ID: B-3680

CONTRACT: C202231

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

CONTENTS

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33222.1.1 (B-3680) F.A. PROJ. BRSTP-15(11)

COUNTY MOORE

PROJECT DESCRIPTION REPLACE BRIDGE 2 OVER CSX TRANSPORTATION OF US 15 /501

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33222.1.1 (B-3680)	1	9

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33222.1.1	BRSTP-15(11)	P.E.
		R/W & UTIL.

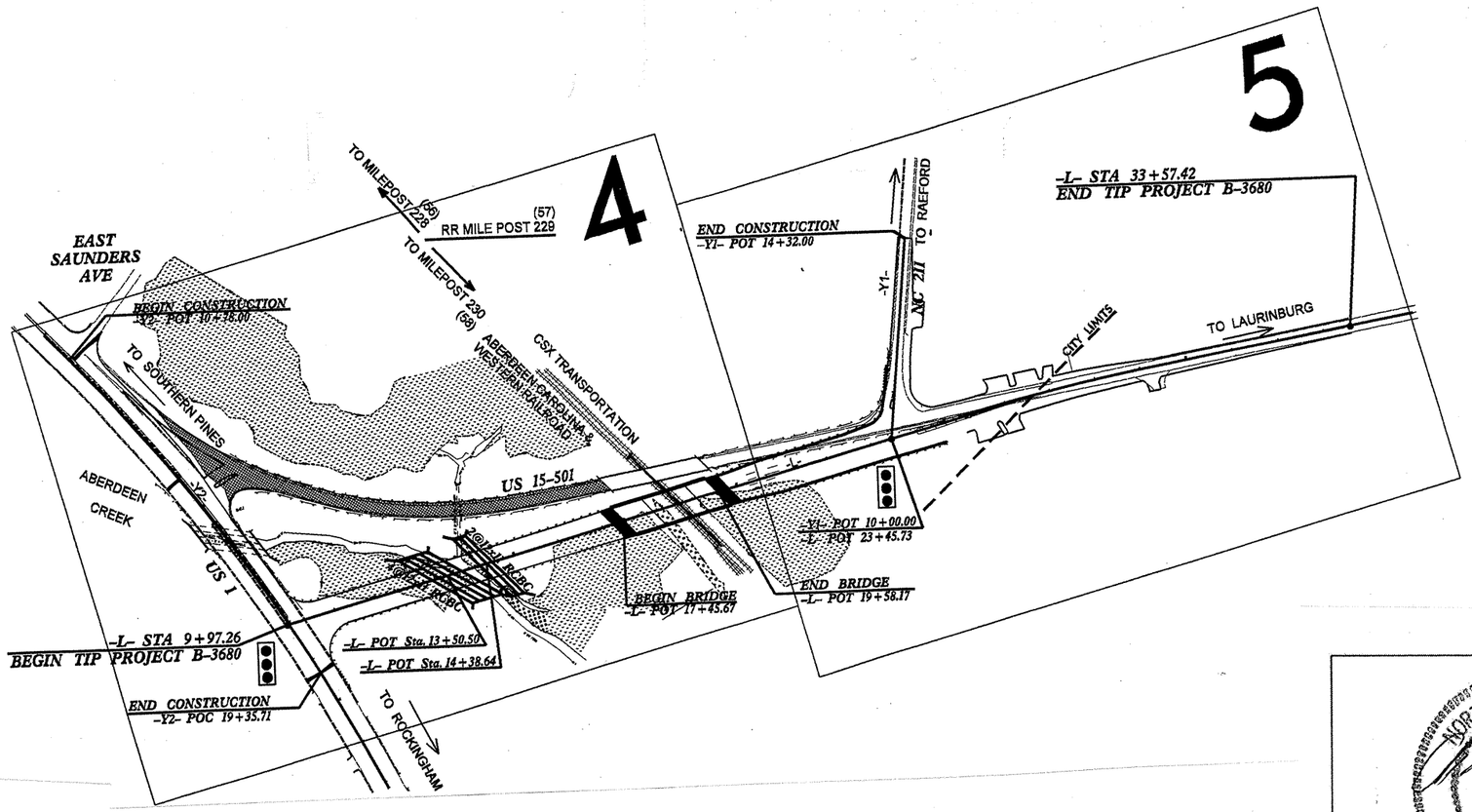
CAUTION NOTICE

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.

NAD 83/95 NC GRID



PERSONNEL

C. C. MURRAY

URS CORPORATION

INVESTIGATED BY C. B. LITTLE

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE APRIL 2012

NORTH CAROLINA LICENSED SEAL 1104 GEOLOGIST CLINTON B. LITTLE

4-17-12

DRAWN BY: C. E. BURRIS

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.

PROJECT REFERENCE NO.	SHEET NO.
33222.1.1 (B-3680)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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-7-5

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-5, A-7-6			
SYMBOL														
% PASSING # 10 # 40 # 200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS 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	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	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	
GRAIN SIZE IN.	12	3					

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, 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
- SPT / SPT CMT / VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [X] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] D-50T
- [ ] _____

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

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

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

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [X] VANE SHEAR TEST
- [X] SOIL PROBE

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 CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

FRACTURE SPACING

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

ELEVATION: FT.

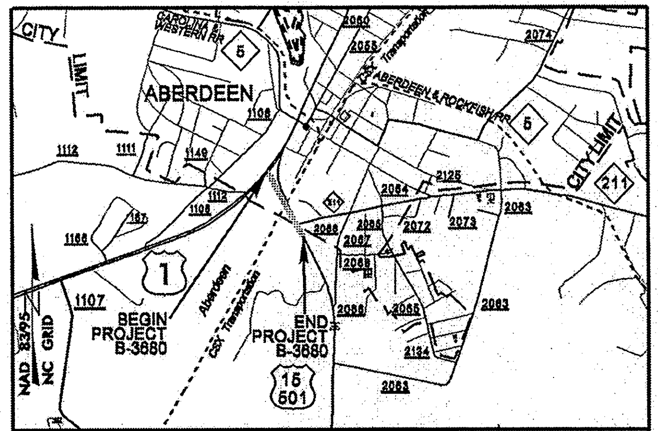
NOTES:
STRATIGRAPHY SHOWN THROUGH BORINGS

