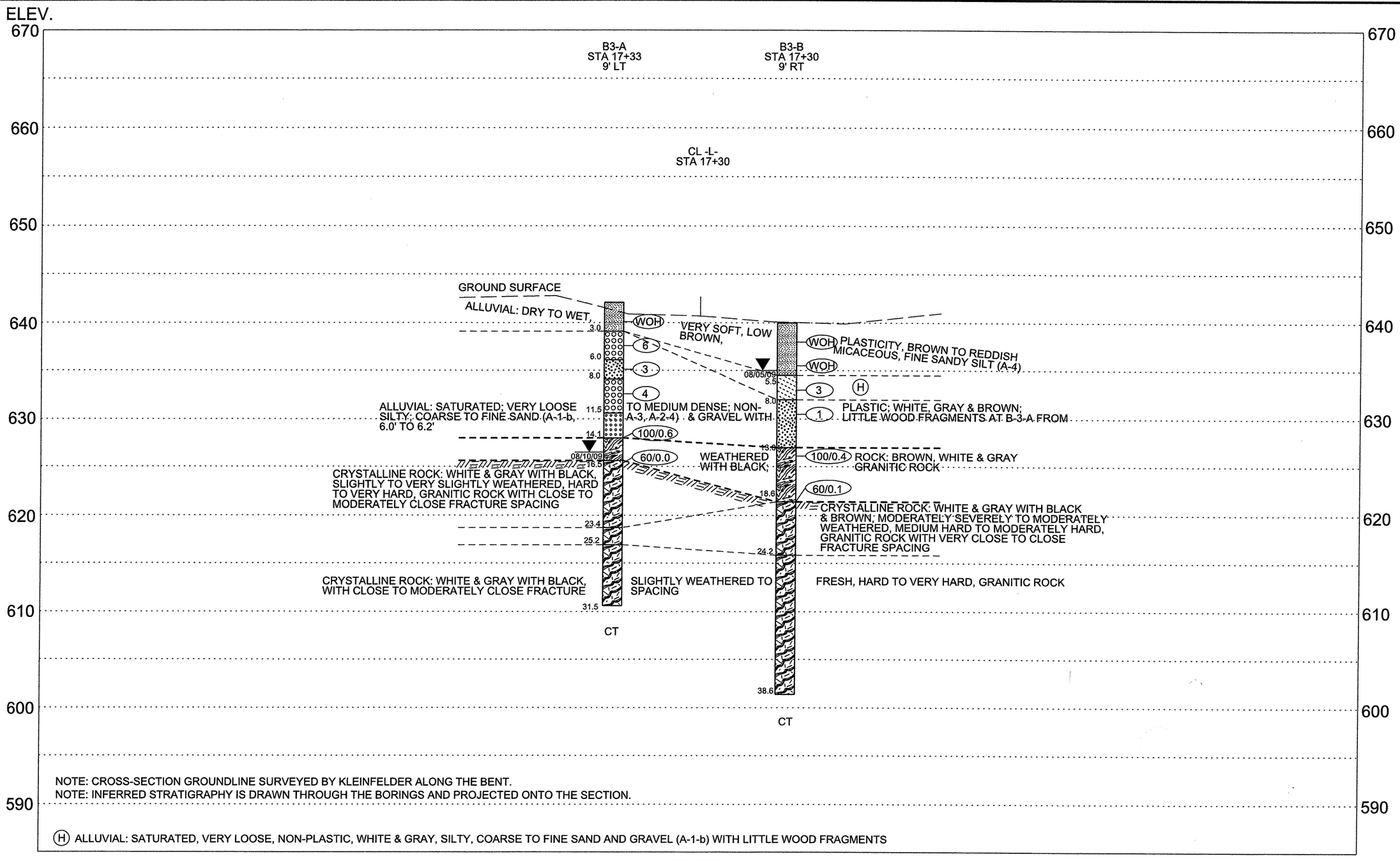
CROSS-SECTION AT BENT - 2

REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048

TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**

ROWAN COUNTY NORTH CAROLINA

SHEET NO. **8**



NOTE: CROSS-SECTION GROUNDLINE SURVEYED BY KLEINFELDER ALONG THE BENT.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ONTO THE SECTION.

(H) ALLUVIAL: SATURATED, VERY LOOSE, NON-PLASTIC, WHITE & GRAY, SILTY, COARSE TO FINE SAND AND GRAVEL (A-1-b) WITH LITTLE WOOD FRAGMENTS

FILE NAME: 105194_profiles.dgn

0 5 10 20
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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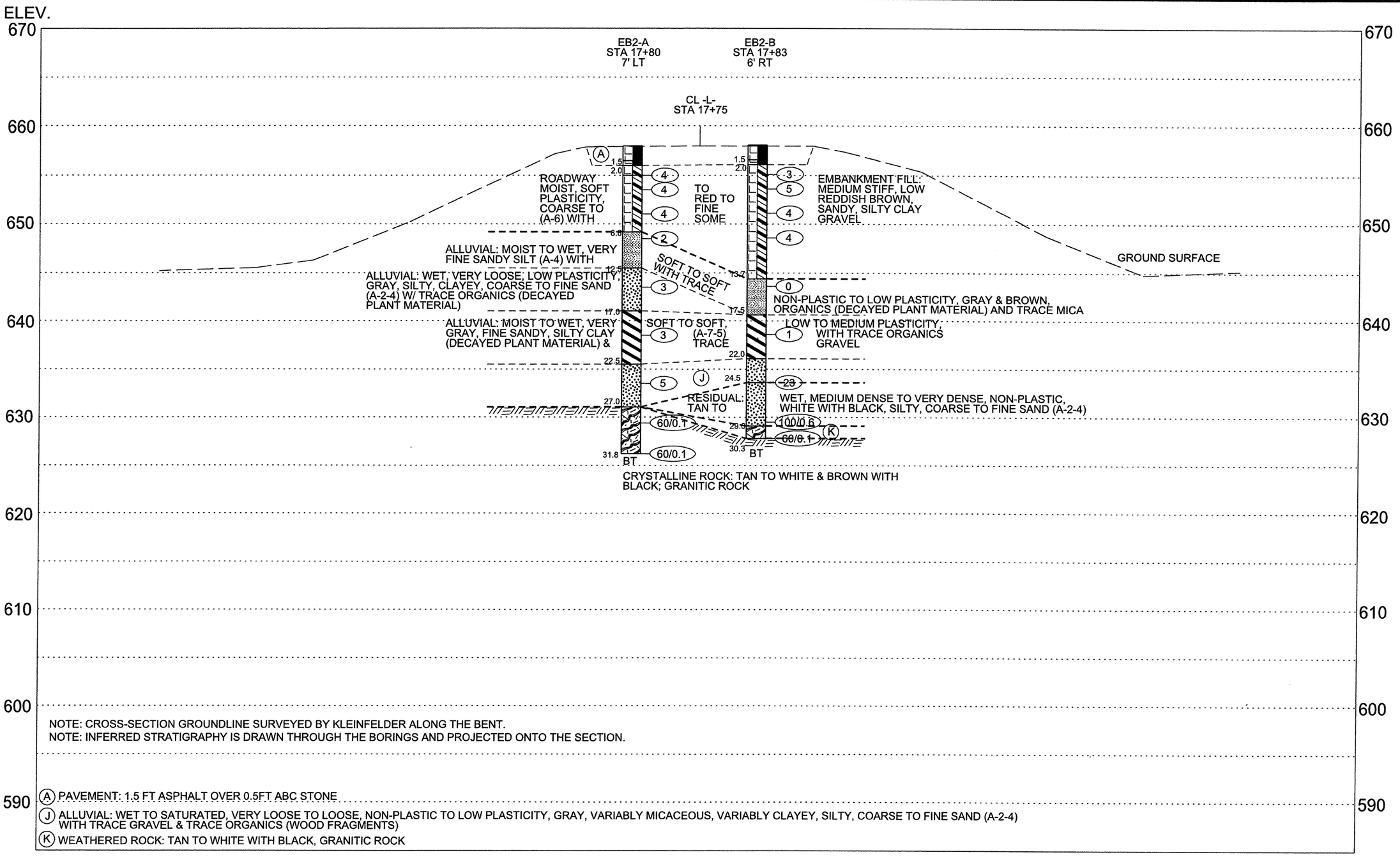
PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10' HORIZONTAL 1" = 10'

