

SEE SHEET 2A FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5720	1	25

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 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

CAROLINA DRILLING

CROCKETT, S.C.

LANE, R. W.

INVESTIGATED BY RWL

DRAWN BY HILL, M. J.

CHECKED BY HUNSBERGER, W. S.

SUBMITTED BY FALCON

DATE FEBRUARY 2019

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY WAKE
PROJECT DESCRIPTION PROPOSED GRADE-SEPARATION
OF DURANT ROAD (SR 2006) OVER CSX S LINE
RAILROAD IN RALEIGH

INVENTORY

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	11+00.00 - 47+67.48	4-6	7-8
-Y2-	10+00.00 - 16+67.41	5	9
-Y3-	10+90.00 - 15+72.87	5	9

CROSS SECTIONS

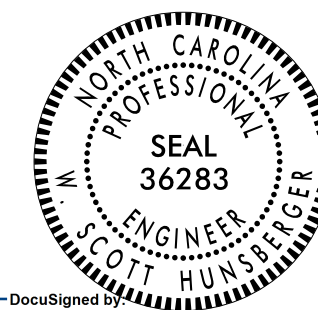
LINE	STATION	SHEETS
-L-	13+00.00 - 18+50.00	10-12

APPENDIX

APPENDIX	TITLES	SHEETS
A	PAVEMENT INVESTIGATION RESULTS	13-23
B	LABORATORY RESULTS	24-25

REFERENCE: P-5720

PROJECT: 46932



DocuSigned by:
W. Scott Hunsberger

2/5/2019 10:00:00 AM FCD49E...

SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL 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:				ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - 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. SLICKENSLIP - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS				WEATHERED ROCK (WR)				NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.			
MINERALOGICAL COMPOSITION										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				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.			
COMPRESSION										SLIGHTLY COMPRESSIBLE LL < 31				NON-CRYSTALLINE ROCK (NCR)				FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC.			
PERCENTAGE OF MATERIAL										ORGANIC MATERIAL				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.			
GROUND WATER										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING				FRESH				ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.			
MISCELLANEOUS SYMBOLS										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				VERY SLIGHT (IV SL.)				ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.			
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE				SLIGHT (SL.)				ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.			
SOIL MOISTURE - CORRELATION OF TERMS										SOIL MOISTURE SCALE (ATTERBERG LIMITS)				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.			
PLASTICITY										PLASTICITY INDEX (PI)				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			
COLOR										DESCRPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				SEVERE (SEV.)				ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF			
EQUIPMENT USED ON SUBJECT PROJECT										DRILL UNITS:				VERY SEVERE (IV SEV.)				ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF			
FRACATURE SPACING										TERM				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.			
BEDDING										TERM				VERY HARD				CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.			
INDURATION										FRABLE				HARD				CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.			
										MODERATELY INDURATED				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.			
										INDURATED				VERY SOFT				CAN BE GROUDED 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.			
										EXTREMELY INDURATED								CAN BE GROUDED 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.			

09/28/17

TIP PROJECT: P-5720

TIP PROJECT: P-5720

CONTRACT: 46932

STATE OF NORTH CAROLINA
RAIL DIVISION

WAKE COUNTY

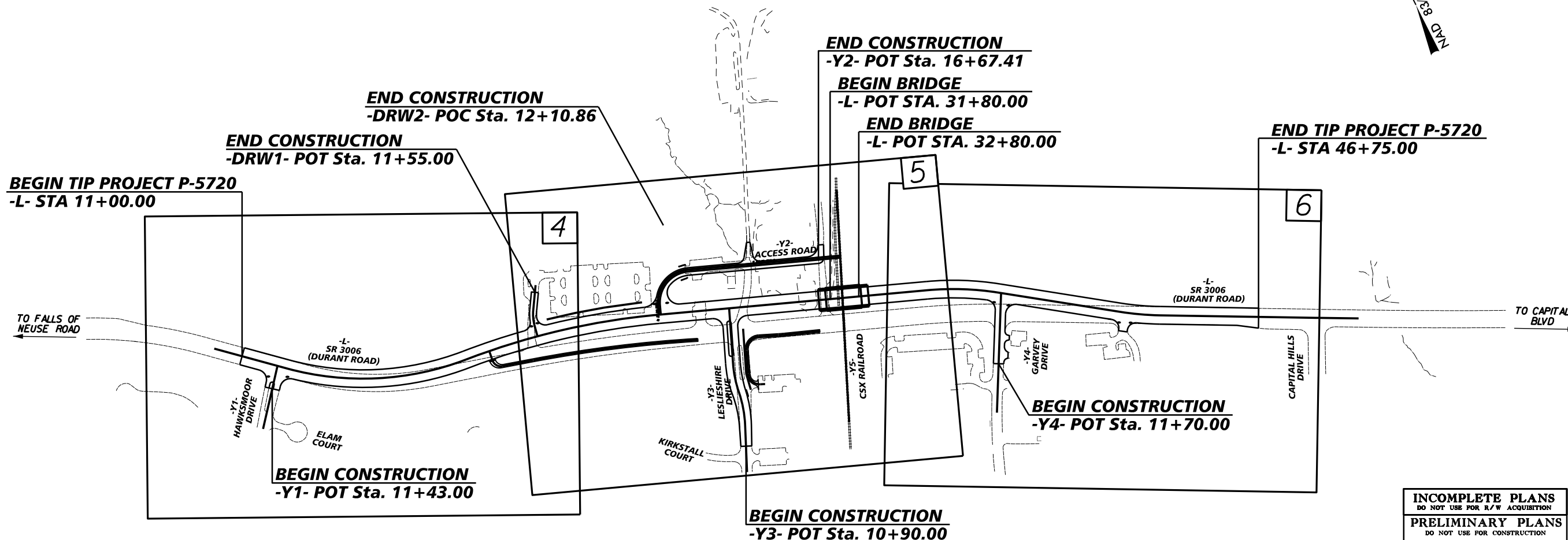
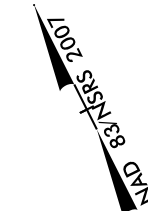
LOCATION: PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006)
OVER CSX S LINE RAILROAD IN RALEIGH

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5720	3	25
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46932.1.1		PE	

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UNLESS ALL SIGNATURES COMPLETED

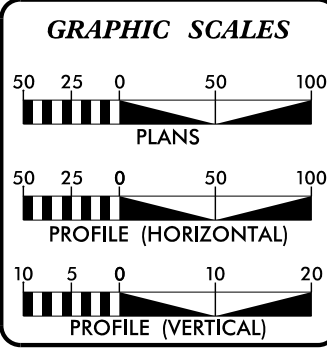
25% APPROVED PLANS



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SUBMITTAL:
DATE: September 26, 2017

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ?



DESIGN DATA

ADT 2019	=	21,000
ADT 2040	=	31,100
K	=	8%
D	=	55%
T	=	3%*
V	=	50 MPH

CLASSIFICATION:
URBAN COLLECTOR

* 1% TTST 2% DUAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT P-5720	=	0.658 MILES
LENGTH STRUCTURE TIP PROJECT P-5720	=	0.019 MILES
TOTAL LENGTH TIP PROJECT P-5720	=	0.677 MILES

Prepared In the Office of:

Kimley»Horn

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 15, 2018

LETTING DATE:
MARCH 19, 2019

GREGORY BREW, P.E.
PROJECT ENGINEER

RACHEL ABROMAITIS, P.E.
PROJECT DESIGN ENGINEER

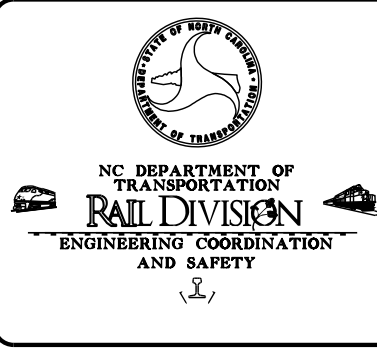
KUMAR TRIVEDI, P.E.
PROJECT MANAGER
NCDOT RAIL DIVISION

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

SIGNATURE: _____ P.E.



DATE \$



WBS: 46932.1.1
TIP: P-5720
COUNTY: Wake
DESCRIPTION: Proposed Grade Separation of Durant Road (SR 2006)
 Over CSX S Line Railroad in Raleigh
SUBJECT: Roadway Subsurface Investigation – Inventory

Roadway Subsurface Investigation Report - Inventory

**Proposed Grade – Separation of Durant Road (SR 2006)
 Over CSX S Line Railroad in Raleigh
 Wake County, North Carolina
 WBS: 46932.1.1 TIP: P-5720
 Falcon Project No.: G17058.00**

Prepared for:

Kimley-Horn and Associates
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601

Submitted by:

Falcon Engineering, Inc.
 1210 Trinity Road, Suite 110
 Cary, North Carolina 27513
 (919) 871-0800
 www.falconengineers.com

February 5, 2019

PROJECT DESCRIPTION

This project consists of constructing a new grade separation on Durant Road over the CSX S line railroad in Wake County. The current at grade crossing will be replaced with a bridge just north of the current crossing. Durant Road will be shifted north to allow the current crossing to remain in place during construction. In addition to the roadway realignment, a bridge structure and multiple retaining walls will be constructed. Investigations for structures will be provided under separate cover.

The investigation was conducted between November 27th, 2017 and December 14th, 2017 in general accordance with our Proposal to Provide Geotechnical Engineering Services, dated August 24th, 2017.

A total of thirteen (13) Standard Penetration Test (SPT) borings and six (6) hand auger borings were performed for the proposed roadway alignments. All mechanical borings were drilled using a CME 550 ATV mounted drill rig equipped with 2 ¼-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler or hand auger, were selected for laboratory testing to verify visual field classifications. In addition, one (1) bulk sample was collected for standard Proctor compaction and California Bearing Ratio (CBR) testing. Twelve (12) locations along the existing roadway were cored, measured and Dual Mass Dynamic Cone Penetrometer (DCP) testing completed to correlate in-situ CBR values for the existing subgrade to depths of up to three feet below subgrade. The dual mass DCP used is manufactured by Kessler Soils Engineering Products, Inc. CBR values were estimated using software provided by the manufacturer which utilizes correlations established by the Army Corps of Engineers Waterways Experiment Station.





The following alignments, totaling approximately 0.91 miles were investigated.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (Durant Road)	11+00 to 46+75
-Y2- (Access Road)	10+00 to 16+67.41
-Y3- (Leslieshire Drive)	10+00 to 15+72.87

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- A. The following locations contain highly plastic soils with plasticity indices (PI) greater than 25 within 3 feet of proposed subgrade elevations:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	13+50 to 18+00
-L-	42+00 to 44+00

- B. The following locations contain very soft to soft/very loose soils with an N-value less than 4 near the ground surface:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	20+00 to 23+00
-L-	28+00 to 30+00

- C. Alluvial soils were not encountered at the locations explored. Isolated alluvial soils may exist elsewhere on the site between borings in proximity to natural waterways and/or constructed drainage features.

- D. Two retaining walls are proposed to be constructed along the roadway alignments at the following locations:

	<u>Alignment</u>	<u>Station (ft)</u>
Wall #1	-L-	22+00.04 to 25+29.95, 42.5' LT
Wall #2	-Y3-	12+75, 42.0' RT to 15+00, 43.54' RT

PHYSIOGRAPHY AND GEOLOGY

According to the *Geologic Map of North Carolina* (1985), the site is in the Raleigh Belt Physiographic Province of North Carolina. Specifically, rocks at the site are noted as Injected Gneiss (**CZig**), consisting of biotite gneiss and schist intruded by numerous sills and dikes of granite, pegmatite, and aplite; minor hornblende gneiss.

Existing site topography is relatively flat, sloping gently from west to east. The site lies in northeast Raleigh and is currently an at-grade crossing for the CSX S line. The existing corridor is populated with residential (multi-family as well as single family) to the south and commercial and municipal properties to the north. A small stream approaches the alignment from the north and crosses the proposed -Y2- alignment. The proposed alignment shift to the north will cross over landscaped and wooded areas.

SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankments, residual soils and weathered rock.