REVISED 09/23/09

TIP PROJECT: B-3680

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MOORE COUNTY

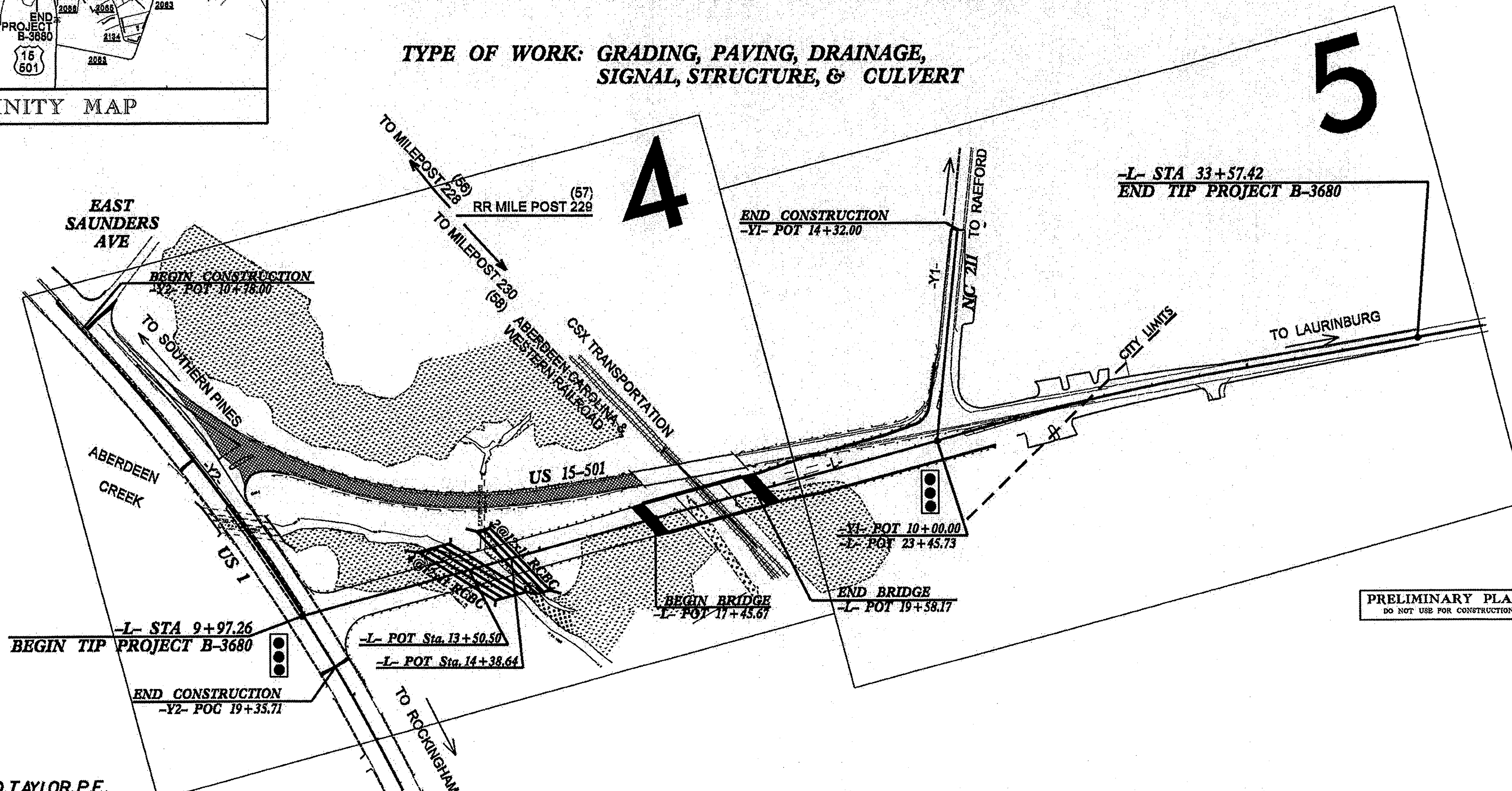
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3680	1	2A

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33222.1.1	BRSTP-15(11)	P.E.
33222.2.1	BRSTP-15(11)	ROW & UTIL.
33222.3.1	BRSTP-15(25)	CONSTRUCTION

NAD 83/95 NC GRID

LOCATION: BRIDGE NO. 2 OVER CSX TRANSPORTATION ON US 15/501

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNAL, STRUCTURE, & CULVERT



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NCDOT CONTACT: B.D.TAYLOR,P.E.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

URBAN ARTERIAL
ADT 2012 = 17,160
ADT 2032 = 23,560
DHV = 10 %
D = 55 %
T = 11 % *
V = 50 MPH
REGIONAL TIER
* (TTST 7 % + DUAL 4 %)

PROJECT LENGTH

LENGTH OF ROADWAY = 0.403 MILES

LENGTH OF STRUCTURE = 0.044 MILES

TOTAL LENGTH OF PROJECT = 0.447 MILES

Prepared In the Office of:
WILBUR SMITH ASSOCIATES
421 FAYETTEVILLE STREET
RALEIGH, NC 27601