CROSS-SECTION AT BENT - 3
REPLACE BRIDGE NO. 25 OVER SECOND CREEK ON SR 2048
TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**
ROWAN COUNTY NORTH CAROLINA

SHEET NO. **9**



NOTE: CROSS-SECTION GROUNDLINE SURVEYED BY KLEINFELDER ALONG THE BENT.
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ONTO THE SECTION.

(A) PAVEMENT: 1.5 FT ASPHALT OVER 0.5FT ABC STONE

(J) ALLUVIAL: WET TO SATURATED, VERY LOOSE TO LOOSE, NON-PLASTIC TO LOW PLASTICITY, GRAY, VARIABLY MICACEOUS, VARIABLY CLAYEY, SILTY, COARSE TO FINE SAND (A-2-4) WITH TRACE GRAVEL & TRACE ORGANICS (WOOD FRAGMENTS)

(K) WEATHERED ROCK: TAN TO WHITE WITH BLACK, GRANITIC ROCK

FILE NAME: 105194_profiles.dgn

0 5 10 20
HORIZONTAL SCALE

0 5 10 20
VERTICAL SCALE

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PROJECT NO.	33804.1.1
DRAWN:	09/03/2009
DRAWN BY:	SLK
CHECKED BY:	PW
SCALE:	VERTICAL 1" = 10' HORIZONTAL 1" = 10'

CROSS-SECTION AT END BENT - 2

REPLACE BRIDGE NO. 25
OVER SECOND CREEK
ON SR 2048

TIP NO. B-4629 | **FEDERAL NO. BRSTP-2048 (2)**

ROWAN COUNTY
NORTH CAROLINA

SHEET NO.
10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** J. Fregosi/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 15+16	**OFFSET** 7ft LT	**ALIGNMENT** -L-	**0 HR.** 26.7
COLLAR ELEV. 657.8 ft	**TOTAL DEPTH** 48.6 ft	**NORTHING** 728,336	**EASTING** 1,537,508	**24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/11/09	**COMP. DATE** 08/11/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 48.2 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
660										657.8 GROUND SURFACE	0.0
	656.3	1.5								656.8 ROADWAY EMBANKMENT 1.0 ft. Asphalt	1.0
655			2	1	2	3		M		656.3 ROADWAY EMBANKMENT 0.5 ft. ABC Stone	1.5
	653.8	4.0								ROADWAY EMBANKMENT Soft to Medium Stiff, Low Plasticity, Brown to Red, Coarse to Fine Sandy, Clayey SILT	
	651.3	6.5	2	2	3	5		M			
650			2	1	2	3		M			
	648.8	9.0									
			WOH	1	2	3		M		646.8 ROADWAY EMBANKMENT Very Loose, Non-Plastic, Tan to Brown to Red, Silty, Coarse to Fine SAND with Trace Gravel	11.0
645	644.3	13.5									
			2	2	1	3		M			
640	639.3	18.5								640.8 ALLUVIAL Loose, Non-Plastic, Red to Tan, Coarse to Fine SAND with Trace Silt	17.0
			2	3	1	4		M			
635	634.3	23.5								635.8 ALLUVIAL Very Loose, Non-Plastic, Brown and Gray, Fine to Coarse SAND with Little Gravel and Trace Silt	22.0
			2	2	1	3		W			
630	629.3	28.5								630.3 ALLUVIAL Medium Dense, Non-Plastic, Gray and Brown, Silty, Coarse to Fine SAND with Trace Gravel	27.5
			5	5	7	12		W			
625	624.3	33.5								624.9 RESIDUAL Very Stiff to Hard, Non-Plastic, Brown and Gray, Micaceous, Coarse to Fine Sandy SILT	32.9
			5	9	25	34		M			
620	619.3	38.5									
			13	13	12	25		M			
615	614.3	43.5								616.3 RESIDUAL Dense; Non-Plastic; Gray, White, and Brown, Silty; Coarse to Fine SAND	41.5
			14	21	20	41		M			
610	609.3	48.5								609.6	48.2
			60/0.1			60/0.1				609.2 CRYSTALLINE ROCK Crystalline Rock: Granitic Rock Boring Terminated with Standard Penetration Test Refusal at Elevation 609.2 ft in Crystalline Rock: Granitic Rock	48.6
605											
600											
595											
590											
585											
580											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/14/09

