

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.	U-5312	1	67

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	17+72.20 - 188.63.29	4-16	17-24
-Y10-	10+00.00 - 19+10.09	15-16	25-26
-Y11-	10+00.00 - 13+91.19	5	27
-WALL1-	11+15.76 - 29+37.17	9	28
-WALL2-	11+50.00 - 13+57.75	9	28
-WALL3-	10+57.53 - 27+50.00	10	28

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	155+00.00	29
-L-	171+50.00	30
-L-	179+42.00	31

APPENDICES

APPENDIX	TITLE	SHEETS
A	PAVEMENT INVESTIGATION RESULTS	32-60
B	LABORATORY RESULTS	61-63

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY WILKES
PROJECT DESCRIPTION US 421 FROM NC 16 TO US 421
BUSINESS IN WILKESBORO

INVENTORY

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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

TRIGON EXPLORATION

LANE, R.W.

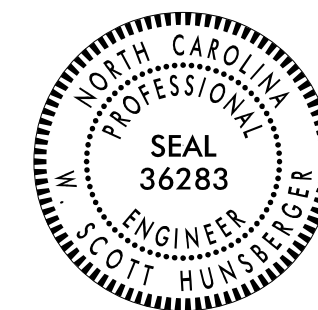
INVESTIGATED BY FALCON ENG.

DRAWN BY HILL, M.J.

CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE OCTOBER 2021



DocuSigned by:
W. Scott Hunsberger 10/7/2021

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REFERENCE: U-5312

PROJECT: 45446

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 208, 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. 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 DISLOADED 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. SLICKENSIDE - 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						MINERALOGICAL COMPOSITION				WEATHERING											
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS						MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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, WOULD YIELD SPT N VALUES > 100 BPF. 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. 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.											
CONSISTENCY OR DENSENESS						GROUND WATER				MISCELLANEOUS SYMBOLS											
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)						WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE											
TEXTURE OR GRAIN SIZE						RECOMMENDATION SYMBOLS				ROCK HARDNESS											
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053						UNDERCUT SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL				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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT - CAN BE GROOVED 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 FINGER NAIL.											
SOIL MOISTURE - CORRELATION OF TERMS						ABBREVIATIONS				FRACTURE SPACING											
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT SAT - SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE						AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE 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 W - UNIT WEIGHT W _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO				TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET											
PLASTICITY						EQUIPMENT USED ON SUBJECT PROJECT				BEDDING											
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH						DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST, MOBILE B-57 ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING W/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, H, N HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST				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											
COLOR						INDURATION															
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.						FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF 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.															

09.08/9c

26-NOV-2018 15:17 I:_Projects\2017\G17038-00 VHB U-5312 (US-421) Superstreet in Wilkes County\U5312_GEO_RDWY_CADD_GEO1TECH\PlanProf\U5312_GEO_tsh.dgn cadmachine AT CAD01

TIP PROJECT: U-5312

CONTRACT: 45446

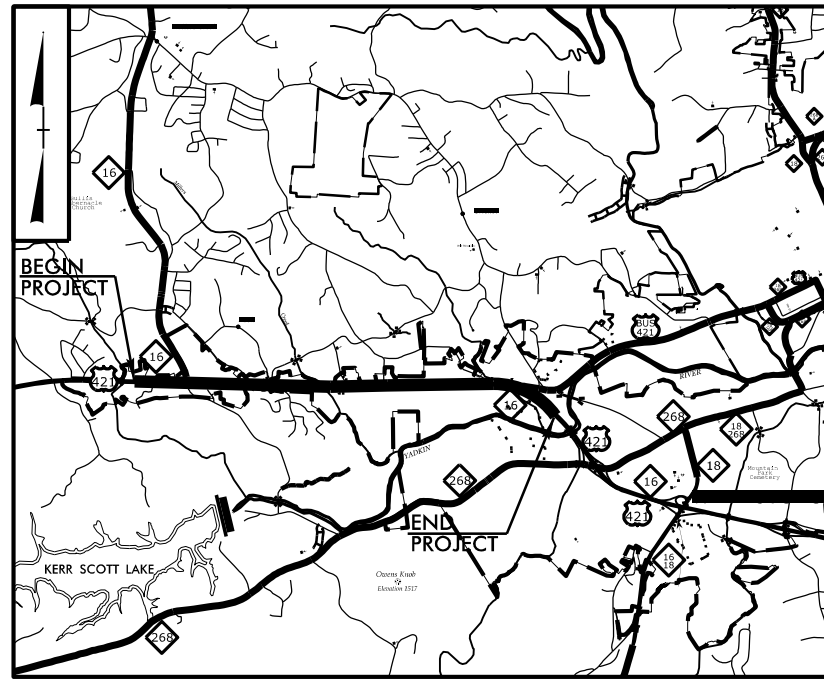
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

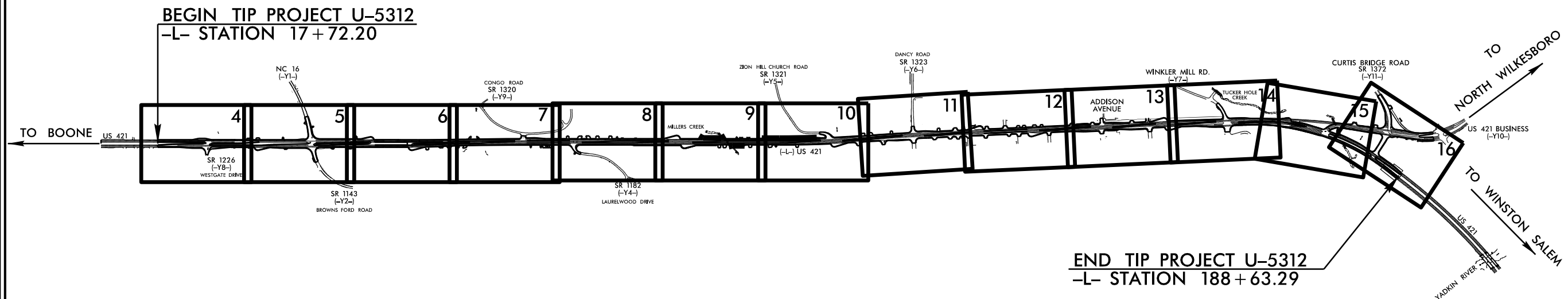
LOCATION: US 421 FROM NC 16 TO US 421 BUSINESS IN WILKESBORO

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES,
SIGNING, SIGNALS, AND ITS

25% PLANS



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	OF
N.C.	U-5312	2A	66
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45446.1.1	NHS-0421(072)	PE	



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WILKESBORO

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

<p>GRAPHIC SCALES</p> <p>50 25 0 50 100 PLANS</p> <p>50 25 0 50 100 PROFILE (HORIZONTAL)</p> <p>10 5 0 10 20 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT 2020 = 37,000 ADT 2040 = 41,900 K = 8 % D = 55 % T = 5 % * V = 55 MPH * TTST = 2% DUAL 3% FUNC CLASS = ARTERIAL STATEWIDE TIER</p>	<p>PROJECT LENGTH</p> <p>LENGTH ROADWAY TIP PROJECT U-5312 = 3.237 MILES TOTAL LENGTH TIP PROJECT U-5312 = 3.237 MILES</p>	<p>Prepared for the North Carolina Department of Transportation in the office of:</p> <p>vhb 940 Main Campus Drive, Suite 500 Raleigh, NC 27606 NC License No. C-3705</p> <p>SUNGATE DESIGN GROUP, P.A. 1405 JONES BRANCH RD WILKESBORO, NC 27606 TEL: 817-835-1111 FAX: 817-835-1111 ENG. FIRM LICENSE NO. C-580</p> <p>2012 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: FEBRUARY 28, 2018</p> <p>LETTING DATE: FEBRUARY 18, 2020</p> <p>NCDOT CONTACT: Dean Ledbetter, PE Division Planning Engineer</p> <p>Jimmy Goodnight, PE PROJECT ENGINEER</p> <p>Mark Hussey PROJECT DESIGN ENGINEER</p>	<p>HYDRAULICS ENGINEER</p> <p>_____ SIGNATURE: P.E.</p> <p>ROADWAY DESIGN ENGINEER</p> <p>_____ SIGNATURE: P.E.</p>	
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Roadway Subsurface Investigation Report - Inventory

US 421 From NC 16 to US 421 Business In Wilkesboro
Wilkes County, North Carolina
WBS: 45446.1.1 TIP: U-5312
Falcon Project No.: G17038.00

Prepared for:

VHB
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

Submitted by:

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

October 7, 2021

WBS: 45446.1.1
TIP: U-5312
COUNTY: Wilkes
DESCRIPTION: US 421 From NC 16 to US 421 Business in Wilkesboro
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of 3.2 miles of proposed new grading, realignment, and widening along US 421 in Wilkes County. A portion of US 421 Business from NC 16 to US 421 will be converted to a superstreet including turn lane and intersection improvements and the addition of U-turn bulbs. Tie-ins and minor improvements to Y-lines and small drives are also included.

Included in this project are one (1) extension of an existing reinforced box culvert facilitating water crossings along the mainline, and three (3) retaining wall along -L-.

The investigation was conducted between February 13th, and April 9th, 2018 in general accordance with the Scope of Services, dated March 29, 2017. The recommendations provided in this report are based solely on our site reconnaissance, soil test borings and laboratory test data, engineering evaluation of these data, and generally accepted soil and foundation engineering practices and principles.

A total of forty (40) Standard Penetration Test (SPT) borings, one (1) auger probe, one (1) hand auger and two (2) rod soundings were performed for the proposed roadway alignments and retaining walls. All mechanical borings were drilled using a Mobil B-57 ATV 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, bulk samples were collected for standard Proctor compaction and California Bearing Ratio (CBR) testing. At thirty-five (35) locations along the existing roadway, existing pavements were cored, measured, and Dual Mass Dynamic Cone Penetrometer (DCP) testing completed on the subgrade to depths of up to three feet to correlate in-situ CBR values. 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 3.7 miles were explicitly investigated. Other minor Y-lines and driveways are included on the project but improvements are not anticipated to be significant enough to warrant investigation.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (US 421)	17+72.20—188+63.29
-Y10- (US 421 Business)	10+00.00—25+21.39
-Y11- (Curtis Bridge Road)	10+00.00—19+27.63

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. Shallow ground water was measured within the following area and may cause groundwater related stability problems during construction:

<u>Alignment</u>	<u>Station (ft)</u>
-Y10-	20+46

Shallow ground water is likely to exist elsewhere on the site between borings in proximity to natural waterways.

- II. Alluvial soils were encountered near the following locations. The potential for shallow groundwater and wet, soft or organic soils should be anticipated at these locations:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	180+36

Isolated alluvial soils are likely to exist elsewhere on the site between borings in proximity to natural waterways.

- III. Roadway Embankment associated with existing roadways was encountered at the following locations:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	31+48
-L-	45+01 – 52+92
-L-	62+29
-L-	109+75 – 129+76
-Y11-	12+99

- IV. Artificial fill associated with commercial development was encountered at the following location:

<u>Alignment</u>	<u>Station (ft)</u>
-Y11-	11+23

- V. Shallow rock within 6 feet of proposed subgrade elevation was encountered at the following location:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	155+27

PHYSIOGRAPHY AND GEOLOGY

The project site is in the Inner Piedmont Belt Physiographic Province of North Carolina. According to the *Geologic Map of North Carolina* (1985), the site is underlain by three major rock types in the Inner Piedmont Belt Physiographic Province. The site transitions from west to east across Banded Gneiss (**CZbb**), Metagraywacke, Amphibiolite and Kyanite Schist (**CZmal**) and Biotite Gneiss and Schist (**CZbg**). All three are of the Cambrian/Late Proterozoic Period.

The Banded Gneiss (**CZbb**) is noted as being interlayered with calc-silicate rock, metaconglomerate, amphibiolite, sillimanite-mica schist, and granitic rock. The Metagraywacke, Amphibiolite and Kyanite Schist (**CZmal**) is noted to consist of metagraywacke (biotite gneiss) interlayered and gradational with amphibiolite and kyanite schist; minor ultramafic and granitic rock. The Biotite Gneiss and Schist (**CZbg**) is noted to consist of biotite gneiss and schist – inequigranular, with locally abundant potassic feldspar and garnet; interlayered and gradational with calc-silicate rock, sillimanite-mica schist, mica schist and amphibolite and contains small masses of granitic rock.

Existing site topography is typical of North Carolina's Foothills Region. The Foothills Region is a portion of the Western Piedmont that approaches the Mountain Region. Terrain is typically more rugged than the majority of the Piedmont, but with less overall elevation change than the Mountain Region. Topography along the project is generally rolling, with steeper ravines in the vicinity of streams or existing roadway cuts. The existing ground surface generally grades downward in the upstation direction, with elevations ranging from a high of around 1254 feet to a low of around 995 feet.

Existing land use is a mix of agriculture, residential, industrial, and commercial, with the majority of the project corridor developed with commercial properties.





SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankments, artificial fill, alluvial deposits, residual soils, weathered rock and crystalline rock. Areas where soils at the ground surface are of a unique origin (i.e. not residual soils) are approximately delineated on the boring location plans based on subsurface conditions encountered in nearby borings, and various topographical, vegetative, or other visual surface features.

Topsoil and rootmat was encountered in grassy, brushy, and wooded areas ranging in thickness from 0.1 to 0.5 feet, and typically on the order of 0.3 feet.

Artificial Fill soils were encountered at the ground surface beneath thin layers of topsoil. These consist of 2 to 10 feet of dry to moist, soft to stiff, sandy clay (A-6).

Roadway Embankment soils were encountered at the ground surface adjacent to existing roadways. These consist of 1.5 to 35 feet of dry to moist, loose to medium dense, silty and clean sands (A-1-a, A-1-b, A-2-4, A-2-5) and dry to wet, very soft to hard, sandy and clayey silts and sandy clays (A-4, A-5, A-6).

Alluvial soils were encountered at the ground surface near the historic floodplains of natural waterways. These soils extended to depths of up to approximately 4 feet and consist of moist to wet, soft, clayey silts (A-5) and loose, clayey sands (A-2-6) with trace amounts of organic material.

Residual soils were encountered at the ground surface, or beneath artificial fill, roadway embankments or alluvial deposits. These soils consist of dry to moist, loose to very dense, clean, clayey and silty sands (A-1-b, A-2-4 and A-2-6) and soft to very stiff, sandy clay and silt, clayey silt, and silty clays (A-4, A-5, A-6, A-7).

Weathered Rock (WR) is a very hard material with properties intermediate of soil and rock. WR is classified as having an N-value of greater than 100 blows per one foot. WR encountered on the project generally consists of tan and white metamorphosed granitic rock.

Crystalline Rock, in the form of metamorphosed granitic rock, was encountered beneath weathered rock or residual soils at various locations throughout the site. Isolated rock outcrops were noted at several locations in existing roadway cuts throughout the project corridor. Where Crystalline Rock was encountered above the proposed subgrade elevation, auger probes were performed to help approximate the

size and expanse of the rock above the proposed cut elevation. Crystalline Rock is classified as material that yields auger refusal or SPT refusal (blow count of 60/0.0 or 60/0.1 feet.)

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, and within residential or commercial areas likely to see pedestrian traffic were backfilled immediately after completion due to safety considerations.

Groundwater levels across the site were generally deep, with the exception of areas near streams and existing low, wet areas.





ADDITIONAL LABORATORY TESTING

The following bulk samples were obtained:

<u>Sample</u>	<u>Location</u>	<u>Depth (ft)</u>	<u>Test</u>
BS-1	154+76, 76' RT, -L-	3.5-8.5	California Bearing Ratio, Standard Proctor
BS-2	11+51, 23' RT, -WALL1-	13.5-31.5	California Bearing Ratio, Standard Proctor

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

CLOSING

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

FALCON ENGINEERING, INC.

Report Prepared By:

Report Reviewed By:

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

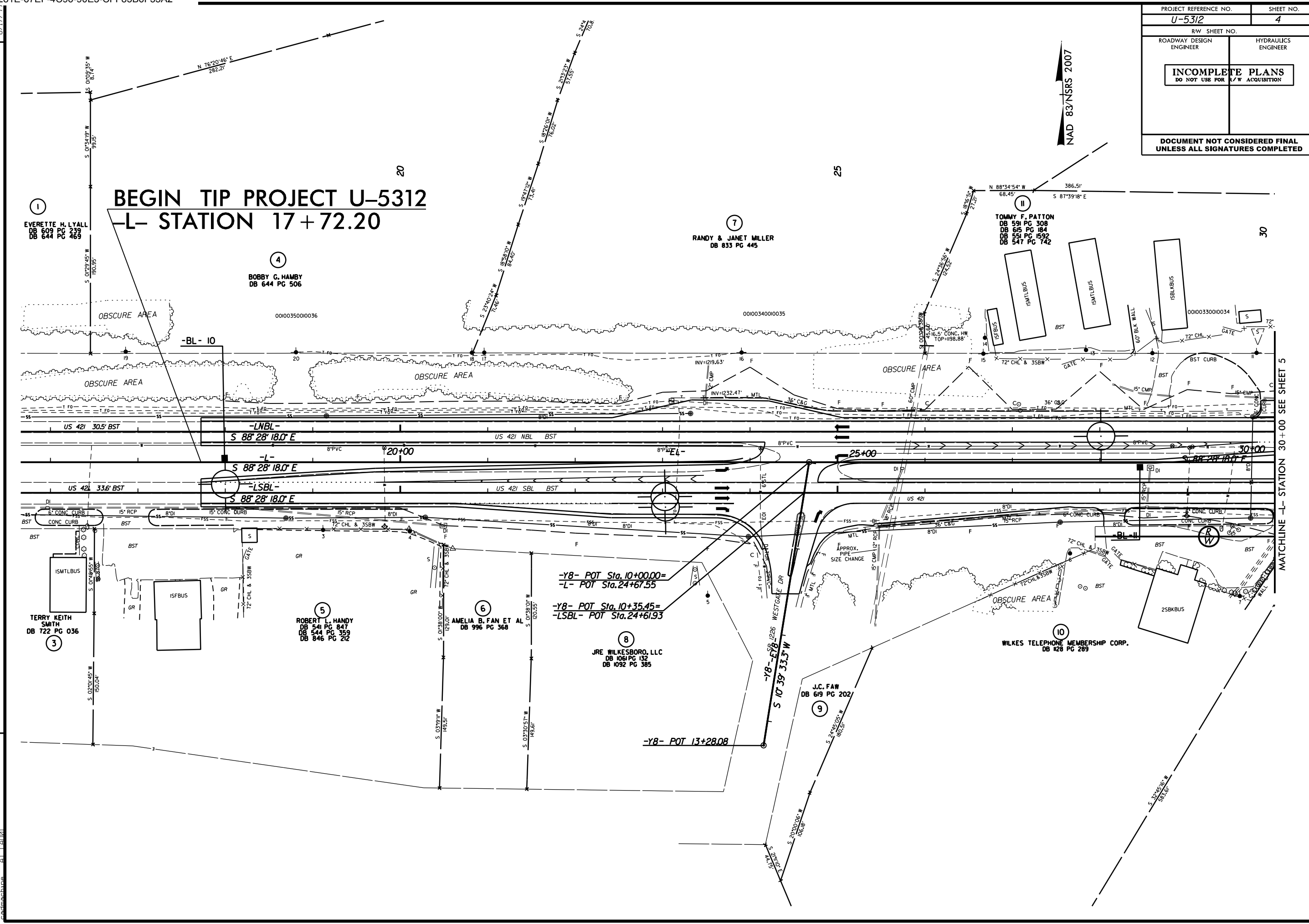
W. Scott Hunsberger, PE
Geotechnical Engineer

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

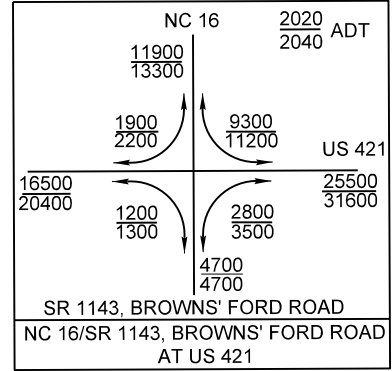
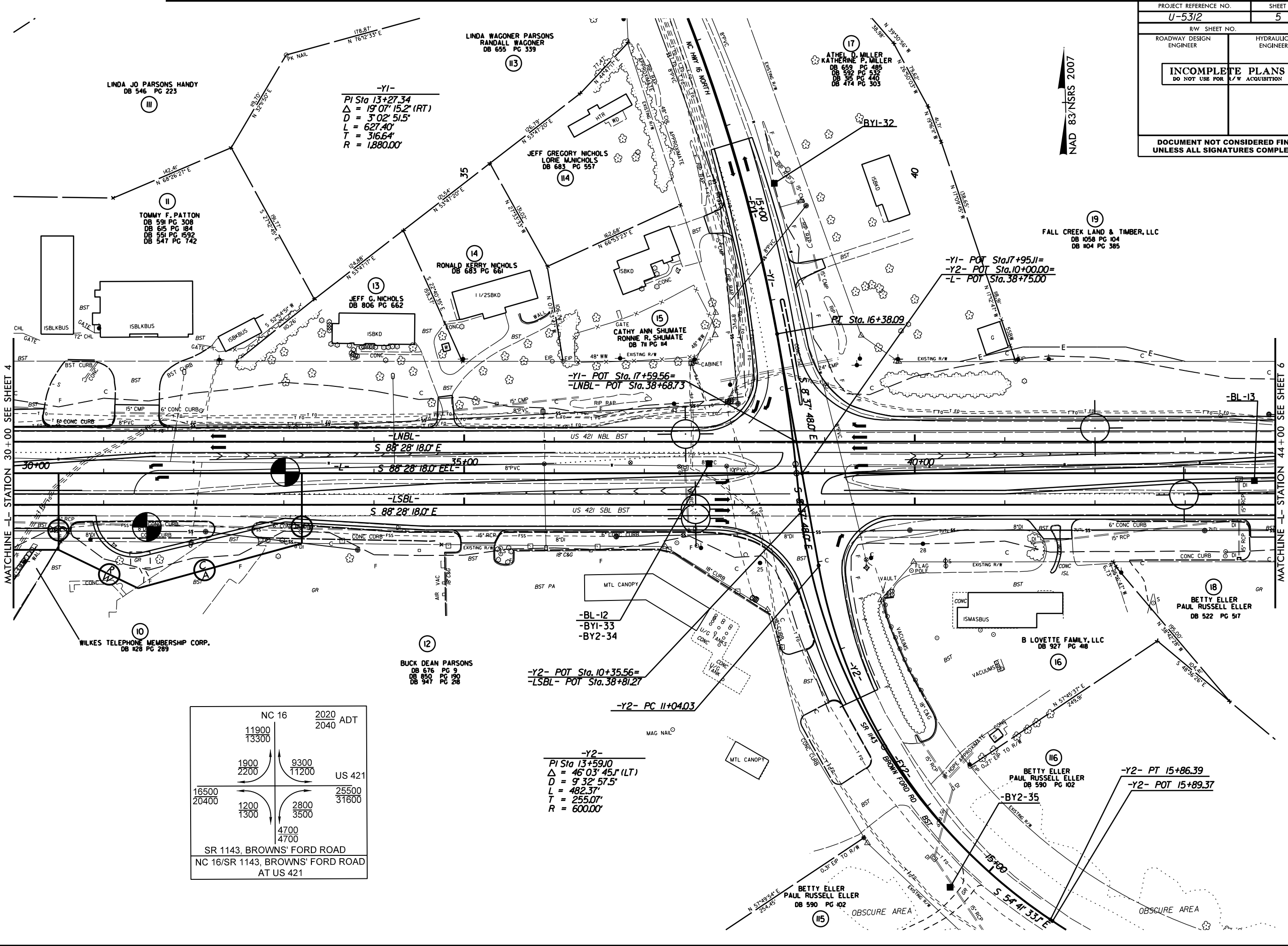
Jeremy R. Hamm, PE
Geotechnical Engineering Manager



PROJECT REFERENCE NO.	SHEET NO.
U-5312	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



24-AUG-2018 09:47
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 cad:nc
 8/17/18



-Y2-
 PI Sta 13+59.10
 $\Delta = 46^{\circ} 03' 45.1" (LT)$
 $D = 9' 32' 57.5"$
 $L = 482.37'$
 $T = 255.07'$
 $R = 600.00'$

-Y1-
 PI Sta 13+27.34
 $\Delta = 19^{\circ} 07' 15.2" (RT)$
 $D = 3' 02' 51.5"$
 $L = 627.40'$
 $T = 316.64'$
 $R = 1,880.00'$

-Y1- POT Sta 17+95.11=
 -Y2- POT Sta 10+00.00=
 -L- POT Sta 38+75.00

-Y2- POT Sta 10+35.56=
 -LSBL- POT Sta 38+81.27

-Y2- PC 11+04.03

-Y2- PT 15+86.39

-Y2- POT 15+89.37

-Y2- POT 15+89.37

PROJECT REFERENCE NO. U-5312		SHEET NO. 5	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



MATCHLINE -L- STATION 30+00 SEE SHEET 4

MATCHLINE -L- STATION 44+00 SEE SHEET 6

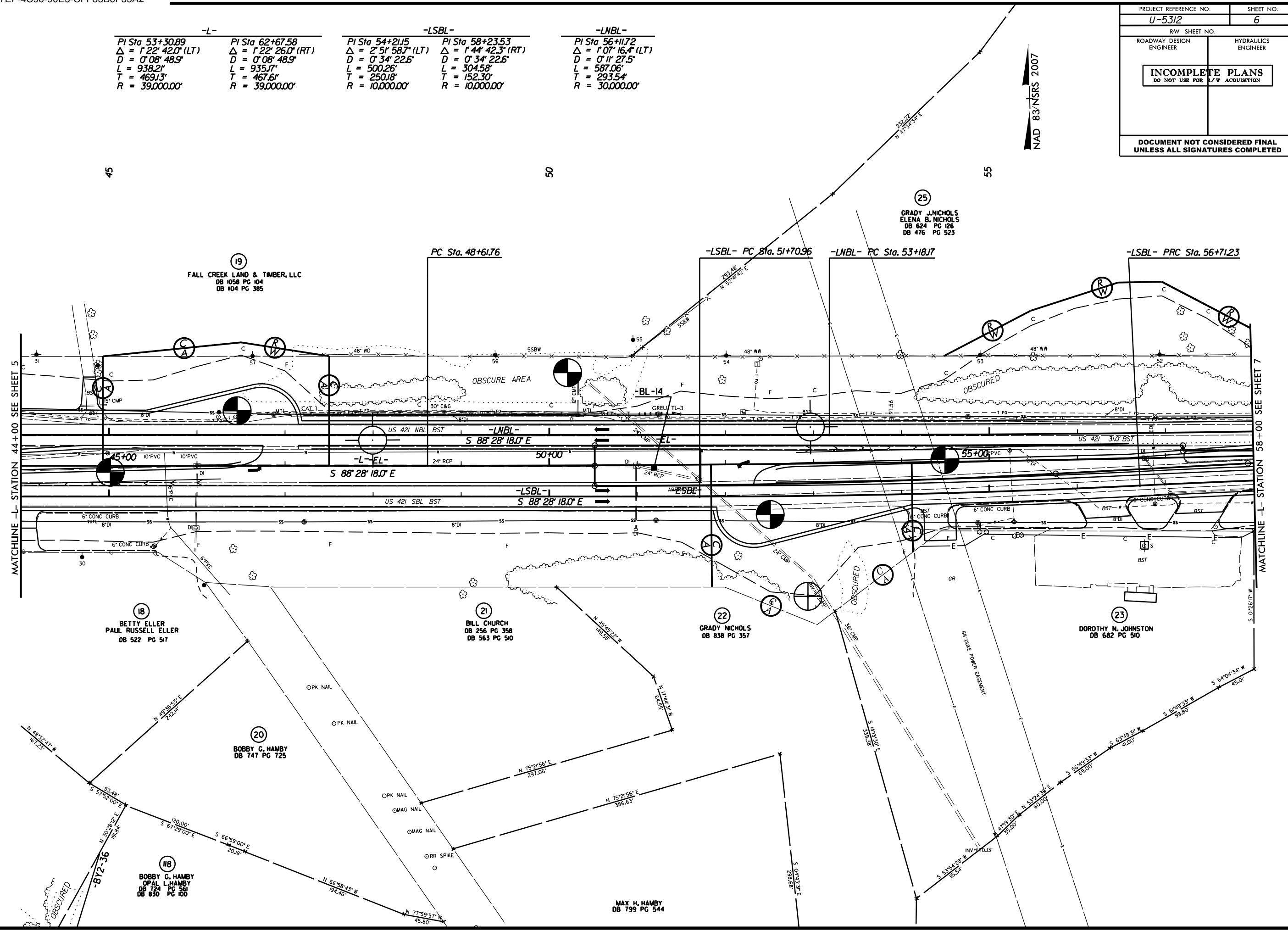
REVISIONS

8/17/18

PROJECT REFERENCE NO. U-5312	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-	-LSBL-	-LNBL-
PI Sta 53+30.89 Δ = 1°22'42.0" (LT) D = 0°08'48.9" L = 938.21' T = 469.13' R = 39,000.00'	PI Sta 62+67.58 Δ = 1°22'26.0" (RT) D = 0°08'48.9" L = 935.17' T = 467.61' R = 39,000.00'	PI Sta 54+21.15 Δ = 2°51'58.7" (LT) D = 0°34'22.6" L = 500.26' T = 250.18' R = 10,000.00'
	PI Sta 58+23.53 Δ = 1°44'42.3" (RT) D = 0°34'22.6" L = 304.58' T = 152.30' R = 10,000.00'	PI Sta 56+11.72 Δ = 1°07'16.4" (LT) D = 0°11'27.5" L = 587.06' T = 293.54' R = 30,000.00'