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 21, 2007

LETTING DATE:
JUNE 19, 2012

DAVID L. WILVER, PE
PROJECT ENGINEER

DAVID L. WILVER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

EARTHWORK BALANCE SHEET

Project: B-3680

County: MOORE

STATION	UNCLASSIFIED EXCAVATION				UNDERCUT EXCAV.	EMBANKMENT				TOTAL EMB. + 20%	BORROW	WASTE			
	TOTAL	SUITABLE EARTH	ROCK	UNSUITABLE		TOTAL	EARTH	ROCK	REPLACE UNDERCUT			SUITABLE EARTH	ROCK	UNSUIT.	TOTAL WASTE
MAINLINE CONSTRUCTION															
SUMMARY #1															
-L- STA 10+33.19 TO STA 17+45.67 (Begin Bridge)	39	39				67,087	67,087			80,504	80,465				-
Y2 STA 10+78.00 TO STA 19+35.71	329	329				338	338			406	77				-
SUBTOTAL: SUMMARY #1	368	368				67,425	67,425			80,910	80,542				-
SUMMARY #2															-
-L- STA 19+58.17 (End Bridge) TO STA 33+57.42	1,684	1,684				43,783	43,783			52,540	50,856				-
Y1 STA 10+36.35 TO STA 14+32.00	596	596				6	6			7		589			589
SUBTOTAL: SUMMARY #2	2,280	2,280				43,789	43,789			52,547	50,856	589			589
SUMMARY #3															-
EXIST -L- STA 25+00.00 TO STA 35+00.00	47,296	47,296										47,296			47,296
TO REMOVE EXISTING ROADBED															-
SUBTOTAL: SUMMARY #3	47,296	47,296										47,296			47,296
SUBTOTAL (SUMMARIES 1-3)	49,944	49,944				111,214	111,214			133,457	131,398	47,885			47,885
SHOULDER CONSTRUCTION						325	325			390	390				-
LOSS DUE CLEARING & GRUBBING PER GEOTECH REPORT	(100)	(100)									100				-
WASTE TO BE USED IN LIEU OF BORROW											(589)	(589)			(589)
PROJECT TOTAL	49,844	49,844				111,539	111,539			133,847	131,299	47,296			47,296
ESTIMATE 5% TO REPLACE TOPSOIL IN BORROW PITS											6,565				-
GRAND TOTAL	49,844	49,844				111,539	111,539			133,847	137,864	47,296			47,296
SAY	**49,900**										**137,900**				
DRAINAGE DITCH EXCAVATION: EST. 1900 CY															
SHALLOW UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT: 750 CY															
UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT: 10,000CY															
SELECT GRANULAR MATERIAL PER GEOTECH REPORT: 3,500 CY															

EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 11, 2012

STATE PROJECT: 33222.1.1 (B-3680)
FEDERAL PROJECT: BRSTP-15(11)
COUNTY: Moore
DESCRIPTION: Bridge No. 2 over CSX Transportation on US 15/501

SUBJECT: Geotechnical Report – Inventory

Project Description

The project is in the southern end of Aberdeen, Moore County at the intersection of US 1 and US 15-501. The proposed design will replace the railroad bridge on new location, 80' to 100' south of the existing bridge. The intersection with US 1 will be shifted about 350' to the south. The total project length is about 0.4 miles. Structures include the railroad bridge and two culverts.

For the roadway investigation, The Geotechnical Engineering Unit obtained five Standard Penetration Test borings (conducted by URS Corp. in conjunction with the structure investigation), several hand probes, two hand auger borings, and two Vane Shear test borings. Two of the structure borings are also included in this report. All of the structure subsurface data is available in a separate Structure Investigation Report.

Areas of Special Geotechnical Interest

Most of the project is in a wet, marshy environment. The near surface soils are very soft, saturated, and organic.

Physiography and Geology

The natural ground elevation is in the range of 315 to 325'. The maximum proposed grade elevation is near 357. The maximum proposed embankment height is about 35' at the End Bent One bridge approach. Groundwater is at the ground surface in most areas. The soft organic soils are associated with the floodplain of Aberdeen Creek which crosses the –L- alignment near Station 14+00. Soils below the recent alluvium are of Coastal Plain origin.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850
Fax: 919-250-4237

www.ncdot.gov/doh/preconstruct/highway/geotech

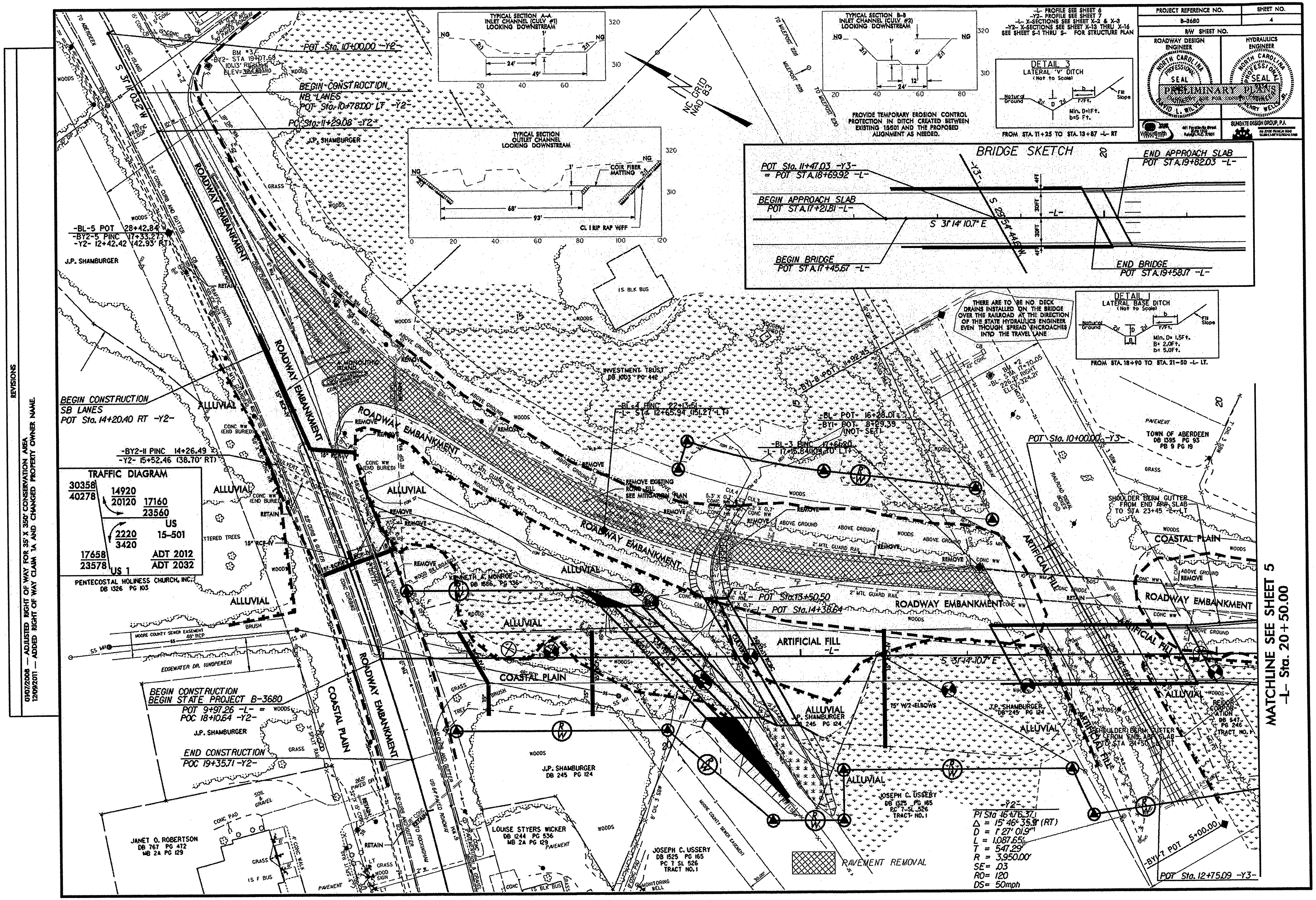
LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