SHEET 11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 15+11	**OFFSET** 9ft RT	**ALIGNMENT** -L-	**0 HR.** 22.0
COLLAR ELEV. 658.0 ft	**TOTAL DEPTH** 48.6 ft	**NORTHING** 728,325	**EASTING** 1,537,495	**24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/03/09	**COMP. DATE** 08/03/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 48.6 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
660										658.0 GROUND SURFACE	0.0
	657.0	1.0								657.3 ROADWAY EMBANKMENT 0.67 ft. Asphalt	0.7
655			2	2	1	3		D		ROADWAY EMBANKMENT Soft, Low Plasticity, Red, Coarse to Fine Sandy, Clayey SILT	
	654.5	3.5									
	652.0	6.0	1	2	1	3		M			
650			2	1	2	3		M			
	649.5	8.5								650.0	8.0
			1	1	2	3		M		ROADWAY EMBANKMENT Very Loose, Non-Plastic, Red, Silty, Coarse to Fine SAND with Trace Gravel and Asphalt	
645	644.5	13.5									
			1	1	2	3		M			
640	639.5	18.5								643.5 ALLUVIAL Very Loose to Loose, Non-Plastic, Brown and Red, Silty, Coarse to Fine SAND	14.5
			4	4	5	9		M			
635	634.5	23.5								635.5	22.5
			2	1	1	2		Sat.		ALLUVIAL Very Loose, Non-Plastic, Gray, Fine to Coarse SAND with Little Gravel and Trace Silt	
630	629.5	28.5								633.2	24.8
			3	5	4	9		Sat.		ALLUVIAL Loose, Non-Plastic, Reddish Brown, Silty, Coarse to Fine SAND with Clay Lense at 29.9 ft.	
625	624.5	33.5									
			5	8	16	24		Sat.		623.8 RESIDUAL Medium Dense, Non-Plastic, White and Tan with Black, Silty, Coarse to Fine SAND	34.2
620	619.5	38.5									
			100/0.3			100/0.3		Sat.		619.2 WEATHERED ROCK Gray and White with Black, Granitic Rock	38.8
615	614.5	43.5									
			84	16/0.1		100/0.6					
610	609.5	48.5								609.4	48.6
			60/0.1			60/0.1				Boring Terminated with Standard Penetration Test Refusal at Elevation 609.4 ft on Crystalline Rock: Granitic Rock	
605											
600											
595											
590											
585											
580											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan		**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. EB1-B U.D.	**STATION** 15+07	**OFFSET** 9ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 658.0 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 728,327	**EASTING** 1,537,491	**24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA			**HAMMER TYPE** 140 lb. Auto
START DATE 08/03/09	**COMP. DATE** 08/03/09	**SURFACE WATER DEPTH** N/A		**DEPTH TO ROCK** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
660										ELEV. (ft) DEPTH (ft)
										658.0 GROUND SURFACE 0.0
655										**ROADWAY EMBANKMENT** Auger Probe to 6.0 ft. Through Soft, Low Plasticity, Red, Coarse to Fine Sandy, Clayey SILT to Take HD Sample No. 1 From 6.0 ft. to 8.0 ft.
650							UD-1			650.0 8.0
										Boring Terminated at Elevation 650.0 ft in Roadway Embankment Fill: A-5
645										
640										
635										
630										
625										
620										
615										
610										
605										
600										
595										
590										
585										
580										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 15+90	**OFFSET** 18ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.6 ft	**TOTAL DEPTH** 66.0 ft	**NORTHING** 728,304	**EASTING** 1,537,575	**24 HR.** 15.5
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 07/29/09	**COMP. DATE** 07/30/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 33.5 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
650										
645	644.6	1.0								645.6 GROUND SURFACE 0.0
	642.1	3.5	2	3	3	6		M		**ALLUVIAL** Loose, Non-Plastic, Reddish Brown, Micaceous, Fine SAND with Trace Silt 642.6 3.0
640	639.6	6.0	1	1	1	2		M		**ALLUVIAL** Soft, Low Plasticity, Reddish Brown, Fine Sandy, Clayey SILT 640.1 5.5
	637.1	8.5	4	3	4	7		Sat.		**ALLUVIAL** Loose, Non-Plastic, Coarse to Fine SAND and Gravel with Trace Silt
635	632.1	13.5	2	3	2	5		Sat.		633.1 12.5
630	627.1	18.5	1	2	2	4		Sat.		**ALLUVIAL** Loose, Non-Plastic, Tan and Gray, Micaceous , Variably Silty, Coarse to Fine SAND with Trace Organics (Decayed Plant Material) and with Little Gravel Below 18.0 ft.
625	622.1	23.5	2	2	4	6		Sat.		625.6 20.0 **RESIDUAL** Dense; Non-Plastic; Black, White, and Tan; Micaceous; Silty; Coarse to Fine SAND
620	617.1	28.5	16	19	20	39		W		617.1 28.5 **WEATHERED ROCK** Black, White, and Tan to Brown; Granitic Rock
615			100/0.4			100/0.4				
610	612.1	33.5	60/0.1			60/0.1				612.1 33.5 **CRYSTALLINE ROCK** Black, White, and Tan; Granitic Rock 610.6 35.0 **RESIDUAL** Soft; Non-Plastic; Black, White, and Tan; Fine Sandy SILT 607.1 38.5 **WEATHERED ROCK** Black, White, and Tan; Granitic Rock
	609.0	36.6								
605	607.1	38.5	2	2	1	3		M		
	602.1	43.5	60/0.1			60/0.1				
600			100/0.2			100/0.2				
595	597.1	48.5	60/0.0			60/0.0				598.1 47.5 **CRYSTALLINE ROCK** White and Gray with Black and With Pink Feldspar, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing
590										
585										
580										579.6 66.0 Boring Terminated at Elevation 579.6 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 66.8 lbs./cu.ft.
575										
570										

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

SHEET 13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan		**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 15+90	**OFFSET** 18ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.6 ft	**TOTAL DEPTH** 66.0 ft	**NORTHING** 728,304	**EASTING** 1,537,575	**24 HR.** 15.5
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 07/29/09	**COMP. DATE** 07/30/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 33.5 ft	
CORE SIZE NQ	**TOTAL RUN** 21.5 ft	**DRILLER** W. Duggins		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
612											Begin Coring @ 33.6 ft
610	612.0	33.6	3.0	1:18 0:51 1:21	(0.0) 0%	(0.0) 0%					610.6 **CRYSTALLINE ROCK** Black, White, and Tan; Granitic Rock *(continued)* 35.0
	609.0	36.6		*N=3*				(0.0) 0%	NA		**RESIDUAL** Soft; Non-Plastic; Black, White, and Tan; Fine Sandy SILT 607.1 38.5
605				*N=60/0.1*				(0.0) 0%	NA		**WEATHERED ROCK** Black, White, and Tan; Granitic Rock
600				*N=100/0.2*							598.1 47.5
	598.1	47.5									**CRYSTALLINE ROCK** White and Gray with Black and With Pink Feldspar, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing
595	594.6	51.0	3.5	1:36/0.5 4:43 *N=60/0.0* 5:41 4:19	(2.7) 77%	(1.5) 43%		(16.4) 89%	(13.5) 73%		Majority of Joints at 0° to 10° 3 Joints at 35° to 45° Very Close Fracture Spacing 50.4 ft. to 51.0 ft., 51.5 ft. to 51.6 ft., 52.0 ft. to 52.1 ft., 53.4 ft. to 53.6 ft., and 57.7 ft. to 57.8 ft.
590	589.6	56.0	5.0	2:32 4:46 6:34 6:21 4:41	(4.1) 82%	(3.7) 74%					
585	584.6	61.0	5.0	6:34 4:11 4:22 5:23 5:03	(4.9) 98%	(3.9) 78%					
580	579.6	66.0	5.0	5:28 5:51 7:26 6:19 5:21	(4.7) 94%	(4.4) 88%					579.6 66.0 Boring Terminated at Elevation 579.6 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 66.8 lbs./cu.ft.
575											
570											
565											
560											
555											
550											
545											
540											
535											

NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B1-A

Box 1 of 2

Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 15+90	**OFFSET** 16ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 646.2 ft	**TOTAL DEPTH** 65.6 ft	**NORTHING** 728,275	**EASTING** 1,537,556	**24 HR.** 11.2
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto
START DATE 07/30/09	**COMP. DATE** 07/31/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 43.6 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
650											
645	645.2	1.0								646.2 GROUND SURFACE	0.0
	642.7	3.5	2	2	3	5 7		D		**ALLUVIAL** Loose, Non-Plastic, Brown, Fine SAND with Trace SILT	
640	640.2	6.0	3	3	4			M		643.2	3.0
	637.7	8.5	2	1	2	3		W		**ALLUVIAL** Loose, Non-Plastic, Reddish Brown, Silty, Coarse to Fine SAND with Trace Clay and Mica	
635			1	1	1	2		Sat.		640.7	5.5
	632.7	13.5								638.2	8.0
630			1	1	1	2		Sat.		**ALLUVIAL** Very Loose, Low Plasticity, Reddish Brown, Clayey, Silty, Coarse to Fine SAND	
	627.7	18.5								**ALLUVIAL** Very Loose, Non-Plastic, Reddish Brown to Gray, Variably Silty, Coarse to Fine SAND	
625			1	3	4	7		Sat.		628.2	18.0
	622.7	23.5								**ALLUVIAL** Loose, Non-Plastic, Gray, Silty, Coarse to Fine SAND and Gravel	
620			17	24	17	41		M		622.4	23.8
	617.7	28.5								**RESIDUAL** Dense to Very Dense, Non-Plastic, White and Tan with Black, Silty, Coarse to Fine SAND with Little Rock Fragments	
615			24	29	33	62		M			
	612.7	33.5									
610			15	23	35	58		M			
	607.7	38.5	100/0.3			100/0.3				608.2	38.0
605										**WEATHERED ROCK** White and Tan to Brown with Black, Granitic Rock	
	602.7	43.5	60/0.1			60/0.1				602.6	43.6
600										**CRYSTALLINE ROCK** White and Gray with Black, Moderately Severely Weathered, Granitic Rock	
										598.9	47.3
595										**CRYSTALLINE ROCK** White and Gray with Black and with Pink Feldspar, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Very Close to Close Fracture Spacing	
										595.9	50.3
590										**CRYSTALLINE ROCK** White and Gray with Black and with Pink Feldspar, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
585											
580										580.6	65.6
										Boring Terminated at Elevation 580.6 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 67.0 lbs./cu.ft.	
575											
570											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/13/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 15+90	**OFFSET** 16ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 646.2 ft	**TOTAL DEPTH** 65.6 ft	**NORTHING** 728,275	**EASTING** 1,537,556	**24 HR.** 11.2
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto
START DATE 07/30/09	**COMP. DATE** 07/31/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 43.6 ft
CORE SIZE NQ	**TOTAL RUN** 22.0 ft		**DRILLER** W. Duggins

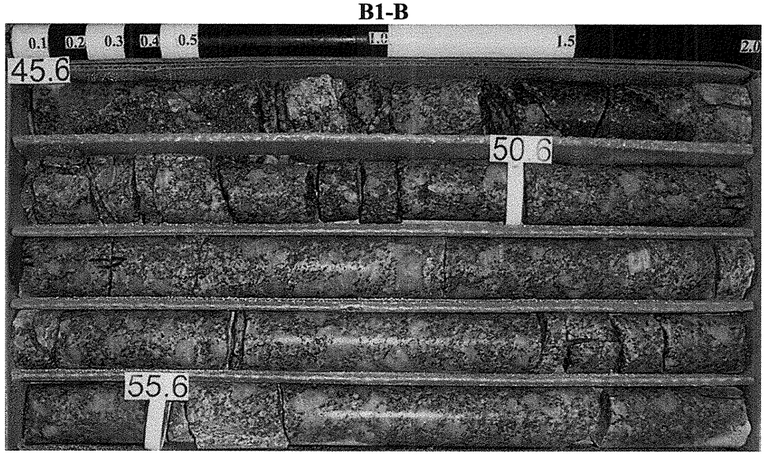
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
602.6											Begin Coring @ 43.6 ft	
	602.6 – 600.6	43.6 – 45.6	2.0	1:47/0.4 2:02 :30/0.6	(0.0) 0%	(0.0) 0%		(0.0) 0%	(0.0) 0%		602.6 **CRYSTALLINE ROCK** White and Gray with Black, Moderately Severely Weathered, Granitic Rock	43.6
600			5.0	1:10 1:43 6:05 5:11 5:08	(3.3) 66%	(0.6) 12%		(3.0) 100%	(0.6) 20%		598.9	47.3
595	595.6	50.6	5.0	6:18 5:46 6:47 7:13 6:47	(5.0) 100%	(3.5) 70%		(15.3) 100%	(11.3) 74%		595.9 **CRYSTALLINE ROCK** White and Gray with Black and with Pink Feldspar, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Very Close to Close Fracture Spacing Majority of Joints at 0° to 10° Near Vertical Fracture Through Majority	50.3
590	590.6	55.6	5.0	6:07 6:14 6:57 4:44 4:01	(5.0) 100%	(4.1) 82%					**CRYSTALLINE ROCK** White and Gray with Black and with Pink Feldspar, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing Majority of Joints at 0° to 10° Very Close Fracture Spacing 58.4 ft. to 58.6 ft., 59.7 ft. to 59.8 ft., 63.6 ft. to 63.9 ft., and 64.3 ft. to 64.4 ft.	
585	585.6	60.6	5.0	4:57 4:05 4:54 3:53 3:34	(5.0) 100%	(3.7) 74%					580.6	65.6
580	580.6	65.6									Boring Terminated at Elevation 580.6 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 67.0 lbs./cu.ft.	
575												
570												
565												
560												
555												
550												
545												
540												
535												
530												
525												

NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

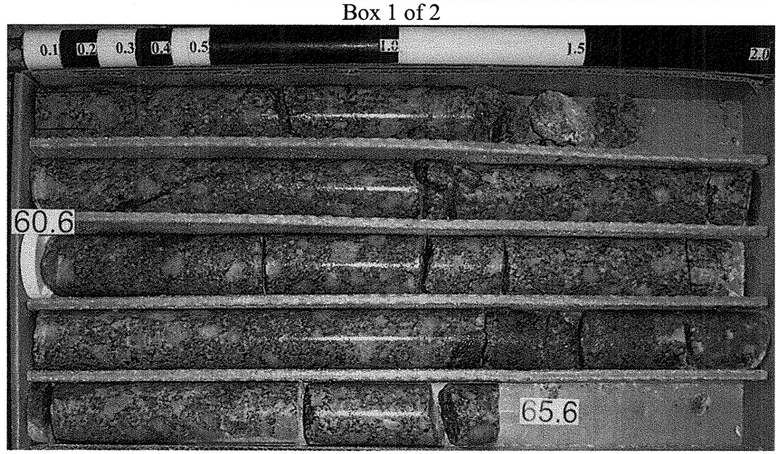
CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B1-B



