5906

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**DESCRIPTION** 

LEGEND (SOIL & ROCK)

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STATE OF NORTH CAROLINA

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

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY MECKLENBURG

PROJECT DESCRIPTION TORRENCE CHAPEL ROAD / CATAWBA AVENUE INTERSECTION & SURROUNDING AREA IMPROVEMENTS

SITE DESCRIPTION <u>RETAINING</u> WALLS -RW1-, -RW2-, -RW3-, -RW4-, AND -RW5STATE PROJECT REFERENCE NO. U-5906

#### **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 INN-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 NDICATED 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 INTERRETATIONS 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 HINSELF AS TO CONDITIONS TO BE ENCOUNTERED OF 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.

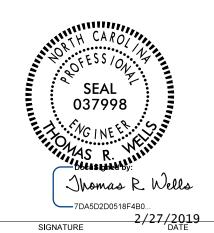
C. DRISCOLL TRIGON EXPLORATION INVESTIGATED BY <u>C. DRISCOLL</u> DRAWN BY \_ C. DRISCOLL CHECKED BY \_T. WELLS

Prepared in the Office of:

DATE \_FEBRUARY 2019

SUBMITTED BY KLEINFELDER, INC

KLEINFELDER Bright People, Right Solution Bright People, Right Solutions.
7343 WEST FRIENDLY AVE. SUITE B
GREENSBORO, NORTH CAROLINA 27410
NC ENGINEERING FIRM LICENSE NO. F-1312



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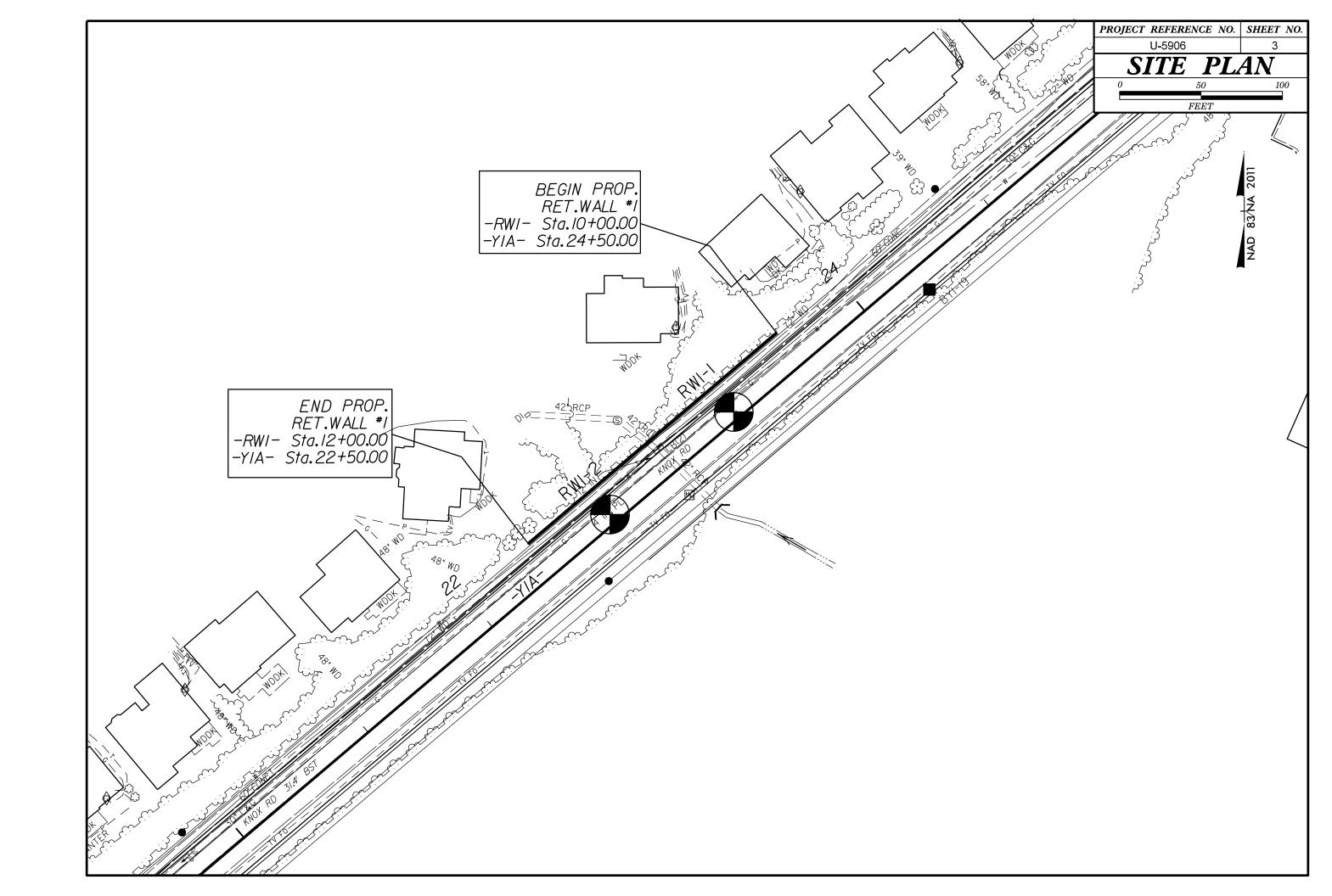
PROJECT REPERENCE NO. SHEET NO. 2

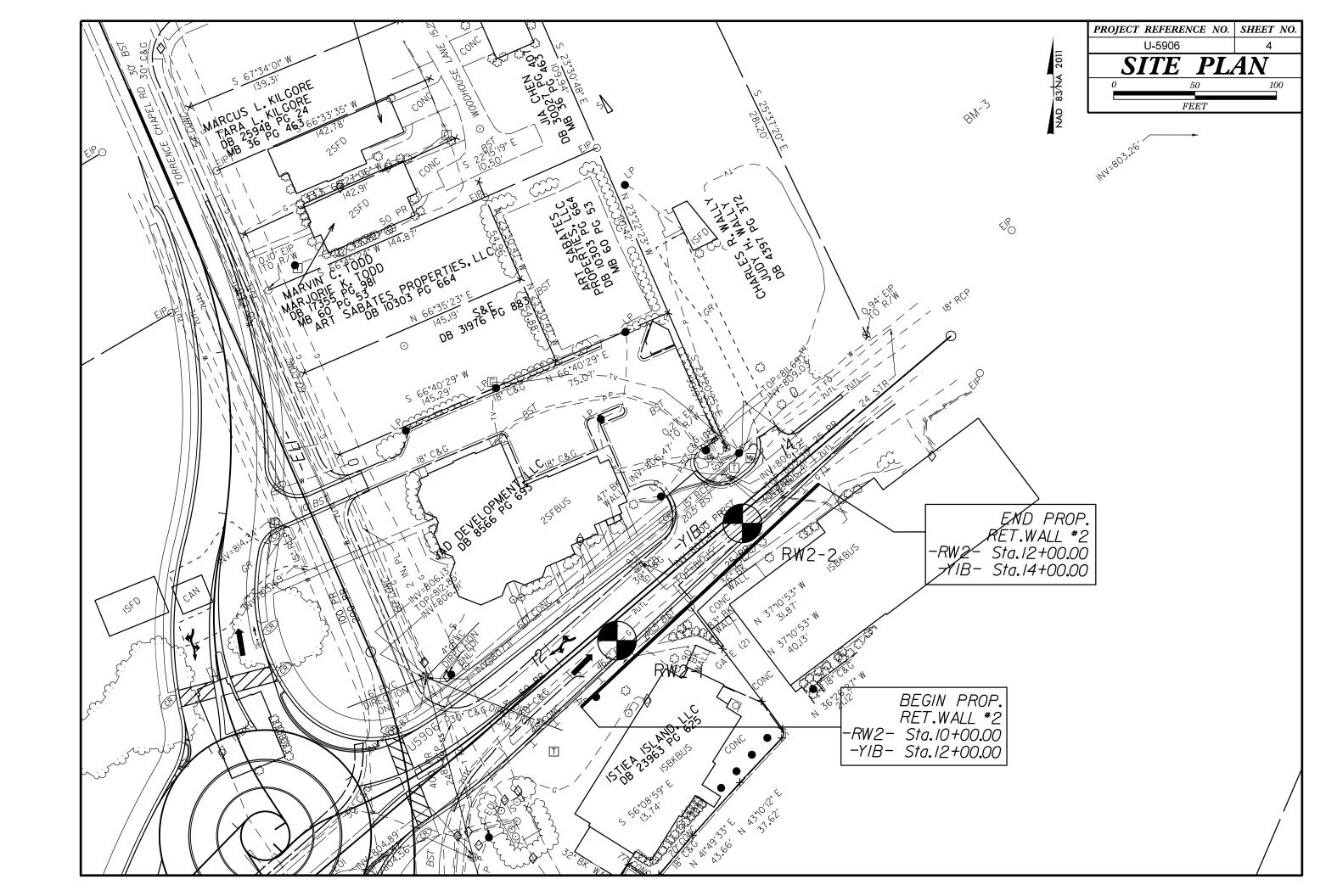
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