NAD 83/NSRS 2007

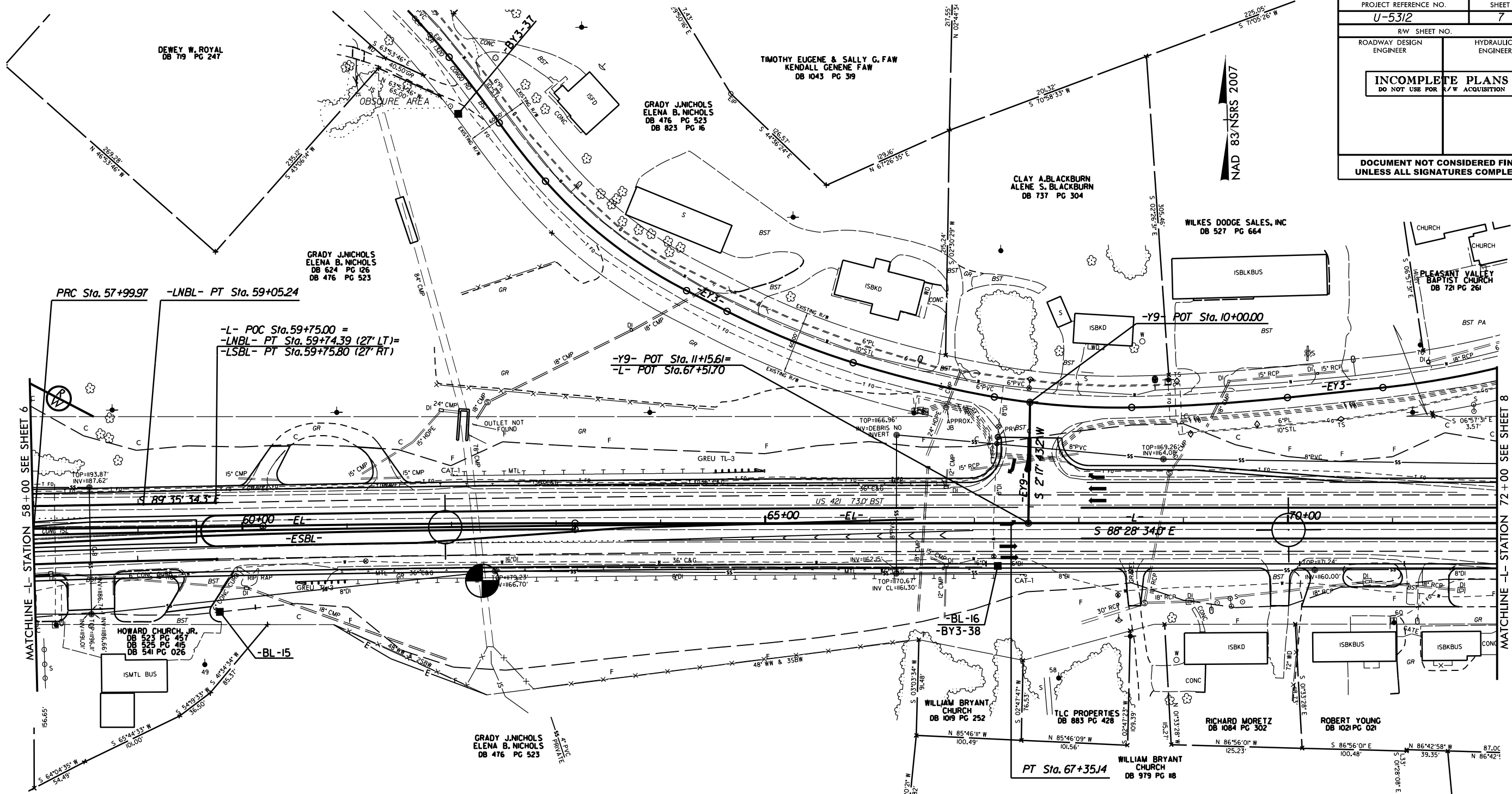


MATCHLINE -L- STATION 44+00 SEE SHEET 5

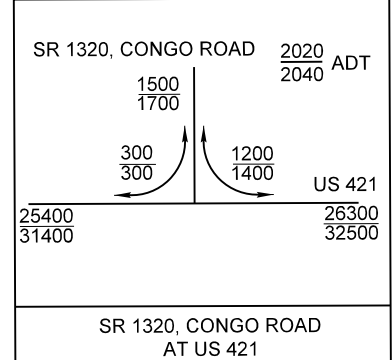
MATCHLINE -L- STATION 58+00 SEE SHEET 7

REVISIONS
 24-AUG-2018 09:48
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 cadmachine

PROJECT REFERENCE NO. U-5312	SHEET NO. 7
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-	-LSBL-	-LNBL-
PI Sta 62+67.58	PI Sta 58+23.53	PI Sta 56+11.72
$\Delta = 1^{\circ}22'26.0\"$ (RT)	$\Delta = 1^{\circ}44'42.3\"$ (RT)	$\Delta = 1^{\circ}07'16.4\"$ (LT)
D = 0'08'48.9"	D = 0'34'22.6"	D = 0'11'27.5"
L = 935.17'	L = 304.58'	L = 587.06'
T = 467.61'	T = 152.30'	T = 293.54'
R = 39,000.00'	R = 10,000.00'	R = 30,000.00'



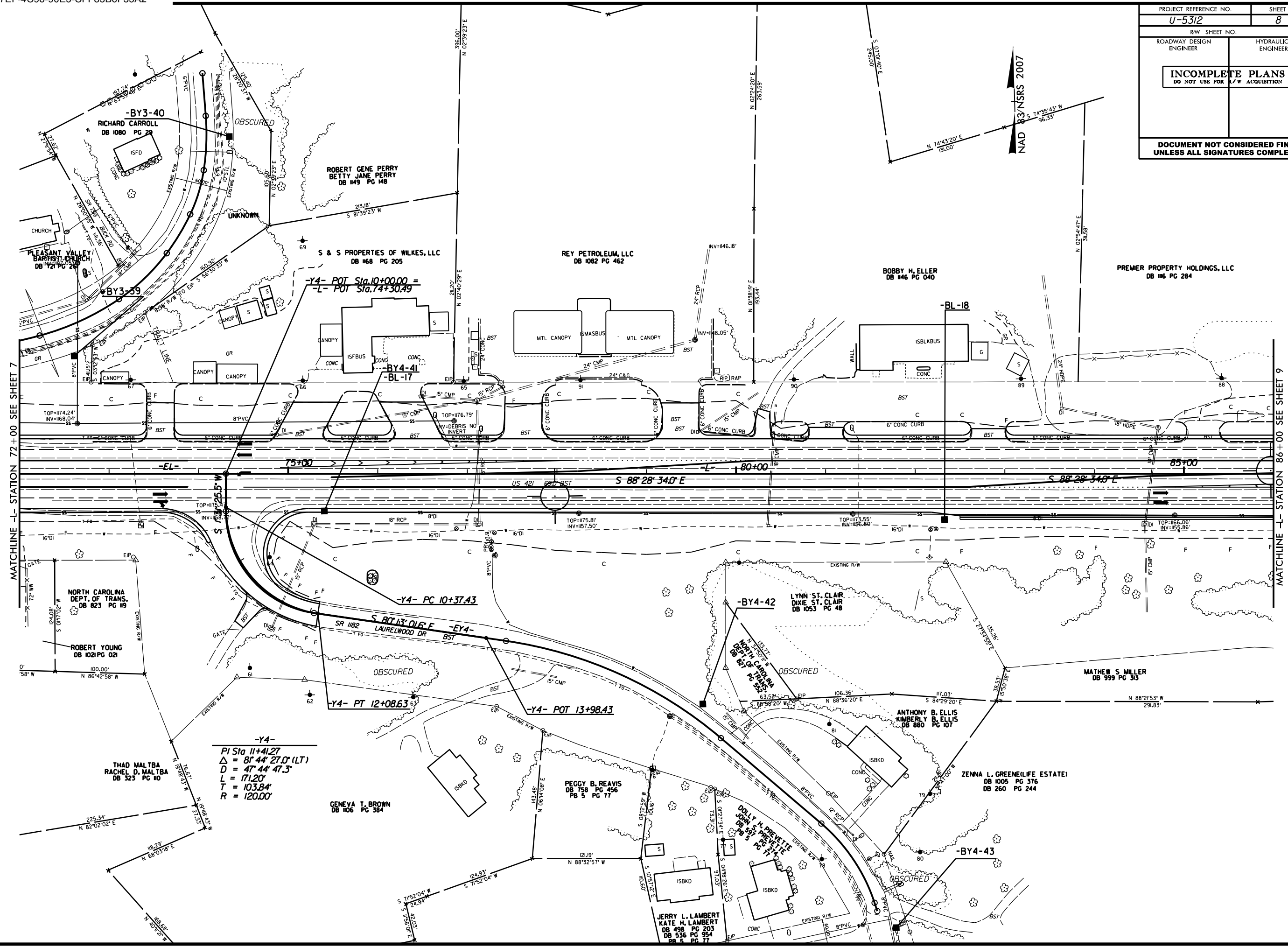
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 cadmachine

MATCHLINE -L- STATION 58+00 SEE SHEET 6

MATCHLINE -L- STATION 72+00 SEE SHEET 8

NAD 83/NSRS 2007

PROJECT REFERENCE NO. U-5312	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCHLINE -L- STATION 72+00 SEE SHEET 7

MATCHLINE -L- STATION 86+00 SEE SHEET 9

-Y4-
 PI Sta 11+41.27
 $\Delta = 81' 44'' 27.0''$ (LT)
 $D = 47' 44'' 47.3''$
 $L = 171.20'$
 $T = 103.84'$
 $R = 120.00'$

REVISIONS
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 cadmachine

-BY3-40
 RICHARD CARROLL
 DB 1080 PG 29

ROBERT GENE PERRY
 BETTY JANE PERRY
 DB 149 PG 148

S & S PROPERTIES OF WILKES, LLC
 DB 168 PG 205

REY PETROLEUM, LLC
 DB 1082 PG 462

BOBBY H. ELLER
 DB 146 PG 040

PREMER PROPERTY HOLDINGS, LLC
 DB 116 PG 284

NORTH CAROLINA
 DEPT. OF TRANS.
 DB 823 PG 19

ROBERT YOUNG
 DB 102 PG 021

THAD MALTBIA
 RACHEL D. MALTBIA
 DB 323 PG 10

GENEVA T. BROWN
 DB 106 PG 384

PEGGY B. REAVIS
 DB 758 PG 456
 PB 5 PG 77

-BY4-42
 LYNN ST. CLAIR
 DIXIE ST. CLAIR
 DB 1053 PG 48

ANTHONY B. ELLIS
 KIMBERLY B. ELLIS
 DB 880 PG 107

ZENNA L. GREENE(LIFE ESTATE)
 DB 1005 PG 376
 DB 260 PG 244

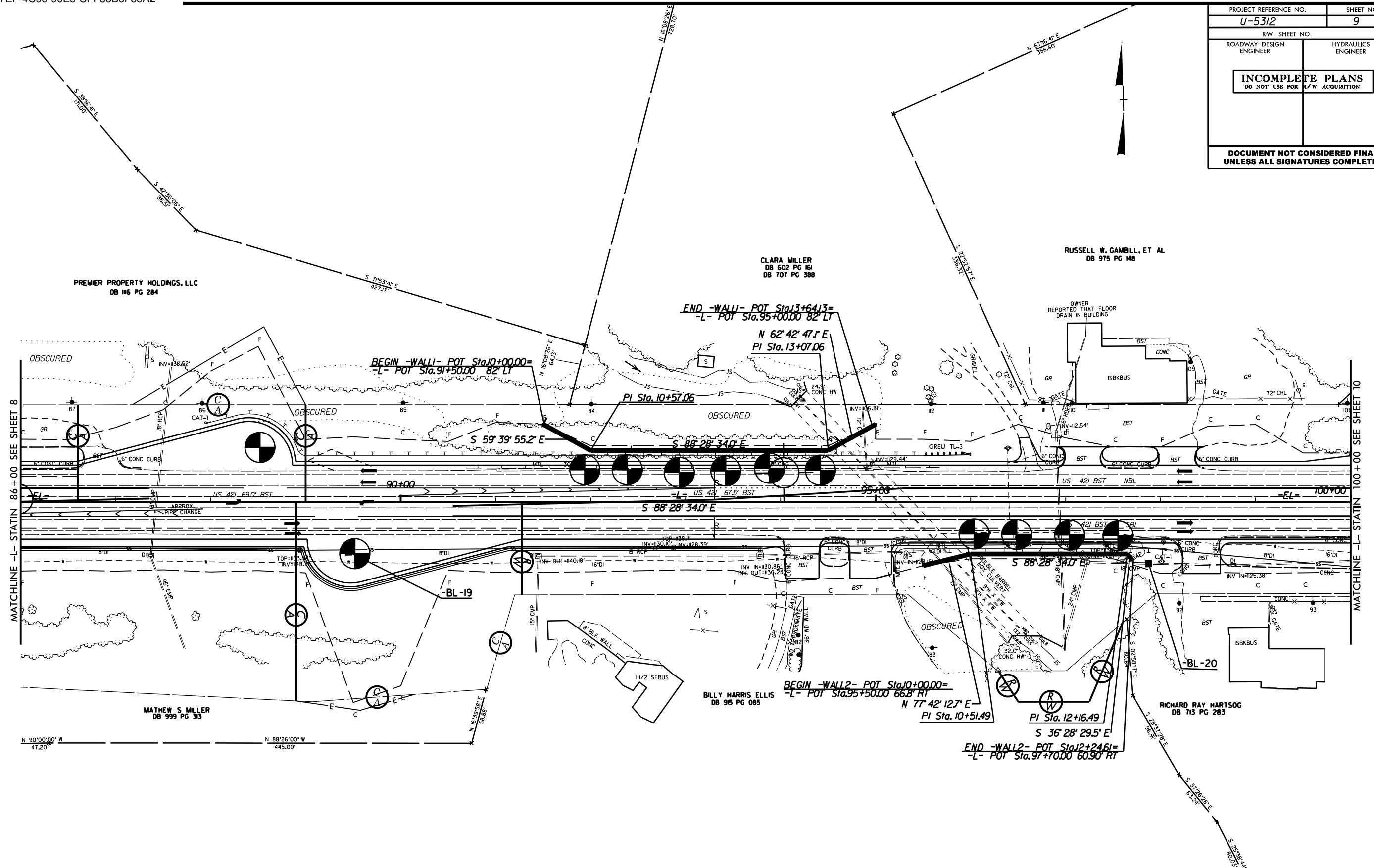
MATHEW S. MILLER
 DB 999 PG 313

JERRY L. LAMBERT
 KATE H. LAMBERT
 DB 498 PG 203
 DB 536 PG 94
 PB 5 PG 77

-BY4-43

NAD 83/NSRS 2007

PROJECT REFERENCE NO.	SHEET NO.
U-5312	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



ALL DRIVEWAY TURNOUTS ARE 20' WIDE WITH 10' RADII UNLESS OTHERWISE NOTED.

REVISIONS
 24-AUG-2018 09:53
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 cadmachine

MATCHLINE -L- STATIN 86+00 SEE SHEET 8

MATCHLINE -L- STATIN 100+00 SEE SHEET 10

PREMIER PROPERTY HOLDINGS, LLC
DB 116 PG 284

CLARA MILLER
DB 602 PG 161
DB 707 PG 388

RUSSELL W. GAMBILL, ET AL
DB 975 PG 148

MATHEW S. MILLER
DB 999 PG 313

BILLY HARRIS ELLIS
DB 915 PG 085

RICHARD RAY HARTSOG
DB 713 PG 283

BEGIN -WALL1- POT Sta10+00.00=
-L- POT Sta.91+50.00 82' LI

END -WALL1- POT Sta13+64.13=
-L- POT Sta.95+00.00 82' LI

N 62° 42' 47.1" E
PI Sta. 13+07.06

PI Sta. 10+57.06

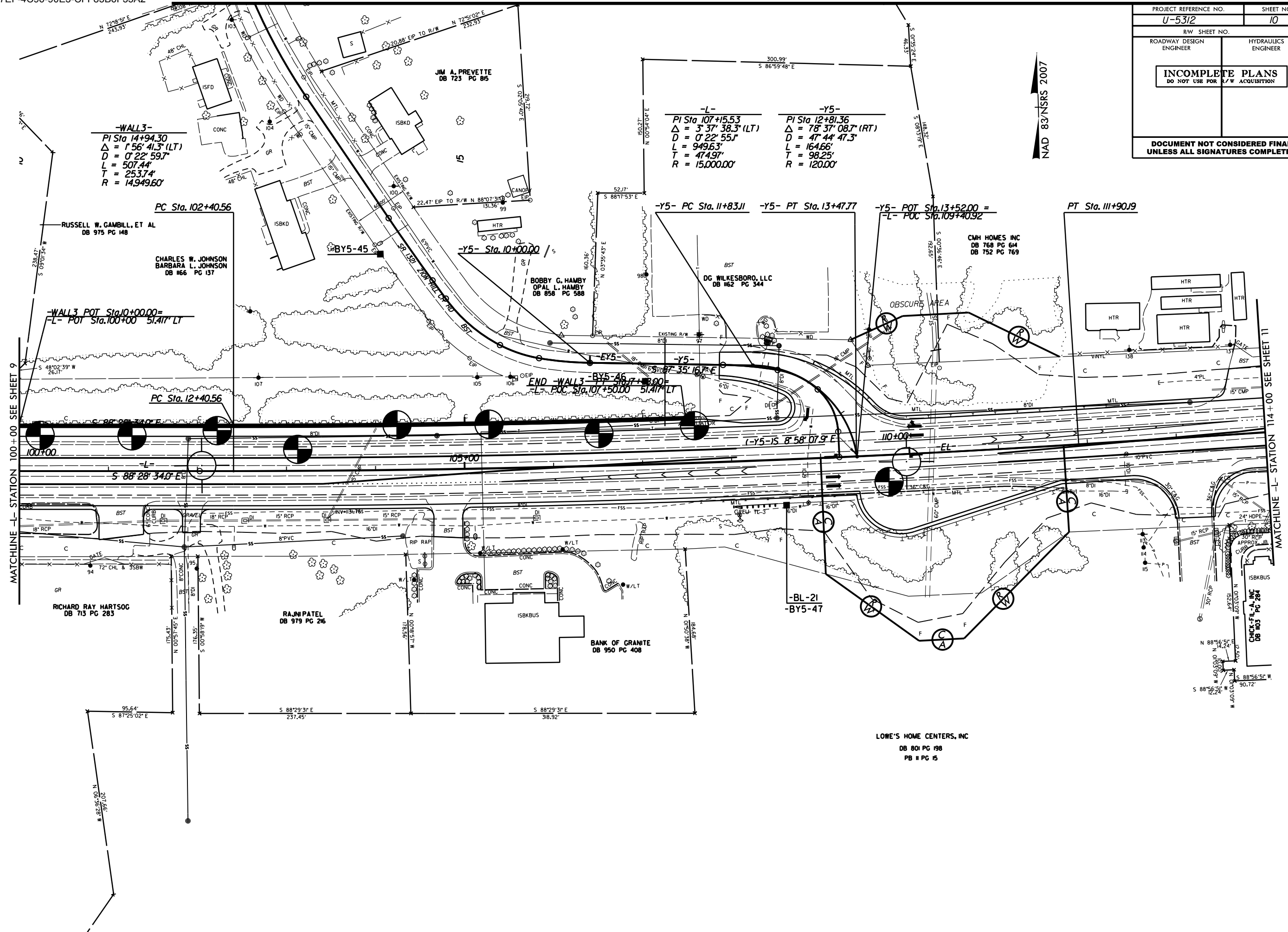
BEGIN -WALL2- POT Sta10+00.00=
-L- POT Sta.95+50.00 66.8' RT

N 77° 42' 12.7" E
PI Sta. 10+51.49

PI Sta. 12+16.49

S 36° 28' 29.5" E
END -WALL2- POT Sta12+24.61=
-L- POT Sta.97+70.00 60.90' RT

PROJECT REFERENCE NO. U-5312	SHEET NO. 10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCHLINE - L- STATION 100+00 SEE SHEET 9

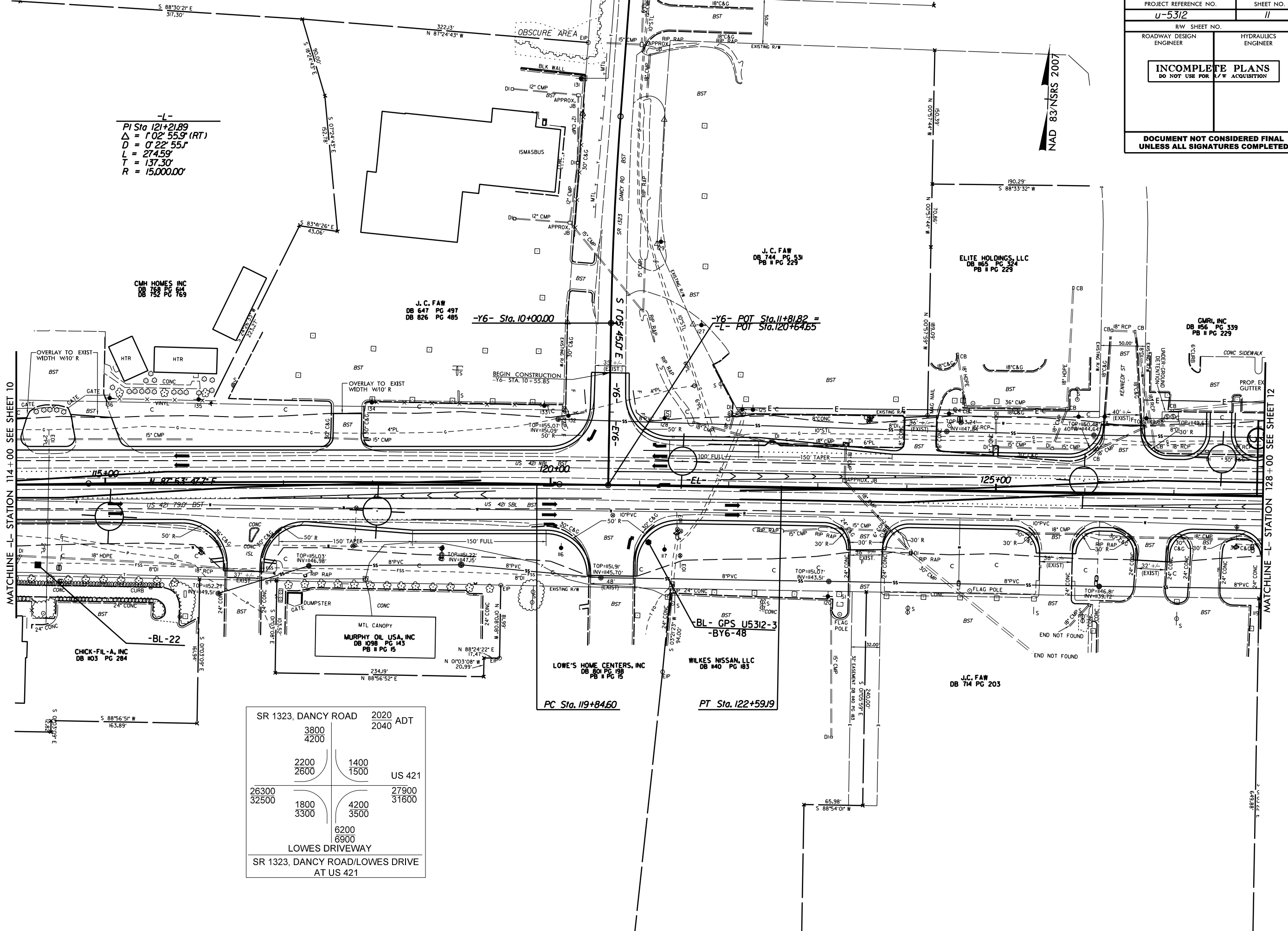
MATCHLINE - L- STATION 114+00 SEE SHEET 11

REVISIONS

24-AUG-2018 09:55
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C:\Users\atc01010\OneDrive\Documents\atc01010\atc01010

LOWE'S HOME CENTERS, INC
DB 801 PG 198
PB 11 PG 15

PROJECT REFERENCE NO.	SHEET NO.
u-5312	11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-
 PI Sta 121+21.89
 $\Delta = 1^{\circ} 02' 55.9''$ (RT)
 $D = 0^{\circ} 22' 55.1''$
 $L = 274.59'$
 $T = 137.30'$
 $R = 15,000.00'$

SR 1323, DANCY ROAD		2020 ADT
3800		2040
4200		
2200	1400	US 421
2600	1500	
26300		27900
32500	1800	31600
	3300	
	6200	
	6900	
LOWES DRIVEWAY		
SR 1323, DANCY ROAD/LOWES DRIVE AT US 421		

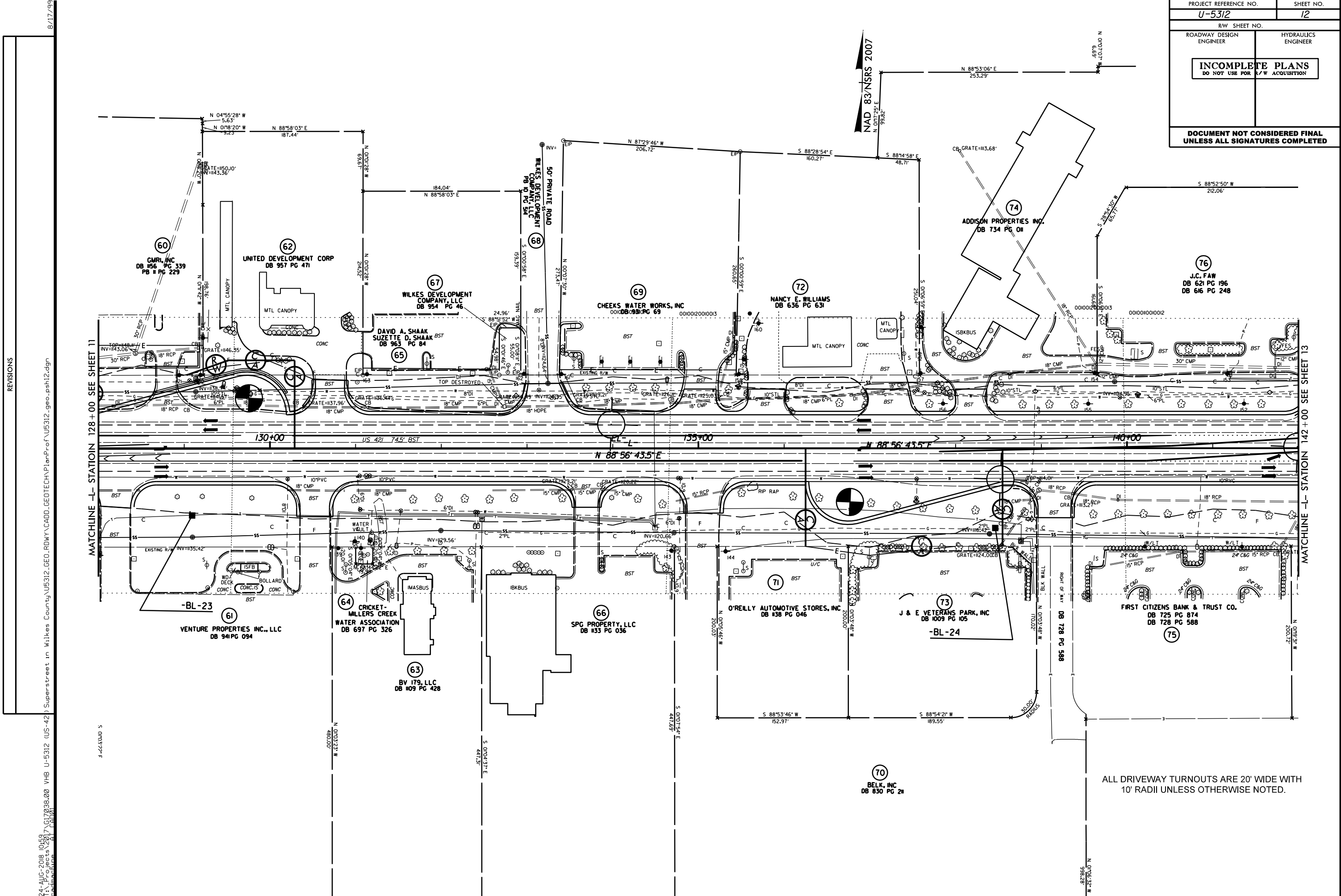
REVISIONS
 24-AUG-2018 09:57
 1-11-18 10:38:00 VHB U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_RDWY\CADD_GEO\TECH\PlanProf\U5312_geo_psh11.dgn
 11/17/2017 6:17:03.88.00 VHB U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_RDWY\CADD_GEO\TECH\PlanProf\U5312_geo_psh11.dgn
 11/17/2017 6:17:03.88.00 VHB U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_RDWY\CADD_GEO\TECH\PlanProf\U5312_geo_psh11.dgn

MATCHLINE -L- STATION 114+00 SEE SHEET 10

MATCHLINE -L- STATION 128+00 SEE SHEET 12

NAD 83/NRS 2007

PROJECT REFERENCE NO.		SHEET NO.
U-5312		12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS		
DO NOT USE FOR A/W ACQUISITION		
DOCUMENT NOT CONSIDERED FINAL		
UNLESS ALL SIGNATURES COMPLETED		



24-AUG-2018 10:58
 1-10-feet
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 8/17/19
 REVISIONS

ALL DRIVEWAY TURNOUTS ARE 20' WIDE WITH 10' RADII UNLESS OTHERWISE NOTED.