Box 1 of 2



Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan		**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 16+45	**OFFSET** 18ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.3 ft	**TOTAL DEPTH** 45.1 ft	**NORTHING** 728,272	**EASTING** 1,537,622	**24 HR.** 11.2
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core			**HAMMER TYPE** 140 lb. Auto
START DATE 07/28/09	**COMP. DATE** 07/28/09	**SURFACE WATER DEPTH** N/A		**DEPTH TO ROCK** 28.6 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
650											
645										645.3 GROUND SURFACE	0.0
	644.3	1.0	2	1	2	3		M		**ALLUVIAL** Soft to Medium Stiff, Non-Plastic, Brown, Micaceous, Fine Sandy SILT	
	641.8	3.5	2	2	2	4		M		639.8	5.5
640	639.3	6.0	3	3	3	6		D		**ALLUVIAL** Medium Stiff to Very Soft, Low Plasticity, Brown and Gray, Clayey SILT with Some Mica and Little Organics (Decayed Plant Material)	
	636.8	8.5	WOH	WOH	1	1		W		633.3	12.0
635	631.8	13.5	WOH	1	WOH	1		Sat.		**ALLUVIAL** Very Soft, Non-Plastic, Gray, Fine Sandy SILT	
	626.8	18.5	2	3	3	6		Sat.		628.3	17.0
630	623.8	21.5	85	15/0.1		100/0.6				**ALLUVIAL** Loose, Non-Plastic, Gray and White, Coarse to Fine SAND with Trace SILT	
625	621.8	23.5								623.8	21.5
	616.8	28.5	100/0.1			100/0.1				**WEATHERED ROCK** White, Tan, and Brown; Granitic Rock	
620										616.7	28.6
615										**CRYSTALLINE ROCK** White and Gray with Black, Moderately to Slightly Weathered, Moderately Hard to Hard, Granitic Rock with Very Close to Close Fracture Spacing	
610										614.4	30.9
605										**CRYSTALLINE ROCK** White and Gray with Black, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
600										600.2	45.1
595										Boring Terminated at Elevation 600.2 ft in Crystalline Rock: Granitic Rock	
590										Note: Bentonite and Creek Water Used as Drilling Fluid	
585										Mud Weight = 67.8 lbs./cu.ft.	
580											
575											
570											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

SHEET 17

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan		**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 16+45	**OFFSET** 18ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.3 ft	**TOTAL DEPTH** 45.1 ft	**NORTHING** 728,272	**EASTING** 1,537,622	**24 HR.** 11.2
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core			**HAMMER TYPE** 140 lb. Auto
START DATE 07/28/09	**COMP. DATE** 07/28/09	**SURFACE WATER DEPTH** N/A		**DEPTH TO ROCK** 28.6 ft
CORE SIZE NQ	**TOTAL RUN** 16.5 ft			**DRILLER** W. Duggins

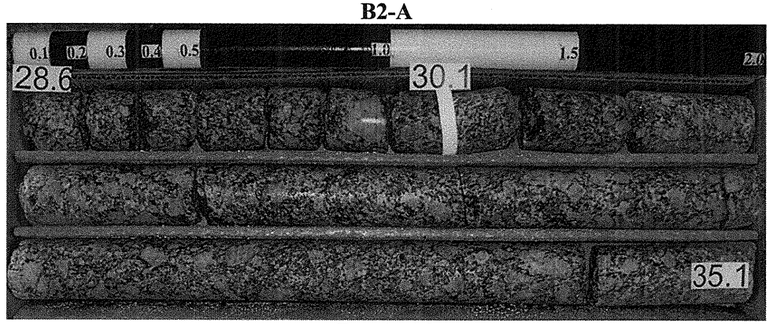
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
616.7											Begin Coring @ 28.6 ft	
615	616.7	28.6	1.5	2:21/0.5 3:27	(1.1) 73%	(0.0) 0%		(1.7) 74%	(0.0) 0%		616.7 **CRYSTALLINE ROCK**	28.6
	615.2	30.1	5.0	3:43 3:28 2:55 3:36 3:38	(4.8) 96%	(3.9) 78%		(14.0) 99%	(12.6) 89%		614.4 White and Gray with Black, Moderately to Slightly Weathered, Moderately Hard to Hard, Granitic Rock with Very Close to Close Fracture Spacing	30.9
610	610.2	35.1	5.0	4:52 3:01 2:32 2:09 2:28	(4.9) 98%	(4.3) 86%					Joints at 0° to 10° **CRYSTALLINE ROCK** White and Gray with Black, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
605	605.2	40.1	5.0	4:10 4:04 3:47 2:32 3:09	(4.9) 98%	(4.4) 88%					Joints at 0° to 10° Very Close Fracture Spacing at 36.7 ft. to 36.9 ft., 38.2 ft. to 38.3 ft., 39.6 ft. to 39.7 ft., and 40.3 ft. to 40.4 ft.	
600	600.2	45.1									600.2	45.1
595											Boring Terminated at Elevation 600.2 ft in Crystalline Rock: Granitic Rock	
590											Note: Bentonite and Creek Water Used as Drilling Fluid	
585											Mud Weight = 67.8 lbs./cu.ft.	
580												
575												
570												
565												
560												
555												
550												
545												
540												

NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

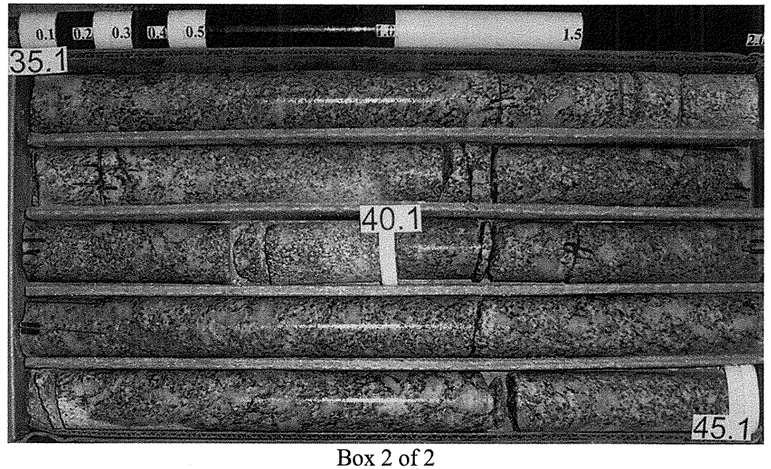
CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B2-A



Box 1 of 2



Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 16+46	**OFFSET** 17ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.2 ft	**TOTAL DEPTH** 48.5 ft	**NORTHING** 728,244	**EASTING** 1,537,601	**24 HR.** 10.5
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 07/27/09	**COMP. DATE** 07/27/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 28.5 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
650												
645										645.2	GROUND SURFACE	0.0
	644.2	1.0	2	1	2	3		D			**ALLUVIAL** Very Loose, Non-Plastic, Reddish Brown, Micaceous, Coarse to Fine SAND with Trace Silt	
	641.7	3.5	3	2	3	5		M		642.2	**ALLUVIAL** Medium Stiff, Non-Plastic, Reddish Brown, Micaceous, Fine Sandy SILT	3.0
640	639.2	6.0	1	1	2	3		M		639.7	**ALLUVIAL** Very Loose, Non-Plastic, Reddish Brown, Silty, Fine SAND	5.5
	636.7	8.5	1	2	3	5		▼		637.2	**ALLUVIAL** Loose to Very Loose, Non-Plastic, Brown and Gray, Micaceous, Silty, Coarse to Fine SAND and Gravel	8.0
635												
	631.7	13.5	2	2	2	4		Sat.				
630												
	626.7	18.5	1	2	1	3		Sat.				
625												
	621.7	23.5	100/0.5			100/0.5				623.2	**WEATHERED ROCK** Tan to White with Black, Granitic Rock	22.0
620												
	616.7	28.5	60/0.1			60/0.1				616.7	**CRYSTALLINE ROCK** Black and White, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	28.5
615	615.8	29.4	60/0.1			60/0.1						
610												
605												
600												
595										596.7	Boring Terminated at Elevation 596.7 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 68.8 lbs./cu.ft.	48.5
590												
585												
580												
575												
570												