Topsoil and rootmat was encountered in grassy, brushy, and wooded areas ranging in thickness from 0.2 to 0.5 feet, typically on the order of 0.3 feet, and consisting of sandy clay.

Roadway Embankment soils were encountered beneath and adjacent to existing roadways. These soils consist of up to 8.5 feet of dry to moist, very loose to medium dense, silty and clayey sand (A-2-4, A-2-6) and soft to very stiff, silty and sandy clay (A-6, A-7).

Residual soils were encountered consisting of dry to saturated, loose to medium dense, clayey and silty sand (A-2-4, A-2-6) and medium stiff to hard, sandy silt, and silty and sandy clays (A-4, A-6, A-7).

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in many cases after a waiting period of at least 24 hours. Borings drilled within and in close proximity to existing roadways were backfilled immediately after completion due to safety considerations. Groundwater was encountered in borings at depths of 22.8 ft to 24.7 ft, corresponding to elevations ranging from 252.7 ft to 273.3 ft.



Detailed groundwater measurements are included in the attached subsurface profiles and cross sections.

ADDITIONAL LABORATORY TESTING

The following bulk sample was obtained:

<u>Sample</u>	<u>Location</u>	<u>Location</u>	<u>Test</u>
BS-1	39+00, 20' LT, -L-	1.0 – 7.0	California Bearing Ratio, Standard Proctor

Classification test results for these samples are included in the subsurface profiles. Standard Proctor and California Bearing Ratio (CBR) data is attached in Appendix A.

FALCON ENGINEERING, INC.

Report Prepared By:

Report Reviewed By:

A handwritten signature in blue ink, appearing to read "W. Scott Hunsberger".

W. Scott Hunsberger, PE
Geotechnical Engineer

A handwritten signature in blue ink, appearing to read "Jeremy R. Hamm".

Jeremy R. Hamm, PE
Geotechnical Engineering Manager



PROJECT REFERENCE NO. <i>P-5720</i>	SHEET NO. 4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-	-DRWI-
PI Sta 15+89.00 Δ = 36° 14' 39.9" (LT) D = 5' 43' 46.5" L = 632.58' T = 327.28' R = 1,000.00' SE = 0.04	PI Sta 22+40.96 Δ = 15° 47' 19.4" (RT) D = 2' 17' 30.6" L = 688.91' T = 346.65' R = 2,500.00' SE = 0.03
	PI Sta 10+66.76 Δ = 20° 22' 45.8" (RT) D = 38' 11' 49.9" L = 53.35' T = 26.96' R = 150.00'

DB 8529 - PG 944
BM 1976 - PG 28
BM 2000 - PG 2010
BM 2014 - PG 1348

DB 14386 - PG 2347
BM 2013 - PG 204
BM 1982 - PG 677
BM 2000 - PG 2012

-DRWI- POT Sta. 11+60.00
END CONSTRUCTION
-DRWI- POT Sta. 11+58.00
 N 32° 08' 24.5" E
-DRWI- PT Sta. 10+93.15
-DRWI- PC Sta. 10+39.79
 N 11° 45' 38.7" E
-L- POC Sta. 21+55.00
-DRWI- POT Sta. 10+00.00

-L- PRC Sta. 18+94.31

BEGIN TIP PROJECT P-5720
-L- POT Sta. 11+00.00

-L- PC Sta. 12+61.72
-L- POT Sta. 12+27.38 =
-Y1- POT Sta. 12+24.40

-L- POT Sta. 10+00.00

B-05

B-04

B-03

B-02

B-01

BEGIN CONSTRUCTION
-Y1- POT Sta. 11+43.00

-L- POT Sta. 10+00.00

MATCHLINE -L- STA 22+00.00
SEE PLAN SHEET 5

DB 13957 - PG 764
BM 1992 - PG 204

 REMOVE EXISTING PAVEMENT

SEE SHEET NO. 7 FOR -L- PROFILE
SEE SHEET NO. 8 FOR -Y1- PROFILE
SEE SHEET NO. 10 FOR -DRWI- PROFILE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

REVISIONS

DATE \$

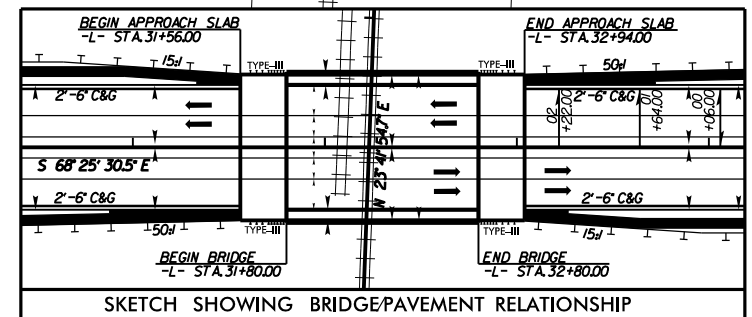
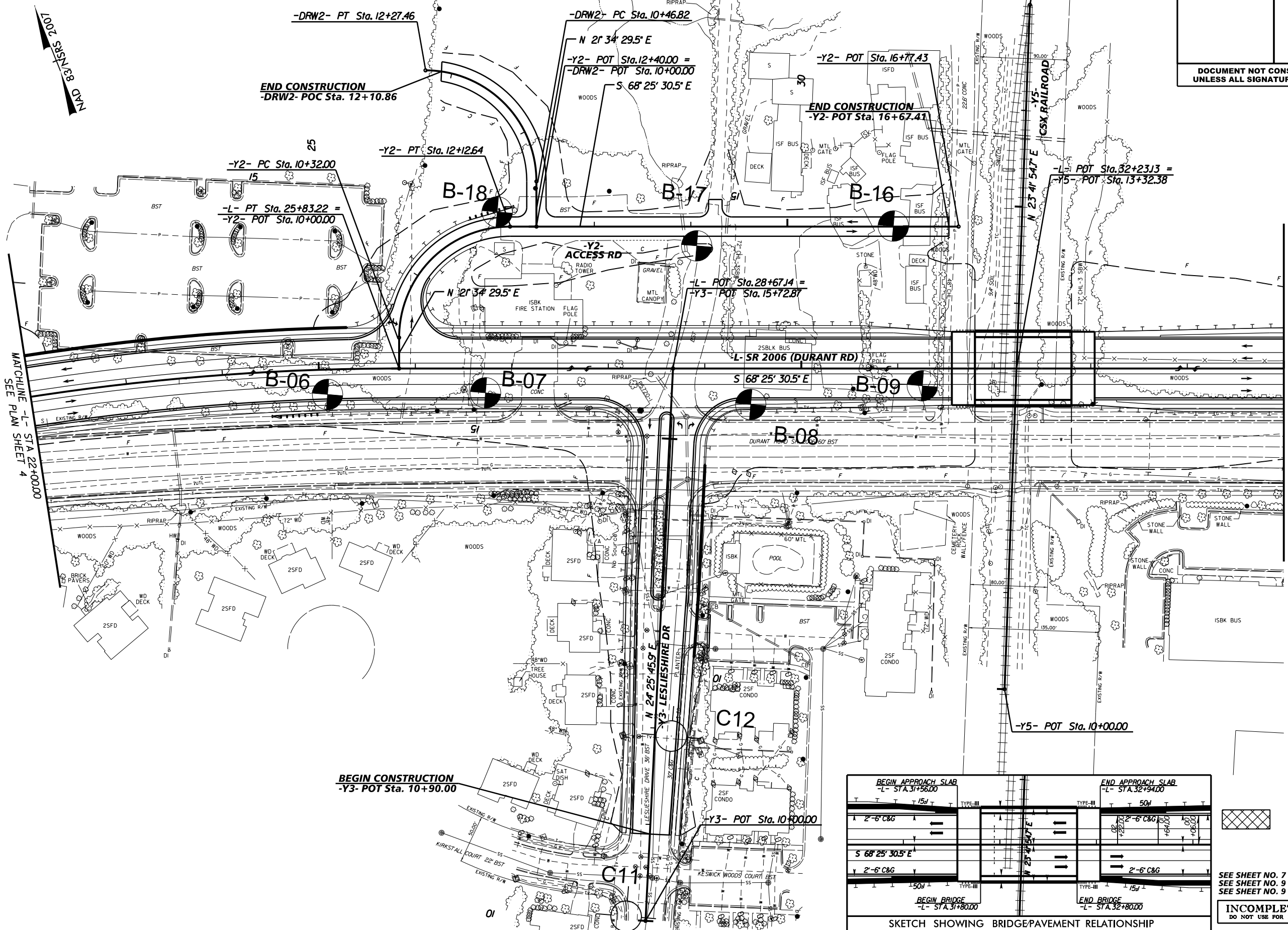
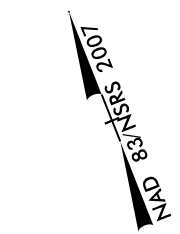
5/14/99

5/14/99

Kimley»Horn

421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, N.C. 27601

PROJECT REFERENCE NO. P-5720	SHEET NO. 5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SEE SHEET NO. 7 FOR -L- PROFILE
 SEE SHEET NO. 9 FOR -Y2- PROFILE
 SEE SHEET NO. 9 FOR -Y3- PROFILE

INCOMPLETE PLANS
 DO NOT USE FOR R/W ACQUISITION

REVISIONS

MATCHLINE -L- STA 22+00.00
SEE PLAN SHEET 4

MATCHLINE -L- STA 35+00.00
SEE PLAN SHEET 6

\$DATE\$

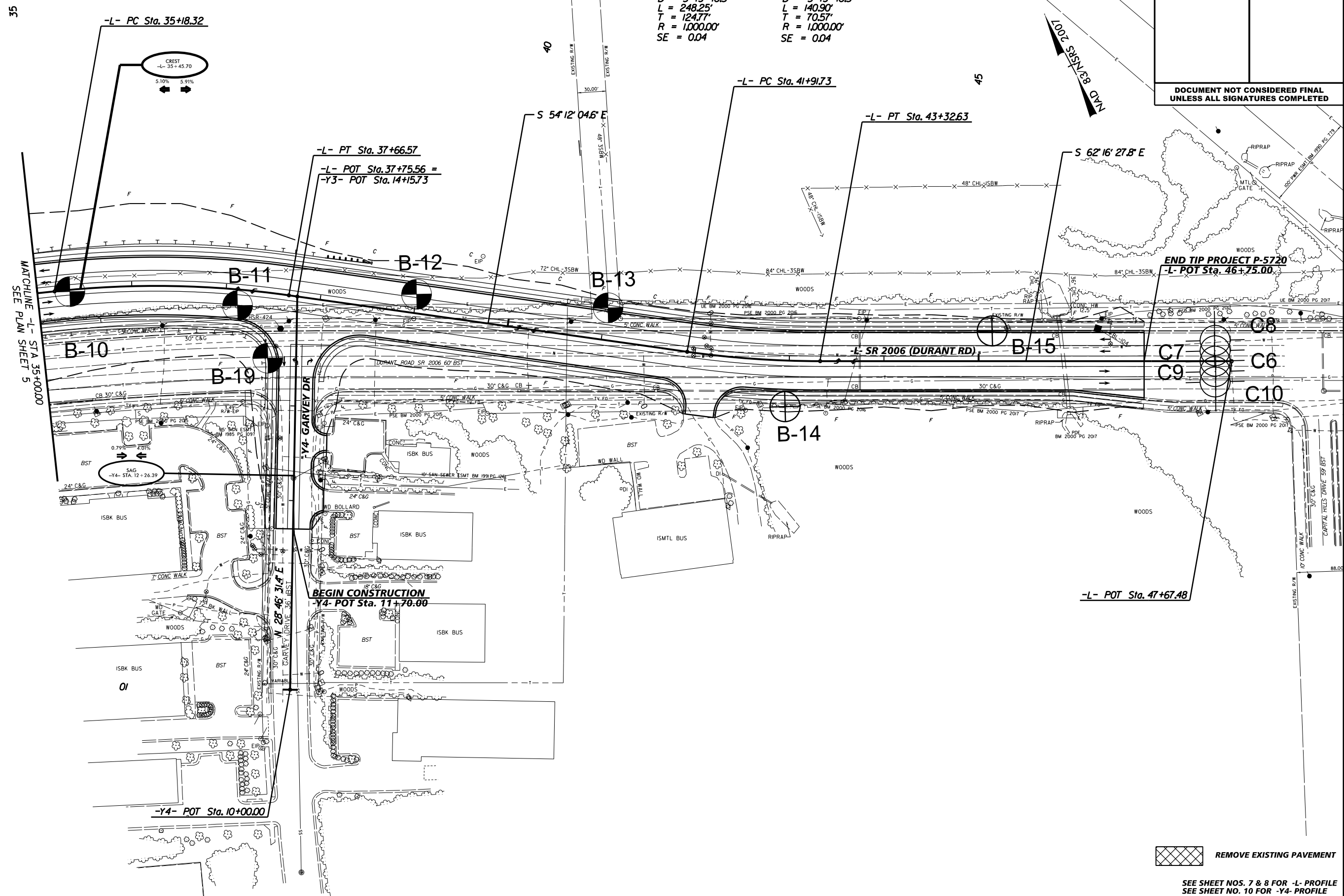
5/14/99

Kimley»Horn
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, N.C. 27601

PROJECT REFERENCE NO. P-5720	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-