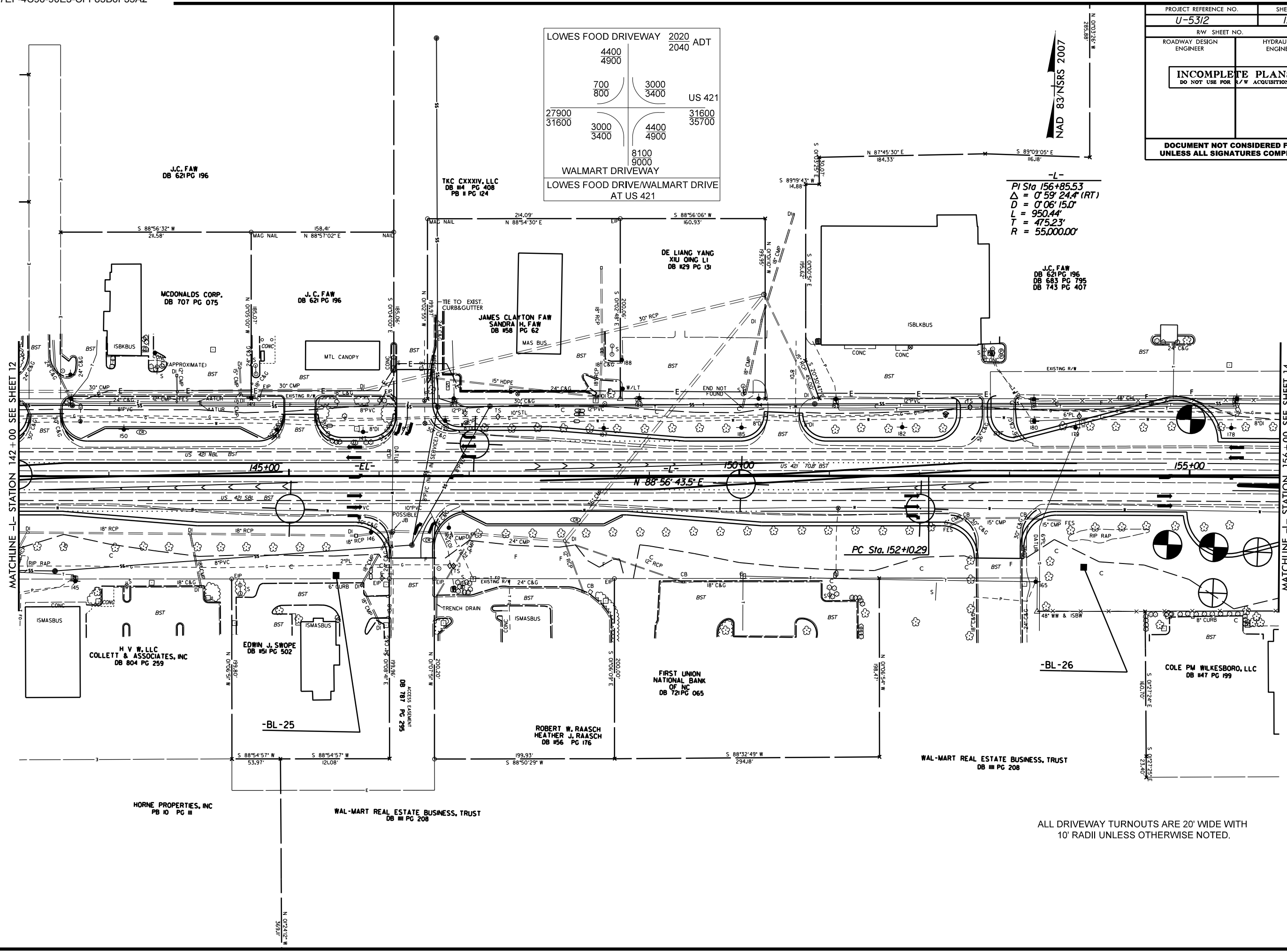
PROJECT REFERENCE NO.	SHEET NO.
U-5312	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

LOWES FOOD DRIVEWAY	2020	2040	ADT
4400			
4900			
700	3000		
800	3400		
			US 421
27900	3000	4400	31600
31600	3400	4900	35700
		8100	
		9000	
WALMART DRIVEWAY			
LOWES FOOD DRIVE/WALMART DRIVE			
AT US 421			

-L-
 PI Sta 156+85.53
 $\Delta = 0^{\circ} 59' 24.4" (RT)$
 $D = 0^{\circ} 06' 15.0"$
 $L = 950.44'$
 $T = 475.23'$
 $R = 55,000.00'$

J.C. FAW
 DB 621 PG 196
 DB 683 PG 795
 DB 743 PG 407

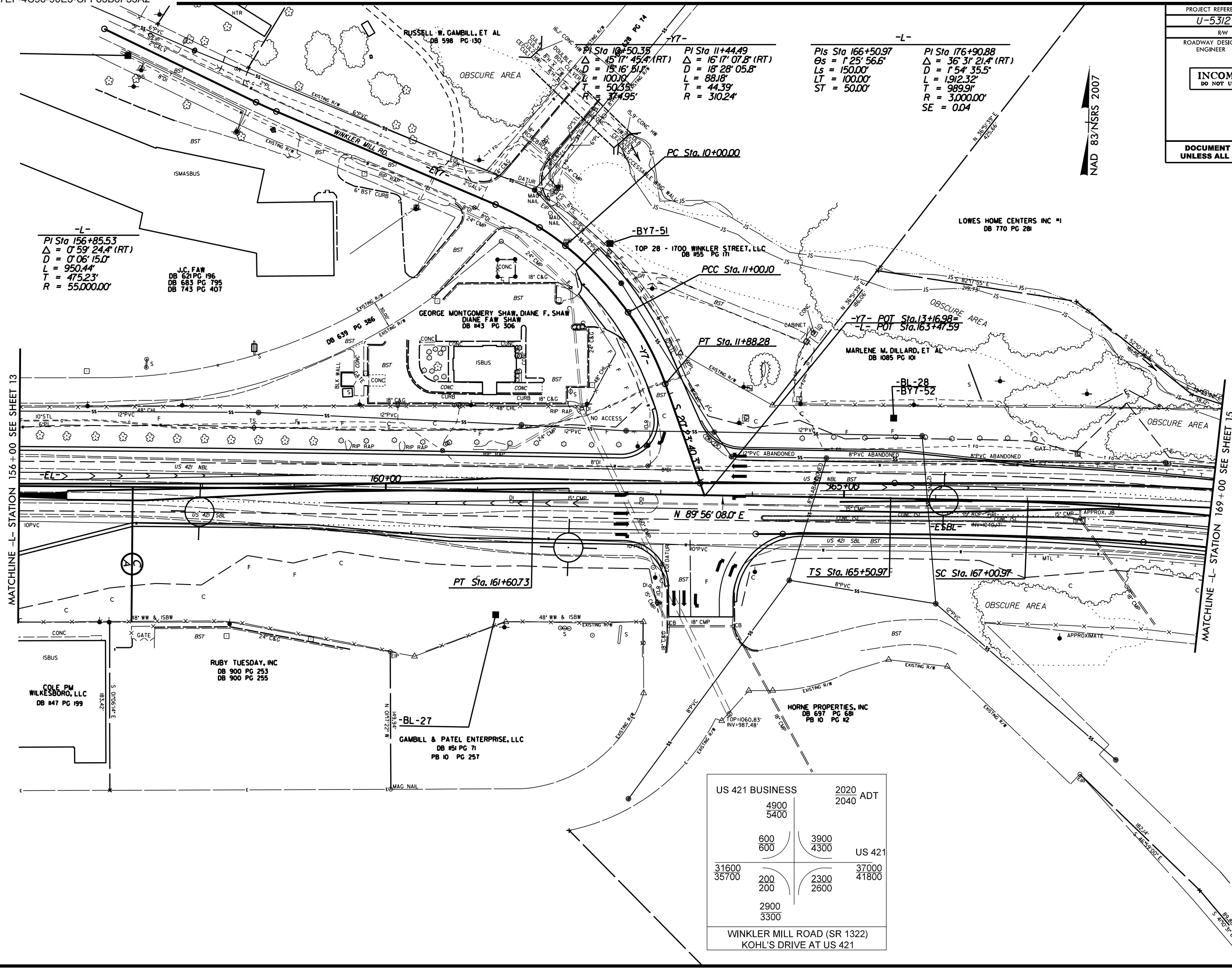
REVISIONS
 28-NOV-2018 14:08
 11-10-2017 16:17:38.00 VHB U-5312 (US-421) Superstreet in Wilkes County, U5312.GEO_RDWY_CADD_GEO TECH Plan Prof U5312.gco_psh13.dgn
 11-10-2017 16:17:38.00 VHB U-5312 (US-421) Superstreet in Wilkes County, U5312.GEO_RDWY_CADD_GEO TECH Plan Prof U5312.gco_psh13.dgn
 11-10-2017 16:17:38.00 VHB U-5312 (US-421) Superstreet in Wilkes County, U5312.GEO_RDWY_CADD_GEO TECH Plan Prof U5312.gco_psh13.dgn



ALL DRIVEWAY TURNOUTS ARE 20' WIDE WITH 10' RADII UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO. U-5312	SHEET NO. 14
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NAD 83/NRS 2007



-L-
PI Sta 156+85.53
Δ = 0° 59' 24.4" (RT)
D = 0° 06' 15.0"
L = 950.44'
T = 475.23'
R = 55,000.00'

J.C. FAW
DB 621 PG 196
DB 683 PG 795
DB 743 PG 407

-L-
PIs Sta 166+50.97
Δs = 1° 25' 56.6"
Ls = 150.00'
LT = 100.00'
ST = 50.00'

PI Sta 176+90.88
Δ = 36° 31' 21.4" (RT)
D = 1° 54' 35.5"
L = 192.32'
T = 989.91'
R = 3,000.00'
SE = 0.04

MATCHLINE -L- STATION 156+00 SEE SHEET 13

MATCHLINE -L- STATION 169+00 SEE SHEET 15

US 421 BUSINESS		2020 ADT	
4900	5400	3900	4300
600	600	2300	2600
31600	35700	2900	3300
		200	200
		200	200
		2900	3300
WINKLER MILL ROAD (SR 1322) KOHL'S DRIVE AT US 421			

REVISIONS
 24-AUG-2018 14:00
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 cadmachine

PROJECT REFERENCE NO.	SHEET NO.
U-5312	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NAD 83/NSRS 2007

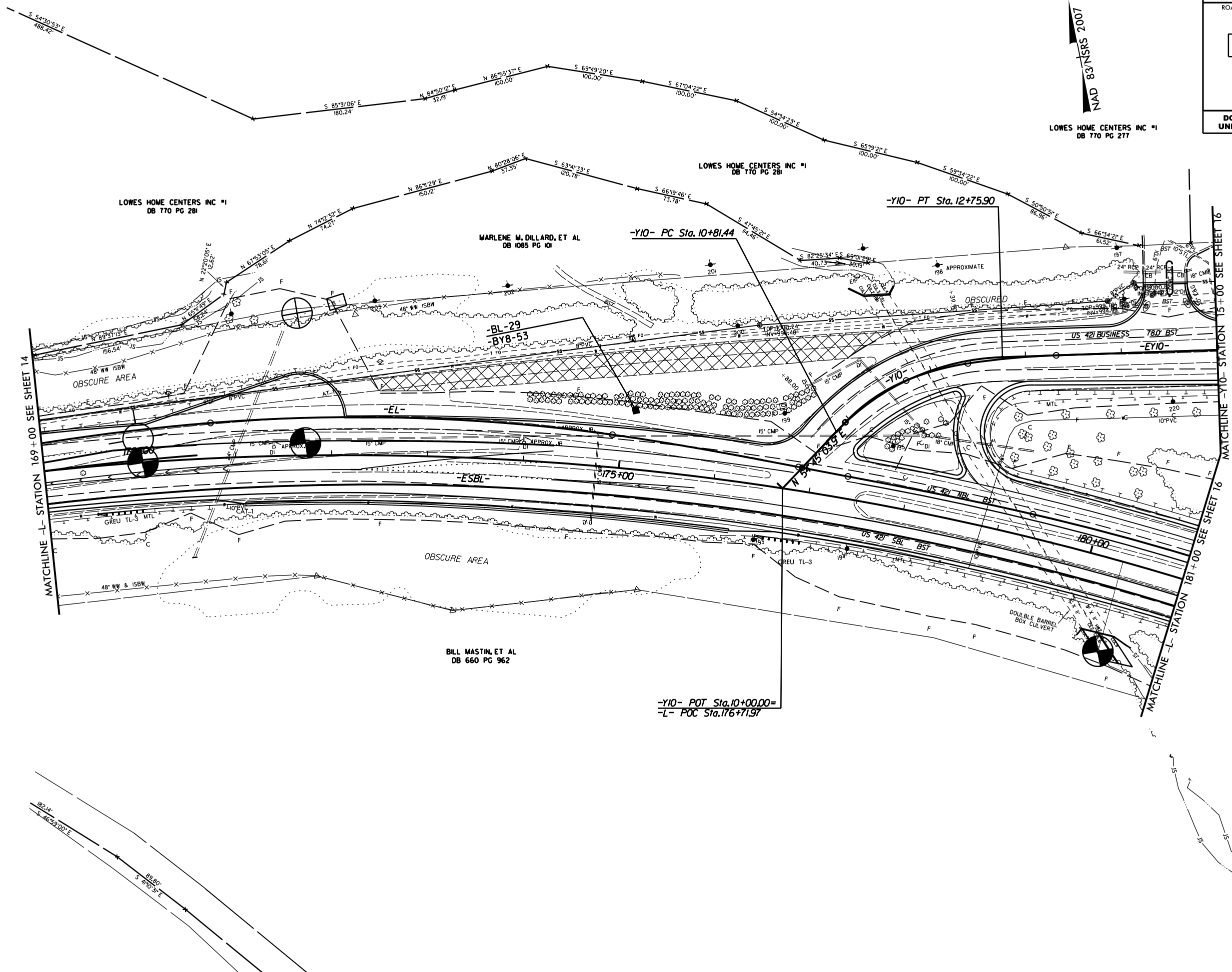
LOWES HOME CENTERS INC #1
DB 770 PG 277

LOWES HOME CENTERS INC #1
DB 770 PG 281

LOWES HOME CENTERS INC #1
DB 770 PG 281

MARLENE M. DILLARD, ET AL
DB 1085 PG 101

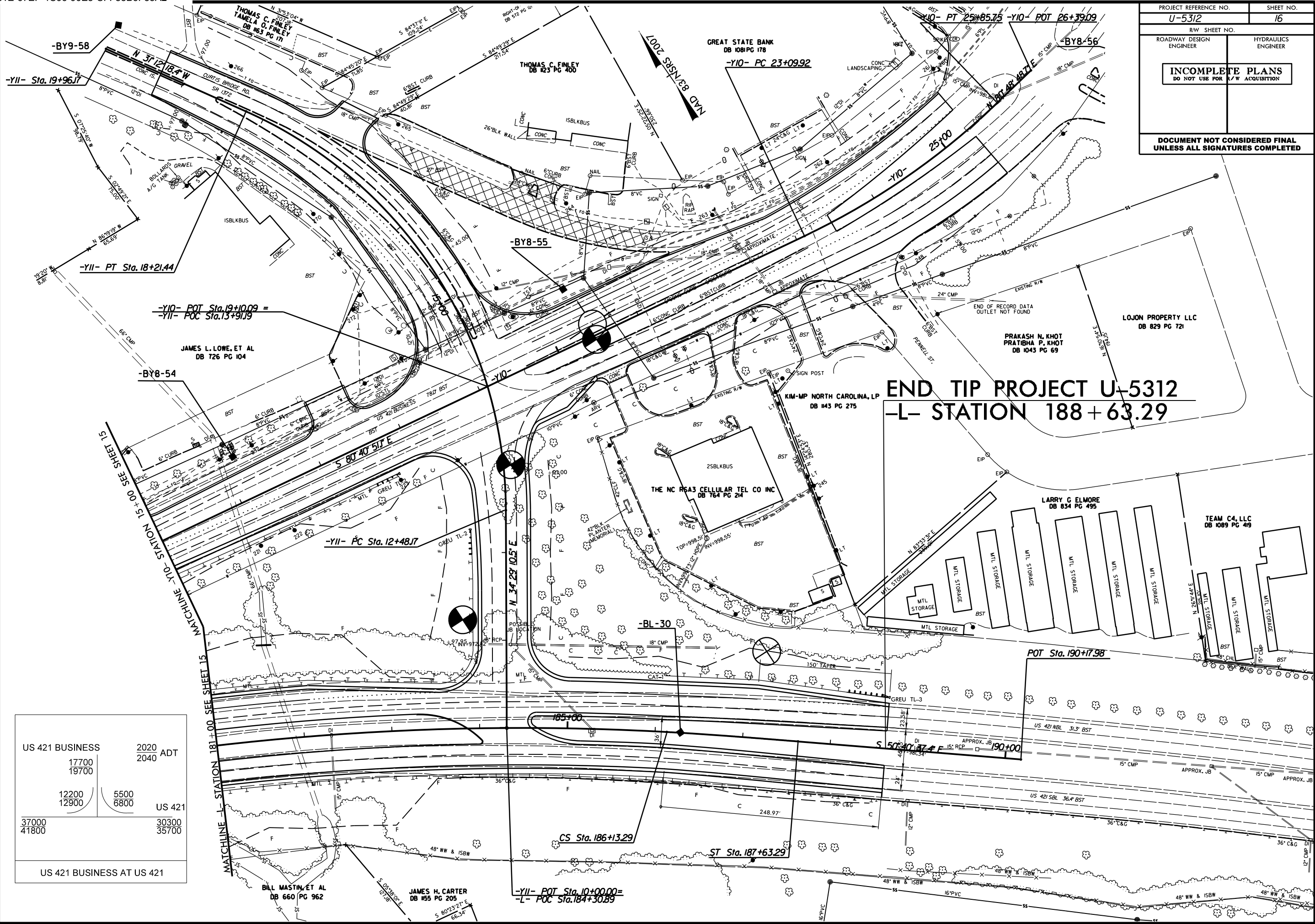
BILL MASTIN, ET AL
DB 660 PG 962



REVISIONS
 04-OCT-2021 09:23
 1: Projects\2017\617038.00 DELAYED VHB U-5312 (US-421) Superstreet in Wilkes County\U5312_GEO_RDMY\CADD_GEO1\TECHN\Plan\Prof\U5312_geo_psh15.dgn
 cadmachine

S 48°27'11" W
102.70'

PROJECT REFERENCE NO. U-5312	SHEET NO. 16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



END TIP PROJECT U-5312

-L- STATION 188 + 63.29

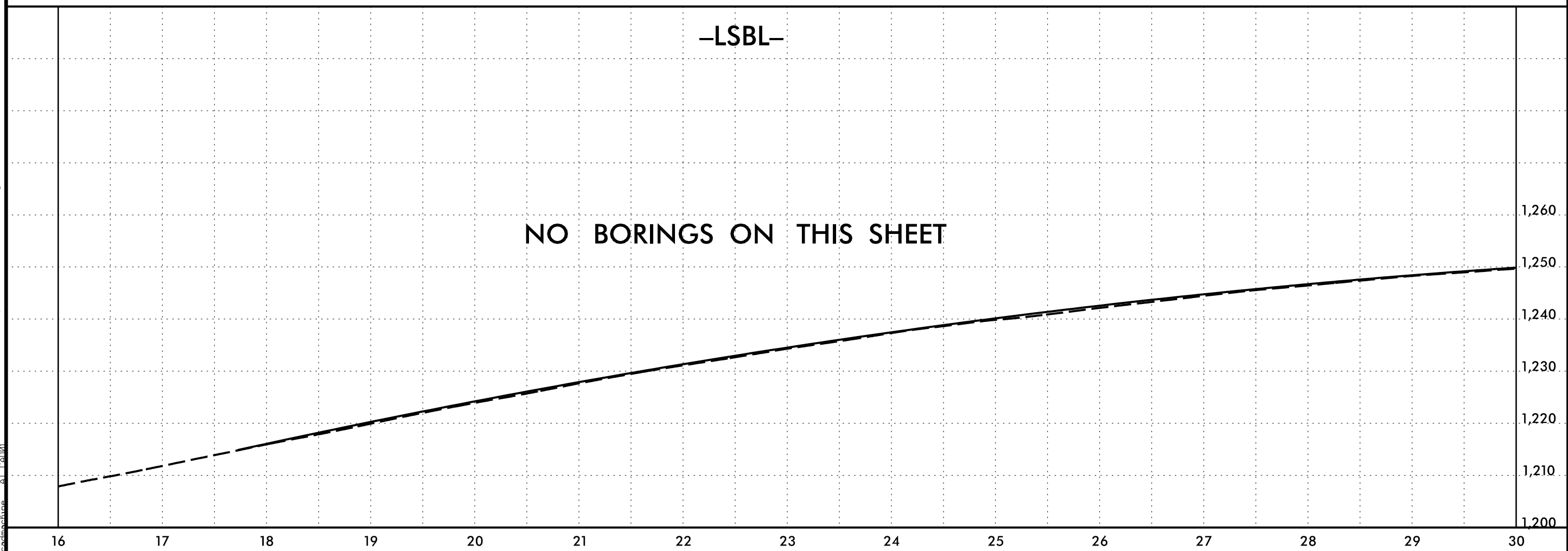
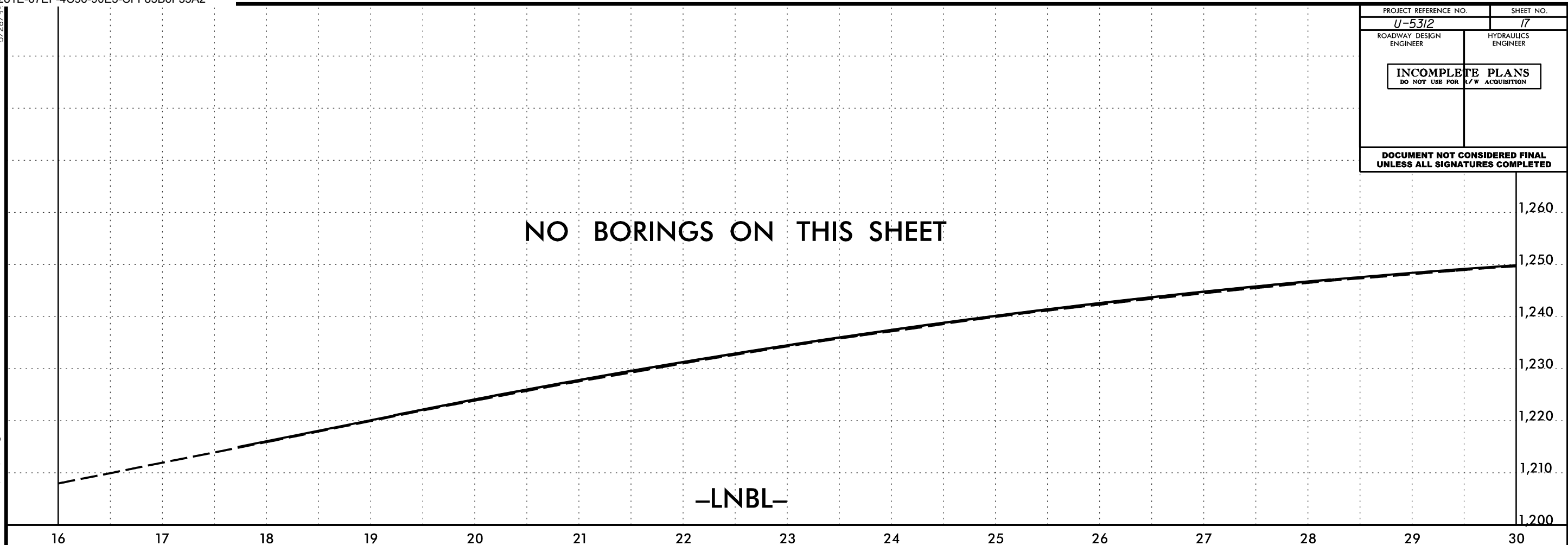
US 421 BUSINESS		2020 ADT	
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12200	12900	5500	6800
US 421		US 421	
37000	41800	30300	35700
US 421 BUSINESS AT US 421			

04-OCT-2021 09:25
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 REVISIONS

REVISIONS

5/28/94
P:\JUG-2006_09\21
P:\JUG-2006_09\21\617038.00_VHB_U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_GEO\TECH\PlanProf\U5312.GEO_pfl_psh.dgn
C:\Users\at\Documents

PROJECT REFERENCE NO. <i>U-5312</i>	SHEET NO. <i>17</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



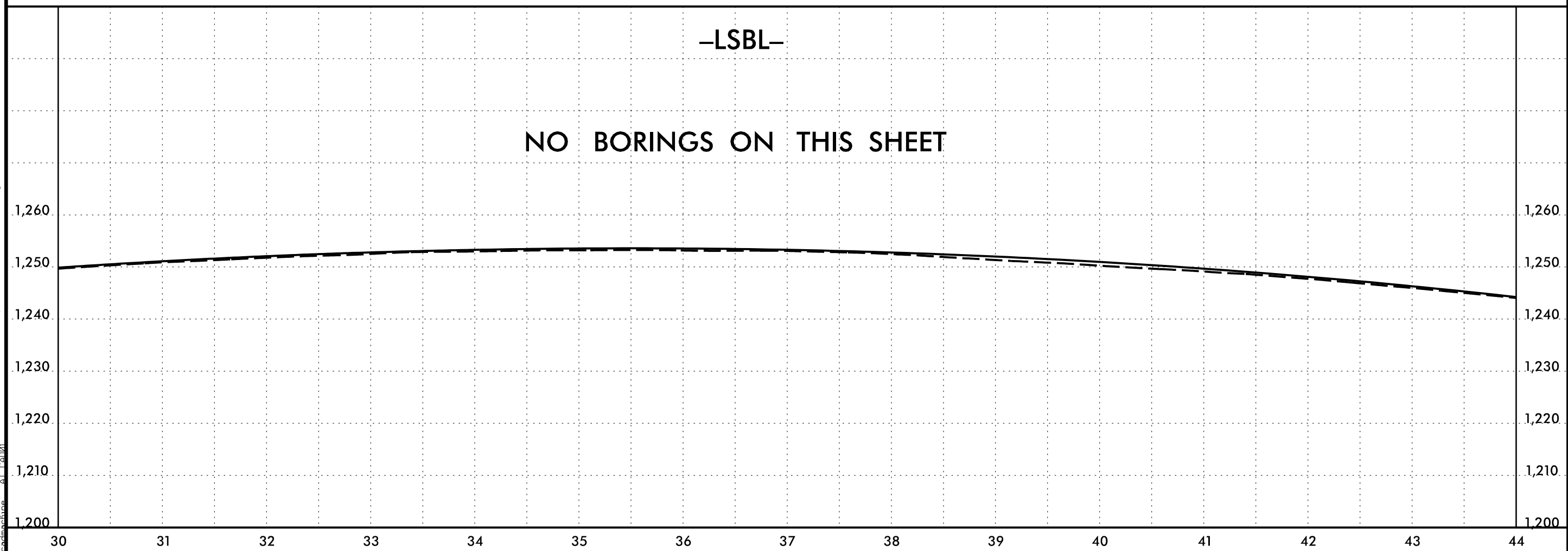
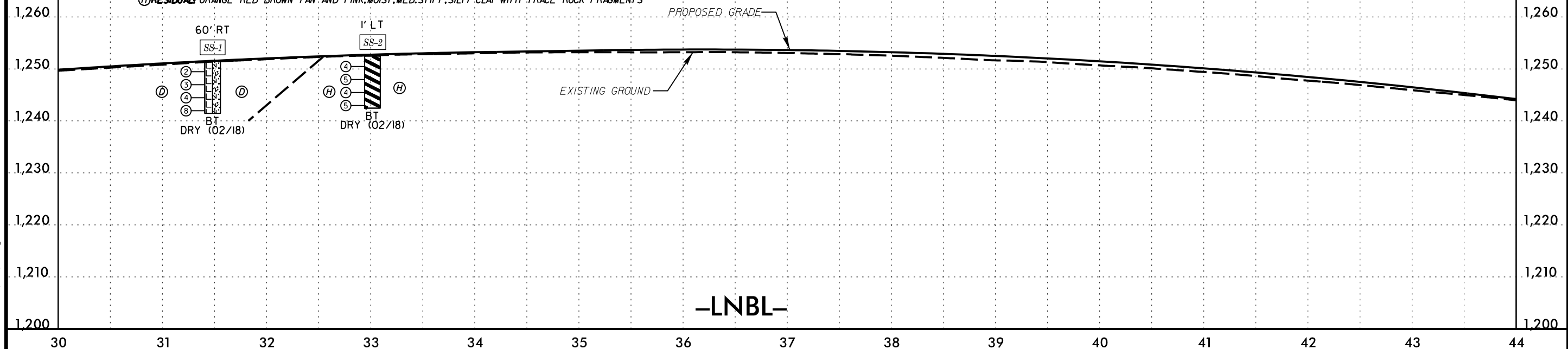
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 11/17/08 08:00 VHB U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO\RDWY\CADD_GEO\TECH\Plan\Prof\U5312.GEO.pfl_psh.dgn
 11/17/08 08:00

PROJECT REFERENCE NO.	SHEET NO.
U-5312	18
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.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	60 FT RT	31+48	1.0'-2.5'	A-5	44	9	-	-	-	86	79	57	28.1	-	
SS-2	1 FT LT	33+02	1.0'-2.5'	A-7-5	71	14	-	-	-	100	98	70	40.3	-	

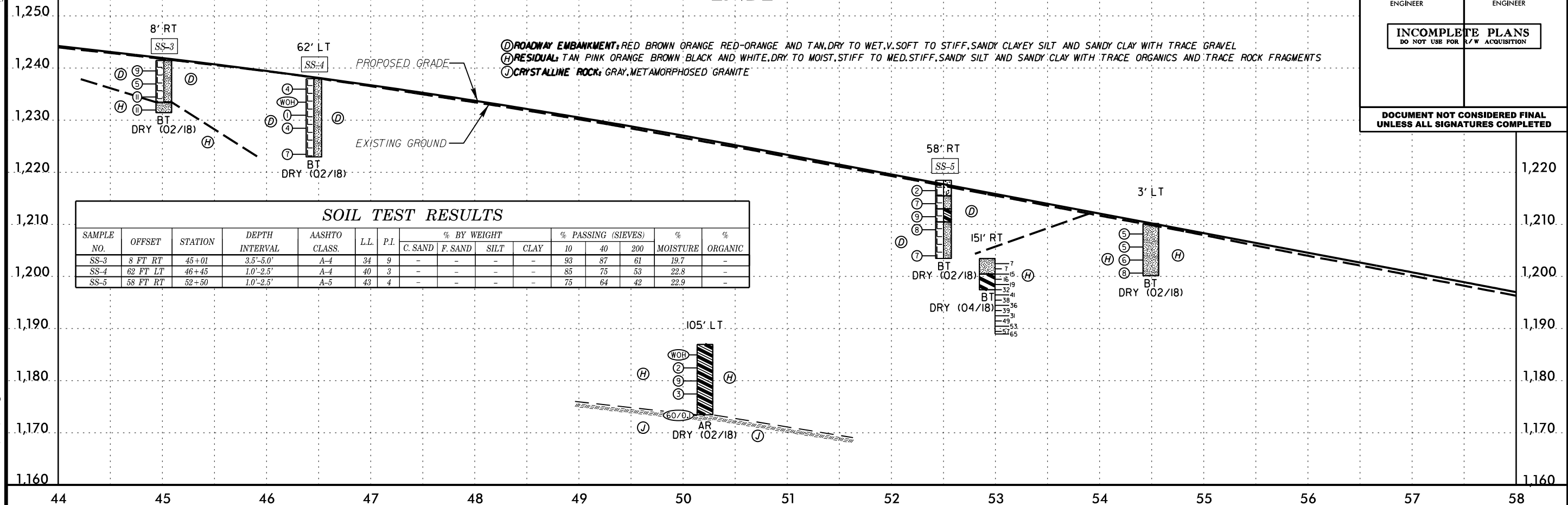
(D) **ROADWAY EMBANKMENT**, ORANGE, MOIST, SOFT TO MED. STIFF, CLAYEY SILT.
 (H) **RESIDUAL**, ORANGE RED BROWN TAN AND PINK, MOIST, MED. STIFF, SILTY CLAY WITH TRACE ROCK FRAGMENTS