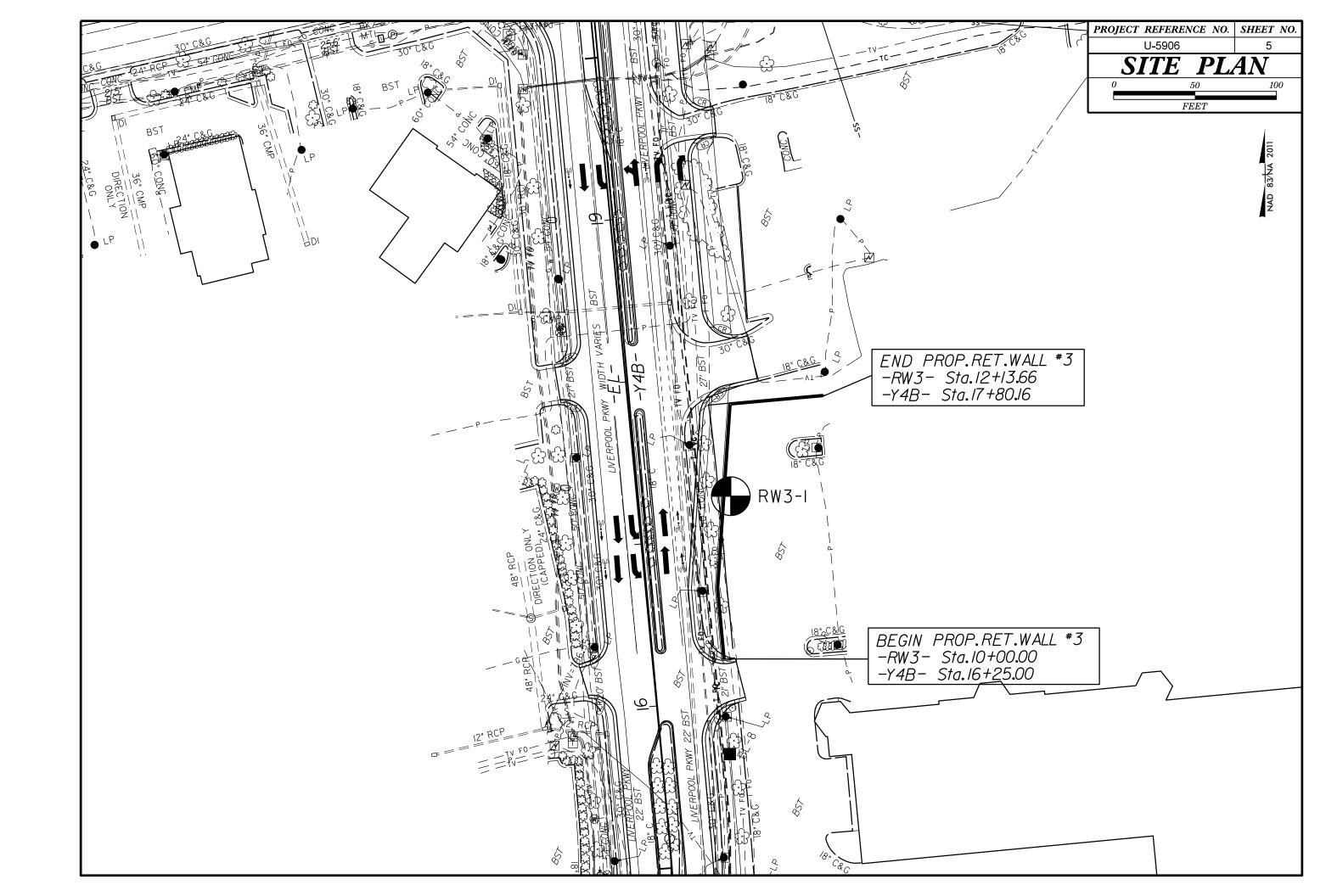
# SUBSURFACE INVESTIGATION

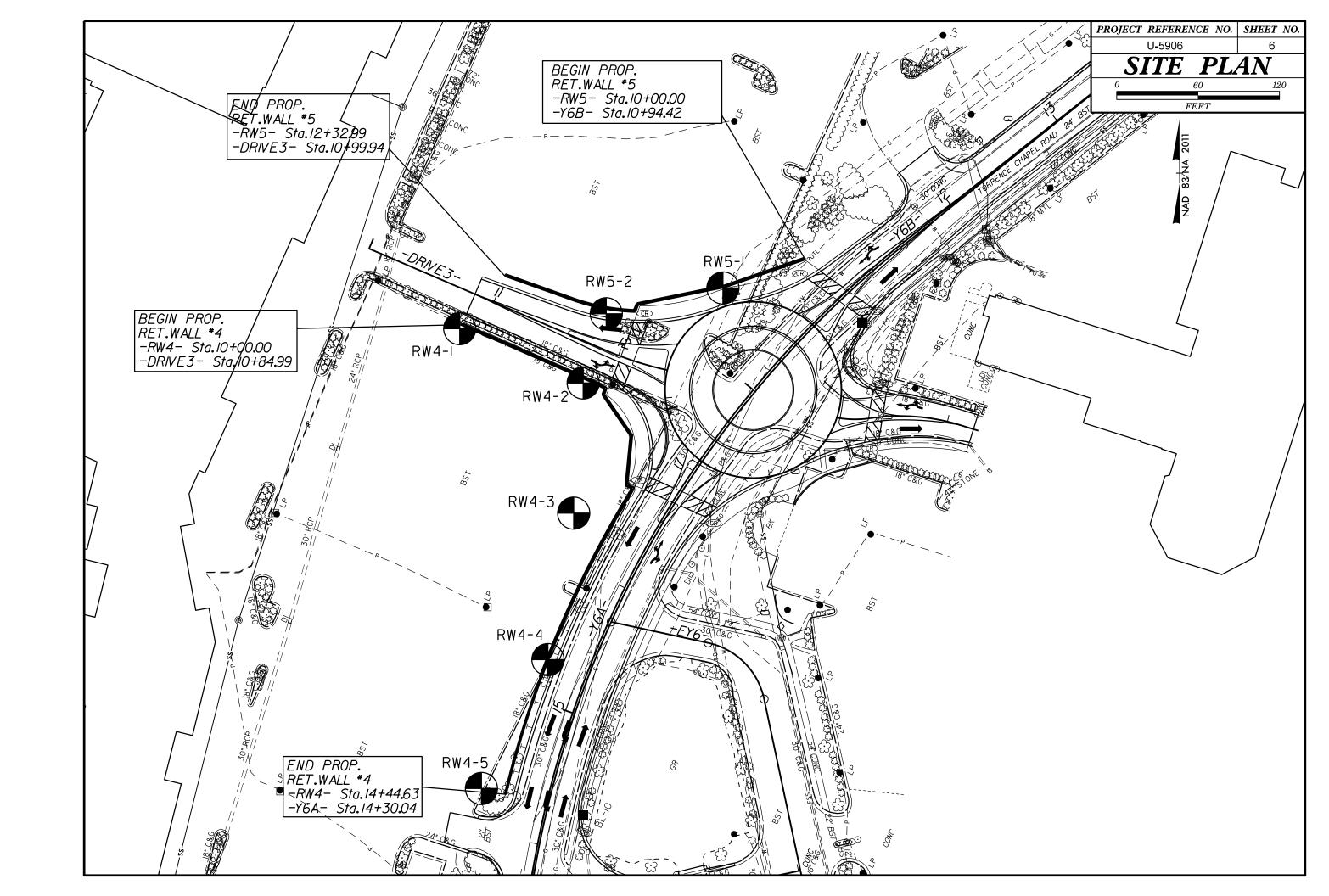
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

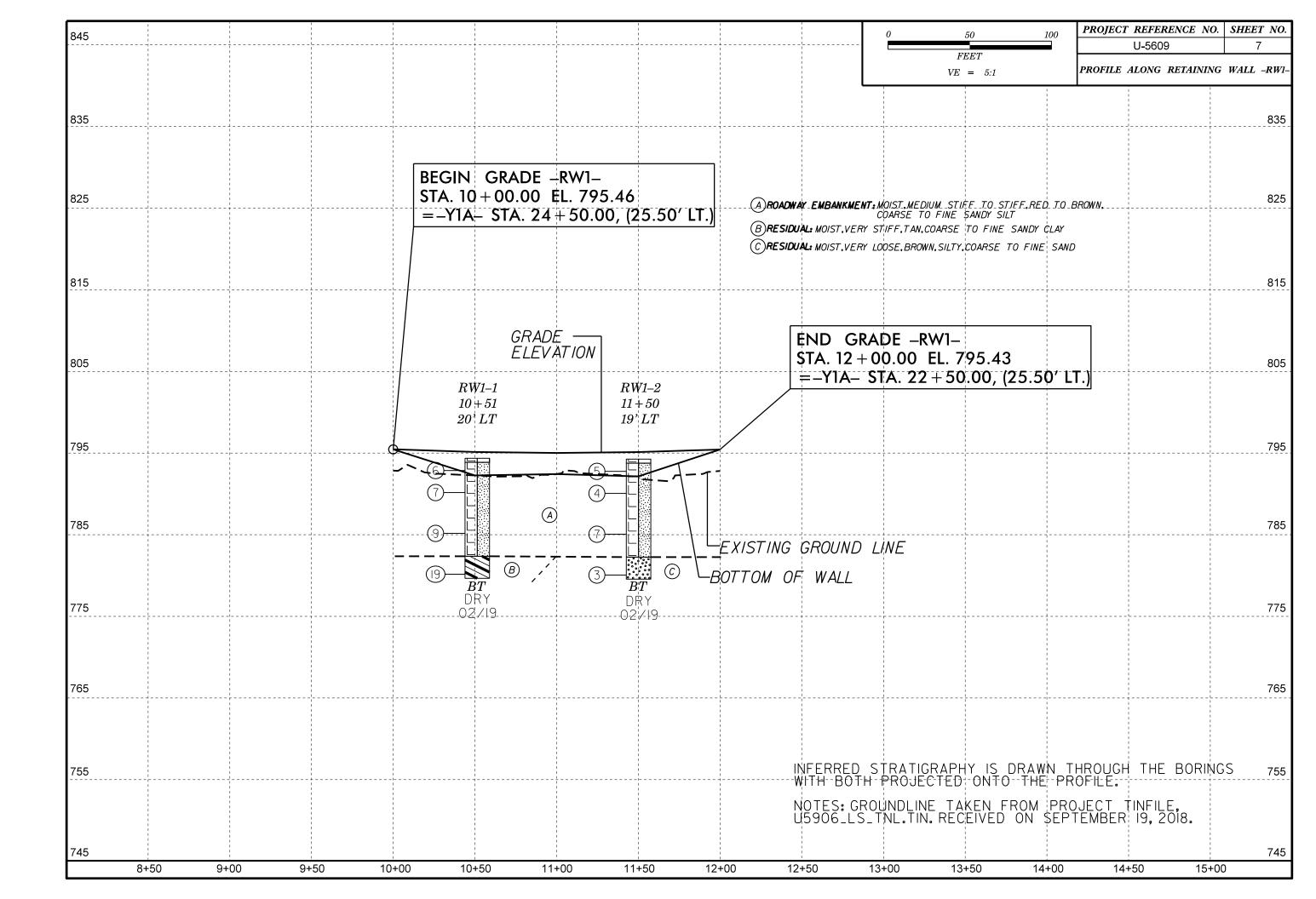
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS				
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.				
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.				
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.				
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	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HA				
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED VIOLOUS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	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 LEVI				
CENEDAL CDANIII AD MATEDIAI C CILTCLAY MATEDIAI C	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN IGNEOUS AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND				
CLASS. (≤ 35% PASSING *200) (> 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.	CRYSTALLINE ROCK (CR)  WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, CNEISS, GABBRO, SCHIST, ETC.	SURFACE.				
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-2-6 A-2-7 A-3 A-6, A-7	COMPRESSIBILITY	NON COVETAL INF. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM				
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.				
	MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED				
7. PASSING GRANULAR SILT- MUCK, GRANULAR CI AY MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	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				
*40 30 MX 50 MX 51 MN   PEAT   200   15 MX 25 MX   10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN   SOILS   CLAT   PEAT   SOILS   CLAT   PEAT   PEAT	GRANULAR SILT - CLAY	WEATHERING	ROCKS OR CUTS MASSIVE ROCK.				
MATERIAL	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL  TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE				
PASSING *40	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.				
LL   -   -   40 MX   41 MN   40 MX   41 MN   40 MX   41 MN   40 MX   41 MN   LITTLE OR HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.				
CROUP INDEX A A A A MY 8 MY 12 MY 16 MY NO MY AMOUNTS OF	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE				
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.				
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM				
CEN PATING		(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.				
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.				
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.				
CONSISTENCY OR DENSENESS  RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.				
PRIMARY SOIL TYPE COMPACIATES OF PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO				
(N-VALUE) (TUNS/FT <sup>-</sup> )	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.				
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL  Oper Date TEST BORING  SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	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				
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF  VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.				
(NON-COHESIVE) VERY DENSE > 50	TITHIN ROHOWHT EMBHINKMENT \$\(\frac{1}{2}\)	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE				