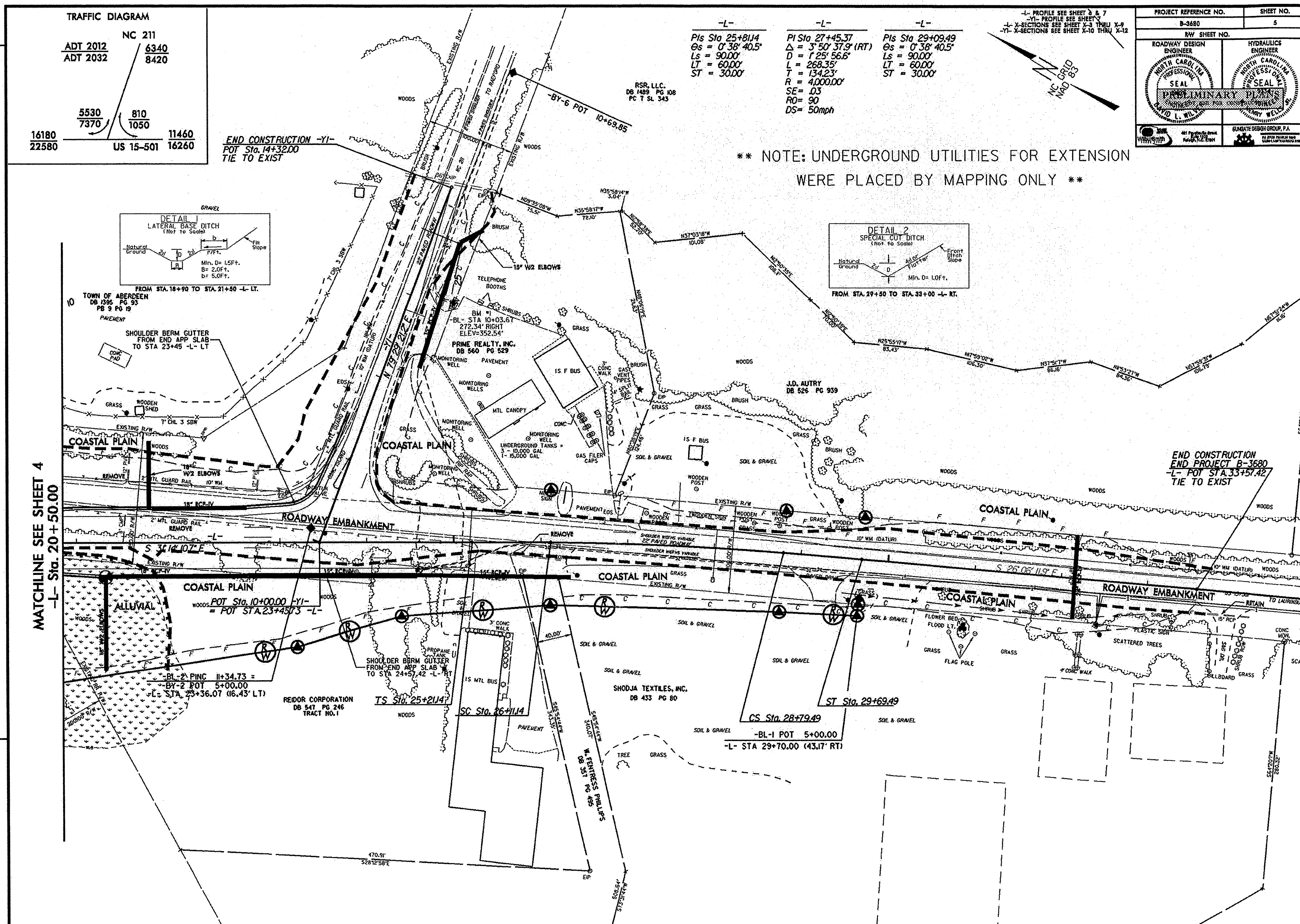
Soils

The recent alluvium appears to be variable in type and thickness. The maximum thickness recorded was about 20'. In some borings it was only 2' thick. The upper portions tended to be soft, organic, and clayey with denser sands below. In the worst case borings, there was 12' of zero (SPT) blow count A-7-5 sandy silty clay with 18% organic content.