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/14/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 16+46	**OFFSET** 17ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 645.2 ft	**TOTAL DEPTH** 48.5 ft	**NORTHING** 728,244	**EASTING** 1,537,601	**24 HR.** 10.5
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 07/27/09	**COMP. DATE** 07/27/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 29.5 ft	
CORE SIZE NQ	**TOTAL RUN** 19.0 ft		**DRILLER** W. Duggins	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	ELEV. (ft)	DESCRIPTION AND REMARKS	DEPTH (ft)
615.7													
615	615.7	29.5	4.0	3:15 2:50 1:55 2:03	(3.6) 90%	(2.8) 70%		(17.9) 94%	(14.9) 78%		615.7	Begin Coring @ 29.5 ft **CRYSTALLINE ROCK** White and Gray with Black, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing Joints at 0° to 10° Very Close Fracture Spacing at 29.9 ft. to 30.1 ft., 30.4 ft. to 30.8 ft., 32.7 ft. to 32.8 ft., 35.8 ft. to 35.9 ft., 37.0 ft. to 37.1 ft., and 45.9 ft. to 46.5 ft.	29.5
	611.7	33.5	5.0	4:01 3:26 3:08 2:42 3:28	(4.9) 98%	(3.8) 76%							
610	606.7	38.5	5.0	1:47 2:11 2:23 2:50 3:15	(4.7) 94%	(3.9) 78%							
605	601.7	43.5	5.0	2:54 3:23 3:09 4:20 4:17	(4.7) 94%	(4.4) 88%							
600	596.7	48.5									596.7	Boring Terminated at Elevation 596.7 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 68.8 lbs./cu.ft.	48.5
595													
590													
585													
580													
575													
570													
565													
560													
555													
550													
545													
540													

NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/14/09

CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B2-B

Box 1 of 2

Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 17+33	**OFFSET** 9ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 642.1 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 728,216	**EASTING** 1,537,689	**24 HR.** 15.6
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/07/09	**COMP. DATE** 08/07/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 16.5 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
645										642.1 GROUND SURFACE	0.0
	641.1	1.0								**ALLUVIAL** Very Soft, Low Plasticity, Brown, Micaceous, Fine Sandy SILT	
640			WOH	WOH	WOH	0		D		639.1	3.0
	638.6	3.5								**ALLUVIAL** Loose, Non-Plastic, Gray, Silty, Coarse to Fine SAND and Gravel	
			3	3	3	6		Sat.		636.1	6.0
635	636.1	6.0								**ALLUVIAL** Very Loose, Non-Plastic, Gray, Silty, Coarse to Fine SAND	
			2	2	1	3		Sat.		634.1	8.0
	633.6	8.5								Note: Wood at 6.0 ft. to 6.2 ft.	
630			3	2	2	4		Sat.		630.6	11.5
	628.6	13.5								**ALLUVIAL** Loose, Non-Plastic, Gray, Silty, Coarse to Fine SAND with Little Gravel and With Thin Clayey Lenses	
			13	87/0.1		100/0.6				628.0	14.1
625	625.3	16.8								**ALLUVIAL** Medium Dense, Non-Plastic, Gray and Brown, Silty, Fine SAND	
			60/0.0			60/0.0				625.6	16.5
620										**WEATHERED ROCK** Brown and White with Black, Granitic Rock	
										618.7	23.4
										CRYSTALLINE ROCK White and Gray with Black, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
615										616.9	25.2
										CRYSTALLINE ROCK White and Gray with Black and Brown, Moderately Weathered, Medium Hard to Moderately Hard, Granitic Rock with Very Close to Close Fracture Spacing	
610										610.6	31.5
										CRYSTALLINE ROCK White and Gray with Black, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
605										Boring Terminated at Elevation 610.6 ft in Crystalline Rock: Granitic Rock	
600										Note: Bentonite and Creek Water Used as Drilling Fluid	
595										Mud Weight = 64.2 lbs./cu.ft.	
590											
585											
580											
575											
570											
565											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

SHEET 21

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 17+33	**OFFSET** 9ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 642.1 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 728,216	**EASTING** 1,537,689	**24 HR.** 15.6
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/07/09	**COMP. DATE** 08/07/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 16.5 ft	
CORE SIZE NQ	**TOTAL RUN** 15.0 ft		**DRILLER** W. Duggins	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
625.6											Begin Coring @ 16.5 ft	
	625.6	16.5	5.0	3:09	(4.8)	(4.3)		(6.7)	(6.2)		625.6 **CRYSTALLINE ROCK**	16.5
				N=60/0.0	96%	86%		97%	90%		White and Gray with Black, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	
				2:13								
				3:38							Majority of Joints at 0° to 10°	
620				4:04							1 Joint at 60°	
	620.6	21.5		2:21							618.7 Very Close Fracture Spacing at 20.1 ft. to 20.2 ft.	23.4
			5.0	4:41	(4.4)	(2.9)		(1.2)	(0.0)		**CRYSTALLINE ROCK**	
				3:26	88%	58%		67%	0%		616.9 White and Gray with Black and Brown, Moderately Weathered, Medium Hard to Moderately Hard, Granitic Rock with Very Close to Close Fracture Spacing	25.2
				3:51								
				4:47							Majority of Joints at 0° to 10°	
615	615.6	26.5		3:32								
			5.0	3:48	(4.8)	(4.3)		(6.1)	(5.3)		**CRYSTALLINE ROCK**	
				3:05	96%	86%		97%	84%		610.6 White and Gray with Black, Slightly to Very Slightly Weathered, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing	31.5
				4:48								
610	610.6	31.5		5:03							Joints at 0° to 10°	
				2:47							Very Close Fracture Spacing at 26.1 ft. to 26.5 ft.	
605											Boring Terminated at Elevation 610.6 ft in Crystalline Rock: Granitic Rock	
600											Note: Bentonite and Creek Water Used as Drilling Fluid	
595											Mud Weight = 64.2 lbs./cu.ft.	
590												
585												
580												
575												
570												
565												
560												
555												
550												

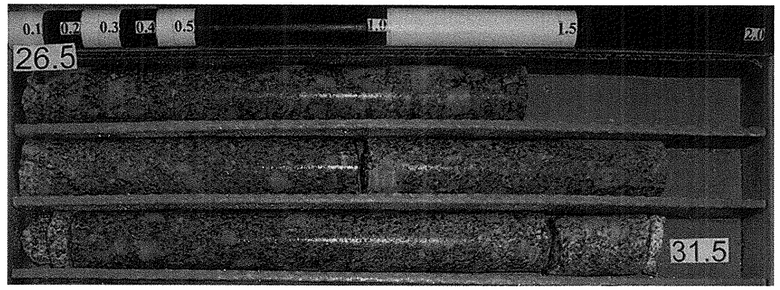
NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B3-A