VERY SOFT         < 2         < 0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.				
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE  MONITORING WELL  TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF				
MATERIAL   STIFF   8 TO 15   1 TO 2	A ALLINIAL COLL BOUNDARY A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE				
HARD > 30 > 4	INSTREATION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT				
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	ROCK,				
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	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	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				
COADCE	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.				
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	UNDERCOT LESS ACCEPTABLE DEGRAPABLE NOCK	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT				
(CSE, SU.) (F SU.)	ABBREVIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF				
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL				
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY  MOD MODERATELY  7 - UNIT WEIGHT  CPT - CONE PENETRATION TEST  NP - NON PLASTIC  7 - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.				
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY				
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTONE DESCRIPTION	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS  DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.				
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH	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				
LL LIQUID LIMIT	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.				
PLASTIC   SEMISOLID: REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING					
(PI) PLASTIC LIMITATTAIN OPTIMUM MOISTURE	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: N/A				
ON CONTINUE MOIST - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: N/A FEET				
OM _ OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED Ø.16 - 1.5 FEET	NOTES:				
- DRY - (D) REQUIRES ADDITIONAL WATER TO	CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET					
- URY - (U) ATTAIN OPTIMUM MOISTURE	X CME-55 CORE SIZE:	THINLY LAMINATED < 0.008 FEET	BORING ELEVATIONS OBTAINED FROM PROJECT TIN FILE u5906_is_tni.tin, recieved on september 19, 2018.				
PLASTICITY	X 8' HULLOW AUGERS   L-B L-H	INDURATION	FIAD- FILLED IMMEDIATELY AFTER DRILLING				
PLASTICITY INDEX (PI) DRY STRENGTH	HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  RUBBING WITH FINGER FREES NUMEROUS GRAINS;					
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST TUNG,-CARBIDE INSERTS HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.					
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:					
COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.					
COLON	TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.					
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.	CORE BIT VANE SHEAR TEST	SHARP HAMMER BLOWS REGULDED TO RREAK SAMPLE.					
HOST ILMS SUCH AS LIGHT, DANK, STILLARED, ETC. HAE USED TO DESCRIBE HEFEHRANCE.		EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-14				