PI Sta 36+43.09 Δ = 14' 13" 25.9' (RT) D = 5' 43" 46.5" L = 248.25' T = 124.77' R = 1,000.00' SE = 0.04	PI Sta 42+62.30 Δ = 8' 04" 23.2' (LT) D = 5' 43" 46.5" L = 140.90' T = 70.57' R = 1,000.00' SE = 0.04
---	---



MATCHLINE -L- STA 35+00.00
SEE PLAN SHEET 5

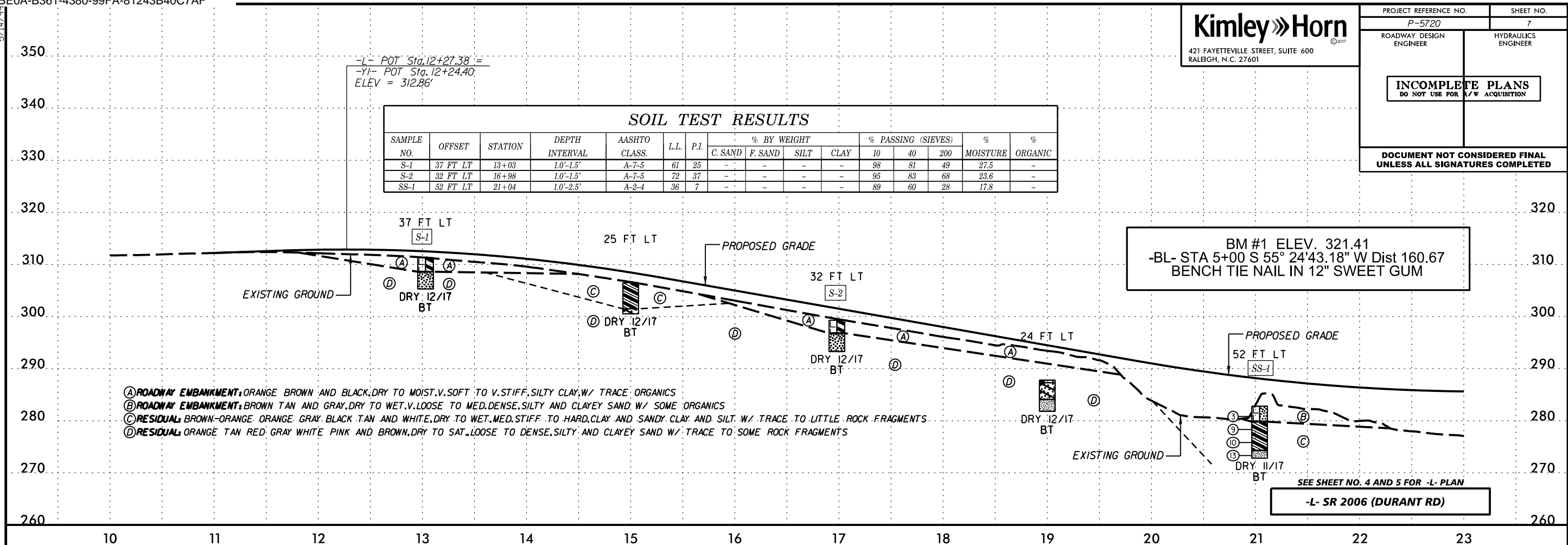
REVISIONS

\$DATE\$

REMOVE EXISTING PAVEMENT

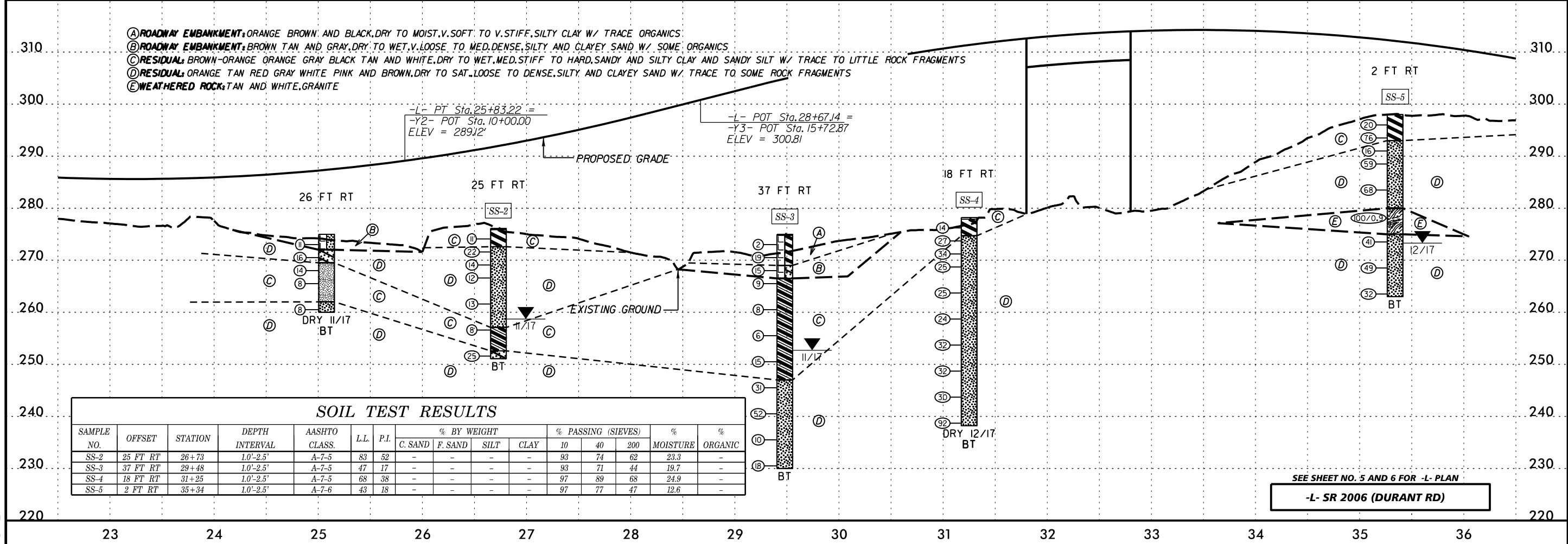
SEE SHEET NOS. 7 & 8 FOR -L- PROFILE
SEE SHEET NO. 10 FOR -Y4- PROFILE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



- (A) ROADWAY EMBANKMENT: ORANGE BROWN AND BLACK, DRY TO MOIST, V. SOFT TO V. STIFF, SILTY CLAY W/ TRACE ORGANICS
- (B) ROADWAY EMBANKMENT: BROWN TAN AND GRAY, DRY TO WET, V. LOOSE TO MED. DENSE, SILTY AND CLAYEY SAND W/ SOME ORGANICS
- (C) RESIDUAL: BROWN-ORANGE, ORANGE GRAY, BLACK TAN AND WHITE, DRY TO WET, MED. STIFF TO HARD, CLAY AND SANDY CLAY AND SILT W/ TRACE TO LITTLE ROCK FRAGMENTS
- (D) RESIDUAL: ORANGE TAN RED, GRAY WHITE PINK AND BROWN, DRY TO SAT., LOOSE TO DENSE, SILTY AND CLAYEY SAND W/ TRACE TO SOME ROCK FRAGMENTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	37 FT LT	13+03	1.0'-1.5'	A-7-5	61	25	-	-	-	-	98	81	49	27.5	-
S-2	32 FT LT	16+98	1.0'-1.5'	A-7-5	72	37	-	-	-	-	95	83	68	23.6	-
SS-1	52 FT LT	21+04	1.0'-2.5'	A-2-4	36	7	-	-	-	-	89	60	28	17.8	-



- (A) ROADWAY EMBANKMENT: ORANGE BROWN AND BLACK, DRY TO MOIST, V. SOFT TO V. STIFF, SILTY CLAY W/ TRACE ORGANICS
- (B) ROADWAY EMBANKMENT: BROWN TAN AND GRAY, DRY TO WET, V. LOOSE TO MED. DENSE, SILTY AND CLAYEY SAND W/ SOME ORGANICS
- (C) RESIDUAL: BROWN-ORANGE, ORANGE GRAY, BLACK TAN AND WHITE, DRY TO WET, MED. STIFF TO HARD, SANDY AND SILTY CLAY AND SANDY SILT W/ TRACE TO LITTLE ROCK FRAGMENTS
- (D) RESIDUAL: ORANGE TAN RED, GRAY WHITE PINK AND BROWN, DRY TO SAT., LOOSE TO DENSE, SILTY AND CLAYEY SAND W/ TRACE TO SOME ROCK FRAGMENTS
- (E) WEATHERED ROCK: TAN AND WHITE, GRANITE

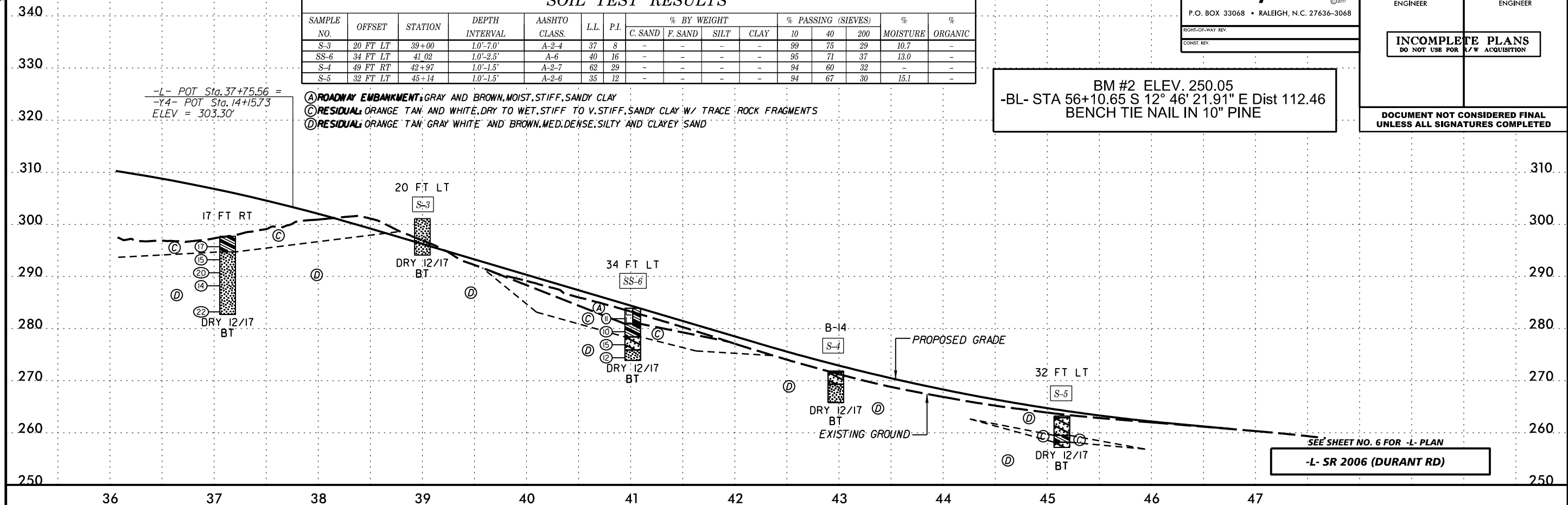
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-2	25 FT RT	26+73	1.0'-2.5'	A-7-5	83	52	-	-	-	-	93	74	62	23.3	-
SS-3	37 FT RT	29+48	1.0'-2.5'	A-7-5	47	17	-	-	-	-	93	71	44	19.7	-
SS-4	18 FT RT	31+25	1.0'-2.5'	A-7-5	68	38	-	-	-	-	97	89	68	24.9	-
SS-5	2 FT RT	35+34	1.0'-2.5'	A-7-6	43	18	-	-	-	-	97	77	47	12.6	-