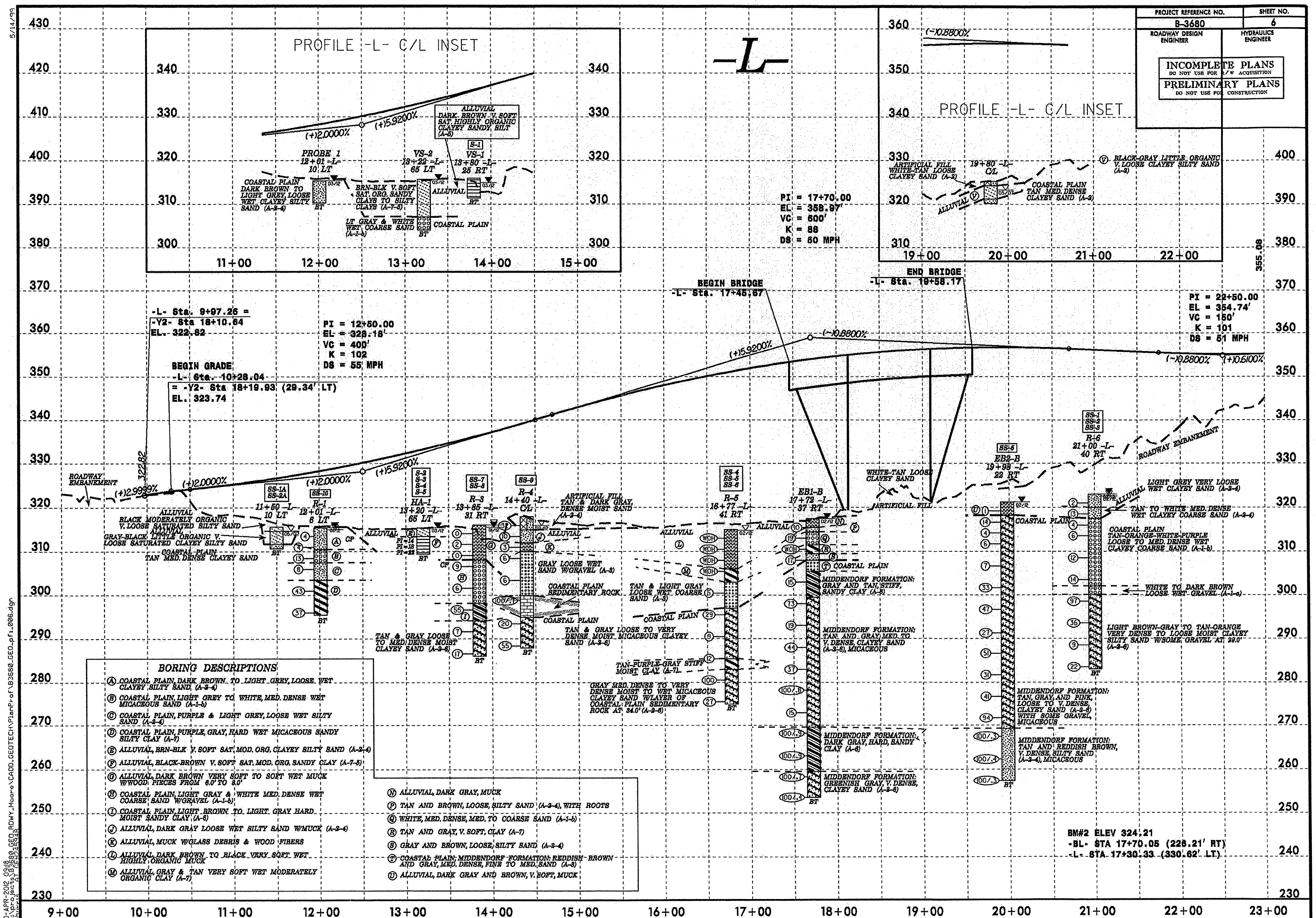
Respectfully Submitted,

Clint Little
Project Geological Engineer


PROJECT REFERENCE NO. B-3680
SHEET NO. 4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
SUNGATE DESIGN GROUP, P.A.
-L- PROFILE SEE SHEET 6
-Y2- PROFILE SEE SHEET 7
-L- X-SECTIONS SEE SHEET X-2 & X-3
-Y2- X-SECTIONS SEE SHEET X-13 THRU X-16
SEE SHEET S-1 THRU S- FOR STRUCTURE PLAN
TYPICAL SECTION A-A
INLET CHANNEL (CULV #1)
LOOKING DOWNSTREAM
TYPICAL SECTION B-B
INLET CHANNEL (CULV #2)
LOOKING DOWNSTREAM
PROVIDE TEMPORARY EROSION CONTROL PROTECTION IN DITCH CREATED BETWEEN EXISTING 15501 AND THE PROPOSED ALIGNMENT AS NEEDED.
TYPICAL SECTION
OUTLET CHANNEL
LOOKING DOWNSTREAM
COIR FIBER MATTING
CL I RIP RAP W/FF
DETAIL 3
LATERAL 'V' DITCH
(Not to Scale)
Min. D=1 Ft.
b=5 Ft.
FROM STA. 11+25 TO STA. 13+87 -L- RT
BRIDGE SKETCH
POT Sta. 11+47.03 -Y3- = POT STA. 18+69.92 -L-
BEGIN APPROACH SLAB
POT STA. 17+21.81 -L-
BEGIN BRIDGE
POT STA. 17+45.67 -L-
END APPROACH SLAB
POT STA. 19+82.03 -L-
END BRIDGE
POT STA. 19+58.17 -L-
S 31°14' 10.7" E
THERE ARE TO BE NO DECK DRAINS INSTALLED ON THE BRIDGE OVER THE RAILROAD AT THE DIRECTION OF THE STATE HYDRAULICS ENGINEER EVEN THOUGH SPREAD ENCROACHES INTO THE TRAVEL LANE
DETAIL 1
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1.5Ft.
B= 2.0Ft.
b= 5.0Ft.
FROM STA. 18+90 TO STA. 21-50 -L- LT.
NC GRID NAD 83
BEGIN CONSTRUCTION NB LANES
POT Sta. 10+78.00 LT -Y2-
PC Sta. 11+29.08 -Y2-
POT Sta. 10+00.00 -Y2-
BEGIN CONSTRUCTION SB LANES
POT Sta. 14+20.40 RT -Y2-
TRAFFIC DIAGRAM
30358
40278
14920
20120
17160
23560
US 15-501
2220
3420
17658
23578
US 1
ADT 2012
ADT 2032
PENTECOSTAL HOLINESS CHURCH, INC. DB 1326 PG 103
BEGIN CONSTRUCTION
BEGIN STATE PROJECT B-3680
POT 9+97.26 -L- = POC 18+10.64 -Y2-
END CONSTRUCTION
POC 19+35.71 -Y2-
J.P. SHAMBURGER DB 245 PG 124
JANET O. ROBERTSON DB 767 PG 472 MB 2A PG 129
LOUISE STYERS WICKER DB 1244 PG 536 MB 2A PG 129
JOSEPH C. USSERY DB 1525 PG 165 PC 7 SL 526 TRACT NO. 1
INVESTMENT TRUST DB 1003 PG 442
TOWN OF ABERDEEN DB 1395 PG 93 PB 9 PG 19
ROADWAY EMBANKMENT
ALLUVIAL
COASTAL PLAIN
ARTIFICIAL FILL
POT Sta. 15+50.50
POT Sta. 14+36.64
POT Sta. 10+00.00 -Y3-
-Y2-
PI Sta 16+76.37
Δ = 15° 46' 35.9" (RT)
D = 1° 27' 01.9"
L = 1,087.65'
T = 547.29'
R = 3,950.00'
SE= .03
RO= 120
DS= 50mph
PAVEMENT REMOVAL
POT Sta. 12+75.09 -Y3-
MATCHLINE SEE SHEET 5
-L- Sta. 20+50.00
REVISIONS
01/07/2008 — ADJUSTED RIGHT OF WAY FOR 35' X 350' CONSERVATION AREA.
12/09/2011 — ADDED RIGHT OF WAY CLAIM 1A AND CHANGED PROPERTY OWNER NAME.