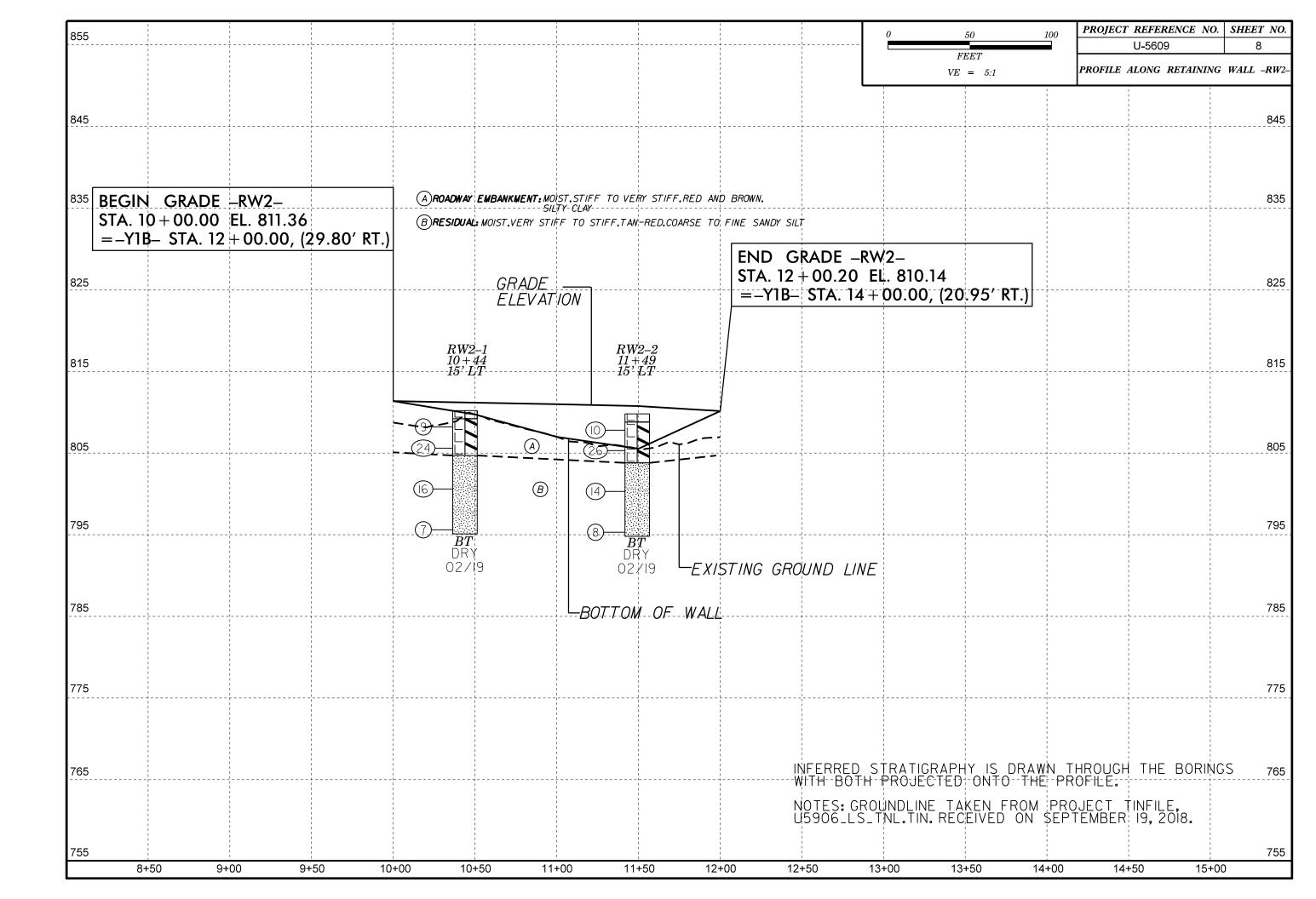


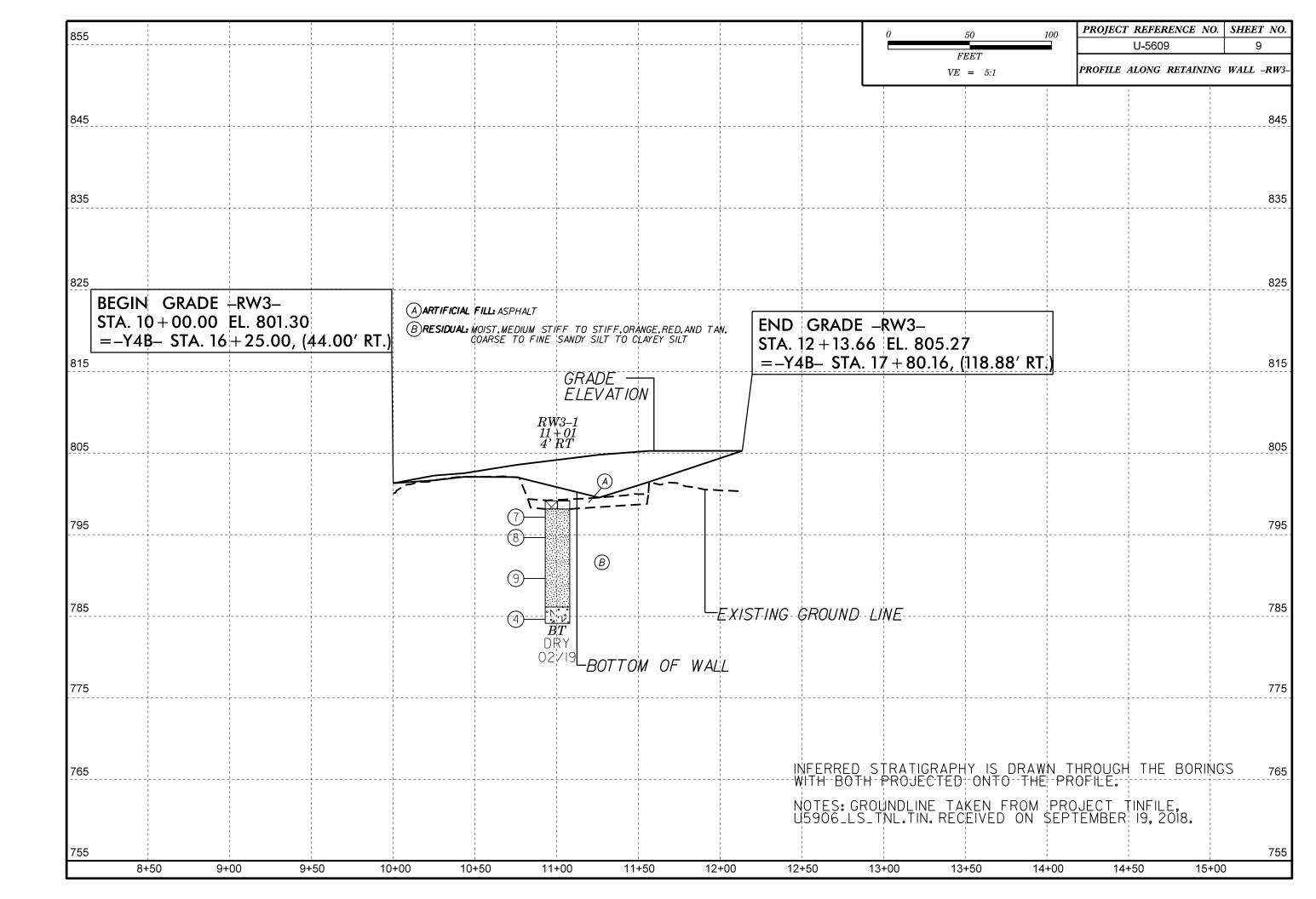


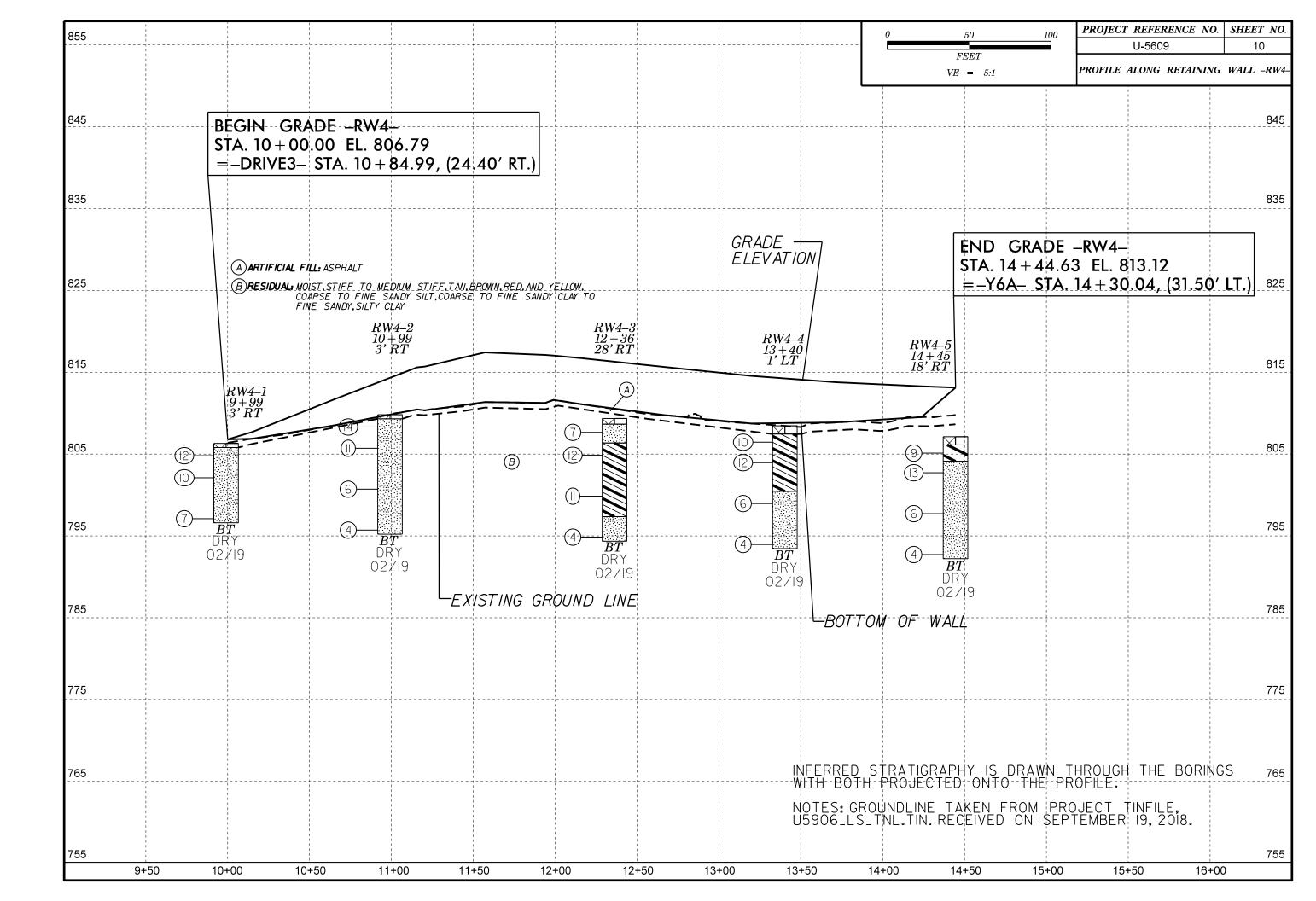


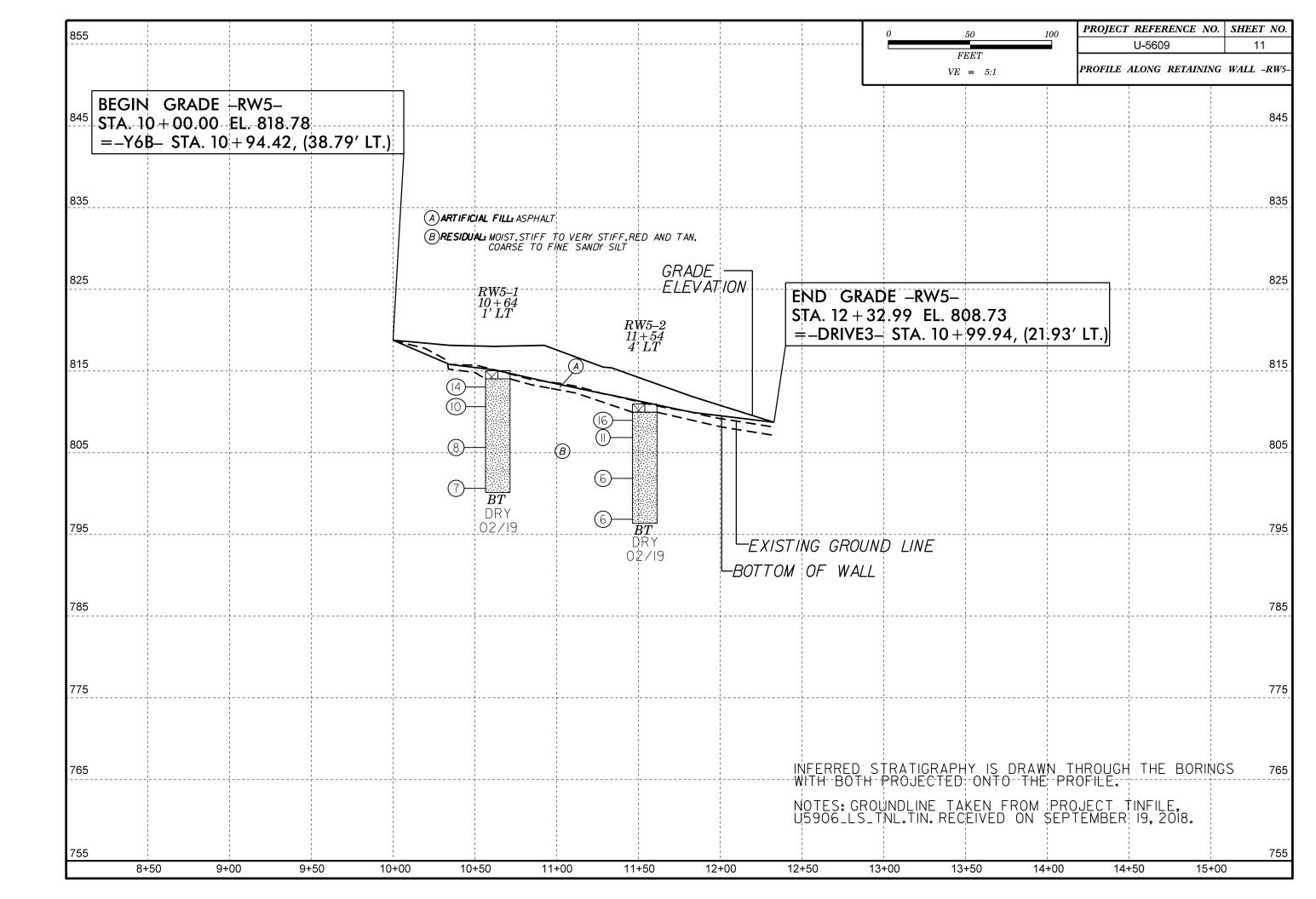




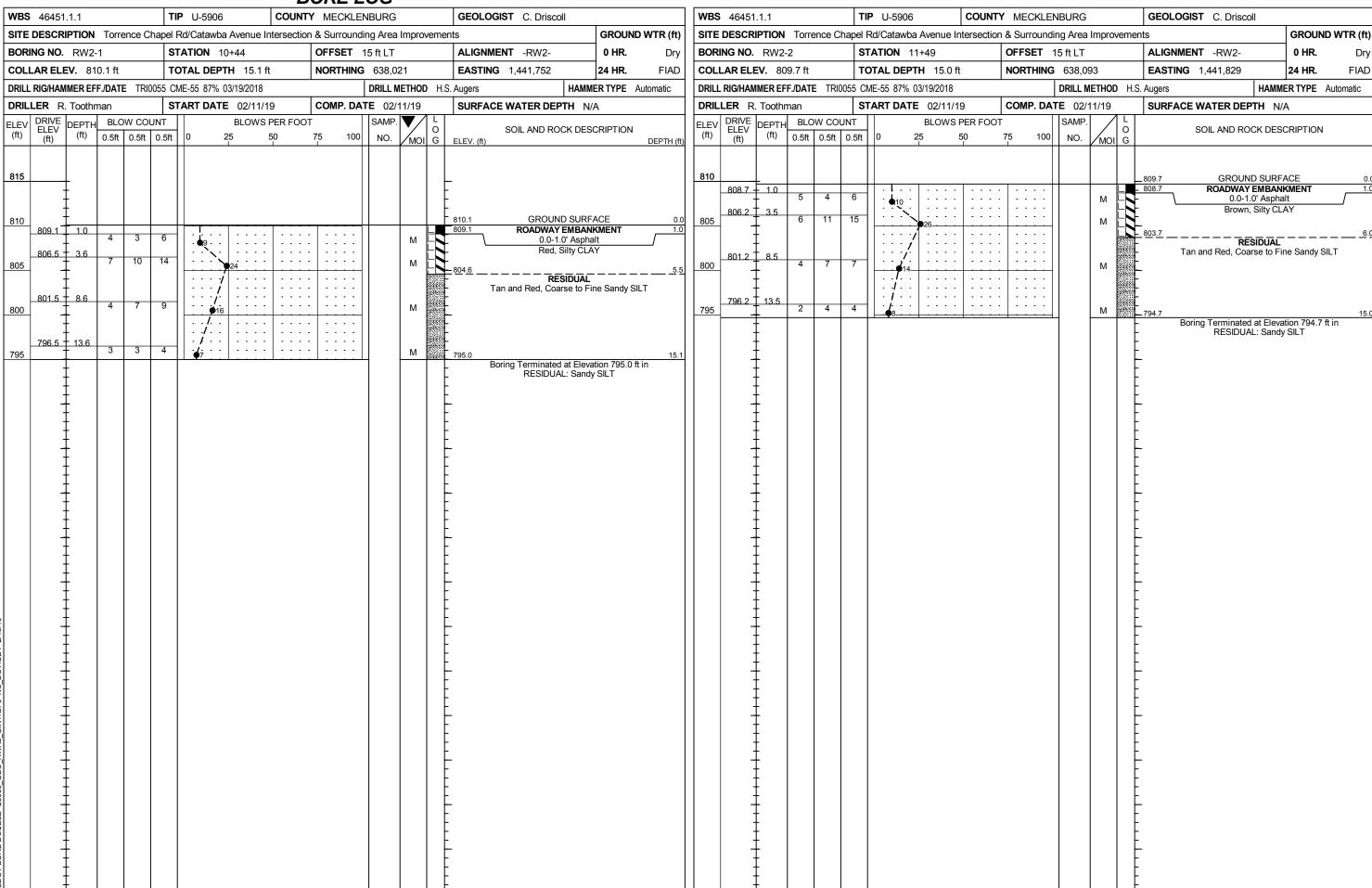








BORE LOG						
WBS 46451.1.1 TIP U-5906 COUNTY MECKLENBURG	GEOLOGIST C. Driscoll	<b>WBS</b> 46451.1.1	TIP U-5906 COUN	TY MECKLENBURG	GEOLOGIST C. Driscoll	
SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Intersection & Surrounding Area Improvements	GROUND WTR (ft)	SITE DESCRIPTION Torrence Cha	apel Rd/Catawba Avenue Intersection	<u> </u>	ents	UND WTR (ft)
BORING NO. RW1-1 STATION 10+51 OFFSET 20 ft LT	ALIGNMENT -RW1- 0 HR. Dry	BORING NO. RW1-2	STATION 11+50	OFFSET 19 ft LT	ALIGNMENT -RW1- 0 H	R. Dry
COLLAR ELEV.         794.3 ft         TOTAL DEPTH         14.7 ft         NORTHING         636,772	<b>EASTING</b> 1,440,259 <b>24 HR.</b> FIAD	COLLAR ELEV. 794.2 ft	TOTAL DEPTH 14.7 ft	<b>NORTHING</b> 636,709	<b>EASTING</b> 1,440,183 <b>24 H</b>	R. FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018 DRILL METHOD H.S. A	ugers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI005	55 CME-55 87% 03/19/2018	DRILL METHOD H.	S. Augers HAMMER TYP	E Automatic
	SURFACE WATER DEPTH N/A	DRILLER R. Toothman	<b>START DATE</b> 02/11/19	COMP. DATE 02/11/19	SURFACE WATER DEPTH N/A	
ELEV (ft)   DRIVE   ELEV (ft)   O.5ft   O.5ft	SOIL AND ROCK DESCRIPTION  LEV. (ft) DEPTH (ft)	ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP	NT BLOWS PER FOO 0.5ft 0 25 50	OT SAMP. L O NO. MOI G	SOIL AND ROCK DESCRIPT	ON