5/14/99

Kimley»Horn
 P.O. BOX 33068 • RALEIGH, N.C. 27636-3068
 ROADWAY DESIGN ENGINEER
 HYDRAULICS ENGINEER

PROJECT REFERENCE NO. P-5720	SHEET NO. 8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-3	20 FT LT	39+00	1.0'-7.0'	A-2-4	37	8	-	-	-	-	99	75	29	10.7	-
SS-6	34 FT LT	41.02	1.0'-2.5'	A-6	40	16	-	-	-	95	71	37	13.0	-	
S-4	49 FT RT	42+97	1.0'-1.5'	A-2-7	62	29	-	-	-	94	60	32	-	-	
S-5	32 FT LT	45+14	1.0'-1.5'	A-2-6	35	12	-	-	-	94	67	30	15.1	-	



BM #2 ELEV. 250.05
 -BL- STA 56+10.65 S 12° 46' 21.91" E Dist 112.46
 BENCH TIE NAIL IN 10" PINE

-L- POT Sta. 37+75.56 =
 -Y4- POT Sta. 14+15.73
 ELEV = 303.30'

SEE SHEET NO. 6 FOR -L- PLAN
 -L- SR 2006 (DURANT RD)

\$DATE\$

5/14/99

Kimley»Horn

P.O. BOX 33068 • RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.
CONST. REV.

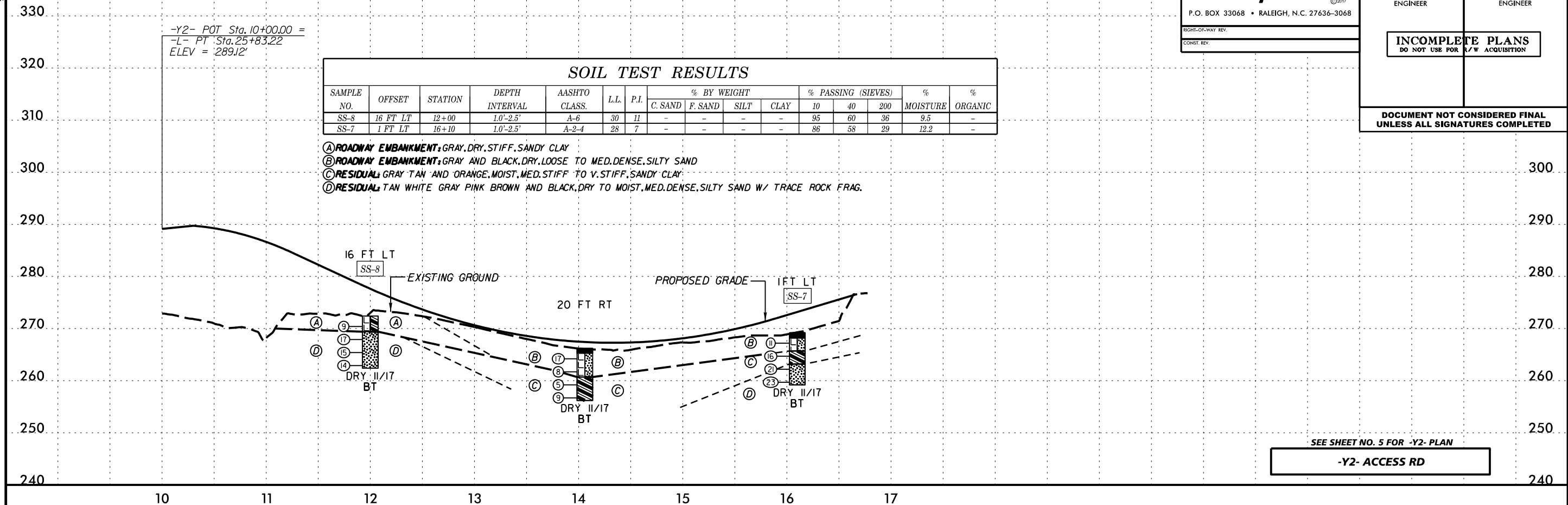
PROJECT REFERENCE NO. SHEET NO.

P-5720 9

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



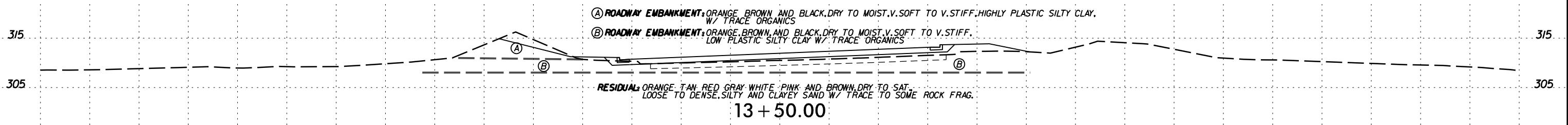
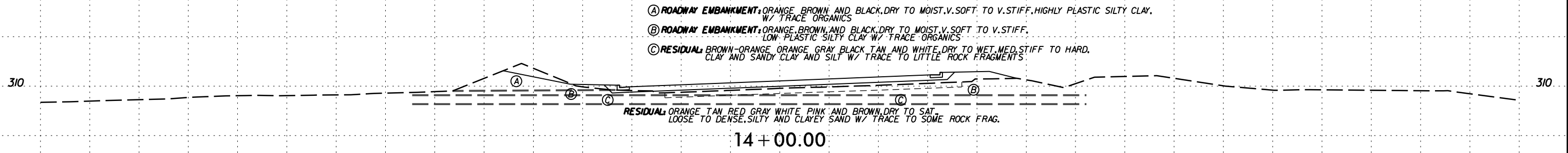
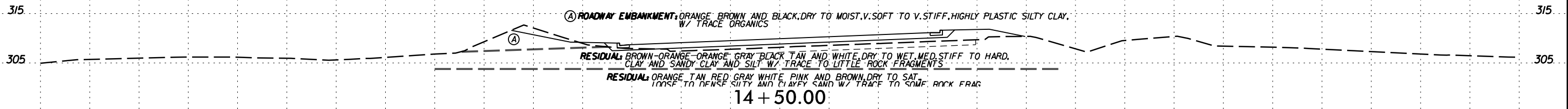
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-8	16 FT LT	12+00	1.0'-2.5'	A-6	30	11	-	-	-	-	95	60	36	9.5	-
SS-7	1 FT LT	16+10	1.0'-2.5'	A-2-4	28	7	-	-	-	-	86	58	29	12.2	-

- Ⓐ ROADWAY EMBANKMENT: GRAY, DRY, STIFF, SANDY CLAY
- Ⓑ ROADWAY EMBANKMENT: GRAY AND BLACK, DRY, LOOSE TO MED. DENSE, SILTY SAND
- Ⓒ RESIDUAL: GRAY TAN AND ORANGE, MOIST, MED. STIFF TO V. STIFF, SANDY CLAY
- Ⓓ RESIDUAL: TAN WHITE GRAY PINK BROWN AND BLACK, DRY TO MOIST, MED. DENSE, SILTY SAND W/ TRACE ROCK FRAG.

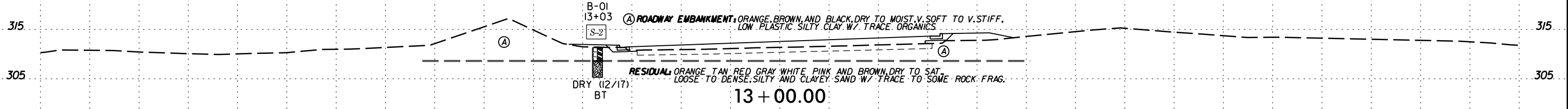
SEE SHEET NO. 5 FOR -Y2- PLAN

-Y2- ACCESS RD

\$DATE\$



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	37 FT LT	13+03	1.0'-1.5'	A-7-5	61	25	-	-	-	-	98	81	49	27.5	-

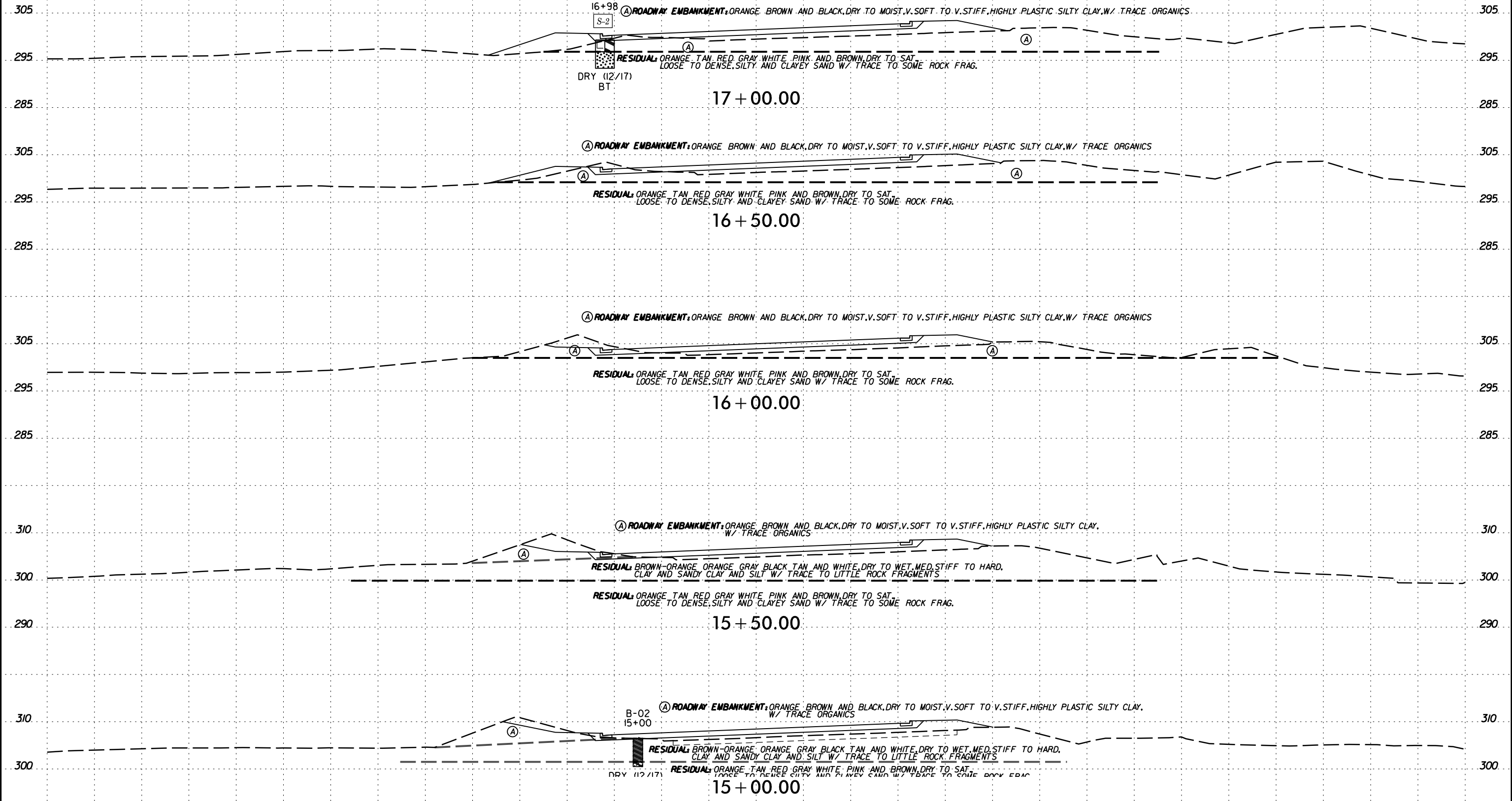


-L- SR 2006 (DURANT ROAD)