Box 1 of 2



Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 17+30	**OFFSET** 9ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 636.0 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 728,203	**EASTING** 1,537,676	**24 HR.** 5.0
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/04/09	**COMP. DATE** 08/04/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 18.6 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
640										
635	635.0	1.0								636.0 GROUND SURFACE 0.0
	632.5	3.5	WOH	WOH	WOH	0		W		**ALLUVIAL** Very Soft, Low Plasticity, Reddish Brown, Micaceous, Fine Sandy SILT
630	630.0	6.0	WOH	WOH	WOH	0				630.5 5.5
	627.5	8.5	1	1	2	3		Sat.		**ALLUVIAL** Very Loose, Non-Plastic, White and Gray, Silty, Coarse to Fine SAND and Gravel with Little Wood Fragments 628.0 8.0
625			WOH	WOH	1	1		Sat.		**ALLUVIAL** Very Loose, Non-Plastic, White and Gray, Silty, Coarse to Fine SAND 623.0 13.0
	622.5	13.5	100/0.4			100/0.4				**WEATHERED ROCK** Brown, White and Gray; Granitic Rock
620										
	617.5	18.5	60/0.1			60/0.1				617.4 18.6 **CRYSTALLINE ROCK** White and Gray with Black and Brown, Moderately Severely Weathered, Granitic Rock
615										611.8 24.2
610										**CRYSTALLINE ROCK** White and Gray with Black, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing
605										
600										
595										597.4 38.6 Boring Terminated at Elevation 597.4 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 65.6 lbs./cu.ft.
590										
585										
580										
575										
570										
565										
560										

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

SHEET 23

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver	
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 17+30	**OFFSET** 9ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 636.0 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 728,203	**EASTING** 1,537,676	**24 HR.** 5.0
DRILL MACHINE Dietrich D50	**DRILL METHOD** Wash Rotary/NQ Core		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/04/09	**COMP. DATE** 08/04/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 18.6 ft	
CORE SIZE NQ	**TOTAL RUN** 20.0 ft		**DRILLER** W. Duggins	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
617.4											Begin Coring @ 18.6 ft
615	617.4	18.6	5.0	2:20 1:10 1:36 9:41 6:48	(0.0) 0%	(0.0) 0%		(0.0) 0%	(0.0) 0%		617.4 **CRYSTALLINE ROCK** 18.6 White and Gray with Black and Brown, Moderately Severely Weathered, Granitic Rock
	612.4	23.6	5.0	2:50 2:32 3:43 3:48 3:58	(4.4) 88%	(3.9) 78%		(14.4) 100%	(13.6) 94%		611.8 24.2 **CRYSTALLINE ROCK** White and Gray with Black, Very Slightly Weathered to Fresh, Hard to Very Hard, Granitic Rock with Close to Moderately Close Fracture Spacing Joints at 0° to 10° Very Close Fracture Spacing at 25.2 ft. to 25.3 ft., 26.3 ft. to 26.5 ft., 34.8 ft. to 35.1 ft.
610	607.4	28.6	5.0	4:21 3:38 3:11 3:14 5:01	(5.0) 100%	(5.0) 100%					
605	602.4	33.6	5.0	4:26 3:34 3:34 3:24 5:18	(5.0) 100%	(4.7) 94%					
600	597.4	38.6									597.4 38.6 Boring Terminated at Elevation 597.4 ft in Crystalline Rock: Granitic Rock Note: Bentonite and Creek Water Used as Drilling Fluid Mud Weight = 65.6 lbs./cu.ft.
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											
540											

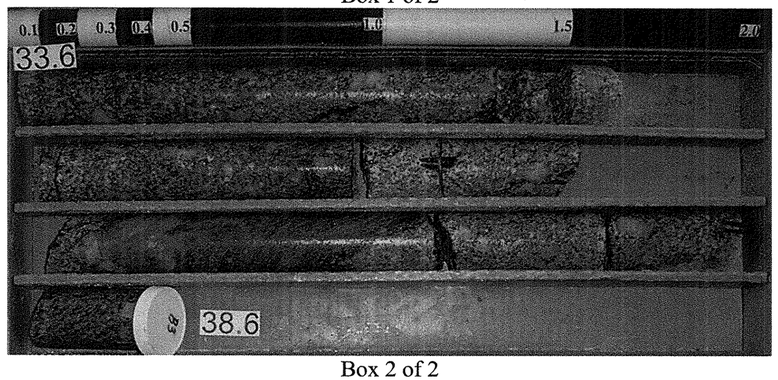
NCDOT CORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

CORE PHOTOGRAPHS

NCDOT Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048

B3-B

Box 1 of 2



Box 2 of 2

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 17+80	**OFFSET** 7ft LT	**ALIGNMENT** -L-	**0 HR.** 30.0
COLLAR ELEV. 658.0 ft	**TOTAL DEPTH** 31.8 ft	**NORTHING** 728,188	**EASTING** 1,537,727	**24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/10/09	**COMP. DATE** 08/10/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 27.0 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
660										658.0 GROUND SURFACE	0.0
	656.0	2.0								656.5 **ROADWAY EMBANKMENT** 1.5 ft. Asphalt	1.5
655	654.5	3.5	1	1	3	4		M		656.0 **ROADWAY EMBANKMENT** 0.5 ft. ABC Stone	2.0
	652.0	6.0	WOH	1	3	4		M		**ROADWAY EMBANKMENT** Soft to Medium Stiff, Low Plasticity, Red, Coarse to Fine Sandy, Silty CLAY	
650	649.5	8.5	1	2	2	4		M		649.2	8.8
			1	1	1	2		M		**ALLUVIAL** Soft, Non-Plastic, Gray and Brown, Micaceous, Fine Sandy SILT	
645	644.5	13.5								645.5	12.5
			WOH	2	1	3		W		**ALLUVIAL** Very Loose, Low Plasticity, Gray, Silty, Clayey, Coarse to Fine SAND with Trace Organics (Decayed Plant Material)	
640	639.5	18.5								641.0	17.0
			WOH	1	2	3		W		**ALLUVIAL** Soft, Medium Plasticity, Gray, Silty CLAY with Trace Organics (Decayed Plant Material)	
635	634.5	23.5								635.5	22.5
			3	2	3	5		Sat.		**ALLUVIAL** Loose, Non-Plastic, Gray, Silty, Coarse to Fine SAND with Trace Gravel and Organics (Wood Fragments)	
630	629.5	28.5								631.0	27.0
			60/0.1			60/0.1				**CRYSTALLINE ROCK** Tan to White and Brown, with Black, Granitic Rock	
	626.3	31.7								626.2	31.8
625			60/0.1			60/0.1				Boring Terminated with Standard Penetration Test Refusal at Elevation 626.2 ft in Crystalline Rock: Granitic Rock	
620											
615											
610											
605											
600											
595											
590											
585											
580											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