795	ground surface 9,9	795			T84.2 GROUND SURFACE	0.0
790  791.1 3.2 3 4 3  785  786.1 8.2 3 3 6  787  788.1 13.2 6 9 10	ROADWAY EMBANKMENT 0.0-0.5' Asphalt Red and Brown, Coarse to Fine Sandy SILT  RESIDUAL 79.6 Tan, Coarse to Fine Sandy CLAY Boring Terminated at Elevation 779.6 ft in RESIDUAL: Sandy CLAY	790 791.0 3.2 2 2 2 785 786.0 8.2 2 3 781.0 13.2	2 4 7	M	ROADWAY EMBANKMENT 0.0-0.5' Asphalt Red and Brown, Coarse to Fine Sa  RESIDUAL Brown, Silty Fine to Coarse SA  Boring Terminated at Elevation 77 RESIDUAL: Silty SAND	ndy SILT 12.0
NCDOT BORE DOUBLE USSOG_GEO_RWAL_GINT.GPJ NC_DOT.GDT 2/19/19						



SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Intersection & Surrounding Area Improvements  GROUND WTR (ft)  BORING NO. RW3-1  STATION 11+01  OFFSET 4 ft RT  ALIGNMENT -RW3- OHR.  Dry  BORING NO. RW4-1  STATION 9+99  OFFSET 3 ft RT  ALIGNMENT -RW4- OHR.  COLLAR ELEV. 799.1 ft  TOTAL DEPTH 15.0 ft  NORTHING 635,659  EASTING 1,441,118  24 HR. FIAD	BORE LOG			1
BORING NO. RW3-1   STATION 11+01   OFFSET 4 ft RT   ALIGNMENT -RW3-   0 HR. DIV	WBS 46451.1.1 TIP U-5906 COUNTY MECKLENBURG			
COLLAR ELEV. 799.1 ft TOTAL DEPTH 15.0 ft NORTHING 635.859	SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Intersection & Surrounding Area Improvements	GROUND WTR (	t) SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Inter	
DRILL RIGHAMMER EFF.DATE   TRIO055 CME-55 87% 03/19/2018   DRILL METHOD   H.S. Augers   HAMMER TYPE   Automatic	BORING NO. RW3-1 STATION 11+01 OFFSET 4 ft RT	ALIGNMENT -RW3- 0 HR.	BORING NO. RW4-1 STATION 9+99	OFFSET 3 ft RT ALIGNMENT -RW4- 0 HR. D