8/23/09

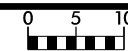
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-2	32 FT LT	16+98	1.0'-1.5'	A-7-5	72	37	-	-	-	-	-	-	68	23.6	-



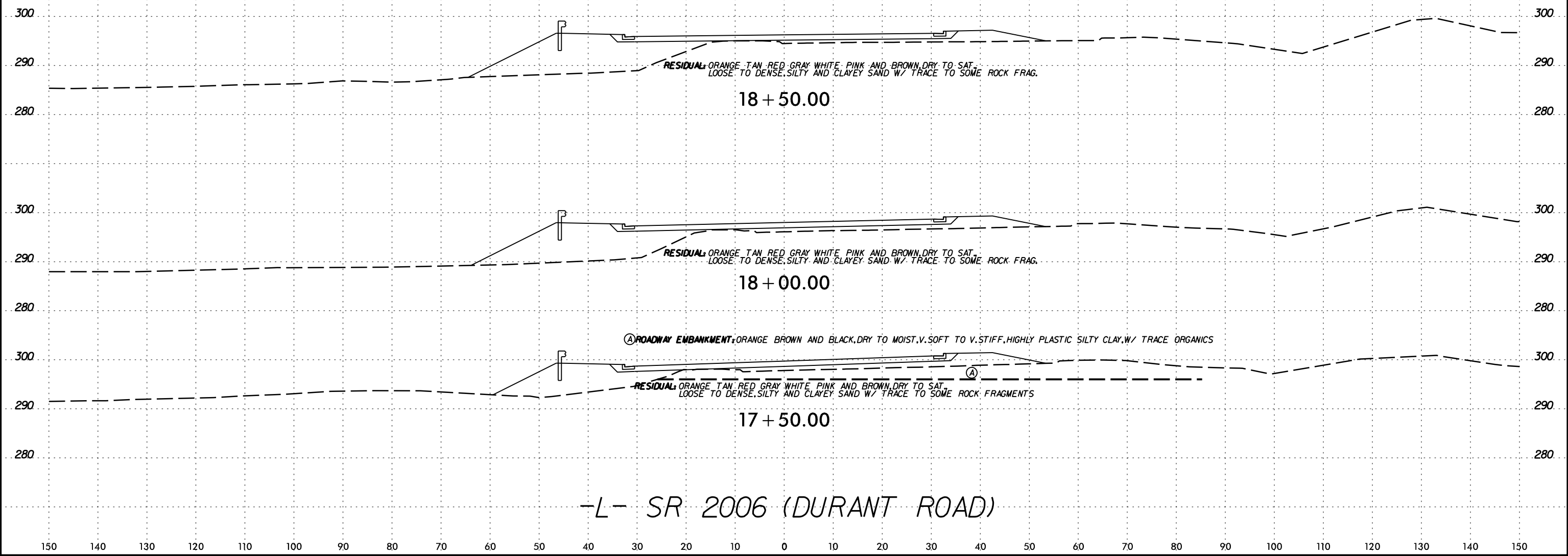
-L- SR 2006 (DURANT ROAD)

8/23/09



8/23/09

SCALE\$



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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

SUBSURFACE INVESTIGATION

*APPENDIX A
PAVEMENT INVESTIGATION RESULTS*

REFERENCE: P-5720

PROJECT: 46932

BS
WSH
2/5/2019
INITIALS DATE



PAVEMENT CORE C-01



PAVEMENT CORE C-02



PAVEMENT CORE C-03



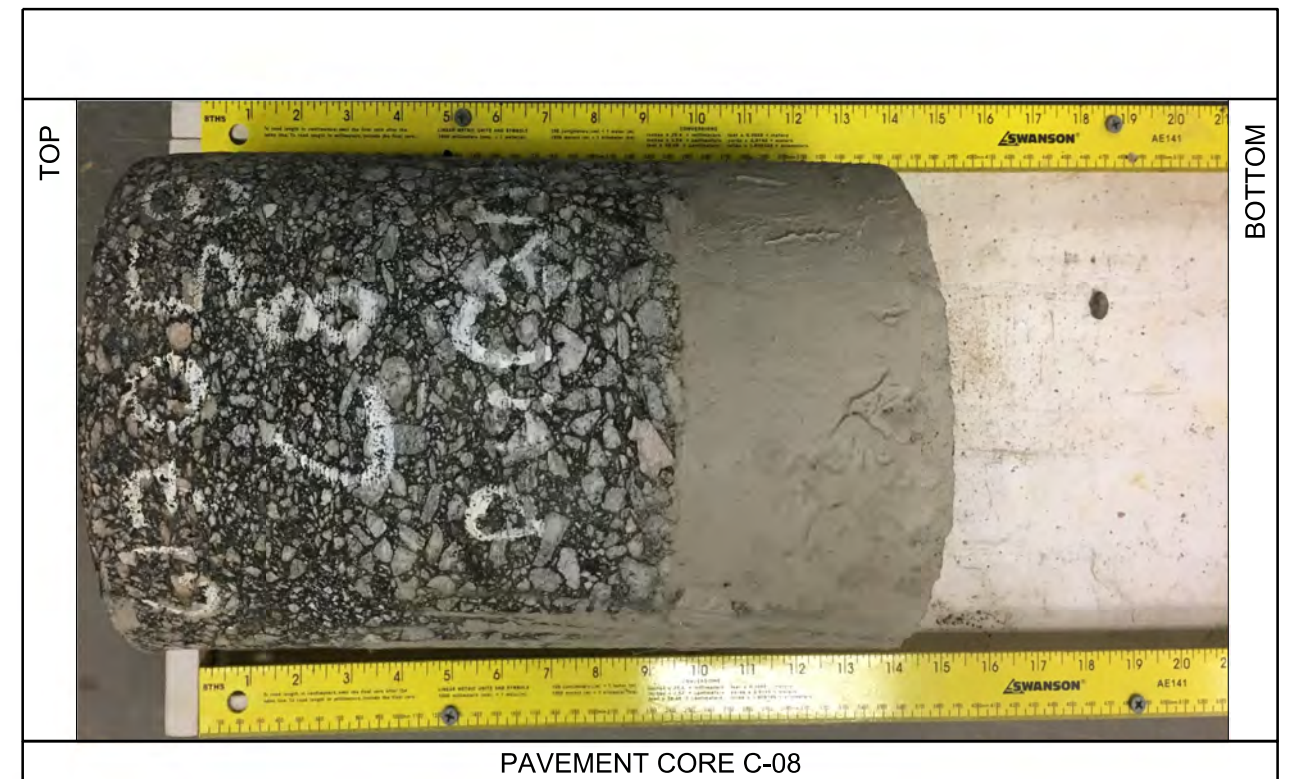
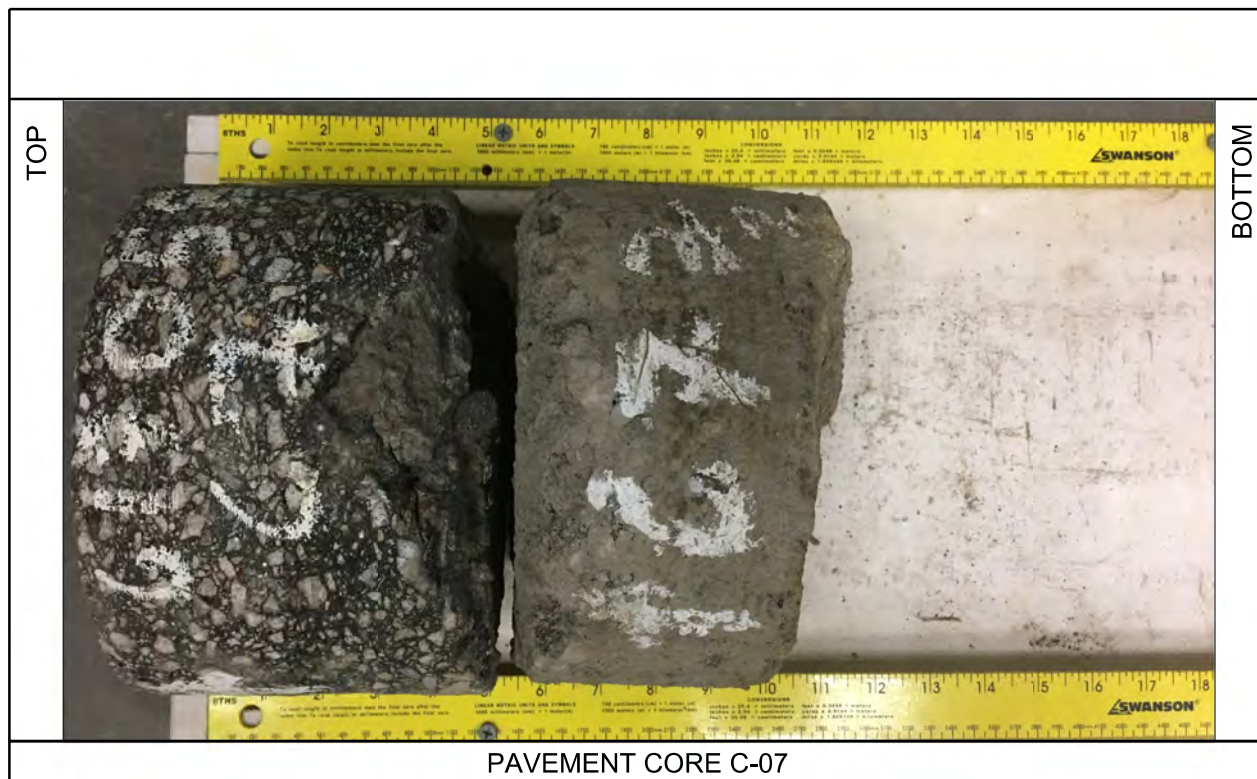
PAVEMENT CORE C-04



FALCON ENGINEERING, INC.
 1210 TRINITY ROAD, SUITE 110
 CARY, NC 27513
 PHONE: 919.871.0800
 FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD
 (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH
 WAKE COUNTY, NORTH CAROLINA
 WBS NO.: 46932.1.1 | TIP NO.: P-5720
 FALCON PROJECT NO.: G17058.00