SHEET 25

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. EB2-A U.D.	**STATION** 17+83	**OFFSET** 8ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 658.0 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 728,187	**EASTING** 1,537,730	**24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA		**HAMMER TYPE** 140 lb. Auto	
START DATE 08/10/09	**COMP. DATE** 08/10/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
660										658.0 GROUND SURFACE	0.0
655										**ROADWAY EMBANKMENT** Auger Probe to 6.0 ft. Through Soft to Medium Stiff, Low Plasticity, Red, Coarse to Fine Sandy, Silty, CLAY to Take HD Sample No. 7 From 6.0 ft. to 8.0 ft.	
650							UD-2			650.0	8.0
645										Boring Terminated at Elevation 650.0 ft in Roadway Embankment Fill: A-6	
640											
635											
630											
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33804.1.1	**ID.** B-4629	**COUNTY** Rowan	**GEOLOGIST** M. Terrell/P. Weaver
SITE DESCRIPTION Replace Bridge No. 25 Over Second Creek on SR 2048			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 17+83	**OFFSET** 6ft RT	**ALIGNMENT** -L- **0 HR.** 29.8
COLLAR ELEV. 658.1 ft	**TOTAL DEPTH** 30.3 ft	**NORTHING** 728,176	**EASTING** 1,537,722 **24 HR.** N/A
DRILL MACHINE Dietrich D50	**DRILL METHOD** HSA		**HAMMER TYPE** 140 lb. Auto
START DATE 08/10/09	**COMP. DATE** 08/10/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										658.1 GROUND SURFACE	0.0
	656.1	2.0								656.6 **ROADWAY EMBANKMENT** 1.5 ft. Asphalt	1.5
655	654.6	3.5	1	1	2	3		M		656.1 **ROADWAY EMBANKMENT** 0.5 ft. ABC Stone	2.0
	652.1	6.0	1	2	3	5		M		**ROADWAY EMBANKMENT** Soft to Medium Stiff, Low Plasticity, Red to Reddish Brown, Coarse to Fine Sandy, Silty CLAY with Some Gravel	
650	649.6	8.5	1	2	2	4		M			
645	644.6	13.5	2	1	3	4		M		644.4 **ALLUVIAL** Very Soft, Low Plasticity, Brown and Gray, Fine Sandy SILT with Trace Mica and Organics (Decayed Plant Material)	13.7
640	639.6	18.5	WOH	WOH	WOH	0		W		640.6 **ALLUVIAL** Very Soft, Low Plasticity, Gray, Fine Sandy, Silty CLAY with Trace Gravel	17.5
635	634.6	23.5	WOH	WOH	1	1		M		636.1 **ALLUVIAL** Very Loose, Low Plasticity, Gray, Micaceous, Silty, Clayey, Coarse to Fine SAND	22.0
			1	2	21	23		W		633.6 **RESIDUAL** Medium Dense to Very Dense, Non-Plastic, Tan to White with Black, Silty, Coarse to Fine SAND	24.5
630	629.6	28.5								629.1 **WEATHERED ROCK** Tan to White with Black, Granitic Rock	29.0
	627.9	30.2	65	35/0.1		100/0.6				627.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 627.8 ft in Crystalline Rock: Granitic Rock	30.3
625			60/0.1			60/0.1					
620											
615											
610											
605											
600											
595											
590											
585											
580											

NCDOT BORE SINGLE 105194.GPJ NC_DOT.GDT 10/12/09

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33804.1.1 TIP: B-4629 COUNTY: Rowan

DESCRIPTION(1): Replace Bridge No. 25 Over Second Creek on SR 2048

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) ____

Bridge No.: 25 Length: 250 Total Bents: 10 Bents in Channel: 2 Bents in Floodplain: 8
Foundation Type: ____

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None

Interior Bents: None

Channel Bed: None

Channel Bank: Erosion of steep east bank in vicinity of bridge

EXISTING SCOUR PROTECTION

Type(3): Rip rap at end bents, some rip rap on east bank just north of bridge

Extent(4): Facing creek and to some extent along sides at end bents

Effectiveness(5): Very

Obstructions(6): Isolated relatively small limbs against upstream pilings

INSTRUCTIONS

1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Only silt is visible as channel bed material

Channel Bank Material(8): A-1-b, A-2-4, A-3, A-4, A-5,

Channel Bank Cover(9): Brush and weeds

Floodplain Width(10): Approximately 600 feet

Floodplain Cover(11): Hardwoods, brush, and weeds

Stream is(12): Aggrading ____ Degrading X Static ____

Channel Migration Tendency(13): No migration tendency noticeable

Observations and Other Comments: Erosion of the east stream bank in the vicinity of the proposed Bent-3 is present due to drainage from the existing bridge and not scour.

Reported by: Paul Weaver **Date:** 9/3/2009

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS B-1	B-2	B-3								
640.5	639	631								

Comparison of DSE to Hydraulics Unit theoretical scour:
The Geotechnical Engineering Unit concurs with the Hydraulics Unit scour evaluation.

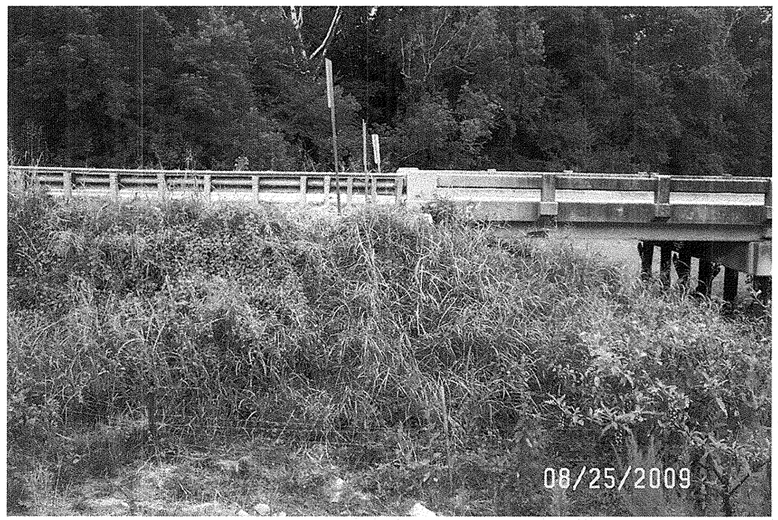
DSE determined by: William F. Goforth, PG **Date:** 9/30/2009

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank							
Sample No.							
Retained #4							
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

SITE PHOTOGRAPHS
State Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048
Rowan County, North Carolina
Page 1 of 4

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



Photograph 2 – View Right to Left Across End Bent-1

SITE PHOTOGRAPHS
State Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048
Rowan County, North Carolina
Page 2 of 4

Photograph 3 – View Left to Right Across Bent-1

Photograph 4 – View Right to Left Across Bent-2

SITE PHOTOGRAPHS
State Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048
Rowan County, North Carolina
Page 3 of 4

Photograph 5 – View Left to Right Across Bent-3

Photograph 6 – View Left to Right Across End Bent-2

SITE PHOTOGRAPHS
State Project No. 33804.1.1 TIP No. B-4629
Replace Bridge No. 25 Over Second Creek on SR 2048
Rowan County, North Carolina
Page 4 of 4

Photograph 7 – View Upstream from Centerline on West Side of Creek

Photograph 8 – View Downstream from Centerline on West Side of Creek