DRILLER R. Toothmark   START DATE 02/12/19   COMP. DATE 02/11/19   SURFACE WATER DEPTH N/A	COLLAR ELEV.         799.1 ft         TOTAL DEPTH         15.0 ft         NORTHING         635,659	<b>EASTING</b> 1,441,118 <b>24 HR.</b> FIA	D COLLAR ELEV. 806.3 ft TOTAL DEPTH 9.7 ft	NORTHING 636,810 EASTING 1,440,964 24 HR. FIA
Control   Cont	DRILL RIG/HAMMER EFF./DATE   TRI0055 CME-55 87% 03/19/2018   DRILL METHOD   H.S. A	Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018	DRILL METHOD H.S. Augers HAMMER TYPE Automatic
RELEV   (ft)   0.5ft   0.5ft		SURFACE WATER DEPTH N/A		COMP. DATE 02/11/19 SURFACE WATER DEPTH N/A
798.1 1.0 3 3 3 4 7 7	(#) ELEV (#) 0			SOIL AND ROCK DESCRIPTION
790 790.6 - 8.5	798.1 1.0 3 3 4 7	98.1 ARTIFICIAL FILL 0.0-1.0' Asphalt  RESIDUAL Orange and Tan, Coarse to Fine Sandy	805.8 = 0.5	ARTIFICIAL FILL
Red to Tan, Clayey SILT  Residual: Sandy SILT  Residual: Sandy SILT  Residual: Sandy SILT  Residual: Sandy SILT	790 790.6 8.5 2 4 5 99	SILT	800 798.1 8.2 2 3 4	RESIDUAL Tan and Brown, Coarse to Fine Sandy SILT  M 796.6
	785 785.6 + 13.5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Red to Tan, Clayey SILT  84.1  Boring Terminated at Elevation 784.1 ft in	3.0	M     796.6

BORE LOG						
WBS 46451.1.1 TIP U-5906 COUNTY MECKLENBURG	GEOLOGIST C. Driscoll	<b>WBS</b> 46451.1.1	TIP U-5906 COUN	TY MECKLENBURG	GEOLOGIST C. Driscoll	
SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Intersection & Surrounding Area Impro	ements GROUND WTR (ft)	SITE DESCRIPTION Torrence Cha	napel Rd/Catawba Avenue Intersection	on & Surrounding Area Improveme	nts GROUND	WTR (ft)