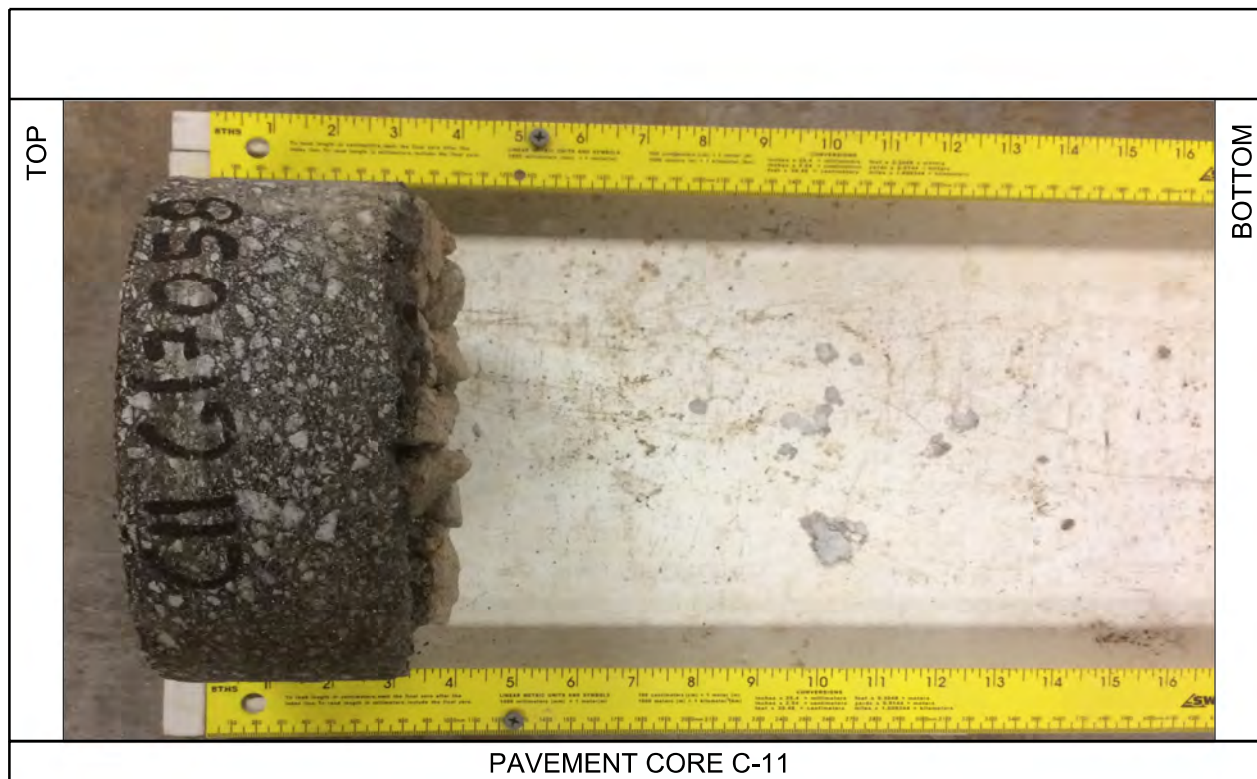
FALCON
ENGINEERING

FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

PHONE: 919.871.0800
FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD
(SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH
WAKE COUNTY, NORTH CAROLINA
WBS NO.: 46932.1.1 | TIP NO.: P-5720
FALCON PROJECT NO.: G17058.00




FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

PROPOSED GRADE-SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S LINE RAILROAD IN RALEIGH WAKE COUNTY, NORTH CAROLINA
WBS NO.: 46932.1.1 | TIP NO.: P-5720
FALCON PROJECT NO.: G17058.00

DCP TEST DATA

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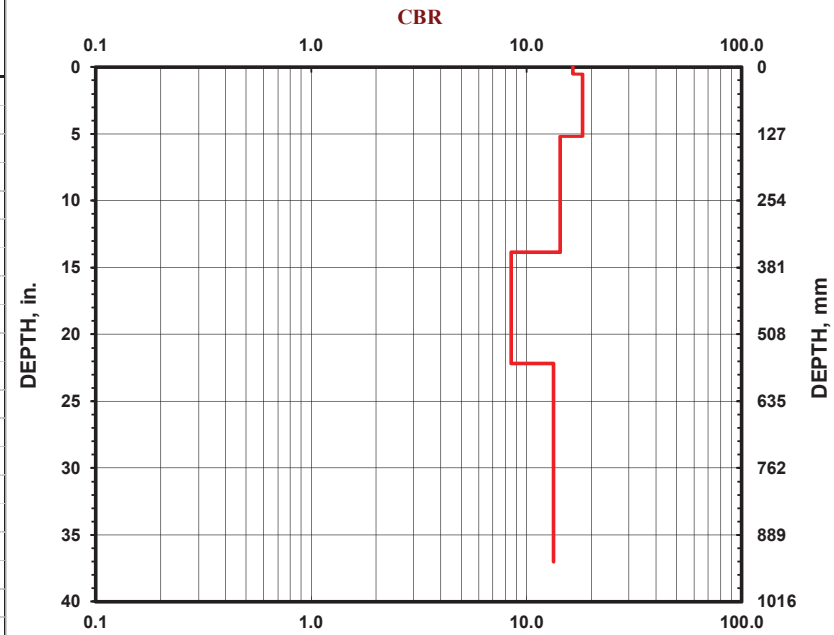
Project: G17058.00
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
1	13	1
10	132	1
15	352	1
9	564	1
24	940	1



DCP TEST DATA

File Name: C-02

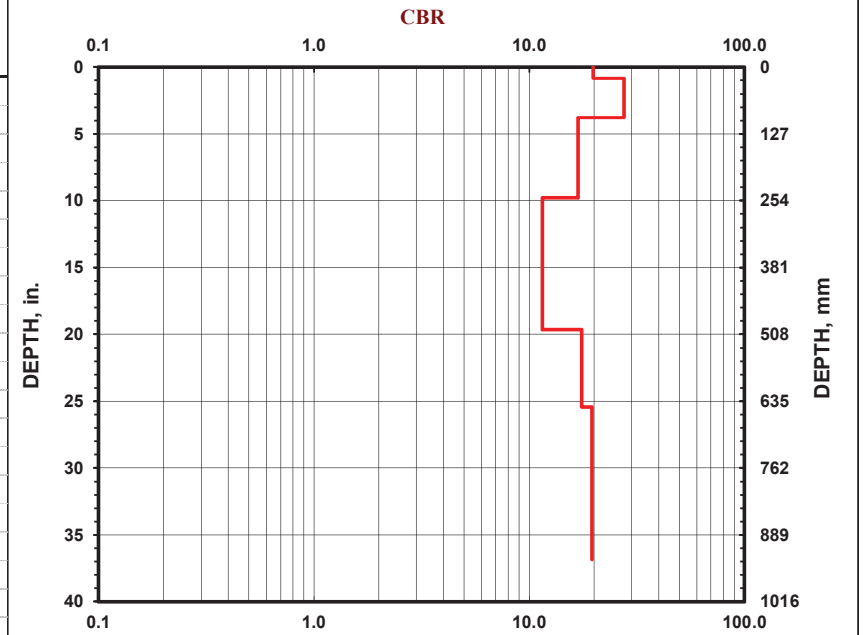
Project: G17058.00
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
2	22	1
9	96	1
12	249	1
14	500	1
12	647	1
26	936	1



DCP TEST DATA

File Name: C-03

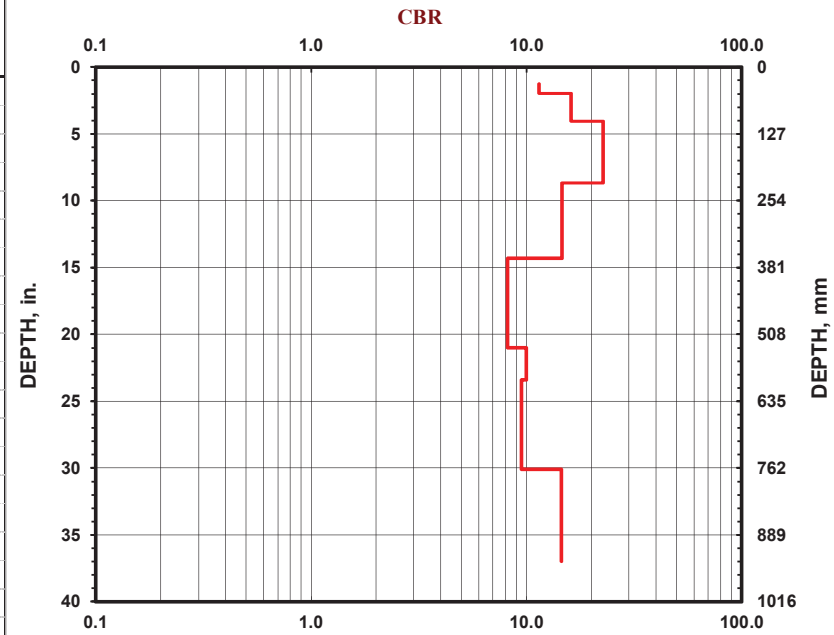
Project: G17058
Location: Durant Road

Date: 5-Dec-17
Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	32	1
1	50	1
4	103	1
12	220	1
10	364	1
7	534	1
3	595	1
8	765	1
12	939	1



DCP TEST DATA

File Name: C-04

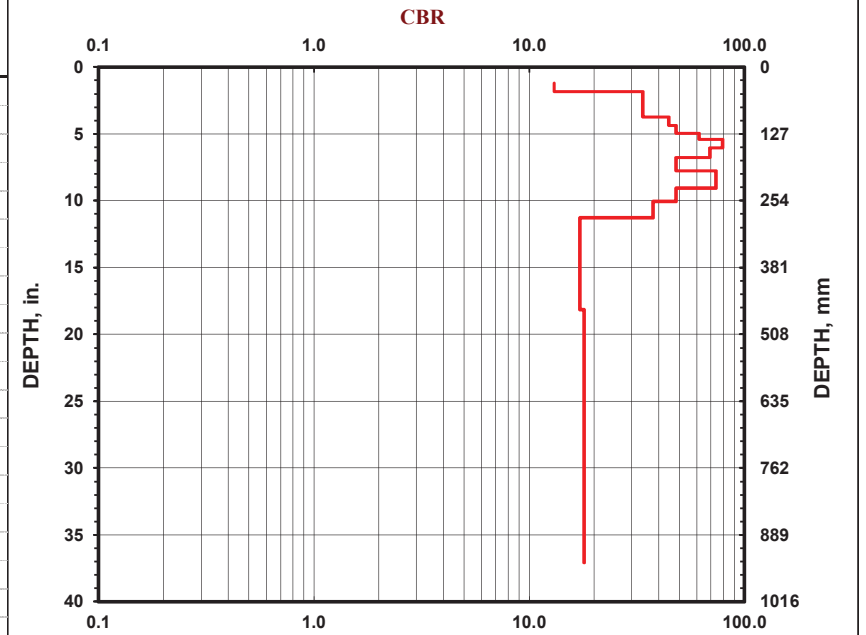
Project: G17058
Location: Durant Road

Date: 5-Dec-17
Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	31	1
1	47	1
7	95	1
3	111	1
3	126	1
3	138	1
5	154	1
5	172	1
5	197	1
5	214	1
5	231	1
5	256	1
5	287	1
14	462	1
40	942	1



DCP TEST DATA

File Name: C-05

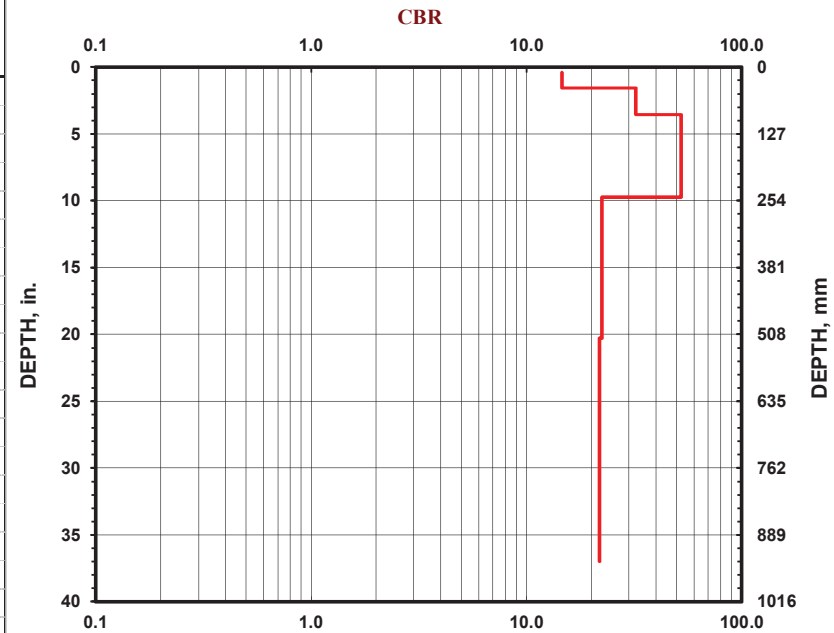
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	11	1
2	40	1
7	90	1
34	248	1
27	515	1
42	939	1