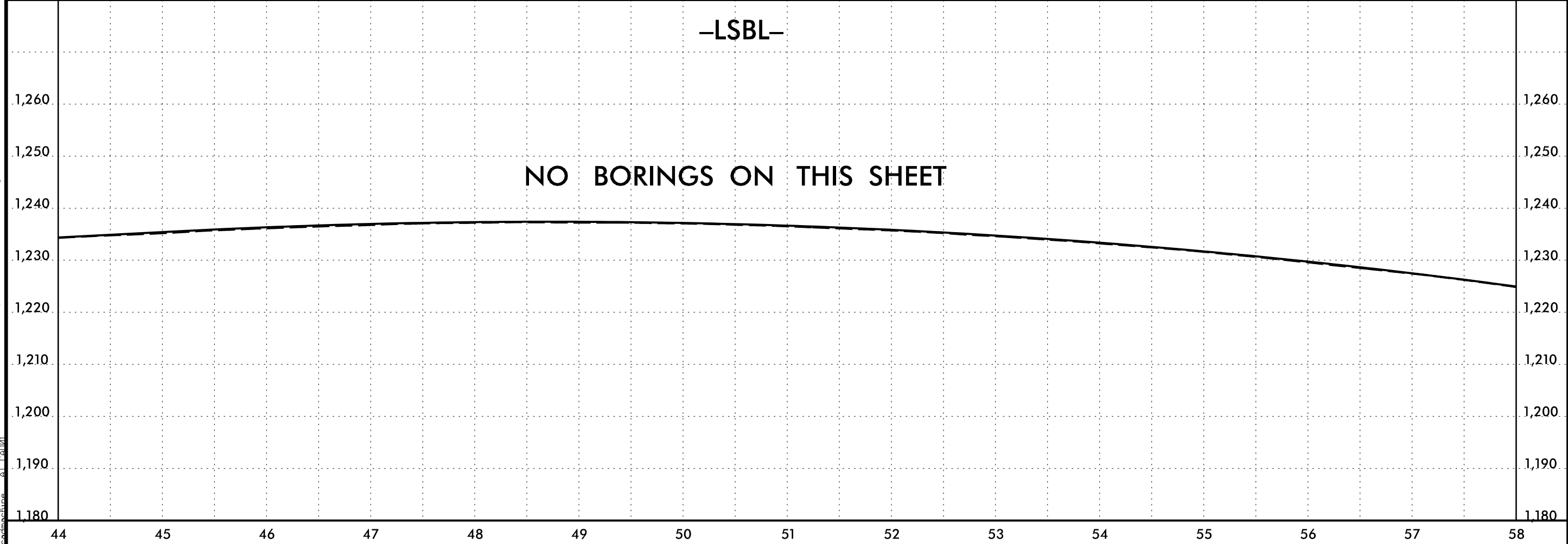
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PROJECT REFERENCE NO. <i>U-5312</i>	SHEET NO. <i>19</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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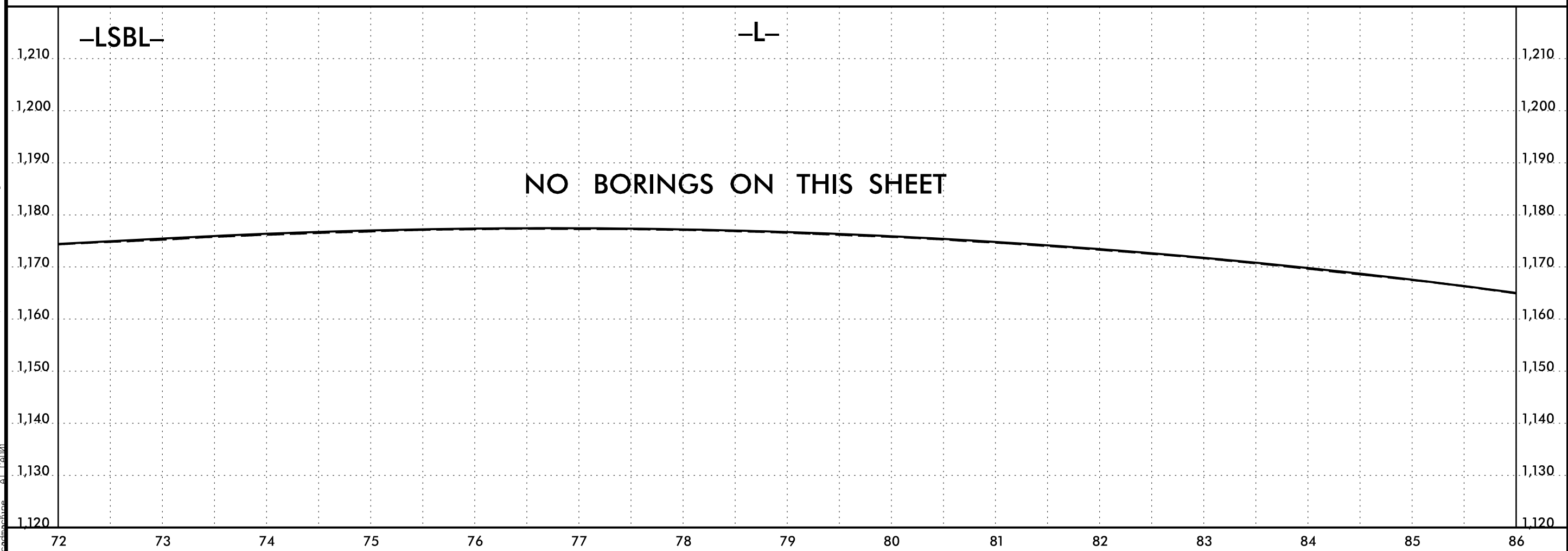
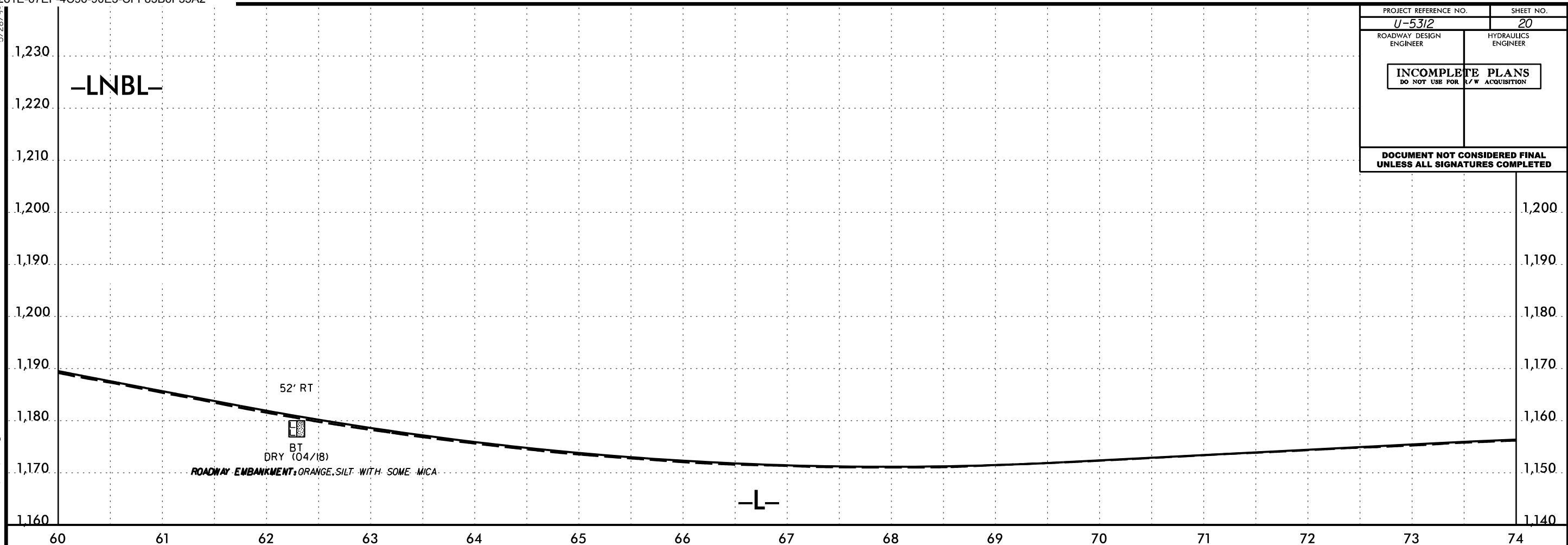
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PROJECT REFERENCE NO. <i>U-5312</i>	SHEET NO. <i>20</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

5/28/09
P:\JUG-2008_09\44_Plan\017\038.00_VHB_U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO\RDWY\CADD_GEO\TECH\PlanProf\U5312.GEO.pfl_psh.dgn



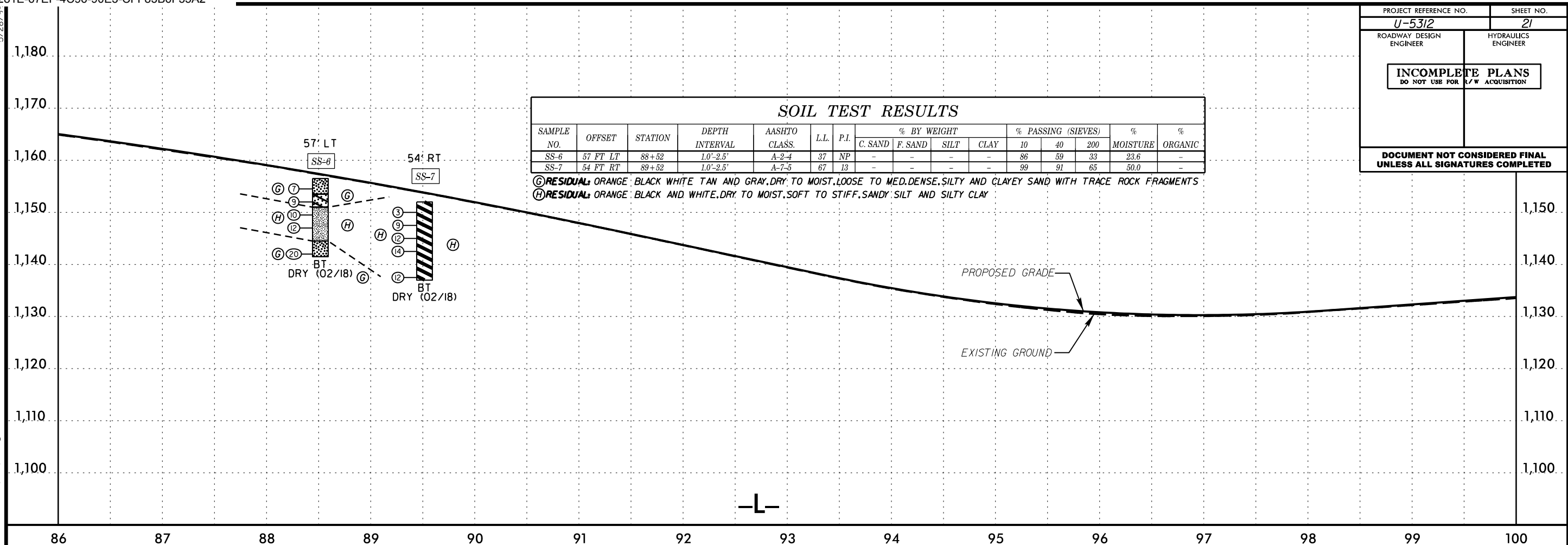
PROJECT REFERENCE NO. U-5312	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-6	57 FT LT	88+52	1.0'-2.5'	A-2-4	37	NP	-	-	-	-	86	59	33	23.6	-
SS-7	54 FT RT	89+52	1.0'-2.5'	A-7-5	67	13	-	-	-	-	99	91	65	50.0	-

(G) RESIDUAL: ORANGE, BLACK, WHITE, TAN AND GRAY, DRY TO MOIST, LOOSE TO MED. DENSE, SILTY AND CLAYEY SAND WITH TRACE ROCK FRAGMENTS
 (H) RESIDUAL: ORANGE, BLACK AND WHITE, DRY TO MOIST, SOFT TO STIFF, SANDY SILT AND SILTY CLAY

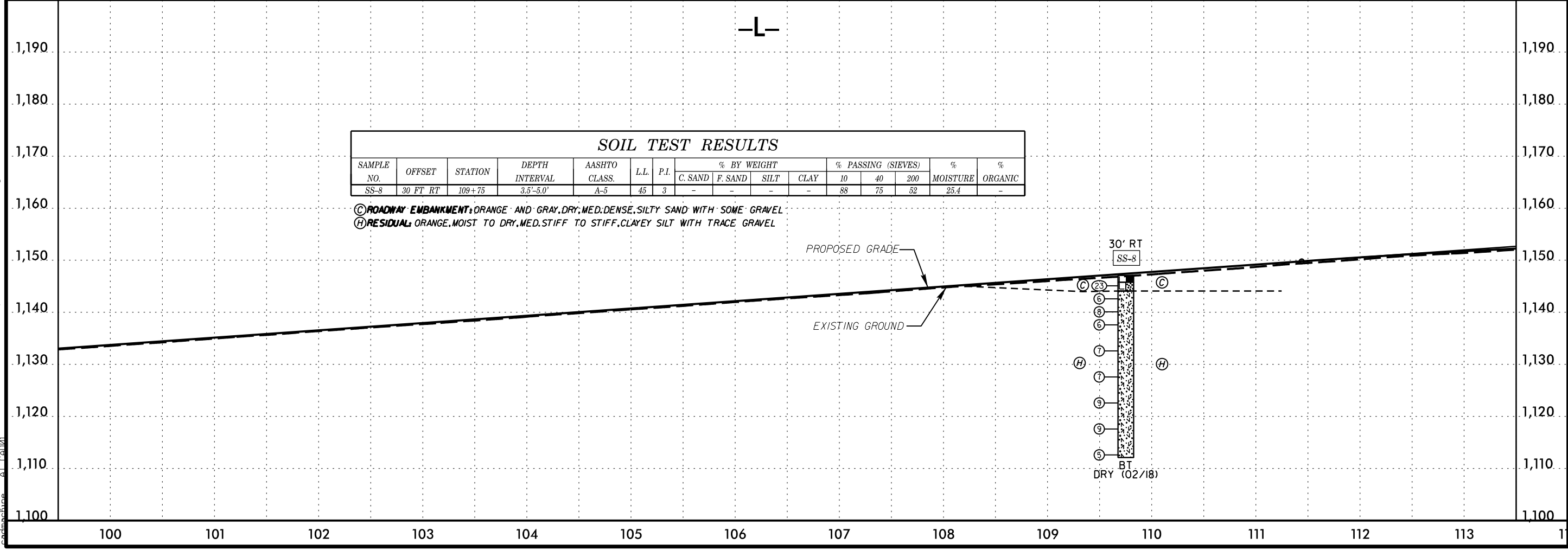
5/28/94
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SOIL TEST RESULTS

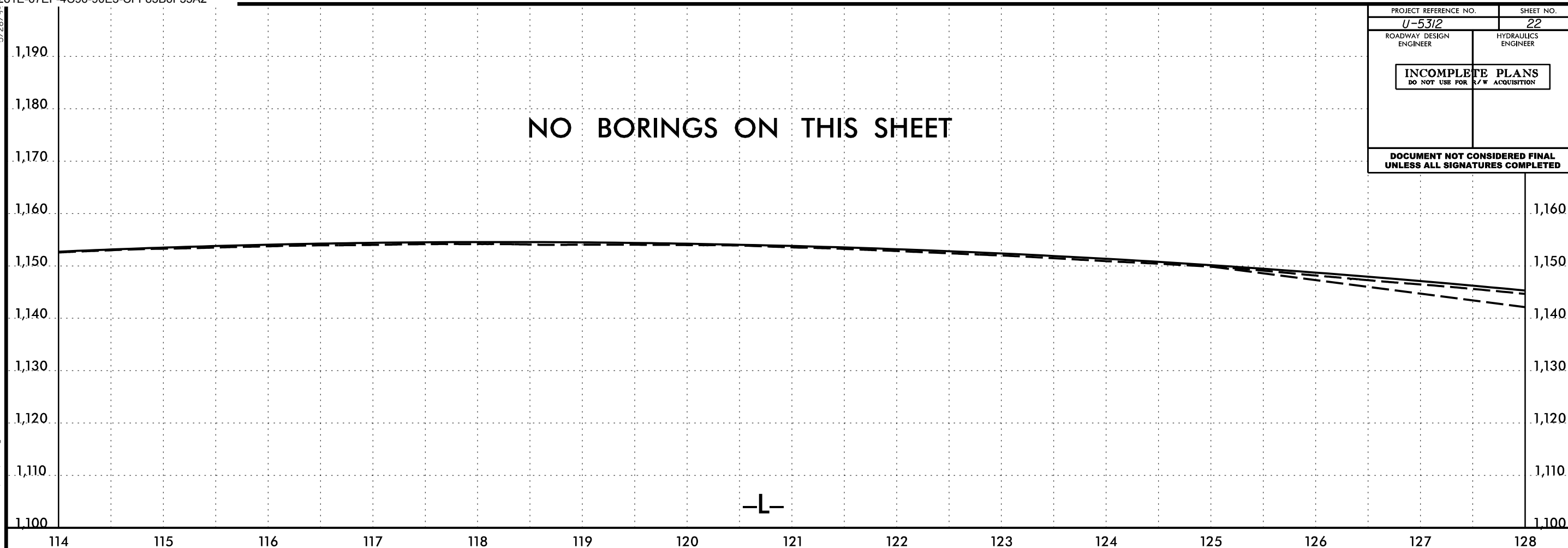
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-8	30 FT RT	109+75	3.5'-5.0'	A-5	45	3	-	-	-	-	88	75	52	25.4	-

(C) ROADWAY EMBANKMENT: ORANGE AND GRAY, DRY, MED. DENSE, SILTY SAND WITH SOME GRAVEL
 (H) RESIDUAL: ORANGE, MOIST TO DRY, MED. STIFF TO STIFF, CLAYEY SILT WITH TRACE GRAVEL



PROJECT REFERENCE NO. <i>U-5312</i>	SHEET NO. <i>22</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

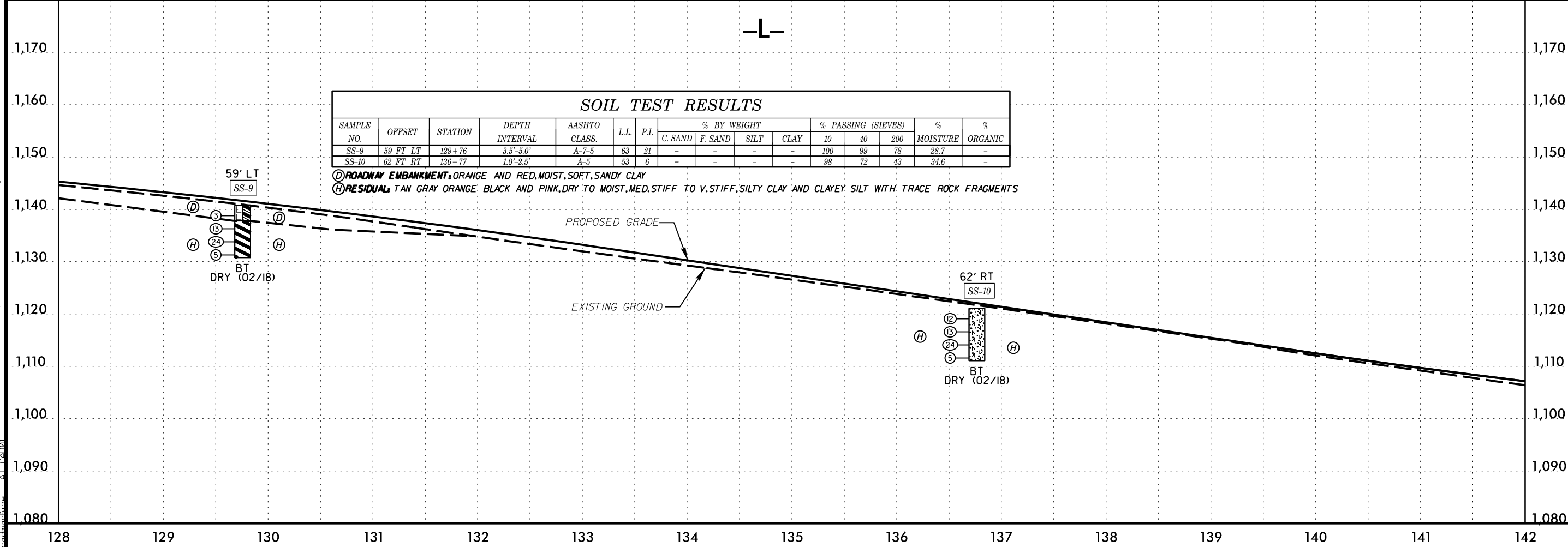
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SOIL TEST RESULTS

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		
SS-9	59 FT LT	129+76	3.5'-5.0'	A-7-5	63	21	-	-	-	-	100	99	78	28.7	-
SS-10	62 FT RT	136+77	1.0'-2.5'	A-5	53	6	-	-	-	-	98	72	43	34.6	-

D ROADWAY EMBANKMENT: ORANGE AND RED, MOIST, SOFT, SANDY CLAY
H RESIDUAL: TAN GRAY ORANGE, BLACK AND PINK, DRY TO MOIST, MED. STIFF TO V. STIFF, SILTY CLAY AND CLAYEY SILT WITH TRACE ROCK FRAGMENTS



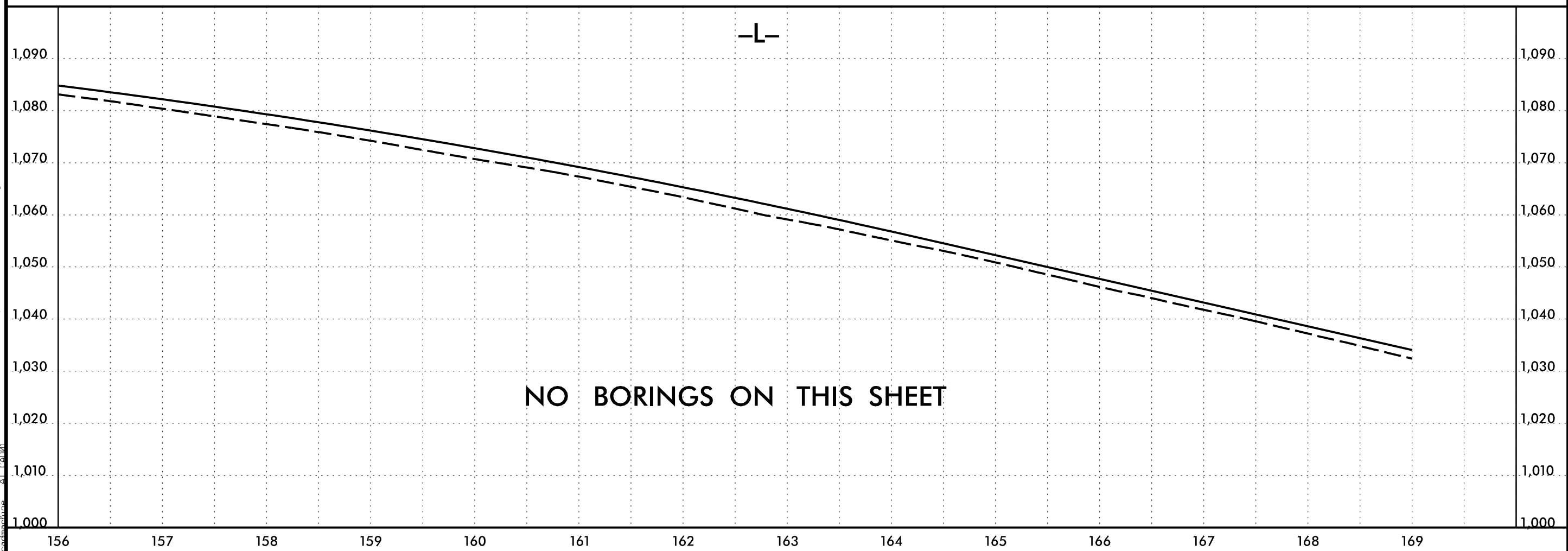
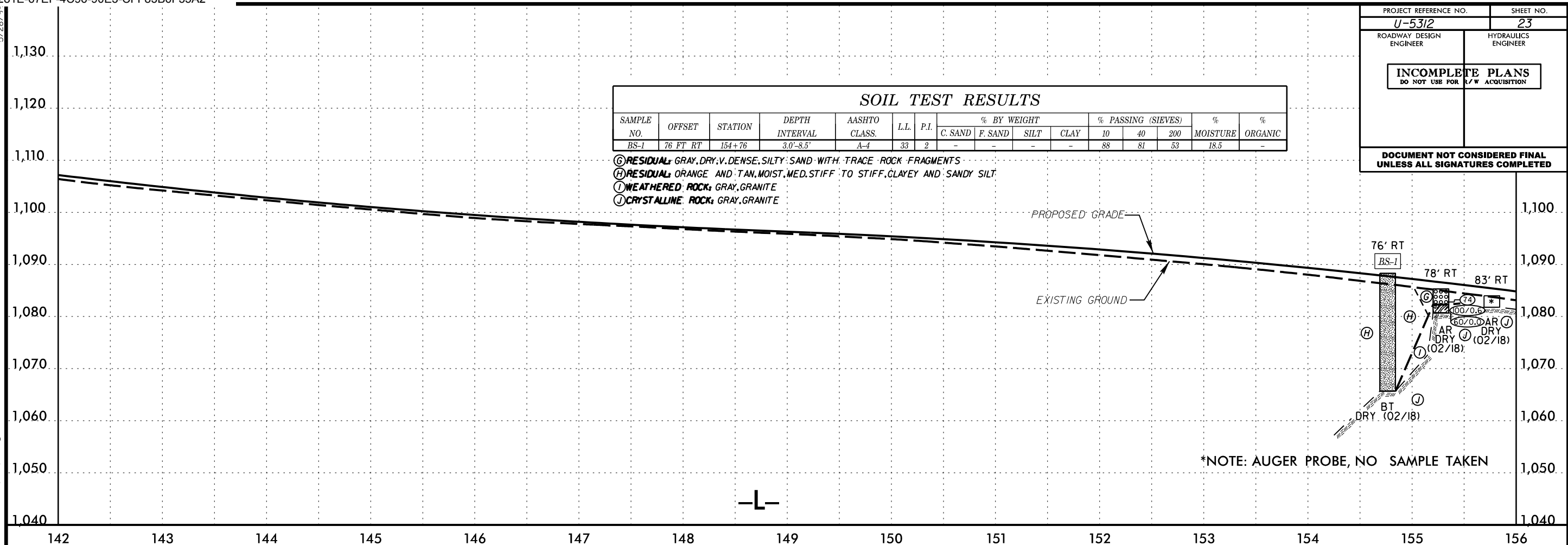
5/28/09
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 18-AUG-2008 09:45
 17/08/08 09:45
 17/08/08 09:45
 17/08/08 09:45

PROJECT REFERENCE NO. U-5312	SHEET NO. 23
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.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
BS-1	76 FT RT	154+76	3.0'-8.5'	A-4	33	2	-	-	-	-	88	81	53	18.5	-

- Ⓒ **RESIDUAL:** GRAY, DRY, V. DENSE, SILTY SAND WITH TRACE ROCK FRAGMENTS
- Ⓗ **RESIDUAL:** ORANGE AND TAN, MOIST, MED. STIFF TO STIFF, CLAYEY AND SANDY SILT
- Ⓛ **WEATHERED ROCK:** GRAY, GRANITE
- Ⓜ **CRYSTALLINE ROCK:** GRAY, GRANITE