PROJECT REFERENCE NO. B-3680
SHEET NO. 5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
TRAFFIC DIAGRAM
NC 211
ADT 2012
ADT 2032
6340
8420
5530
7370
810
1050
16180
22580
11460
16260
US 15-501
-L-
PIs Sta 25+81.14
Θs = 0° 38' 40.5"
Ls = 90.00'
LT = 60.00'
ST = 30.00'
-L-
PI Sta 27+45.37
Δ = 3° 50' 37.9" (RT)
D = 1° 25' 56.6"
L = 268.35'
T = 134.23'
R = 4,000.00'
SE= .03
RO= 90
DS= 50mph
-L-
PIs Sta 29+09.49
Θs = 0° 38' 40.5"
Ls = 90.00'
LT = 60.00'
ST = 30.00'
NC GRID NAD 83
** NOTE: UNDERGROUND UTILITIES FOR EXTENSION WERE PLACED BY MAPPING ONLY **
END CONSTRUCTION -Y1-
POT Sta. 14+32.00
TIE TO EXIST
-BY-6 POT 10+69.85
RSR, LLC.
DB 1489 PG 108
PC T SL 343
DETAIL 1
LATERAL BASE DITCH
(Not to Scale)
FROM STA. 18+90 TO STA. 21+50 -L- LT.
DETAIL 2
SPECIAL CUT DITCH
(Not to Scale)
FROM STA. 29+50 TO STA. 33+00 -L- RT.
TOWN OF ABERDEEN
DB 1395 PG 93
PB 9 PG 19
SHOULDER BERM GUTTER FROM END APP SLAB TO STA 23+45 -L- LT
BM #1
-BL- STA 10+03.67
272.34' RIGHT
ELEV=352.54'
PRIME REALTY, INC.
DB 560 PG 529
J.D. AUTRY
DB 526 PG 939
COASTAL PLAIN
ROADWAY EMBANKMENT
ALLUVIAL
MATCHLINE SEE SHEET 4
-L- Sta. 20+50.00
POT Sta. 10+00.00 -Y1-
= POT STA.23+45.73 -L-
-BL-2 PINC 11+34.73 =
-BY-2 POT 5+00.00
-L- STA. 23+36.07 (16.43' LT)
REIDOR CORPORATION
DB 547 PG 246
TRACT NO. 1
TS Sta. 25+21.14
SC Sta. 26+11.14
SHOULDER BERM GUTTER FROM END APP SLAB TO STA 24+57.42 -L- RT
SHODJA TEXTILES, INC.
DB 433 PG 80
W. FENTRESS PHILLIPS
DB 351 PG 495
CS Sta. 28+79.49
ST Sta. 29+69.49
-BL-1 POT 5+00.00
-L- STA 29+70.00 (43.17' RT)
END CONSTRUCTION
END PROJECT B-3680
-L- POT STA.33+57.42
TIE TO EXIST
TO LAURINBURG
REVISIONS