DCP TEST DATA

File Name: C-06

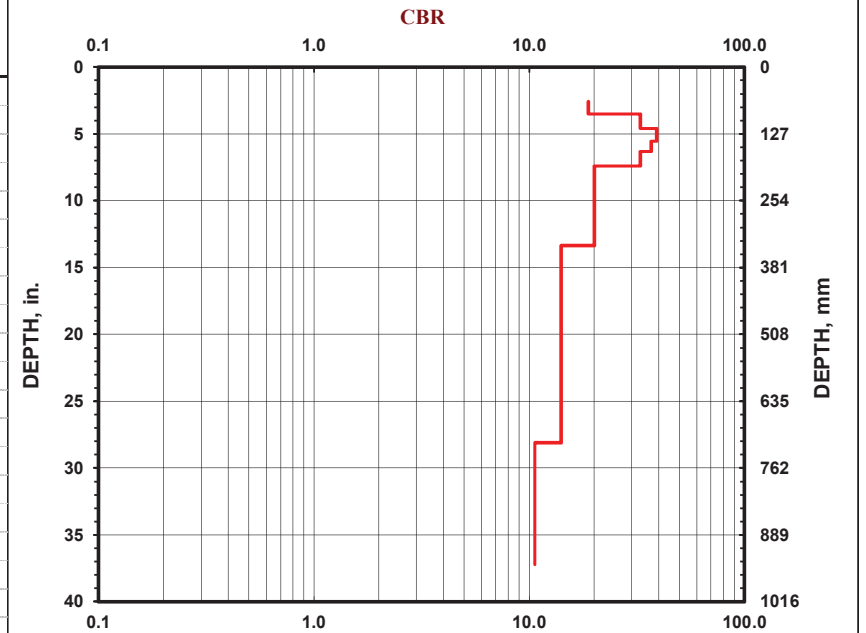
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	66	1
2	89	1
2	103	1
2	117	1
2	129	1
2	141	1
3	160	1
4	188	1
14	340	1
25	714	1
12	945	1



DCP TEST DATA

File Name: C-07

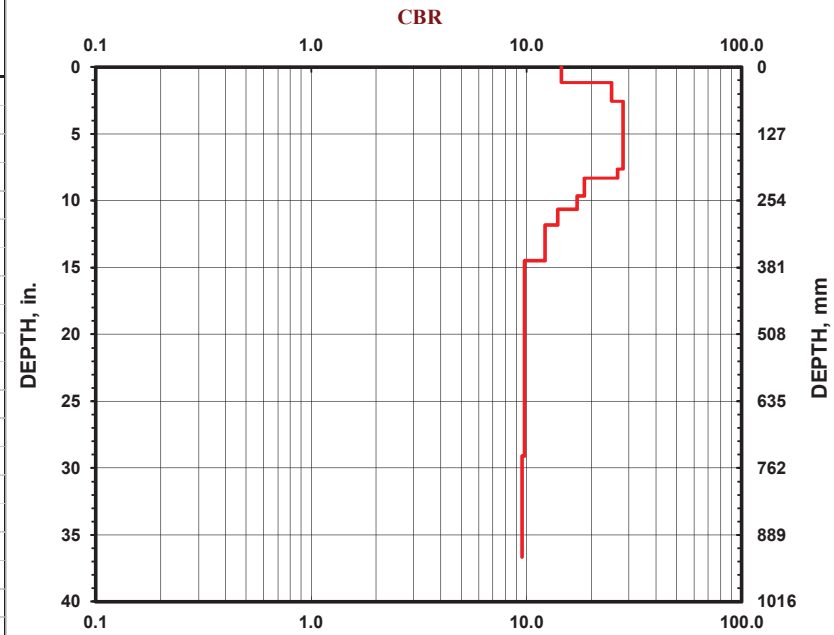
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
2	29	1
2	47	1
2	65	1
16	194	1
2	211	1
3	246	1
2	271	1
2	301	1
2	335	1
2	369	1
18	740	1
9	931	1



DCP TEST DATA

File Name: C-08

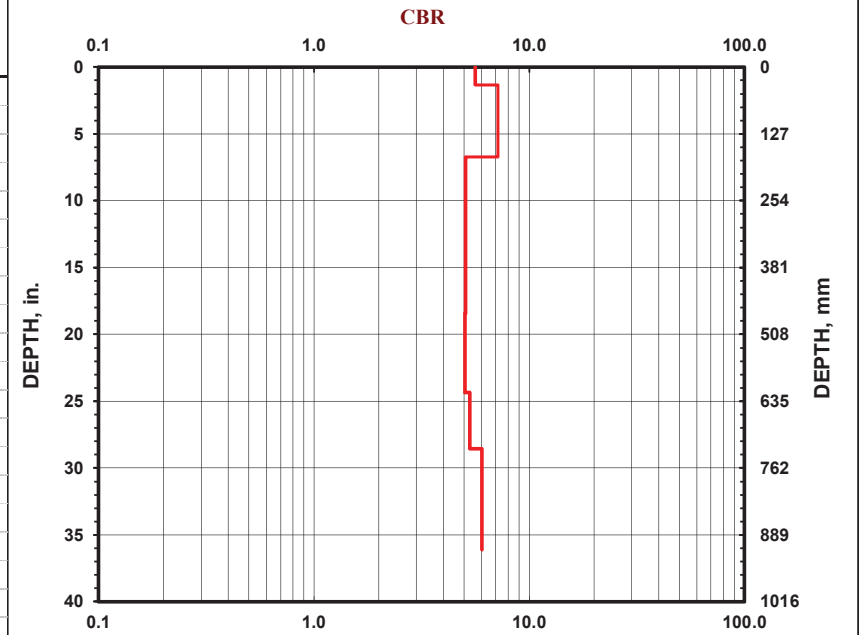
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
1	34	1
5	171	1
8	469	1
4	619	1
3	726	1
6	917	1



DCP TEST DATA

File Name: C-09

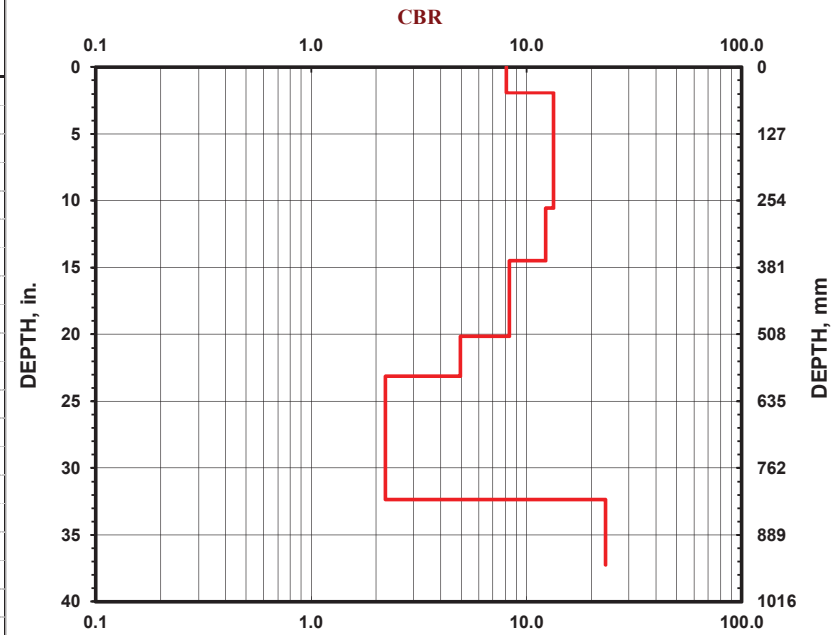
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
2	49	1
14	268	1
6	369	1
6	512	1
2	588	1
3	822	1
13	946	1



DCP TEST DATA

File Name: C-10

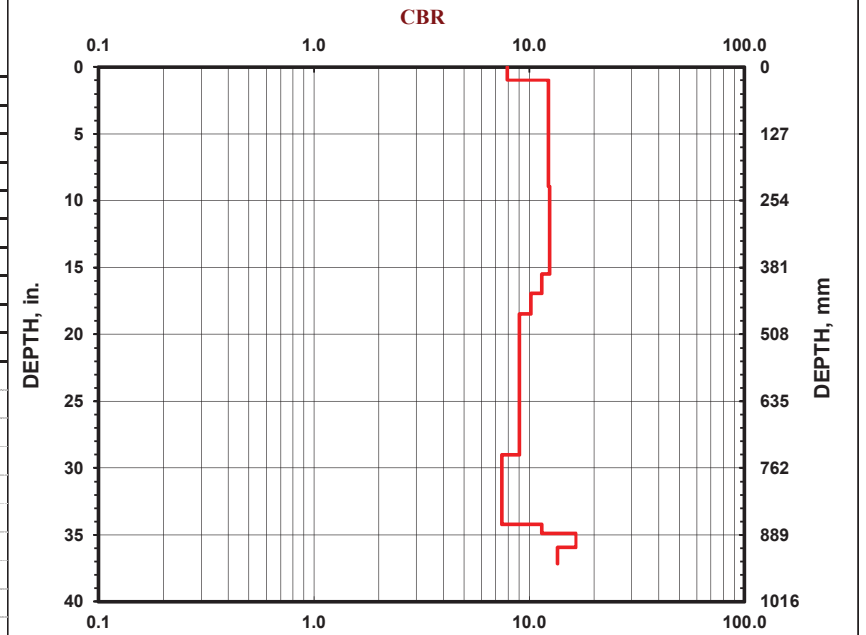
Project: G17058
 Location: Durant Road

Date: 5-Dec-17
 Soil Type(s): CL

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
1	25	1
12	227	1
10	394	1
2	430	1
2	470	1
12	737	1
5	869	1
1	887	1
2	913	1
2	944	1



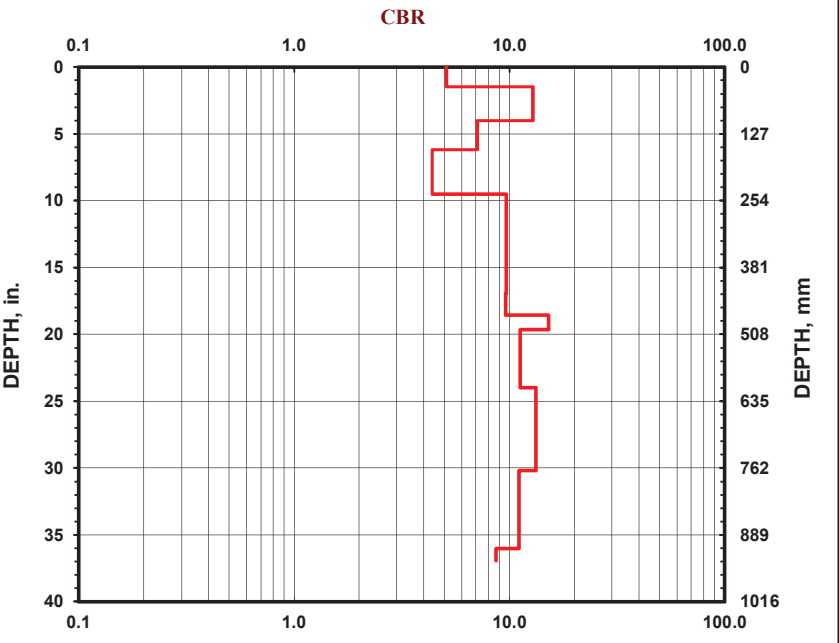
DCP TEST DATA

File Name: C-11

Project: G17058 Date: 5-Dec-17
 Location: Durant Road Soil Type(s): CL

Hammer: 10.1 lbs., 17.6 lbs., Both hammers used
 Soil Type: CH, CL, All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
1	37	1
4	102	1
2	157	1
2	242	1
9	430	1
2	472	1
2	500	1
6	610	1
10	767	1
8	915	1
1	938	1



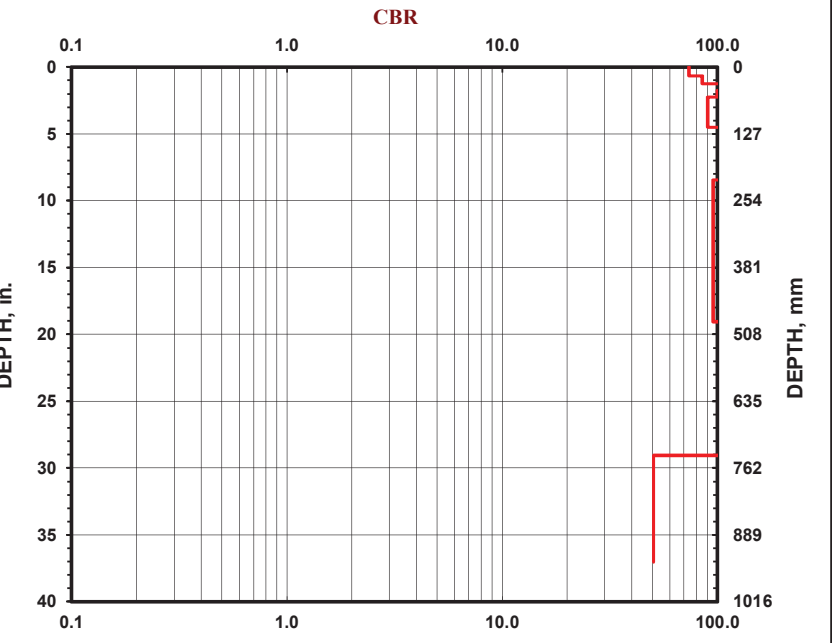
DCP TEST DATA

File Name: C-12

Project: G17058 Date: 5-Dec-17
 Location: Durant Road Soil Type(s): CL

Hammer: 10.1 lbs., 17.6 lbs., Both hammers used
 Soil Type: CH, CL, All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
Start	0	1
5	17	1
5	32	1
5	44	1
5	57	1
20	114	1
40	214	1
100	485	1
190	663	1
40	739	1
42	940	1



Falcon Engineering, Inc.