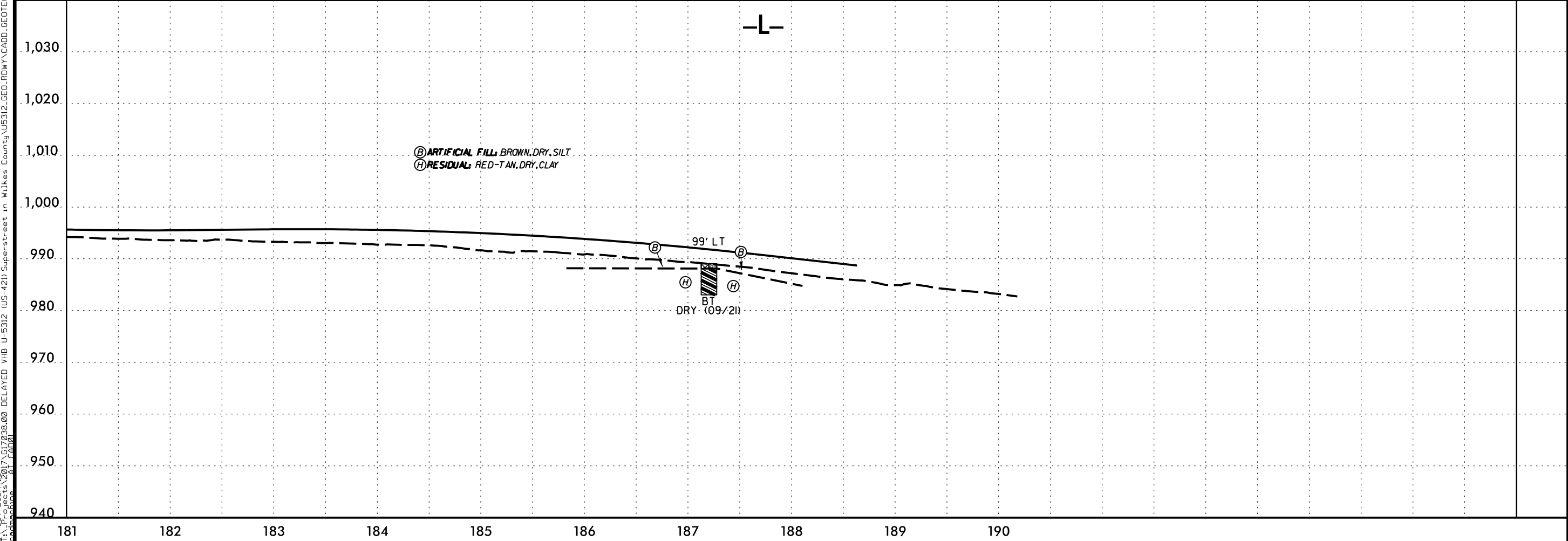
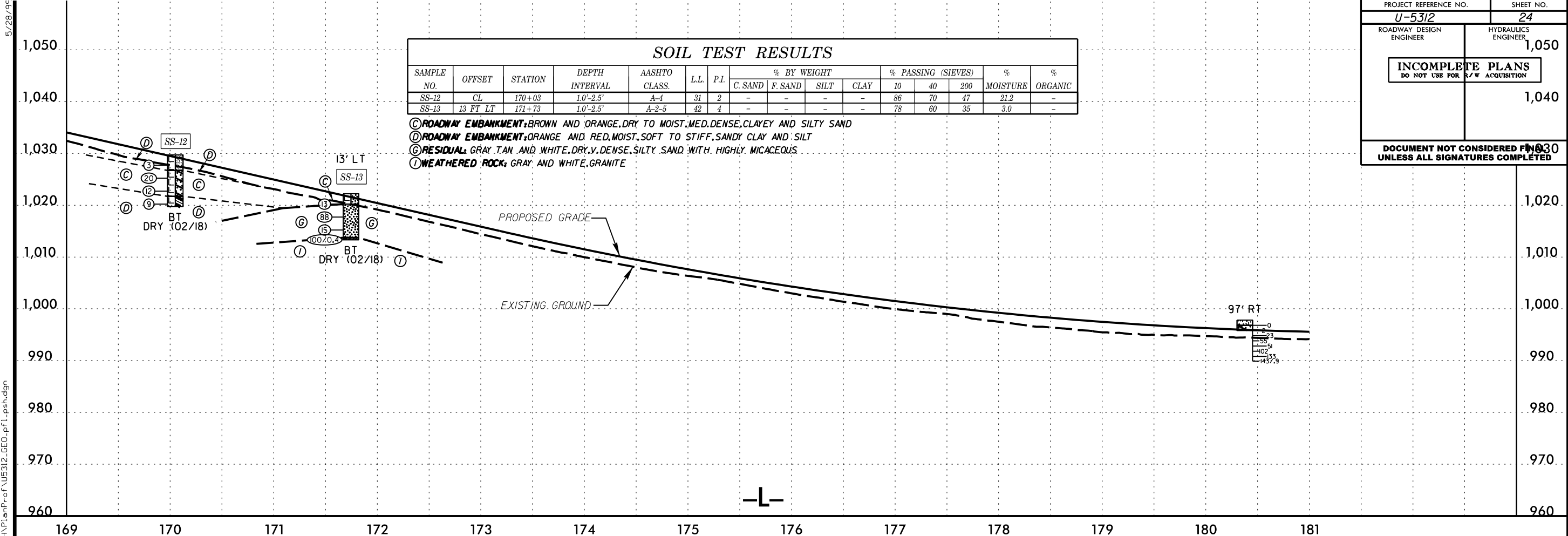
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 08-NOV-2008 14:50
 15-NOV-2008 14:50
 15-NOV-2008 14:50
 15-NOV-2008 14:50
 15-NOV-2008 14:50

PROJECT REFERENCE NO. U-5312	SHEET NO. 24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
DOCUMENT NOT CONSIDERED FINISHED UNLESS ALL SIGNATURES COMPLETED	

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		
SS-12	CL	170+03	1.0'-2.5'	A-4	31	2	-	-	-	-	86	70	47	21.2	-
SS-13	13 FT LT	171+73	1.0'-2.5'	A-2-5	42	4	-	-	-	-	78	60	35	3.0	-

- Ⓒ ROADWAY EMBANKMENT, BROWN AND ORANGE, DRY TO MOIST, MED. DENSE, CLAYEY AND SILTY SAND
- Ⓓ ROADWAY EMBANKMENT, ORANGE AND RED, MOIST, SOFT TO STIFF, SANDY CLAY AND SILT
- Ⓔ RESIDUAL, GRAY-TAN AND WHITE, DRY, V. DENSE, SILTY SAND WITH HIGHLY MICACEOUS
- Ⓘ WEATHERED ROCK, GRAY AND WHITE, GRANITE

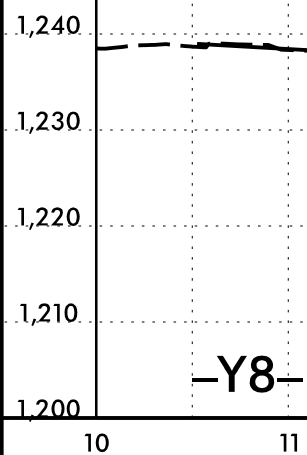


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 cadmachine

5/28/09
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 08-AUG-2008 09:45
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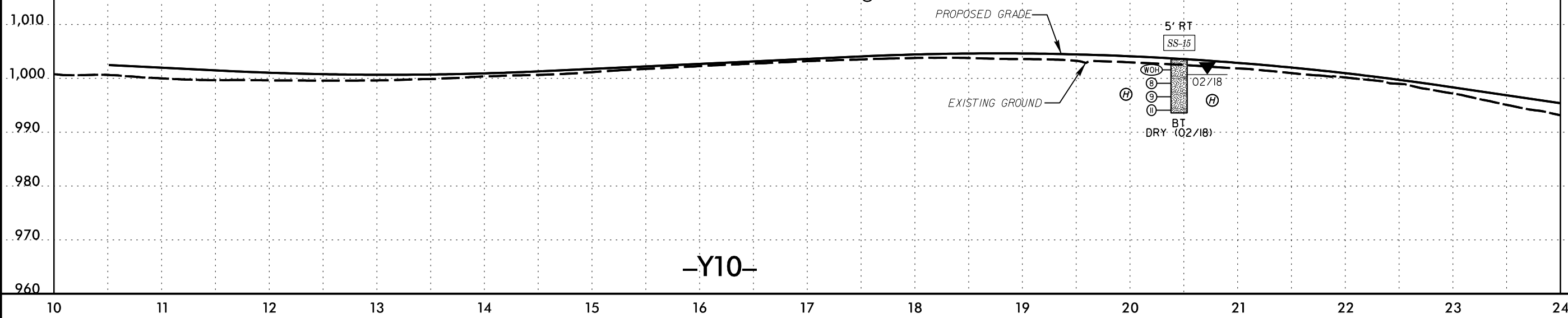
PROJECT REFERENCE NO. <i>U-5312</i>	SHEET NO. 25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NO BORINGS ON THIS SHEET



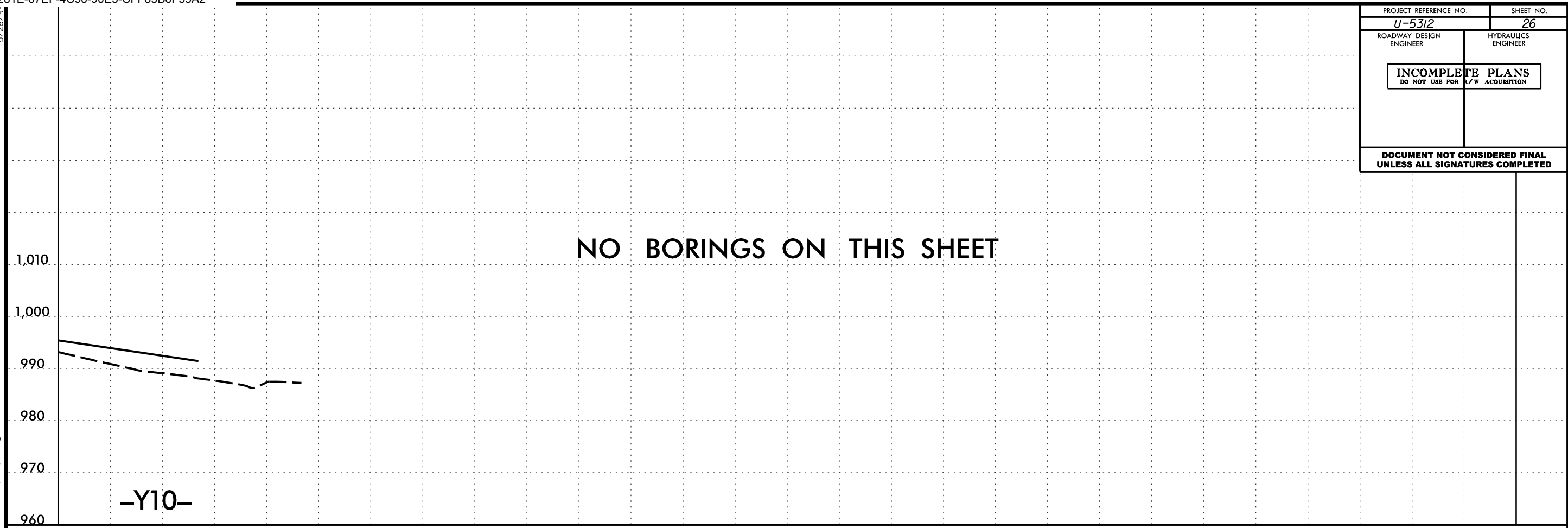
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-15	5 FT RT	20+46	1.0'-2.5'	A-4	35	NP	-	-	-	-	96	69	42	25.7	-

Ⓜ RESIDUAL TAN. MOIST. V. SOFT TO STIFF, SANDY SILT



5/28/94
P:_PLANS\1617038.00_VHB_U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_CADD.GEOTECH\PlanProf\U5312.GEO.pfl_psh.dgn
1617038.00_VHB_U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO_CADD.GEOTECH\PlanProf\U5312.GEO.pfl_psh.dgn

PROJECT REFERENCE NO. U-5312	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



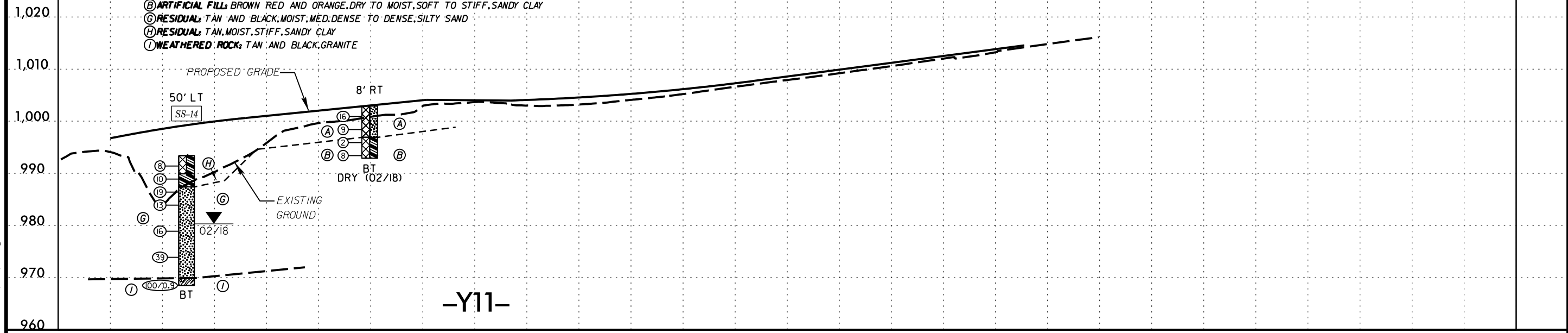
NO BORINGS ON THIS SHEET

NO BORINGS ON THIS SHEET

PROJECT REFERENCE NO.		SHEET NO.	
U-5312		27	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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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		
SS-14	50 FT LT	11+23	1.0'-2.5'	A-6	38	12	-	-	-	-	92	86	60	5.1	-

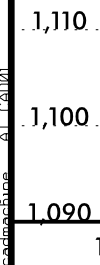
- Ⓐ ARTIFICIAL FILL; TAN, MOIST, LOOSE TO MED. DENSE, SILTY SAND
- Ⓑ ARTIFICIAL FILL; BROWN RED AND ORANGE, DRY TO MOIST, SOFT TO STIFF, SANDY CLAY
- Ⓒ RESIDUAL; TAN AND BLACK, MOIST, MED. DENSE TO DENSE, SILTY SAND
- Ⓓ RESIDUAL; TAN, MOIST, STIFF, SANDY CLAY
- Ⓔ WEATHERED ROCK; TAN AND BLACK, GRANITE



-Y11-

-WALK1-

NO BORINGS ON THIS SHEET



5/28/09
10/10/2008 15:24
F:\10-208\524
11-10-08.ctb
C:\Program Files\Autodesk\AutoCAD 2010\acad

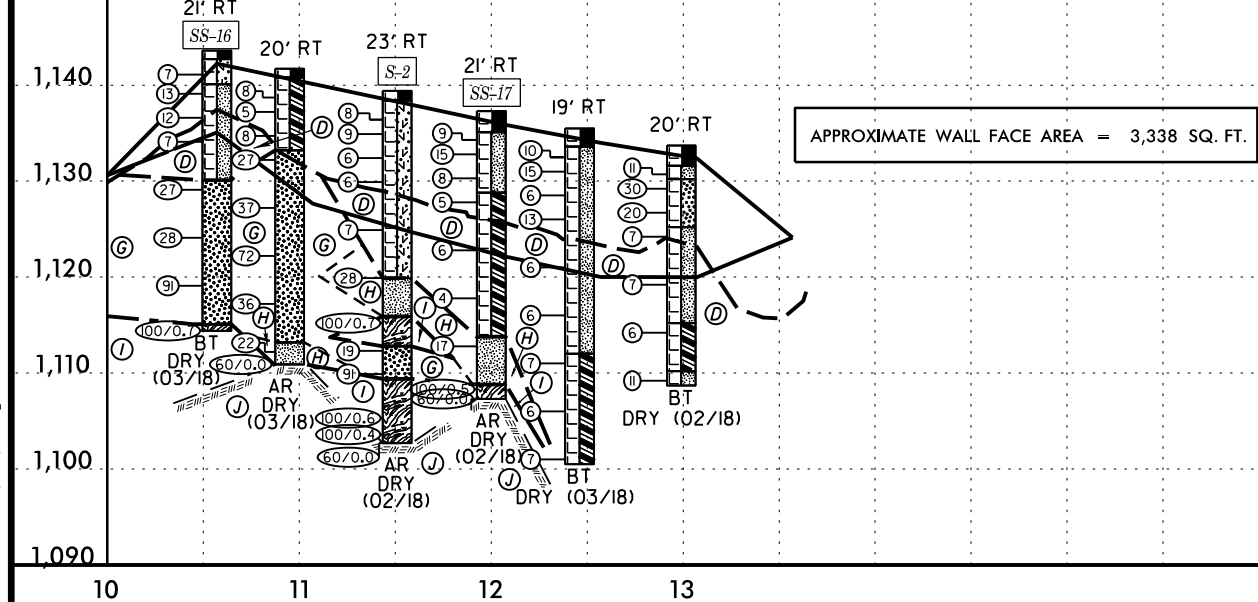
THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL

PROJECT REFERENCE NO.	SHEET NO.
U-5312	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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-16	21 FT RT	10+57	1.0'-3.0'	A-5	43	6	-	-	-	-	98	93	72	26.0	-
S-2	23 FT RT	11+51	13.5'-18.5'	A-5	47	9	-	-	-	-	81	75	58	20.9	-
SS-17	21 FT RT	12+00	2.0'-3.5'	A-4	38	3	-	-	-	-	97	86	46	23.3	-

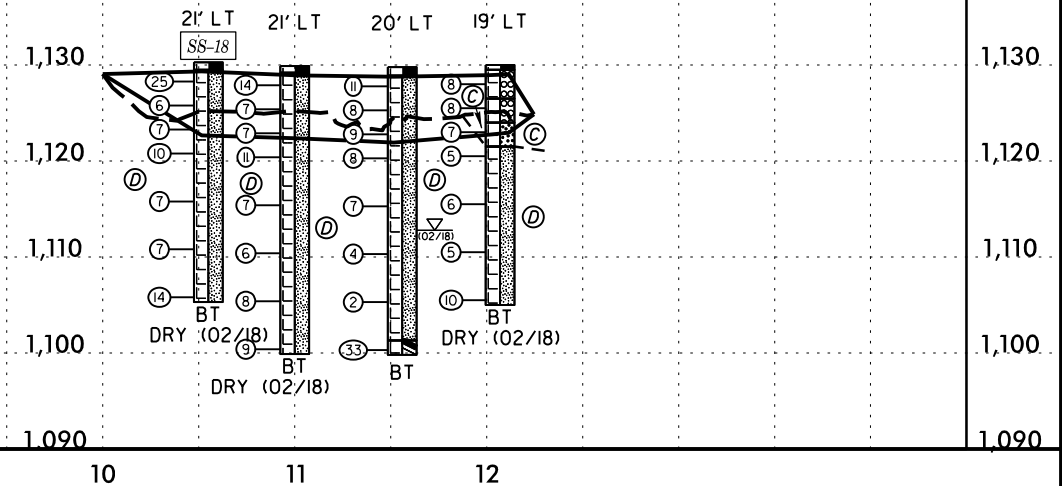
APPROXIMATE WALL FACE AREA = 1,040 SQ. FT.

- ① ROADWAY EMBANKMENT: BROWN AND ORANGE, DRY, MED. DENSE, SILTY SAND
- ② ROADWAY EMBANKMENT: ORANGE, GRAY, BROWN AND WHITE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SANDY CLAY WITH MICA AND TRACE GRAVEL
- ③ RESIDUAL: TAN GRAY AND WHITE, DRY, MED. DENSE TO V. DENSE, SILTY SAND WITH LITTLE ROCK FRAGMENTS
- ④ RESIDUAL: TAN-ORANGE TAN AND WHITE, DRY TO MOIST, V. STIFF, SILT AND SANDY SILT WITH SOME ROCK FRAGMENTS
- ⑤ WEATHERED ROCK: GRAY TAN AND WHITE, GRANITE
- ⑥ CRYSTALLINE ROCK: GRAY TAN AND WHITE, GRANITE



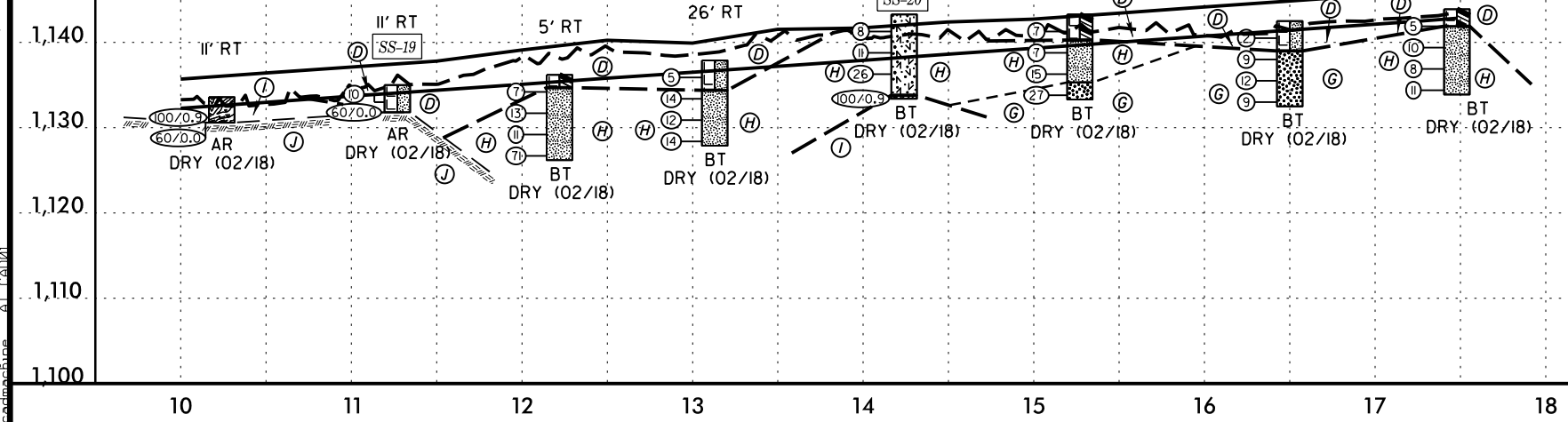
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-18	21 FT LT	10+55	3.5'-5.0'	A-4	38	NP	-	-	-	-	97	86	52	23.2	-

- ③ ROADWAY EMBANKMENT: GRAY TAN AND BROWN, DRY, LOOSE, SAND AND SILTY SAND WITH SOME GRAVEL
- ④ ROADWAY EMBANKMENT: ORANGE TAN TAN-ORANGE AND BROWN, DRY TO MOIST, SOFT TO HARD, SILT AND SANDY SILT WITH TRACE GRAVEL



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-19	11 FT RT	11+27	1.0'-2.5'	A-4	35	1	-	-	-	-	75	62	38	16.7	-
SS-20	1 FT LT	14+24	1.0'-2.5'	A-5	42	NP	-	-	-	-	88	67	38	21.8	-

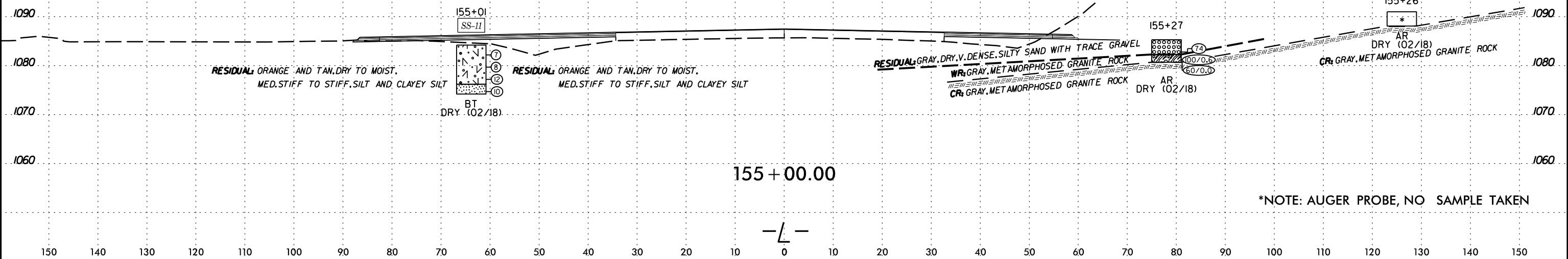
- ① ROADWAY EMBANKMENT: ORANGE BROWN RED AND TAN, MOIST, MED. STIFF TO STIFF, SANDY SILT AND SANDY CLAY WITH TRACE ASPHALT FRAGMENTS
- ② RESIDUAL: GRAY TAN AND WHITE, DRY, DENSE, SILTY SAND
- ③ RESIDUAL: ORANGE TAN BROWN GRAY WHITE AND BLACK, DRY TO MOIST, MED. STIFF TO HARD, SANDY SILT
- ④ WEATHERED ROCK: TAN AND WHITE, GRANITE
- ⑤ CRYSTALLINE ROCK: TAN, GRANITE



6/23/16

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

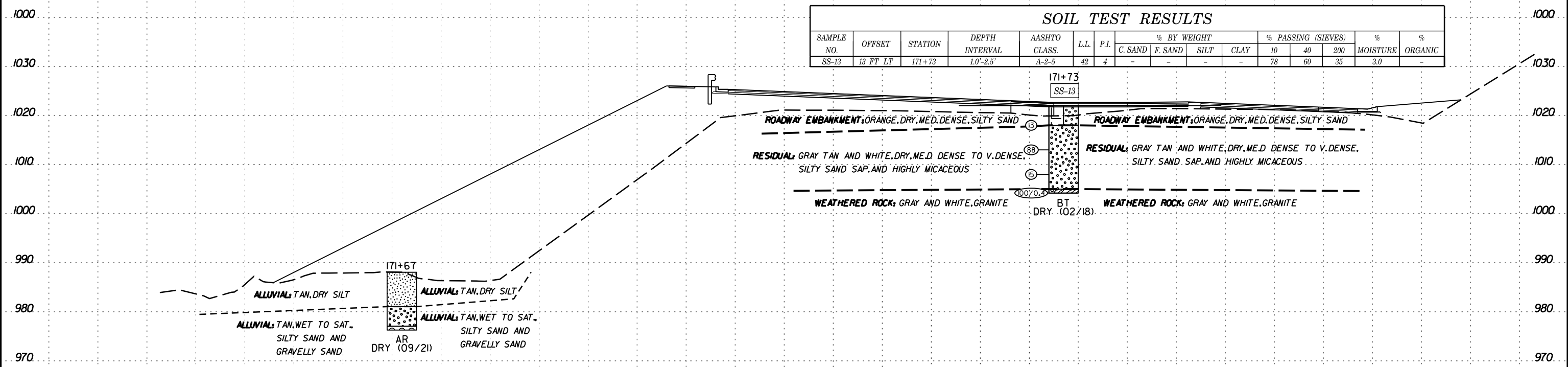
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-11	64 FT LT	155+01	1.0'-2.5'	A-5	43	9	-	-	-	-	87	79	59	26.0	-



28-NOV-2018 15:28 I:\Projects\2017\US7098.00 WHB U-5312 (US-421) Superstreet in Wilkes County\U5312.GEO.RDWY\CADD.GEOTECH\use\U5312.GEO.xpl.dgn

6/23/16

220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80



171 + 50.00
-L-

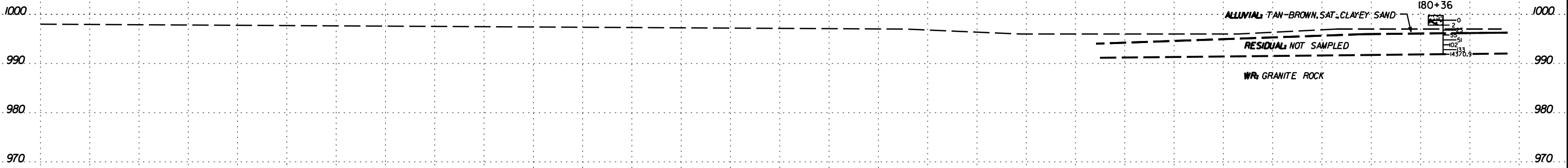
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 cadmac@me

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-5312	31

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



179 + 42.00
-L-

NOTES:
GROUNDLINE PROFILE ALONG CULVERT CENTERLINE DRAWN FROM TOPOGRAPHIC DATA FROM ELECTRONIC FILES RECEIVED FROM VHB DATED SEPTEMBER 2017.
CULVERT SKEW: 42 DEGREES

07-OCT-2021 16:05
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 cadmac@tnc.com

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REFERENCE: U-5732

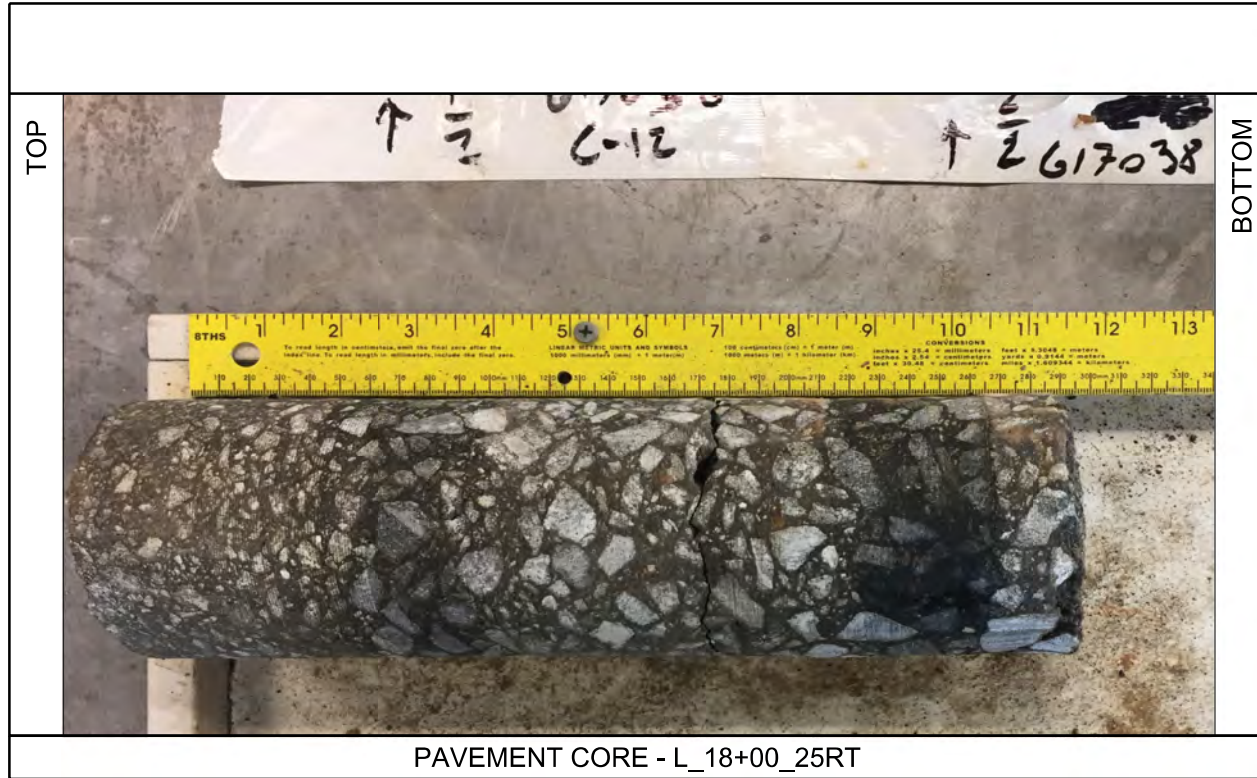
PROJECT: 45446

*NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT*
SUBSURFACE INVESTIGATION
*APPENDIX A
PAVEMENT INVESTIGATION RESULTS*