BORING NO. RW4-2 STATION 10+99 OFFSET 3 ft RT	ALIGNMENT -RW4- 0 HR. Dry	BORING NO. RW4-3	STATION 12+36	OFFSET 28 ft RT	ALIGNMENT -RW4- 0 HR.	Dry
COLLAR ELEV.         809.8 ft         TOTAL DEPTH         14.6 ft         NORTHING         636,770	<b>EASTING</b> 1,441,055 <b>24 HR.</b> FIAD	COLLAR ELEV. 809.3 ft	TOTAL DEPTH 15.0 ft	<b>NORTHING</b> 636,674	<b>EASTING</b> 1,441,048 <b>24 HR.</b>	FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018 DRILL METHOL	H.S. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI00	055 CME-55 87% 03/19/2018	DRILL METHOD H.S	S. Augers HAMMER TYPE A	Automatic
DRILLER R. Toothman START DATE 02/11/19 COMP. DATE 02/11/19	SURFACE WATER DEPTH N/A	DRILLER R. Toothman	<b>START DATE</b> 02/11/19	COMP. DATE 02/11/19	SURFACE WATER DEPTH N/A	
ELEV (ft)   DRIVE   ELEV (ft)   O.5ft   O.5ft	C SOIL AND ROCK DESCRIPTION  G ELEV. (ft)  DEPTH (ft)	ELEV (ft) DEPTH BLOW COUNTY (ft) 0.5ft 0.5ft (	0.5ft 0 25 50	OT SAMP.   L O NO.   MOI G	SOIL AND ROCK DESCRIPTION	
810 809.3 0.5 4 6 6 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	809.8 GROUND SURFACE 0.0809.3 ARTIFICIAL FILL0.5				-809.3 GROUND SURFACE	0.0
	ARTIFICIAL FILL 0.5 0.0-0.5' Asphalt RESIDUAL	805 8 - 3.5 3 4 805 8 - 3.5 3 4 800 8 - 8.5 4 4	3	M M	RESIDUAL  Brown and Tan, Coarse to Fine Sandy S  Brown and Tan, Coarse to Fine Sandy S  Brown Sandy SILT  Brown Sandy SILT  Brown and Tan, Coarse to Fine Sandy SILT	12.0_ SILT 15.0
					- - - - - -	