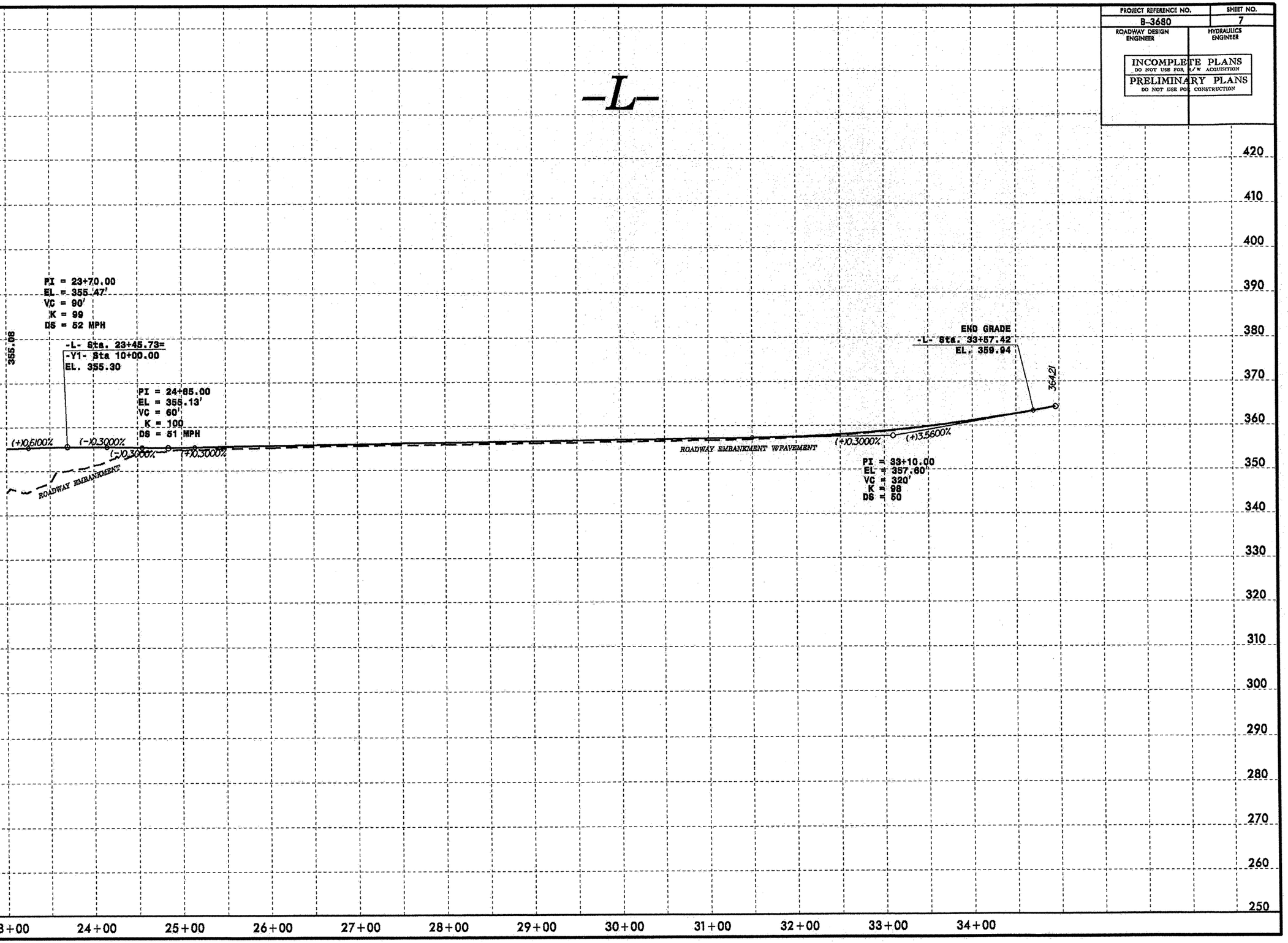
PROJECT REFERENCE NO. B-3680
SHEET NO. 6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
-L-
PROFILE -L- C/L INSET
PROFILE -L- C/L INSET
PI = 17+70.00
EL = 358.97'
VC = 600'
K = 88
DS = 50 MPH
PI = 12+50.00
EL = 328.18'
VC = 400'
K = 102
DS = 55 MPH
PI = 22+50.00
EL = 354.74'
VC = 150'
K = 101
DS = 51 MPH
-L- Sta. 9+97.26 =
-Y2- Sta 18+10.64
EL. 322.82
BEGIN GRADE
-L- Sta. 10+28.04
= -Y2- Sta 18+19.93 (29.34' LT)
EL. 323.74
BEGIN BRIDGE
-L- Sta. 17+45.67
END BRIDGE
-L- Sta. 19+58.17
(+)2.0000%
(+)5.9200%
(−)0.8800%
(+)0.6100%
(+)2.9999%
ROADWAY EMBANKMENT
BORING DESCRIPTIONS
(A) COASTAL PLAIN, DARK BROWN TO LIGHT GREY, LOOSE WET CLAYEY SILTY SAND (A-2-4)
(B) COASTAL PLAIN, LIGHT GREY TO WHITE, MED. DENSE WET MICACEOUS SAND (A-1-b)
(C) COASTAL PLAIN, PURPLE & LIGHT GREY, LOOSE WET SILTY SAND (A-2-4)
(D) COASTAL PLAIN, PURPLE, GRAY, HARD WET MICACEOUS SANDY SILTY CLAY (A-7)
(E) ALLUVIAL, BRN-BLK V. SOFT SAT. MOD. ORG. CLAYEY SILTY SAND (A-2-4)
(F) ALLUVIAL, BLACK-BROWN V. SOFT SAT. MOD. ORG. SANDY CLAY (A-7-5)
(G) ALLUVIAL, DARK BROWN VERY SOFT TO SOFT WET MUCK W/WOOD PIECES FROM 6.0' TO 8.0'
(H) COASTAL PLAIN, LIGHT GRAY & WHITE MED. DENSE WET COARSE SAND W/GRAVEL (A-1-b)
(I) COASTAL PLAIN, LIGHT BROWN TO LIGHT GRAY HARD MOIST SANDY CLAY (A-6)
(J) ALLUVIAL, DARK GRAY LOOSE WET SILTY SAND W/MUCK (A-2-4)
(K) ALLUVIAL, MUCK W/GLASS DEBRIS & WOOD FIBERS
(L) ALLUVIAL, DARK BROWN TO BLACK VERY SOFT WET HIGHLY ORGANIC MUCK
(M) ALLUVIAL, GRAY & TAN VERY SOFT WET MODERATELY ORGANIC CLAY (A-7)
(N) ALLUVIAL, DARK GRAY, MUCK
(P) TAN AND BROWN, LOOSE, SILTY SAND (A-2-4), WITH ROOTS
(Q) WHITE, MED. DENSE, MED. TO COARSE SAND (A-1-b)
(R) TAN AND GRAY, V. SOFT, CLAY (A-7)
(S) GRAY AND BROWN, LOOSE, SILTY SAND (A-2-4)
(T) COASTAL PLAIN; MIDDENDORF FORMATION; REDDISH BROWN AND GRAY, MED. DENSE, FINE TO MED. SAND (A-3)
(U) ALLUVIAL, DARK GRAY AND BROWN, V. SOFT, MUCK
BM#2 ELEV 324.21
-BL- STA 17+70.05 (226.21' RT)
-L- STA 17+30.33 (330.62' LT)
9+00
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-3680	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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PROJECT REFERENCE NO.	SHEET NO.
B-3680	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y1-

-Y1- Sta. 10+00.00 =
-L- Sta. 23+45.73
EL. 355.30

BEGIN GRADE
-Y1- Sta. 10+32.08
=-L- Sta. 23+57.08 (30' LT)
EL. 354.74

PI = 11+00.00
EL = 354.96'
VC = 120'
K = 52
DS = 40 MPH

PI = 12+40.00
EL = 352.16'
VC = 100'
K = 250
DS = 70 MPH

END GRADE
-Y1- Sta. 14+32.00
EL. 349.09

(+)0.3300%
(-)2.0000%
(-)1.6000%
(-)1.7606%
ROADWAY EMBANKMENT W/PAVEMENT

BM#1 ELEV 352.54
-BL- STA 10+03.67 (272.34' RT)
-Y1- STA 13+07.17 (49.81' RT)