DS
WSH 10/7/2021
INITIALS DATE

TEST LOCATION				PAVEMENT SECTION THICKNESS (INCHES)			SUBGRADE	NOTES
ALIGNMENT	LANE	STATION	OFFSET	HMA	AGGREGATE BASE	TOTAL	IN-SITU CBR	
-L-	EB, OTL	23+03	51' RT	0.80	0.80	1.60	10	Voids in base
-L-	EB, OTL	37+57	50' RT	0.90	0.80	1.70	11	Voids in base
-L-	WB, OTL	42+00	50' LT	1.50	1.00	2.50	9	Base deteriorated and delaminated. *See note below
-L-	EB, OTL	115+05	36' RT	0.90	0.80	1.70	7	Base delaminated
-L-	WB, OSL	121+48	27' LT	14.00	0.00	14.00	6	Base horizontally cracked
-L-	WB, OTL	127+53	41' LT	5.00	6.00	11.00	11	-
-L-	EB, OTL	138+52	36' RT	11.00	11.00	22.00	7	-
-L-	EB, OTL	145+01	36' RT	12.00	7.00	19.00	12	-
-L-	WB, OTL	147+06	36' LT	10.00	0.00	10.00	4	-
-L-	EB, OTL	151+01	36' RT	7.00	3.00	10.00	16	-
-L-	EB, OTL	162+00	60' RT	7.00	7.00	14.00	8	-
-L-	EB, ISL	18+00	24' RT	11.00	0.00	11.00	8	-
-L-	EB, OSL	23+02	40' RT	7.00	14.00	21.00	11	-
-L-	WB, ISL	28+01	30' LT	15.00	14.00	29.00	11	Large voids in base
-L-	WB, OSL	37+46	43' LT	19.00	15.00	34.00	7	Voids and delamination in mid-section. *See note below
-L-	EB, OSL	37+57	40' RT	8.00	7.00	15.00	11	-
-L-	EB, ISL	42+99	24' RT	7.00	17.00	24.00	11	-
-L-	WB, ISL	48+00	29' LT	17.00	7.00	24.00	10	-
-L-	WB, OSL	52+97	42' LT	25.00	11.00	36.00	5	Multiple delaminations. *See note below
-L-	CTL	61+94	CL	14.00	7.00	21.00	3	Voids in base
-L-	EB, ISL	70+01	7' RT	10.00	11.00	21.00	8	Voids in base
-L-	EB, OSL	77+98	25' RT	10.00	12.00	22.00	12	Voids in base
-L-	CTL	85+97	3' LT	20.00	14.00	34.00	15	Voids in mid-section. *See note below
-L-	WB, OSL	94+03	31' LT	19.00	5.00	24.00	13	Delamination in mid-section. *See note below
-L-	WB, ISL	102+05	6' LT	6.00	24.00	30.00	12	Some voids in mid-section of core
-L-	EB, ISL	109+96	9' RT	10.00	10.00	20.00	24	-
-L-	EB, OTL	118+05	30' RT	12.00	19.00	31.00	6	Some voids in mid-section of core. *See note below
-L-	WB, ISL	125+98	13' LT	13.00	12.00	25.00	11	Thin layers of voids in base
-L-	WB, OSL	133+98	28' LT	7.00	12.00	19.00	7	-
-L-	CTL	141+99	2' LT	12.00	6.00	18.00	3	*See note below
-L-	EB, ISL	150+02	9' RT	10.00	6.00	16.00	8	-
-L-	EB, OSL	157+97	26' RT	7.00	14.00	21.00	10	-
-L-	WB, ITL	166+09	1' RT	17.00	0.00	17.00	11	-
-L-	WB, ISL	170+00	25' LT	10.00	14.00	24.00	8	-
-Y10-	WB, ITL	20+49	13' LT	14.00	7.00	21.00	15	-
REPRESENTATIVE AVERAGE				10.6	8.4	19	10	-

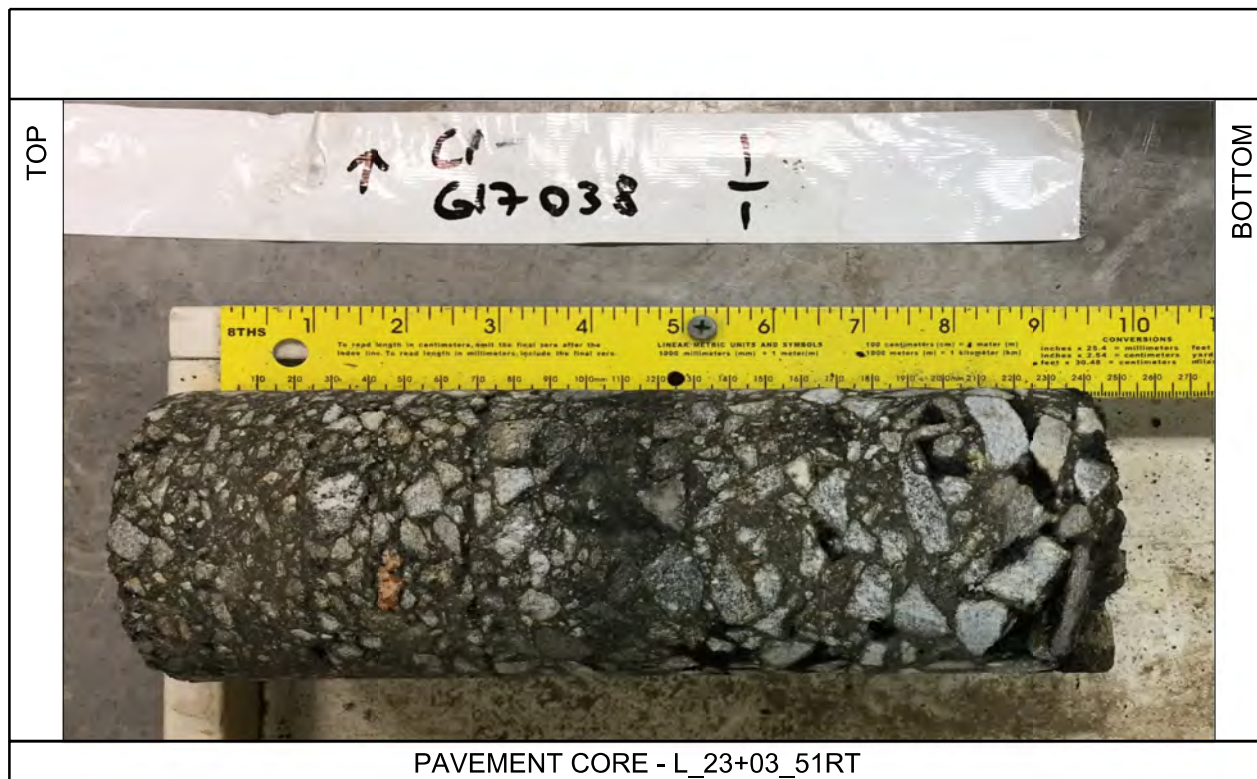
LEGEND: EB - EASTBOUND, WB - WESTBOUND, OSL - OUTSIDE LANE, ISL - INSIDE LANE, CTL - CENTRAL TURN LANE, OTL - OUTSIDE TURN LANE, ITL - INSIDE TURN LANE
 *Note: Most cores generally display increasing aggregate size with depth, i.e. indicative of base course, intermediate course and surface course. The cores noted above do not. Cores vary from a consistent mix, to appearance of old surface layers overlain by base or intermediate mixes and new surface mix.



PAVEMENT CORE - L_18+00_25RT



PAVEMENT CORE - L_23+03_40RT



PAVEMENT CORE - L_23+03_51RT



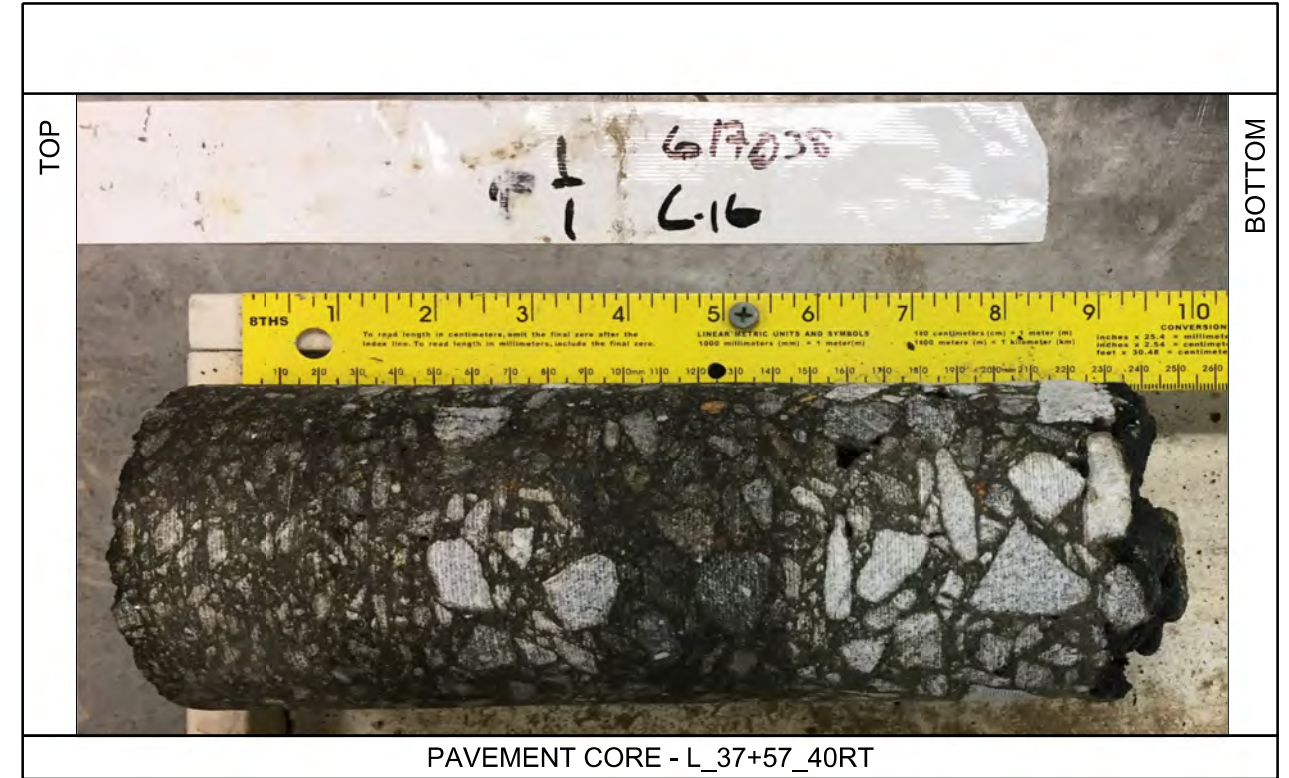
PAVEMENT CORE - L_28+01_30LT




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

PAVEMENT CORE PHOTOGRAPHS

US 421 FROM NC 16 TO US 421 BUSINESS
 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.:45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01



 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 FAX: 919.871.0803</p>	<p>PAVEMENT CORE PHOTOGRAPHS</p> <p>US 421 FROM NC 16 TO US 421 BUSINESS WILKES / WILKESBORO, NORTH CAROLINA WBS NO.:45446.1.1 TIP NO.: U-5312 FALCON PROJECT NO.: G17038.01</p>
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PAVEMENT CORE - L_42+99_24RT



PAVEMENT CORE - L_48+00_29RT



PAVEMENT CORE - L_52+97_42RT



PAVEMENT CORE - L_61+94



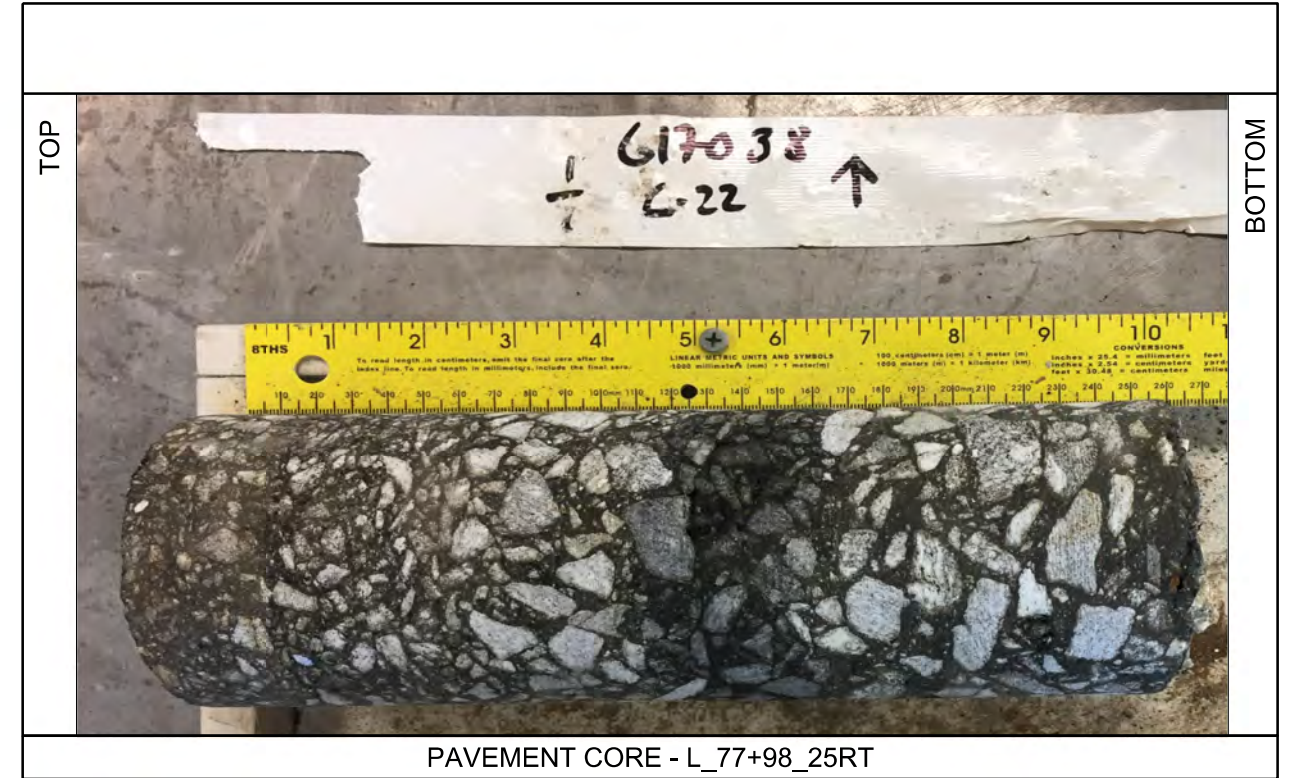
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

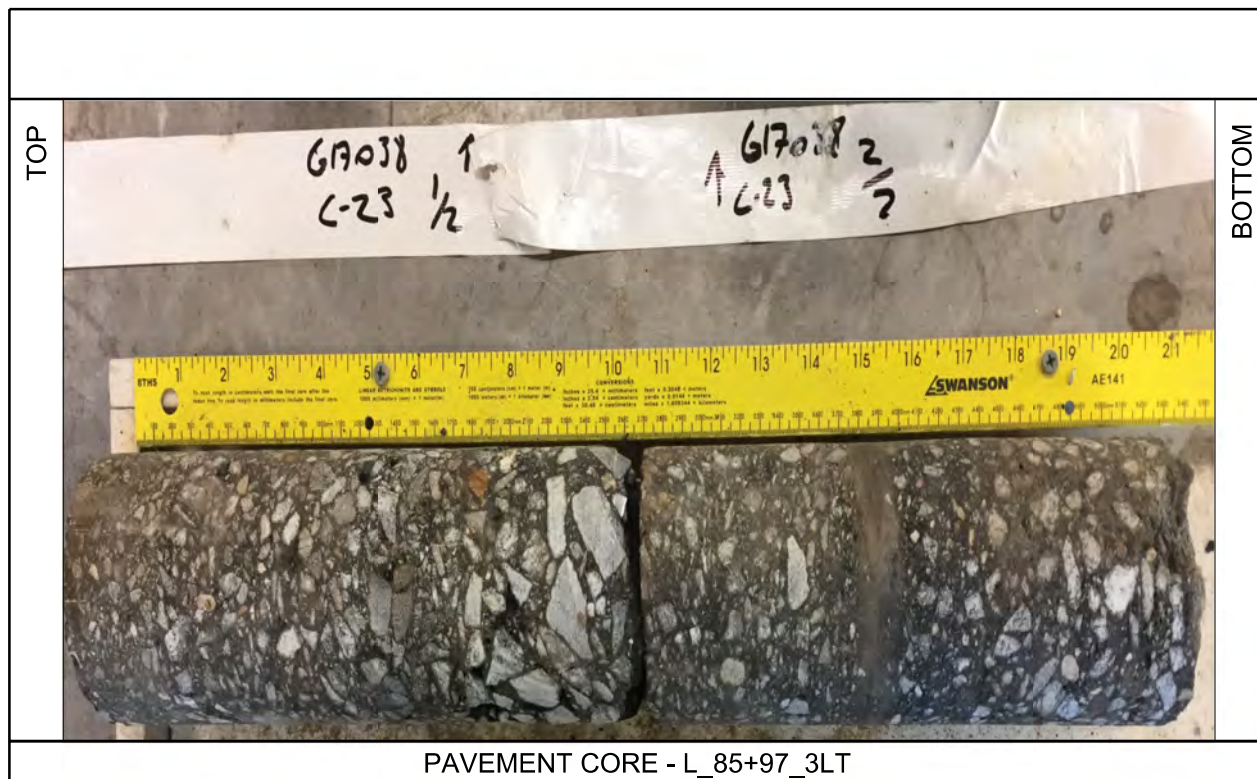
US 421 FROM NC 16 TO US 421 BUSINESS
WILKES / WILKESBORO, NORTH CAROLINA
WBS NO.: 45446.1.1 | TIP NO.: U-5312
FALCON PROJECT NO.: G17038.01



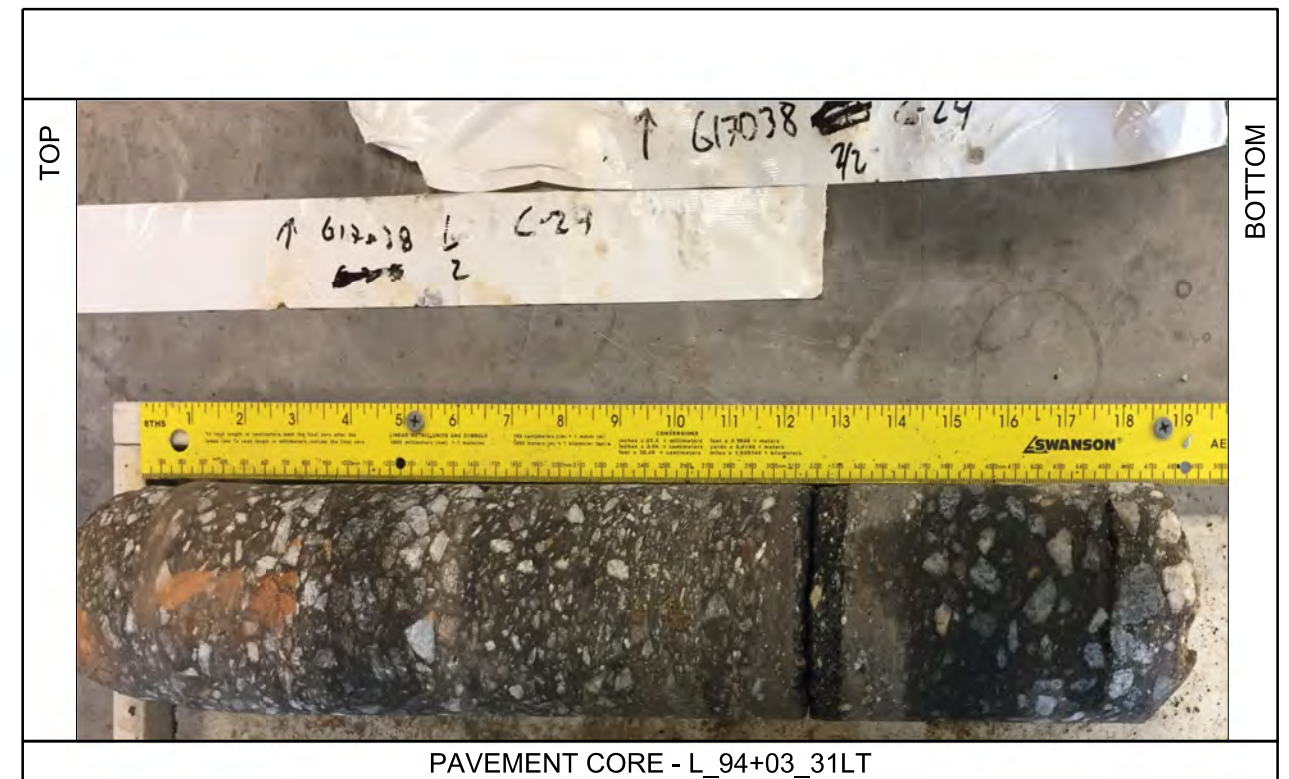
PAVEMENT CORE - L_70+01_7RT



PAVEMENT CORE - L_77+98_25RT



PAVEMENT CORE - L_85+97_3LT



PAVEMENT CORE - L_94+03_31LT



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PAVEMENT CORE PHOTOGRAPHS

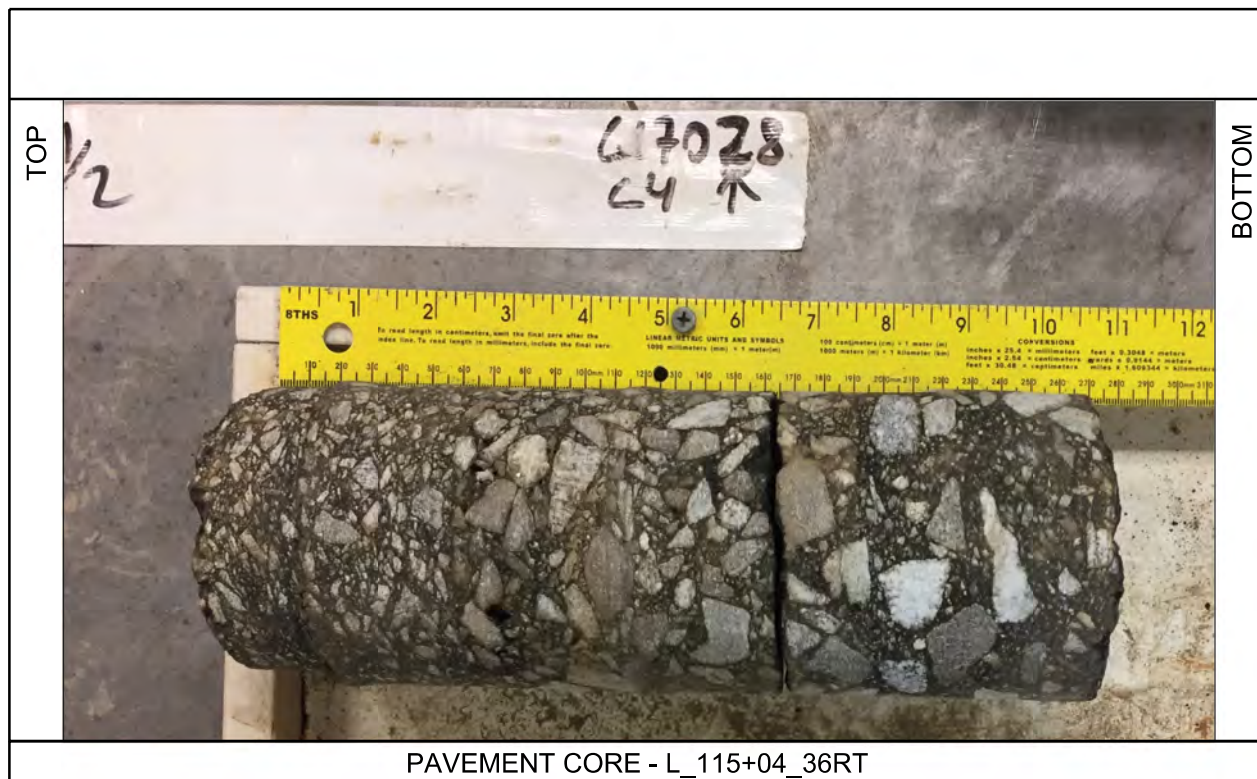
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 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.: 45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01



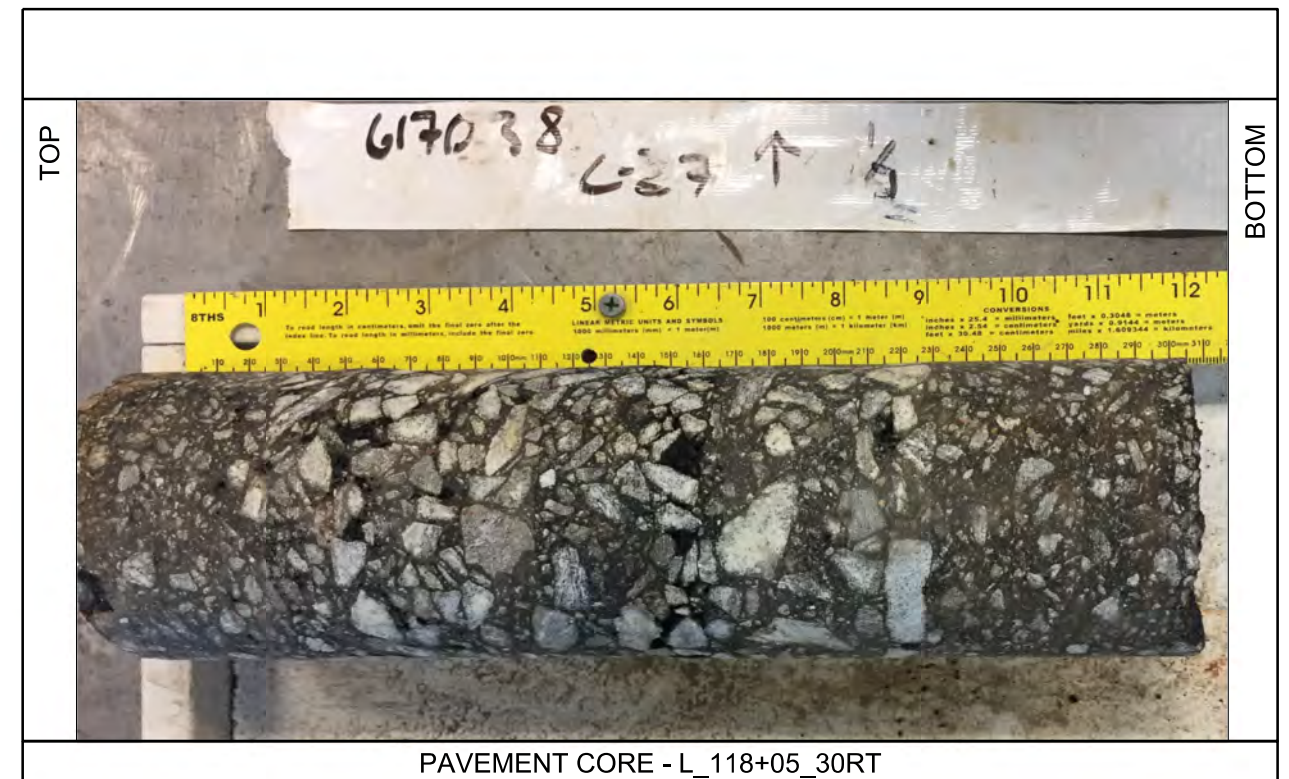
PAVEMENT CORE - L_102+05_6LT



PAVEMENT CORE - L_109+96_8RT



PAVEMENT CORE - L_115+04_36RT



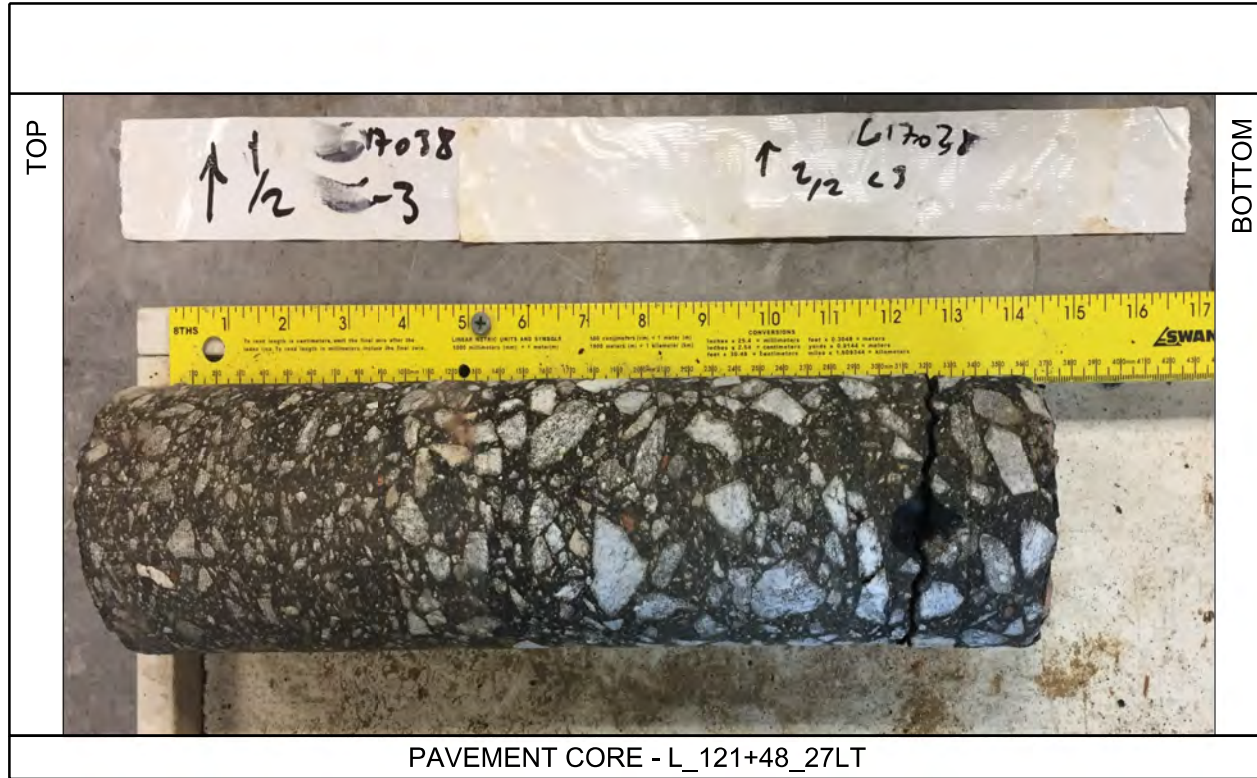
PAVEMENT CORE - L_118+05_30RT



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PAVEMENT CORE PHOTOGRAPHS

US 421 FROM NC 16 TO 421 BUSINESS
 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.:45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01