1210 Trinity Road, Suite 110 Raleigh, NC 27607

PAVEMENT SECTION AND SUBGRADE CONDITION SUMMARY

PROPOSED GRADE SEPARATION OF DURANT ROAD (SR 2006) OVER CSX S-LINE RAILROAD

WAKE COUNTY, NORTH CAROLINA

TIP No.: P-7520 WBS No. 46932.1.1 Falcon Project No.: G17063.00

TEST LOCATION					PAVEMENT SECTION THICKNESS (INCHES)			SUBGRADE	NOTES
LOCATION	ALIGNMENT	LANE	STATION	OFFSET	HMA	AGGREGATE BASE	TOTAL	IN-SITU CBR	
C-01	-L-	CTL	11+00, -L-	CL	14.00	0.00	14.00	10	-
C-02	-L-	WB, ISL	11+00, -L-	11' LT	14.00	0.00	14.00	11	-
C-03	-L-	WB, OSL	11+00, -L-	22' LT	15.00	0.00	15.00	10	-
C-04	-L-	EB, ISL	11+00, -L-	11' RT	15.00	0.00	15.00	11	-
C-05	-L-	EB, OSL	11+00, -L-	22' RT	14.00	0.00	14.00	11	-
C-06	-L-	CTL	46+50, -L-	CL	14.00	0.00	14.00	11	-
C-07	-L-	WB, ISL	46+50, -L-	11' LT	11.00	0.00	11.00	10	-
C-08	-L-	WB, OSL	46+50, -L-	22' LT	13.00	0.00	13.00	6	-
C-09	-L-	EB, ISL	46+50, -L-	11' RT	15.00	0.00	15.00	5	-
C-10	-L-	EB, OSL	46+50, -L-	22' RT	14.00	0.00	14.00	10	-
C-11	-L-	SB	10+04, -Y3-	20' LT	3.00	9.00	12.00	8	-
C-12	-L-	NB	11+93, -Y3-	17' RT	2.00	7.00	9.00	25	-
REPRESENTATIVE AVERAGE					12.00	1.33	13	11	-

LEGEND: EB - EASTBOUND, WB - WESTBOUND, SB- SOUTHBOUND, NORTHBOUND, OSL - OUTSIDE LANE, ISL - INSIDE LANE, CTL - CENTRAL TURN LANE

*NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX B
LABORATORY RESULTS*

REFERENCE: P-5720

PROJECT: 46932

DS
WSH
2/5/2019
INITIALS DATE

**REPORT OF LABORATORY COMPACTION CHARACTERISTICS
OF SOILS USING STANDARD EFFORT**

Performed in general accordance with ASTM D 698, Method A

January 10, 2018



**REPORT OF CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOILS**

Performed in General Accordance with ASTM D 1883

January 10, 2018



PROJECT NAME: P-5720 Durant Road Grade Separation

PROJECT NUMBER: G17058.00

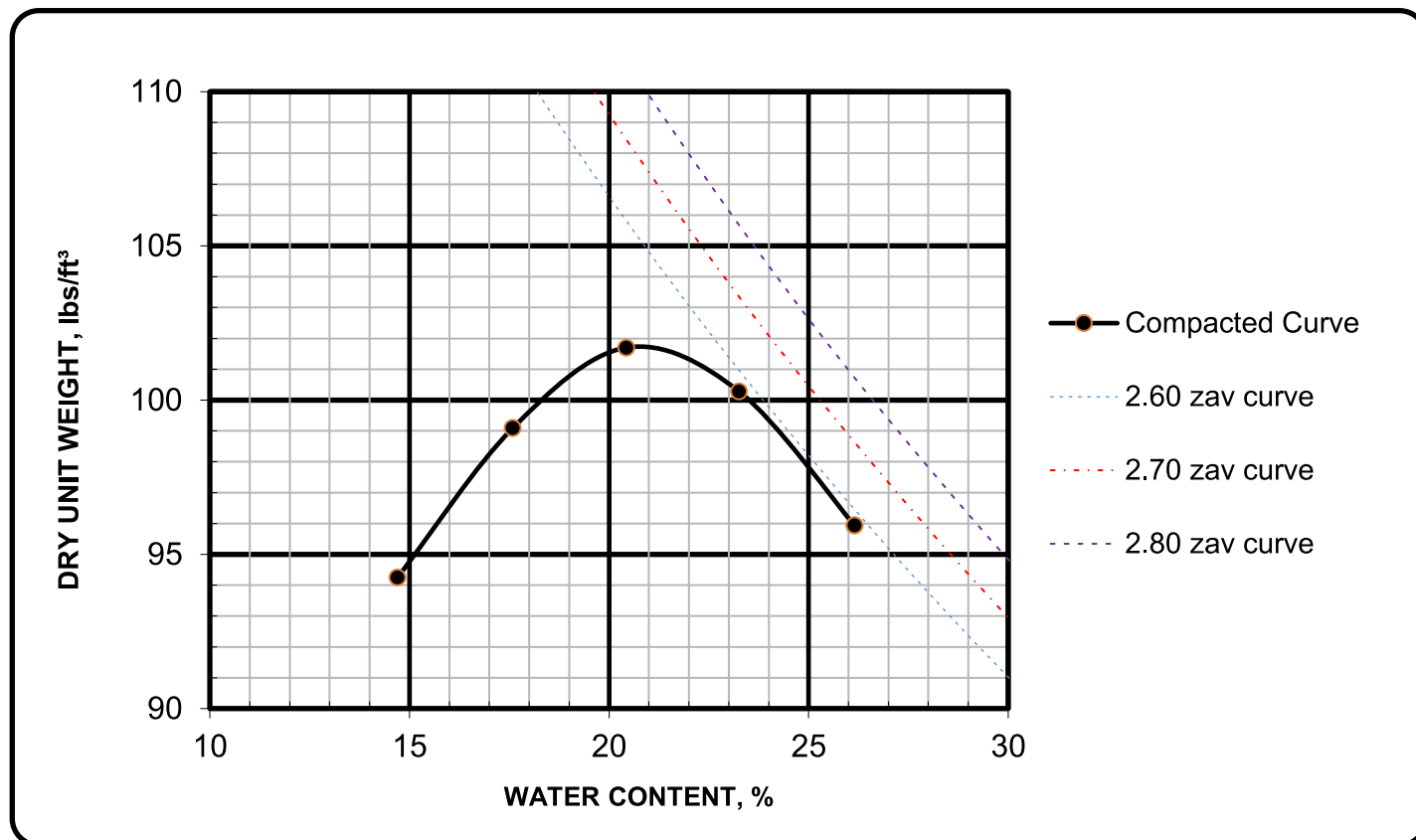
SAMPLE IDENTIFICATION: B-12, BS-01, 1.0-7.0'

SAMPLE DESCRIPTION: Brown silty sand

PROJECT NAME: P-5720 Durant Road Grade Separation

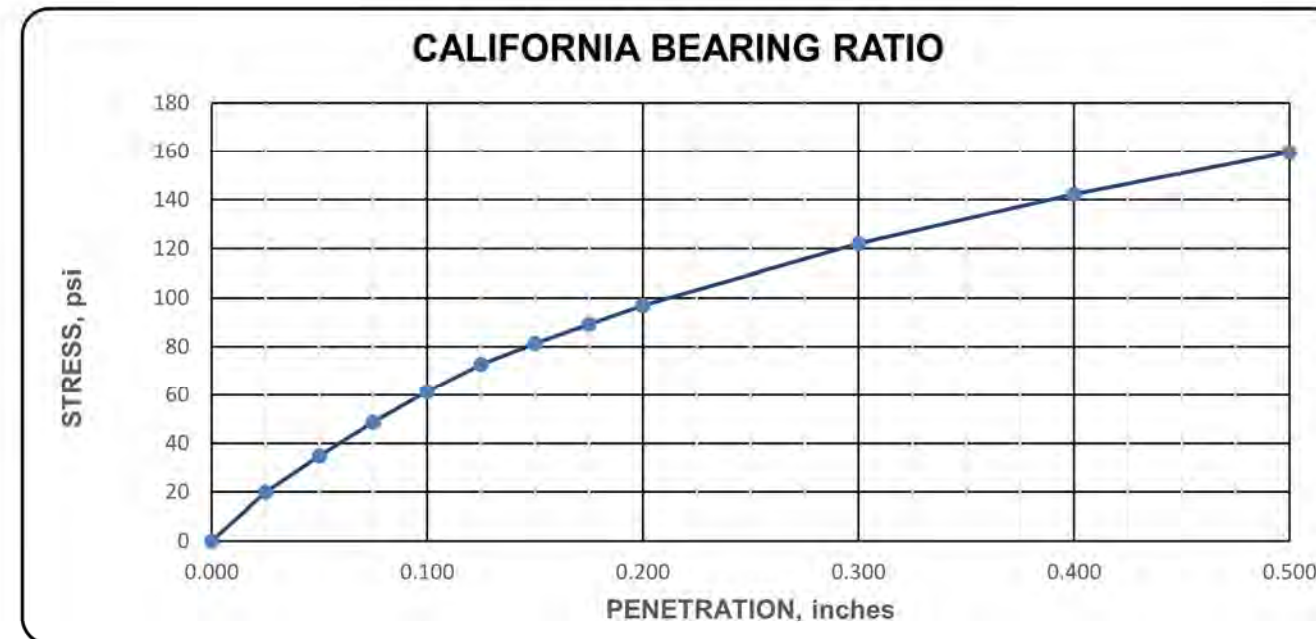
PROJECT NUMBER: G17058.00

SAMPLE IDENTIFICATION: B-12, BS-01, 1.0-7.0



STANDARD MAXIMUM DRY UNIT WEIGHT, lbs/ft³: 101.8
STANDARD OPTIMUM WATER CONTENT, %: 20.8

AS-RECEIVED WATER CONTENT: 10.7
LIQUID LIMIT: 37
PLASTIC LIMIT: 29
PLASTICITY INDEX: 8
PERCENT FINER NO. 200: 29
USCS CLASSIFICATION: SM



BEARING RATIO:	at 0.1 inches of penetration:	<u>uncorrected</u>	<u>corrected</u>
		6.1	6.1
	at 0.2 inches of penetration:	6.5	6.5

Compaction Method: ASTM D698
 Maximum Dry Unit Weight, lbs/ft³: 101.8
 Optimum Water Content, %: 20.8
 Compacted Dry Unit Weight, lbs/ft³: 100.8
 Compacted Water Content, %: 20.7
 Compaction Percentage: 99.0
 Water Content, Top one-inch after test, %: 28.2
 Surcharge amount, lbs: 10
 Immersion period, hours: 97
 Swell, %: 1.4

REMARKS:

REVIEWED BY: John Dailly

Reviewed by: John Dailly