370 360 350 340 330

10+00 11+00 12+00 13+00 14+00 15+00

-Y2-

BM#3 ELEV 324.61
-BY2- STA 19+07.68 (101.13' RT)
-Y2- STA 10+90.26 (89.15' LT)

BEGIN GRADE
-Y2- Sta. 10+78.00
EL. 326.33

PI = 11+00.00
EL = 326.19'
VC = 50'
K = 174
DS = 63 MPH

PI = 11+50.00
EL = 325.72'
VC = 50'
K = 278
DS = >80 MPH

PI = 13+00.00
EL = 324.60'
VC = 90'
K = 257
DS = >80 MPH

PI = 14+00.00
EL = 324.20'
VC = 110'
K = 157
DS = 61 MPH

PI = 15+00.00
EL = 323.10'
VC = 80'
K = 143
DS = 62 MPH

PI = 16+75.00
EL = 322.15'
VC = 150'
K = 145
DS = 62 MPH

-Y2- STA 18+10.64 =
-L- STA 9+97.26
ELEV 322.82

END GRADE
-Y2- Sta. 19+35.71
EL. 323.44

(+)0.9300%
(-)0.6430%
(-)0.7500%
(-)0.4000%
(-)1.1000%
(-)0.5400%
(+)0.4940%
ROADWAY EMBANKMENT W/PAVEMENT
ROADWAY EMBANKMENT W/PAVEMENT

340 330 320 310 300

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

5/28/99

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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	Line or Boring ID			
							C.SAND	F.SAND	SILT	CLAY	10	40	200						
S-1	25 RT	13+80	2.5-3.0	A-5(4)	50	10	24.1	24.5	35.3	16.1	100	90	52	-	15.5	L			
S-2	65 LT	13+20	0.0-2.0	A-2-4(0)	37	NP	35.1	31.1	19.7	14.1	98	77	33	-	7.5	L			
S-3	65 LT	13+20	2.0-2.5	A-7-5(5)	52	14	30.9	18.1	26.9	24.1	96	78	49	-	17.9	L			
S-4	65 LT	13+20	2.5-3.0	A-7-5(14)	60	18	12.4	19.1	36.3	32.1	99	93	68	-	17.4	L			
S-5	65 LT	13+20	3.0-4.0	A-7-5(18)	64	22	11.2	19.1	41.6	28.1	100	93	71	-	16.5	L			
S-1A	20 LT	11+50	0.0-1.0	A-2-4(0)	37	NP	39.2	35.9	15.8	9.1	99	79	28	-	7.2	L			
S-2A	20 LT	11+50	1.0-4.0	A-2-4(0)	21	NP	37.1	43.2	10.6	9.1	100	82	25	-	4.3	L			
SS-1	40 RT	21+00	1.0-2.5	A-2-4(0)	17	NP	51.8	29.0	5.0	14.2	98	76	19	-	-	L			
SS-2	40 RT	21+00	3.5-5.0	A-2-4(0)	18	NP	67.4	18.3	2.1	12.2	99	71	14	-		L			
SS-3	40 RT	21+00	8.5-10.0	A-1-b(0)	21	3	76.3	11.0	0.5	12.2	96	39	12	-	-	L			
SS-4	41 RT	16+77	6.0-8.5											-	-	L			
SS-5	41 RT	16+77	8.5-10.0				7.7	24.4	27.3	40.6	100	96	70	-	29.2	L			
SS-6	41 RT	16+77	13.5-15.0	A-3(0)	16	NP	75.3	16.9	5.8	2.0	100	58	8	-	14.8	L			
SS-7	31 RT	13+85	3.5-5.0											-	-	L			
SS-8	31 RT	13+85	8.5-10.0	A-1-b(0)	20	NP	80.4	18.1	1.5	0	82	30	2	-	15.7	L			
SS-9	C/L	14+40	1.0-2.5	A-2-4(0)	18	NP	57.1	26.0	8.8	8.1	96	62	17	-	-	L			
SS-10	6 LT	12+01	1.0-2.5	A-2-4(0)	16	NP	20.9	54.0	12.9	12.2	99	82	26	-	-	L			
SS-5	22 RT	19+98	6.0-7.5	A-2-6	29	11	71	13	3	13	94	51	16	-	-	L			

VANE SHEAR CALCULATIONS FOR BORING VS-1

DEPTH	OFFSET	STATION	S (psf)	VANE SIZE	FIELD READING (kpa)	CORRECTION FACTOR	CORRECTED READING (kpa)	LINE
1.0	25 RT	13+80	167	25.4X50.8mm	16	0.5	8.0	L
2.0	25 RT	13+80	783	25.4X50.8mm	75	0.5	37.5	L
3.0	25 RT	13+80	710	25.4X50.8mm	68	0.5	34.0	L
4.5	25 RT	13+80	668	25.4X50.8mm	64	0.5	32.0	L

VANE SHEAR CALCULATIONS FOR BORING VS-2

DEPTH	OFFSET	STATION	S (psf)	VANE SIZE	FIELD READING (kpa)	CORRECTION FACTOR	CORRECTED READING (kpa)	LINE
0.5	65 LT	13+22	292	25.4X50.8mm	28	0.5	14.0	L
1.5	65 LT	13+22	0	25.4X50.8mm	0	0.5	0.0	L
3.0	65 LT	13+22	209	25.4X50.8mm	20	0.5	10.0	L
3.5	65 LT	13+22	104	25.4X50.8mm	10	0.5	5.0	L
4.0	65 LT	13+22	313	25.4X50.8mm	30	0.5	15.0	L
4.5	65 LT	13+22	418	25.4X50.8mm	40	0.5	20.0	L
5.0	65 LT	13+22	261	25.4X50.8mm	25	0.5	12.5	L
6.0	65 LT	13+22	564	25.4X50.8mm	54	0.5	27.0	L
8.0	65 LT	13+22	647	25.4X50.8mm	62	0.5	31.0	L
10.5	65 LT	13+22	1357+	25.4X50.8mm	130+	0.5	65.0	L
11.5	65 LT	13+22	1357+	25.4X50.8mm	130+	0.5	65.0	L