PAVEMENT CORE - L_121+48_27LT



PAVEMENT CORE - L_125+98_13LT



PAVEMENT CORE - L_127+53_41LT



PAVEMENT CORE - L_133+98_28LT



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PAVEMENT CORE PHOTOGRAPHS

US 421 FROM NC 16 TO US 421 BUSINESS
 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.: 45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01



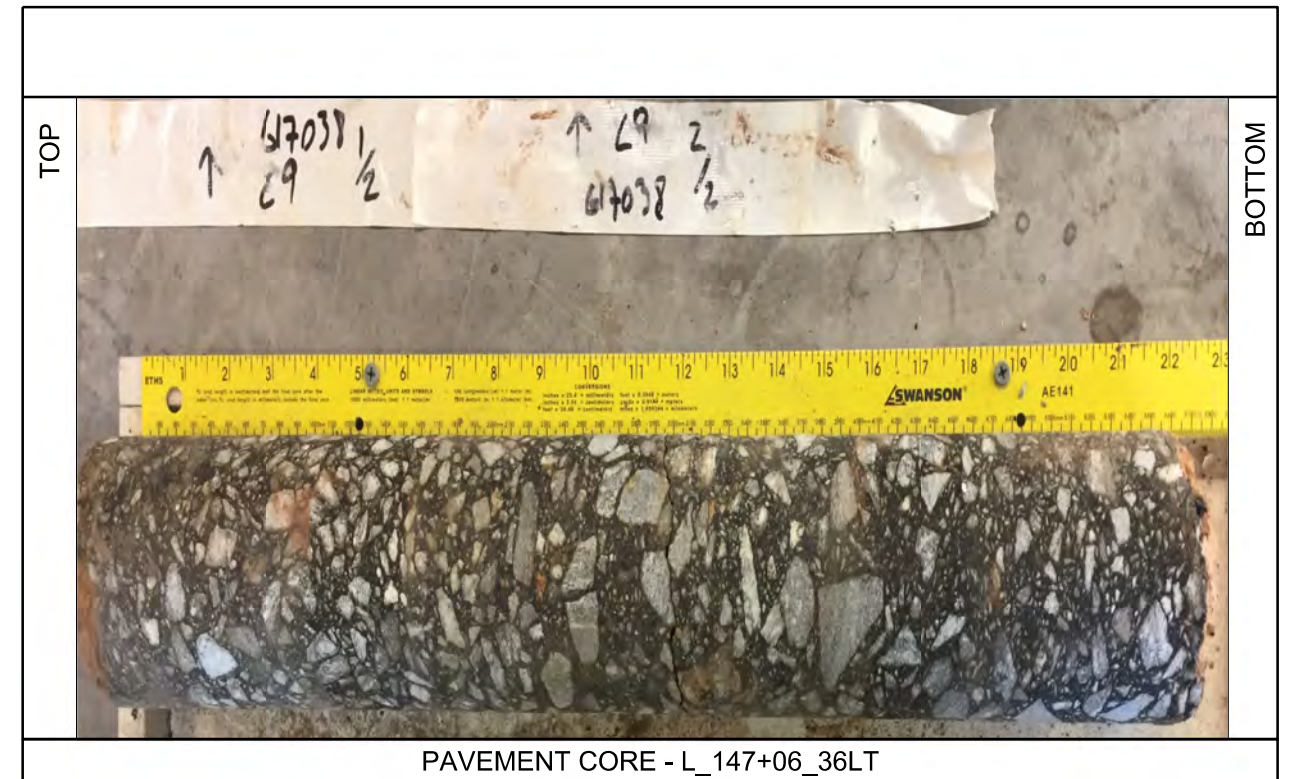
PAVEMENT CORE - L_138+52_36RT



PAVEMENT CORE - L_141+99_2LT



PAVEMENT CORE - L_145+01_36RT



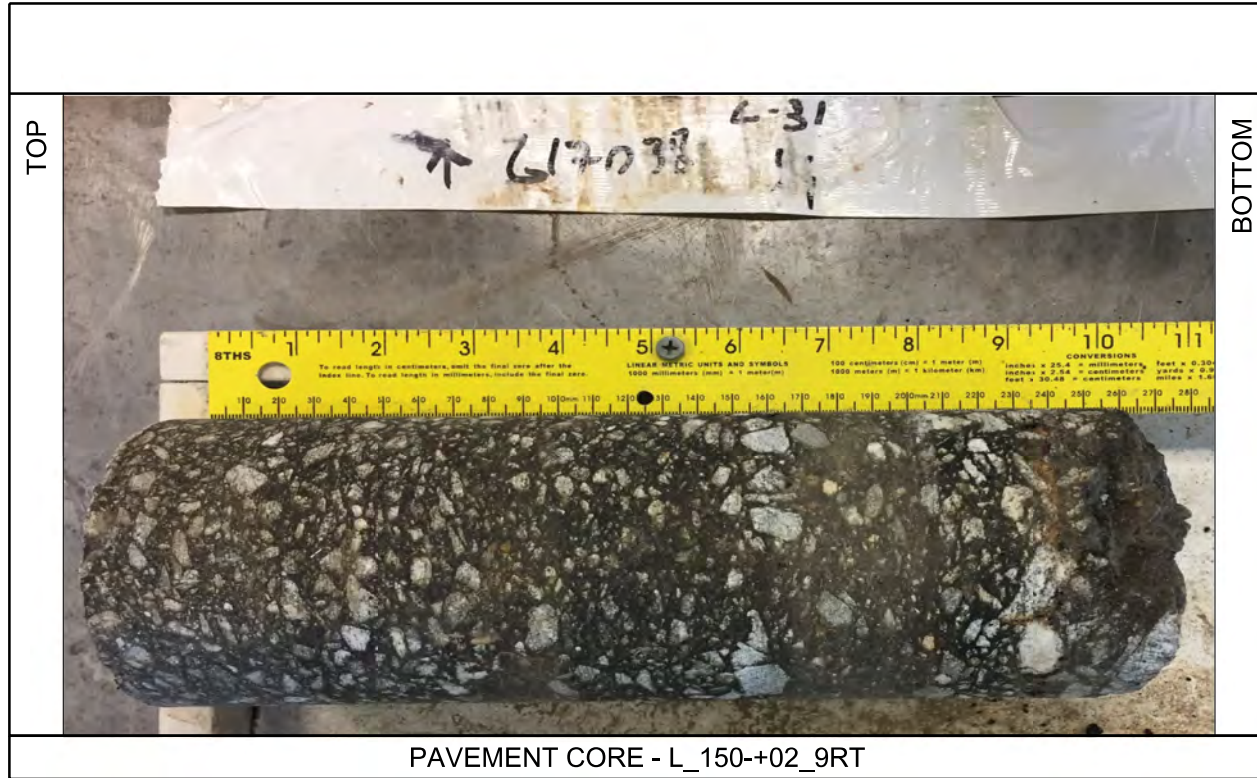
PAVEMENT CORE - L_147+06_36LT



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 1210 TRINITY ROAD, SUITE 110
 CARY, NC 27513
 PHONE: 919.871.0800
 FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

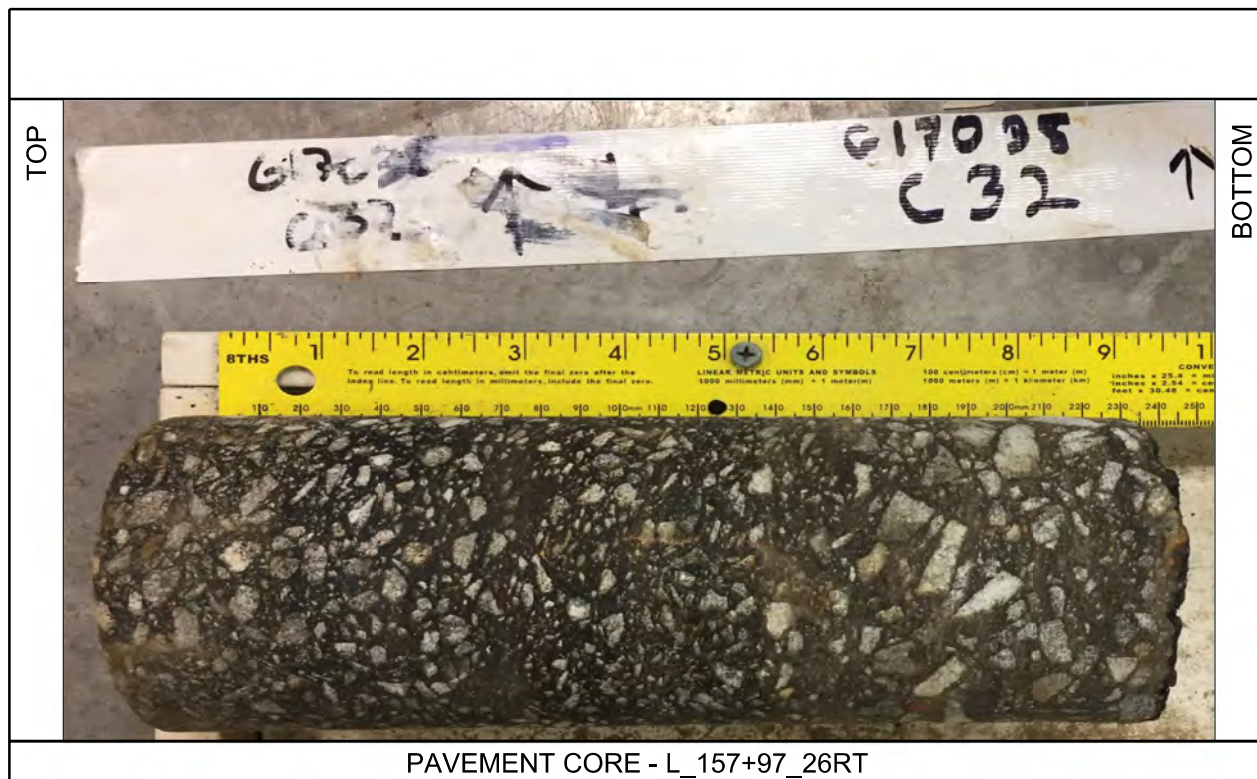
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 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.: 45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01



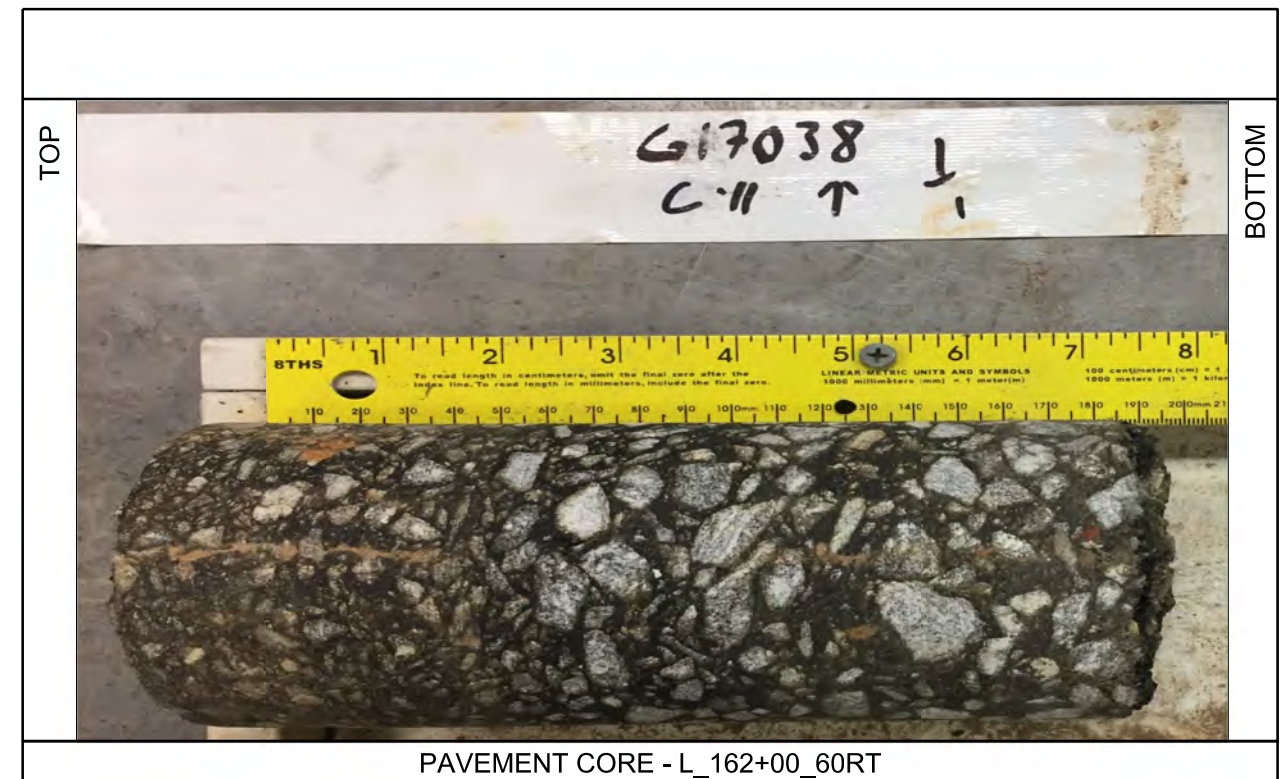
PAVEMENT CORE - L_150+02_9RT



PAVEMENT CORE - L_152+01_36RT



PAVEMENT CORE - L_157+97_26RT



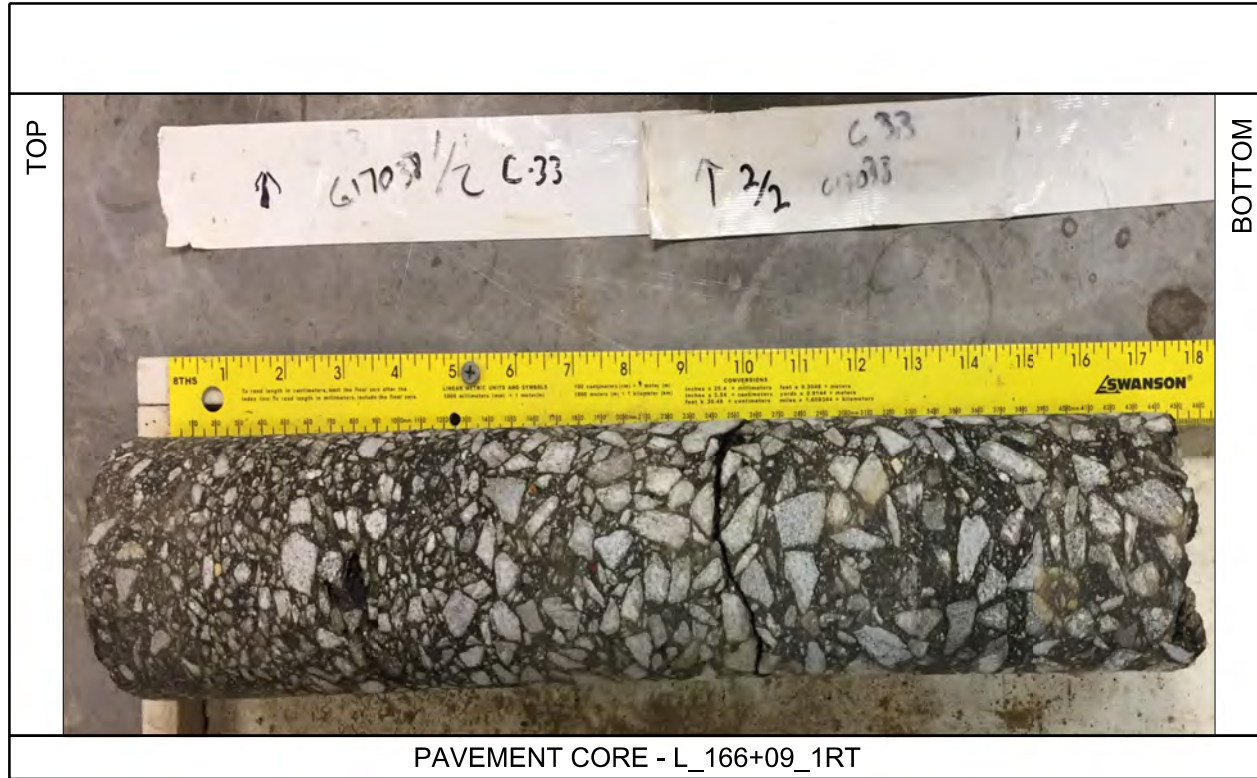
PAVEMENT CORE - L_162+00_60RT



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

PAVEMENT CORE PHOTOGRAPHS

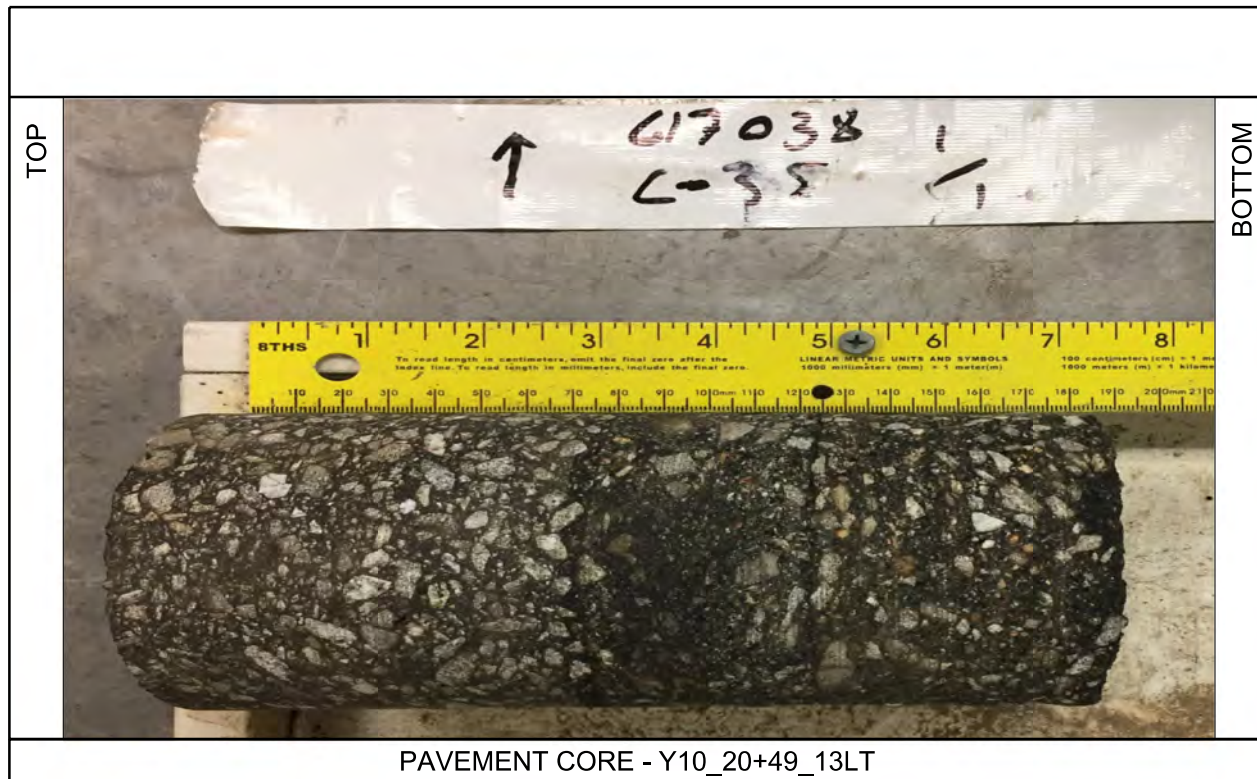
US 421 FROM NC 16 TO US 421 BUSINESS
WILKESBORO, NORTH CAROLINA
WBS NO.: 45446.1.1 | TIP NO.: U-5312
FALCON PROJECT NO.: G17038.01



PAVEMENT CORE - L_166+09_1RT



PAVEMENT CORE - L_170+00_25LT



PAVEMENT CORE - Y10_20+49_13LT



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 CARY, NC 27513
 PHONE: 919.871.0800
 FAX: 919.871.0803

PAVEMENT CORE PHOTOGRAPHS

US 421 FROM NC 16 TO US 421 BUSINESS
 WILKES / WILKESBORO, NORTH CAROLINA
 WBS NO.: 45446.1.1 | TIP NO.: U-5312
 FALCON PROJECT NO.: G17038.01

DCP TEST DATA

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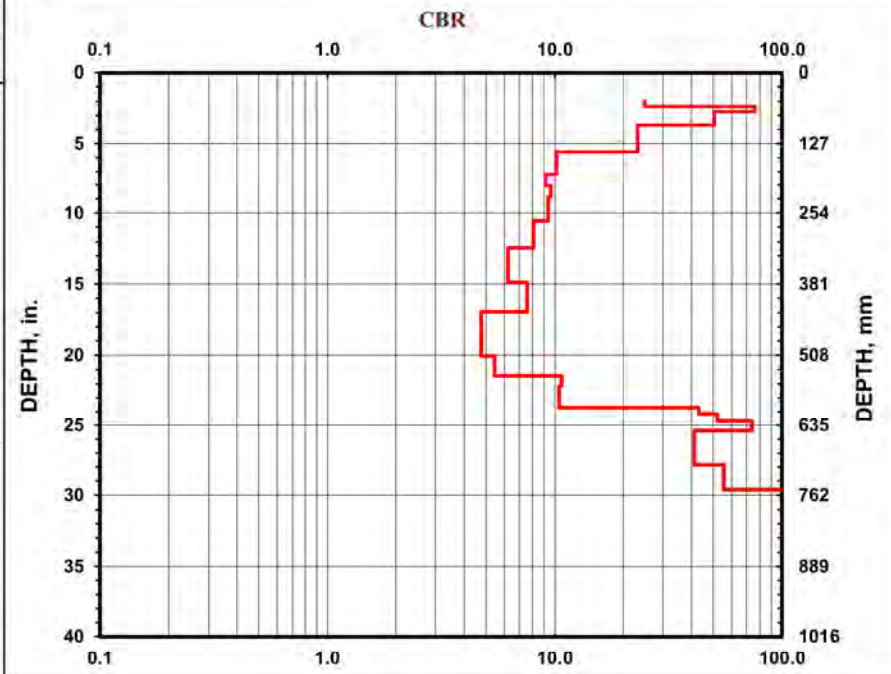
Project: US-421 Superstreet Wilkes Co.
 Location: L_1800_25RT

Date: 8-Mar-18
 Soil Type(s): Silt (A-4)

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
0	51	1
1	60	1
3	70	1
5	94	1
5	142	1
2	182	1
1	204	1
1	225	1
2	268	1
2	317	1
2	379	1
2	431	1
2	510	1
1	545	1
1	564	1
2	603	1
2	614	1
3	628	1
5	645	1
11	708	1
10	752	1
11	764	1
20	795	1
20	804	1
20	808	1
20	810	1



DCP TEST DATA

File Name: G17038

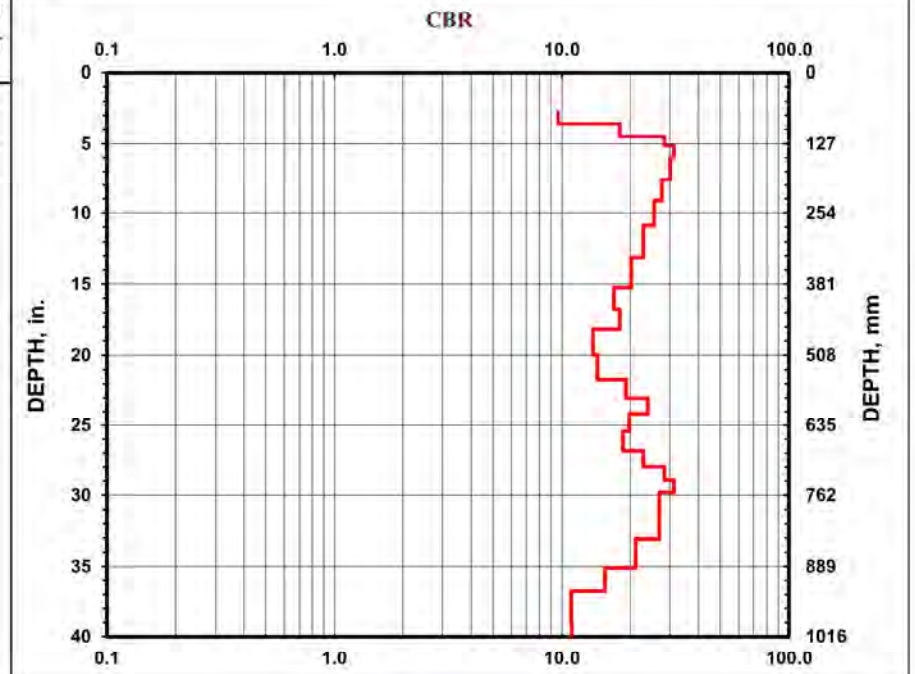
Project: US-421 Superstreet Wilkes Co.
 Location: L_23+03_40RT

Date: 8-Mar-18
 Soil Type(s): Silt (A-4)

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
1	70	1
1	91	1
2	115	1
2	131	1
3	153	1
5	191	1
5	232	1
5	276	1
6	334	1
5	388	1
3	426	1
3	462	1
3	508	1
3	552	1
3	586	1
3	614	1
3	647	1
3	682	1
3	711	1
3	735	1
3	757	1
5	799	1
5	841	1
5	893	1
3	934	1
3	990	1
2	1027	1
2	1056	1
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5	1116	1
6	1164	1
3	1182	1



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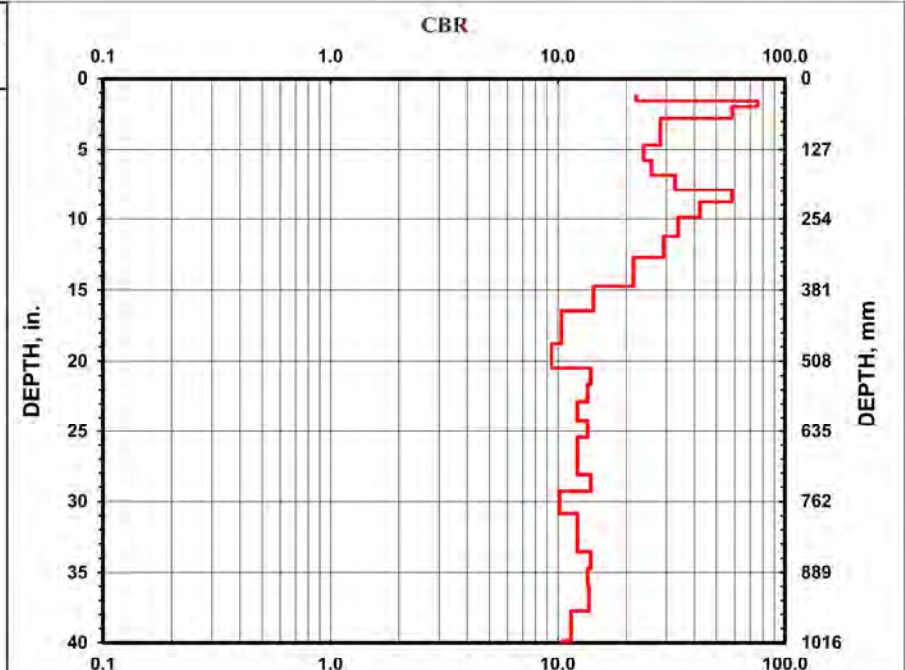
Project: US-421 Superstreet Wilkes Co.
Location: L_23+03_51RT

Date: 8-Mar-18
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
0	30	1
1	40	1
3	50	1
5	71	1
6	119	1
3	147	1
3	173	1
4	201	1
5	222	1
5	250	1
5	284	1
5	323	1
5	374	1
3	418	1
3	477	1
2	520	1
2	550	1
2	581	1
2	615	1
2	646	1
2	680	1
2	714	1
2	744	1
2	784	1
2	818	1
2	852	1
2	882	1
2	913	1
3	959	1
3	1013	1
2	1052	1
2	1094	1
2	1137	1
1	1156	1
1	1177	1
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		1



DCP TEST DATA

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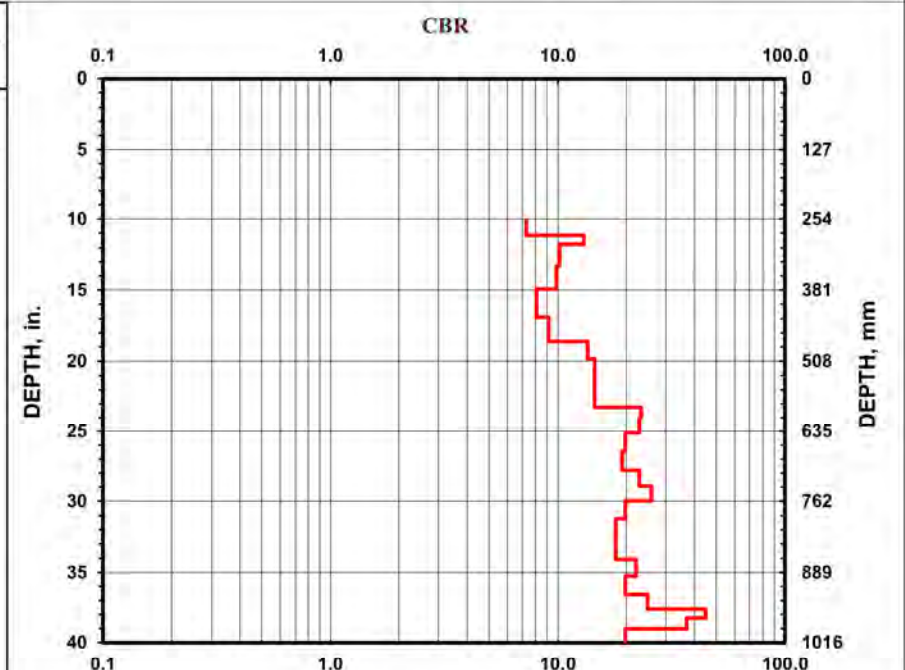
Project: US-421 Superstreet Wilkes Co.
Location: L_28+01_30LT

Date: 7-Mar-18
Soil Type(s): Clay (A-6)