								_		RE																														
WBS 4						U-5906					ENBUR				GIST C. [	Oriscoll					4645					P U-59				ry MEC					EOLOGIS	ST C. Dris	coll			
SITE DI	ESCRI	PTION	Torre	ence C	<del>-i</del>	d/Catawb		Interse				a Impro					GRO	UND W	TR (ft)	SITE	DESCF	RIPTION	Torre	ence C	<del></del>				tersection			ng Area In	nprove					GROU	IND WT	R (ft)
BORING					ST	ATION 1	3+40			FFSET				ALIGNM	ENT -RV	V4-	0 HF		Dry		ING NO					TATION				OFFS				Al	LIGNME	<b>NT</b> -RW4-		0 HR		Dry
COLLA	R ELE	<b>V</b> . 80	8.4 ft		то	TAL DEP	<b>TH</b> 15.0	O ft	N	ORTHIN	<b>G</b> 636,				3 1,441,0		24 HF		FIAD	COL	LAR EL	<b>EV</b> . 80	7.1 ft		TC	OTAL DE	PTH	14.9 ft		NORT		636,471				1,440,980		24 HR		FIAD
DRILL RI	IG/HAM	MER EF	F./DATI	E TRIC		E-55 87%						METHO	) H.S. A	Augers		HA	MMER TYP	PE Autor	matic	DRILI	L RIG/HAI	MMER EF	F./DATE	E TRIC		ME-55 87°						DRILL ME		H.S. Aug	jers		HAM	MER TYPE	Autom	atic
DRILLE						ART DAT				OMP. D	ATE 02		<del></del>	SURFAC	E WATER	R DEPTH	N/A				LER F					ART DA						<b>E</b> 02/11	/19	SI	JRFACE	WATER D	EPTH N	N/A		
ELEV (ft)	ORIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	JNT 0.5ft	0	BLOW 25	S PER F	FOOT 75	10		MOI	0	ELEV. (ft)	SOIL AN	ID ROCK D	DESCRIPTION		DEPTH (ft)	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	UNT 0.5ft	0	8l 25		PER FOC	75 75	100	NO.	MOI	O G		SOIL AND F	ROCK DE	SCRIPTIC	N	
810 805 g	307.4 304.9	•	2	4	6	10 .						М		308.4 307.4		ROUND SL ARTIFICIAI 0.0-1.0' As RESIDU	L FILL sphalt AL		0.0	810 805		1.0	2	4	5	9							М	807	.1	<b>AR</b> 7 0.0	JND SUR <b>TFICIAL I</b> -1.0' Aspl	FILL halt		0.0
800 7	†	•	3	5	7	12:		-				M		800.4	Yellow and	CLAY	,		8.0	800		+ 3.4 + + +	4	6	7	. \\ \cdot \cdot \\ \cdot \\ \cdot \cdot \\ \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdo	3						М	804	1	Fovellow and Re	RESIDUA vn, Silty C d, Coarse SILT	L AY	i	3.0_
795 7	+	•	2	3	2	•6· · · · · · · · · · · · · · · · · · ·						M		793.4	in and Brow			•	15.0	795	798.7	8.4 - 8.4 - 13.4	1	3		<b>9</b> 6							М							
	1						•	•					F	В	oring Term RES	inated at E SIDUAL: Sa	levation 79 andy SILT	3.4 ft in				<del>†</del> —	1	2	2	<b>•</b> 4 · ·					• •		М	792		ing Terminat	ed at Fle	vation 792	2 ft in	14.9
NCDOT BORE DOUBLE U5906_GEO_RWAL_GINT.GPJ NC_DOT.GDT 2/19/19																						<del></del>																		

BORE LOG					
WBS 46451.1.1 TIP U-5906 COUNTY MECKLENBURG	GEOLOGIST C. Driscoll	<b>WBS</b> 46451.1.1	TIP U-5906 COUNTY	MECKLENBURG	GEOLOGIST C. Driscoll
SITE DESCRIPTION Torrence Chapel Rd/Catawba Avenue Intersection & Surrounding Area Improvement	GROUND WTR (ft)	SITE DESCRIPTION Torrence Cha	apel Rd/Catawba Avenue Intersection &	Surrounding Area Improveme	ents GROUND WTR (ft)
BORING NO. RW5-1 STATION 10+64 OFFSET 1 ft LT	ALIGNMENT -RW5- 0 HR. Dry	BORING NO. RW5-2	STATION 11+54	OFFSET 4 ft LT	ALIGNMENT -RW5- 0 HR. Dry
COLLAR ELEV.         815.0 ft         TOTAL DEPTH         14.9 ft         NORTHING         636,840	<b>EASTING</b> 1,441,158 <b>24 HR.</b> FIAD	COLLAR ELEV. 810.9 ft	TOTAL DEPTH 14.6 ft	IORTHING 636,821	<b>EASTING</b> 1,441,072 <b>24 HR.</b> FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 03/19/2018 DRILL METHOD H.S. /	Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI00	055 CME-55 87% 03/19/2018	DRILL METHOD H.S	S. Augers HAMMER TYPE Automatic
	SURFACE WATER DEPTH N/A	DRILLER R. Toothman		COMP. DATE 02/12/19	SURFACE WATER DEPTH N/A
ELEV (ft)   DRIVE   DEPTH   BLOW COUNT     BLOWS PER FOOT   SAMP.   V   C   C   C   C   C   C   C   C   C	SOIL AND ROCK DESCRIPTION  ELEV. (ft) DEPTH (ft)	ELEV (ft) DEPTH BLOW COUP (ft) (ft) 0.5ft 0.5ft (	NT BLOWS PER FOOT 0.5ft 0 25 50 75	5 100 SAMP. CONTROL OF MOI G	SOIL AND ROCK DESCRIPTION
814.0 1.0	315.0 GROUND SURFACE 0.0 314.0 ARTIFICIAL FILL 1.0	815			
810	0.0-1.0' Asphalt  RESIDUAL  Red and Tan, Coarse to Fine Sandy SILT	810 809.9 1.0 3 7		20000000	810.9 GROUND SURFACE 0.0 809.9 ARTIFICIAL FILL 1.0
806.6 + 8.4 2 3 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		805	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		- 0.0-1.0' Asphalt  RESIDUAL  Tan and Red, Coarse to Fine Sandy SILT
801.6 + 13.4   2 4 3	Boring Terminated at Elevation 800.1 ft in RESIDUAL: Sandy SILT	800	3		- - - - -
	RESIDUAL. Sality SILT	797.8 + 13.1 2 2	4 6	M	796.3 14.6 Boring Terminated at Elevation 796.3 ft in RESIDUAL: Sandy SILT
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ONE DOUBLE  -					- - - -
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