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
0	256	1
1	283	1
1	299	1
2	339	1
2	380	1
2	429	1
2	473	1
2	504	1
2	533	1
2	562	1
2	591	1
2	610	1
3	639	1
3	672	1
3	706	1
3	735	1
3	761	1
3	794	1
3	830	1
3	866	1
3	896	1
3	929	1
3	956	1
3	972	1
3	991	1
5	1046	1
5	1105	1
3	1139	1
3	1168	1
2	1183	1
1	1191	1
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		1



DCP TEST DATA

File Name: G17038

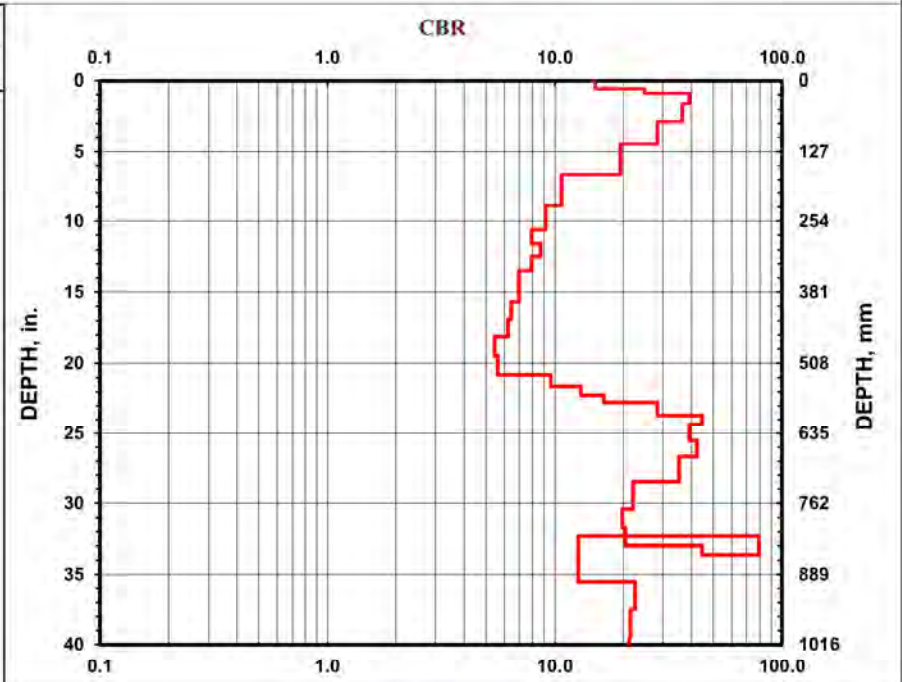
Project: US-421 Superstreet Wilkes Co.
 Location: L_70+01_7RT

Date: 5-Mar-18
 Soil Type(s): Silt (A-4)

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
0	0	1
1	14	1
1	23	1
3	41	1
5	73	1
5	113	1
5	169	1
3	226	1
2	270	1
1	295	1
1	318	1
1	343	1
1	371	1
1	399	1
1	429	1
1	460	1
1	495	1
1	529	1
1	550	1
1	566	1
1	579	1
3	603	1
3	619	1
5	649	1
5	677	1
7	723	1
5	773	1
3	806	1
3	838	1
3	854	1
5	821	1
5	903	1
5	952	1
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File Name: G17038

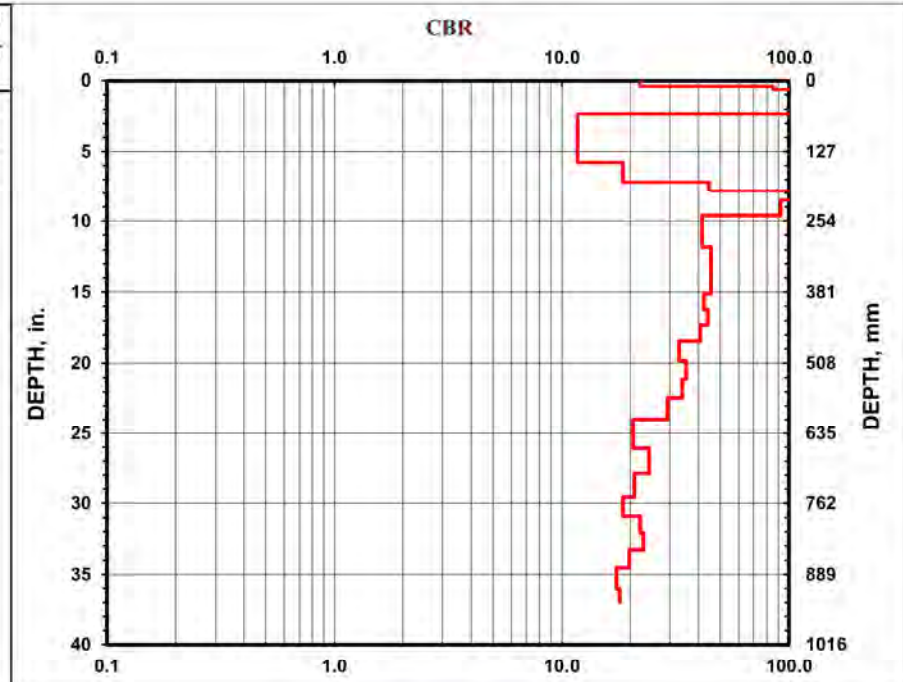
Project: US-421 Superstreet Wilkes Co.
 Location: L_77+98_25RT

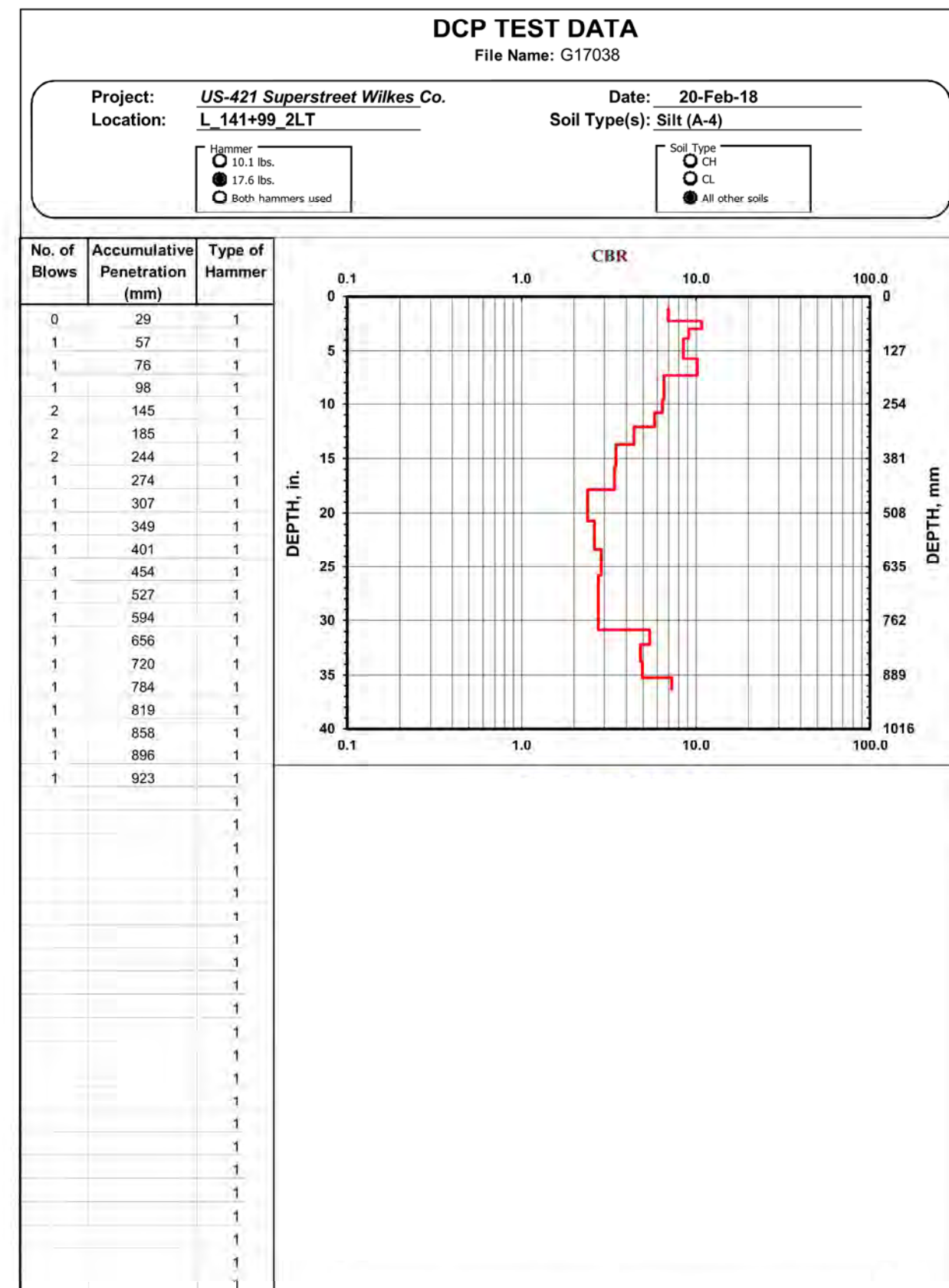
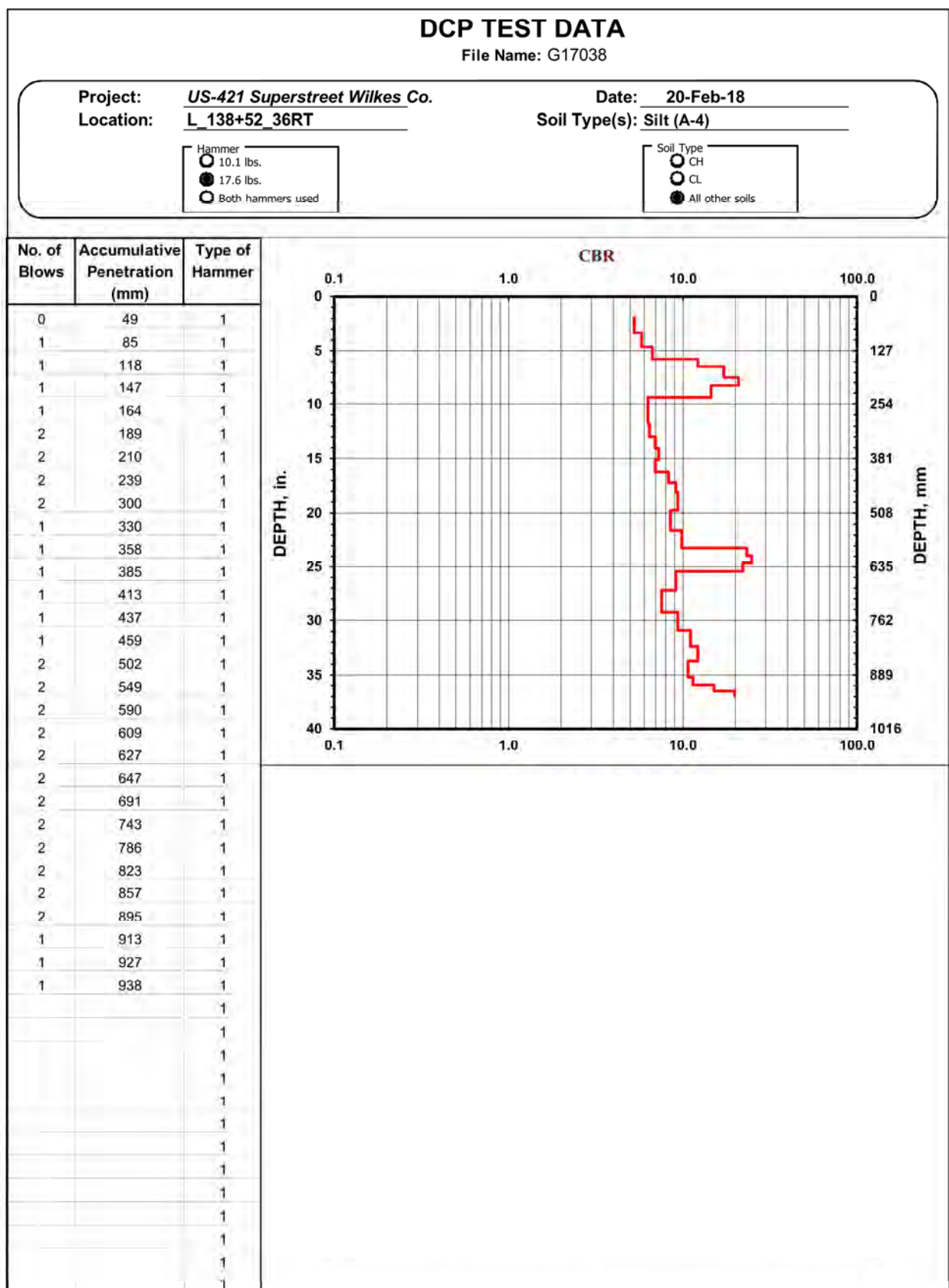
Date: 5-Mar-18
 Soil Type(s): Clay (A-6)

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
0	0	1
1	10	1
2	16	1
3	21	1
5	26	1
10	50	1
6	59	1
5	147	1
3	182	1
3	198	1
3	205	1
5	216	1
10	244	1
10	301	1
8	343	1
8	385	1
5	413	1
5	440	1
5	469	1
5	504	1
5	537	1
5	571	1
5	610	1
5	663	1
5	709	1
4	751	1
3	786	1
3	816	1
3	845	1
3	878	1
3	915	1
1	927	1
1	939	1
		1
		1
		1
		1
		1
		1





U-5312

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

REFERENCE: U-5732

PROJECT: 45446

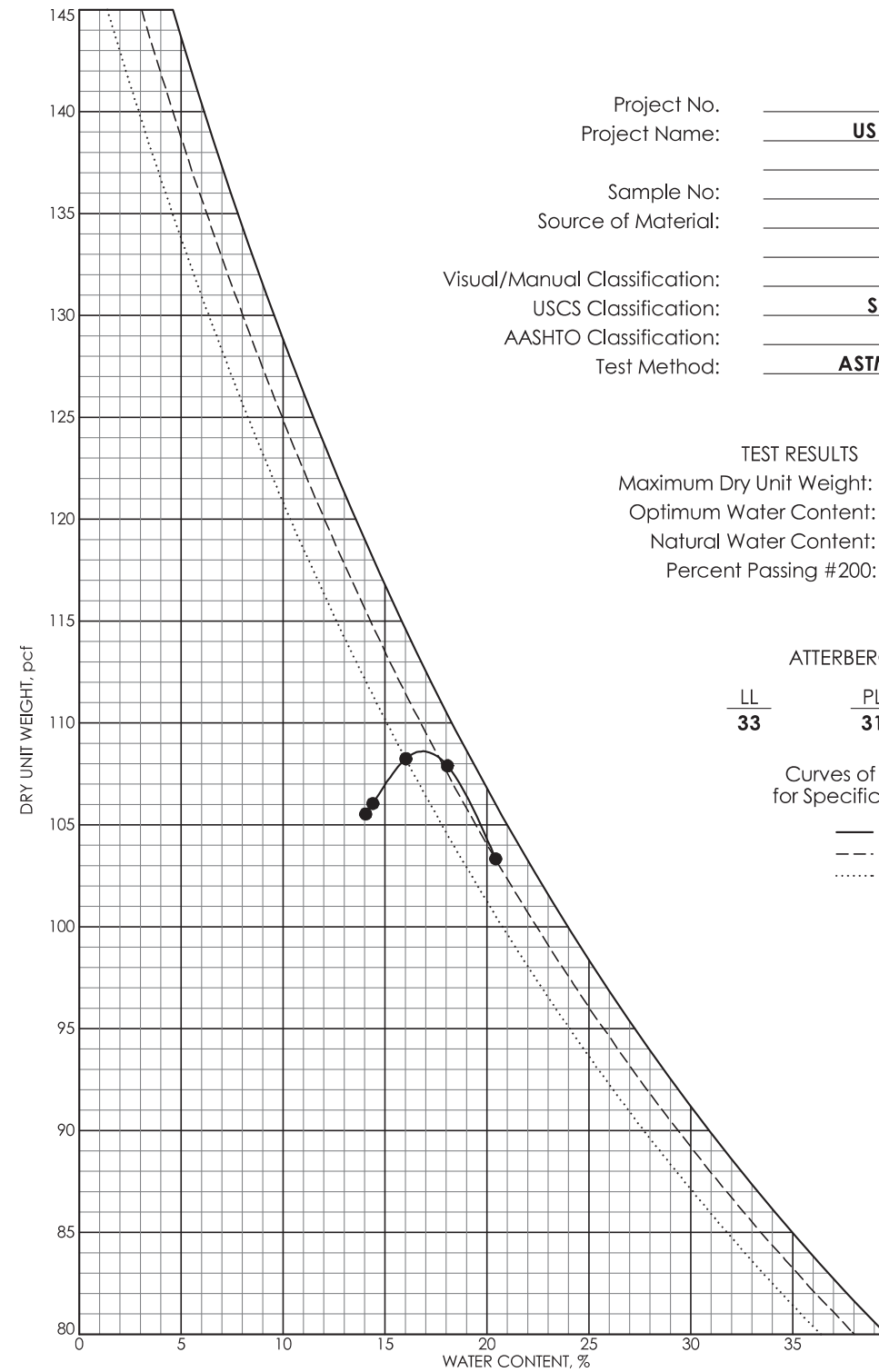
DS	
<i>WSH</i>	10/7/2021
INITIALS	DATE



FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
www.falconengineers.com

LABORATORY COMPACTION TEST RESULTS

5/16/2018



Project No. G17038.00
Project Name: US 421 Superstreet
Sample No. BS-1
Source of Material: B-16 AP-4
Visual/Manual Classification: _____
USCS Classification: SANDY SILT(ML)
AASHTO Classification: A-4
Test Method: ASTM D698 Method B

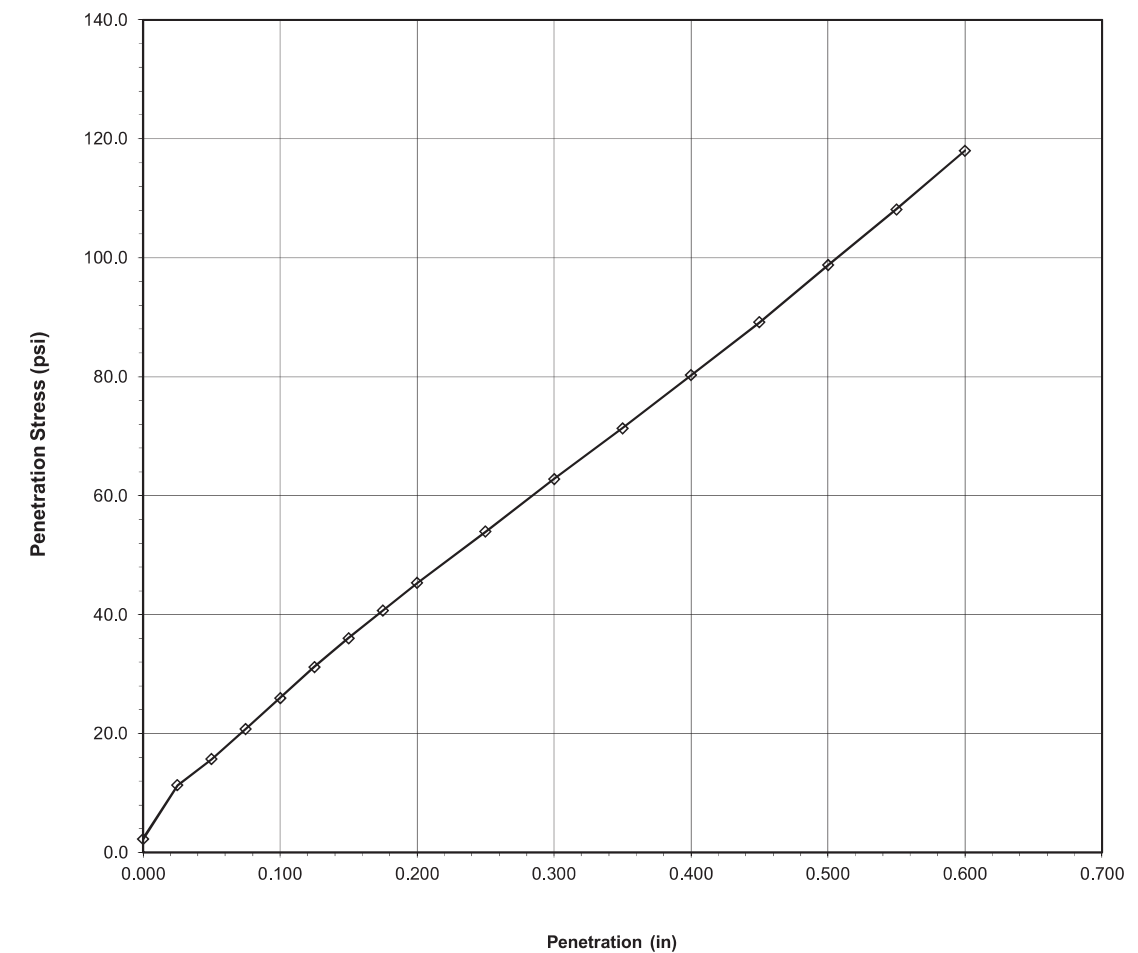
SINGLE POINT CBR TEST

ASTM D 1883-16

Client	Falcon Engineering	Boring No.	B-16 AP-A
Client Reference	G17038.00	Depth(ft.)	3.5-8.5
Project No.	R-2018-136-001	Sample No.	BS-1
Lab ID	R-2018-136-001-001	Visual Description	BROWN SANDY CLAY

CBR VALUE (0.1") **2.6 %**
CBR VALUE (0.2") **3.0 %**

Penetration Stress vs. Penetration



Tested By APG Date 5/17/18 Approved By MPS Date 5/22/18



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LABORATORY COMPACTION TEST RESULTS

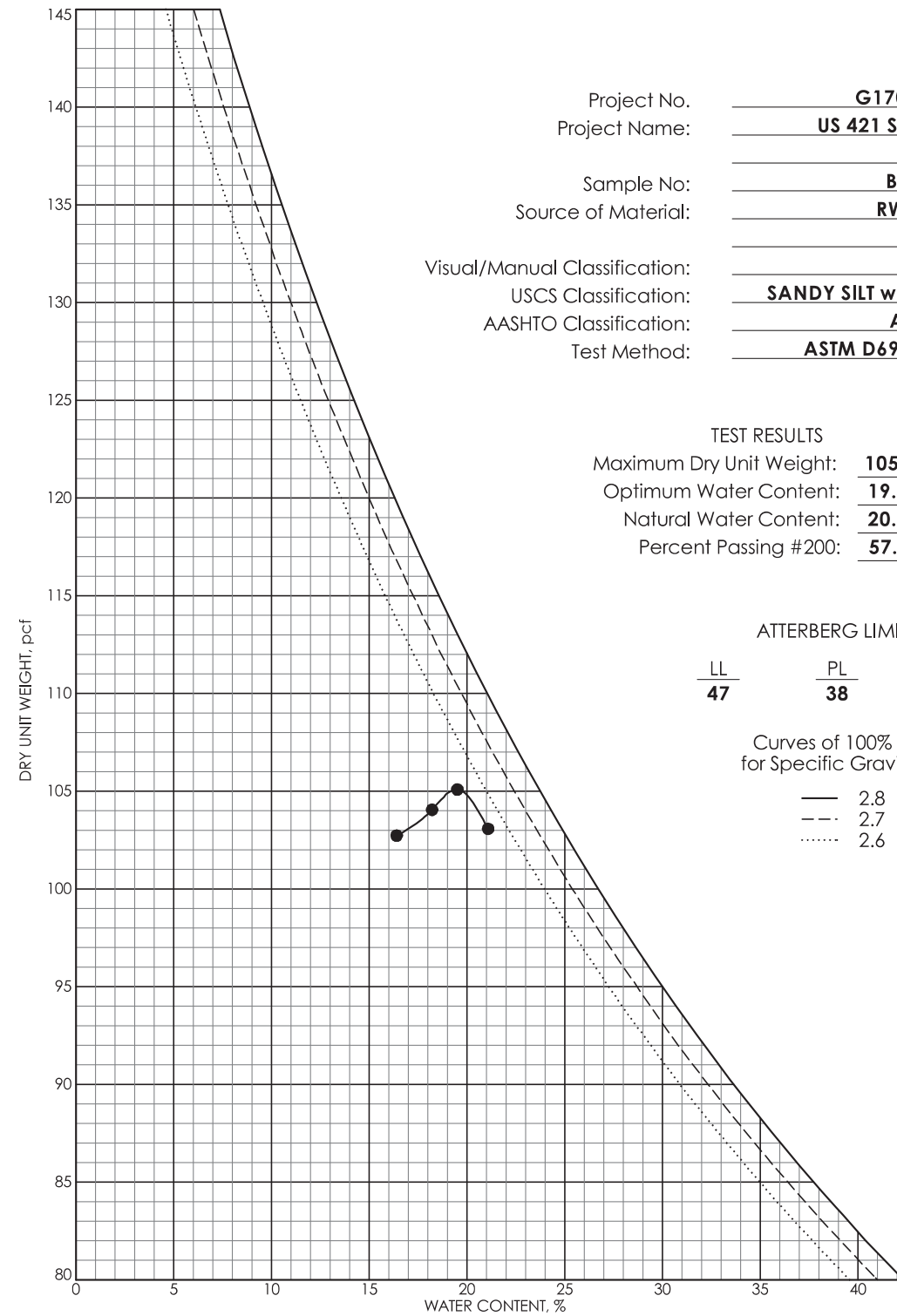
5/16/2018



SINGLE POINT CBR TEST
ASTM D 1883-16

Client	Falcon Engineering	Boring No.	RW1-3
Client Reference	G17038.00	Depth(ft.)	18.5-31.5
Project No.	R-2018-136-001	Sample No.	BS-2
Lab ID	R-2018-136-001-002	Visual Description	RED/BROWN SANDY CLAY

CBR VALUE (0.1")	4.4 %
CBR VALUE (0.2")	5.7 %
CORRECTED CBR VALUE (0.1")	4.9 %
CORRECTED CBR VALUE (0.2")	5.9 %



Project No. G17038.00
Project Name: US 421 Superstreet
Sample No. BS-2
Source of Material: RW1-3
Visual/Manual Classification: _____
USCS Classification: SANDY SILT with GRAVEL(ML)
AASHTO Classification: A-5
Test Method: ASTM D698 Method B

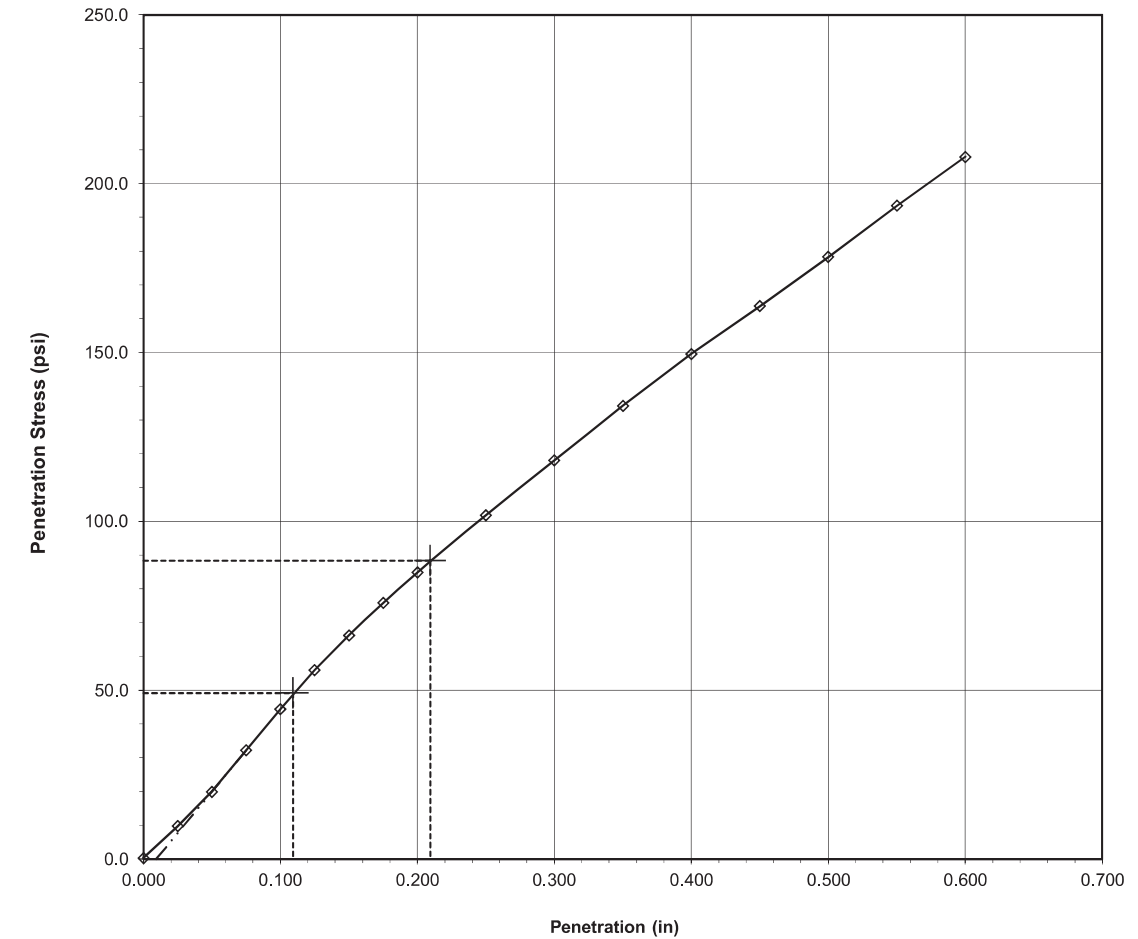
TEST RESULTS
Maximum Dry Unit Weight: 105.1 PCF
Optimum Water Content: 19.5 %
Natural Water Content: 20.9 %
Percent Passing #200: 57.6 %

ATTERBERG LIMITS

LL	PL	PI
<u>47</u>	<u>38</u>	<u>9</u>

Curves of 100% Saturation
for Specific Gravity Equal to:
— 2.8
- - - 2.7
..... 2.6

Penetration Stress vs. Penetration



Tested By APG Date 5/17/18 Approved By MPS Date 5/22/18