REFERENCE: R-3833C

PROJECT: 34554

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

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	18+05.86 - 75+82.64	4-8	12-14
-Y-	13+75.00 - 56+40.00	7,9,10,11	15,16
-Y1-	13+00.00 - 18+84.36	4	17
-Y5-	10+00.00 - 18+22.77	6,11	18

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	21+00.00 - 23+50.00	19,20
-L-	36+00.00	21
-L-	71+00.00 - 72+00.00	22
-L-	74+00.00 - 75+50.00	23
-Y-	19+00.00 - 25+00.00	24-26
-Y5-	15+00.00 - 17+50.00	27,28

APPENDICES

APPENDIX	TITLE	SHEETS
A	PAVEMENT INVESTIGATION	29-50
B	LABORATORY RESULTS	51-54

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *IREDELL*

PROJECT DESCRIPTION *SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833C	1	57

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

HPC

LANE, R.W.

INVESTIGATED BY *FALCON ENG.*

DRAWN BY *HILL, M.J.*

CHECKED BY *HUNSBERGER, W.S.*

SUBMITTED BY *FALCON ENG.*

DATE *JULY 2019*

NORTH CAROLINA PROFESSIONAL SEAL 36283 ENGINEER W. SCOTT HUNSBERGER

DocuSigned by:
W. Scott Hunsberger 7/3/2019
5A469AC80FCD49E...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- 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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK:
BORING ELEVATIONS TAKEN FROM r3833c_ls_tnl_170727.tin
DATED 7/27/2017 ELEVATION: FEET

NOTES:
FIAD - FILLED IMMEDIATELY AFTER DRILLING

DATE: 1-XX-17

TIP PROJECT: R-3833C

CONTRACT: 34554

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833C	2A	57

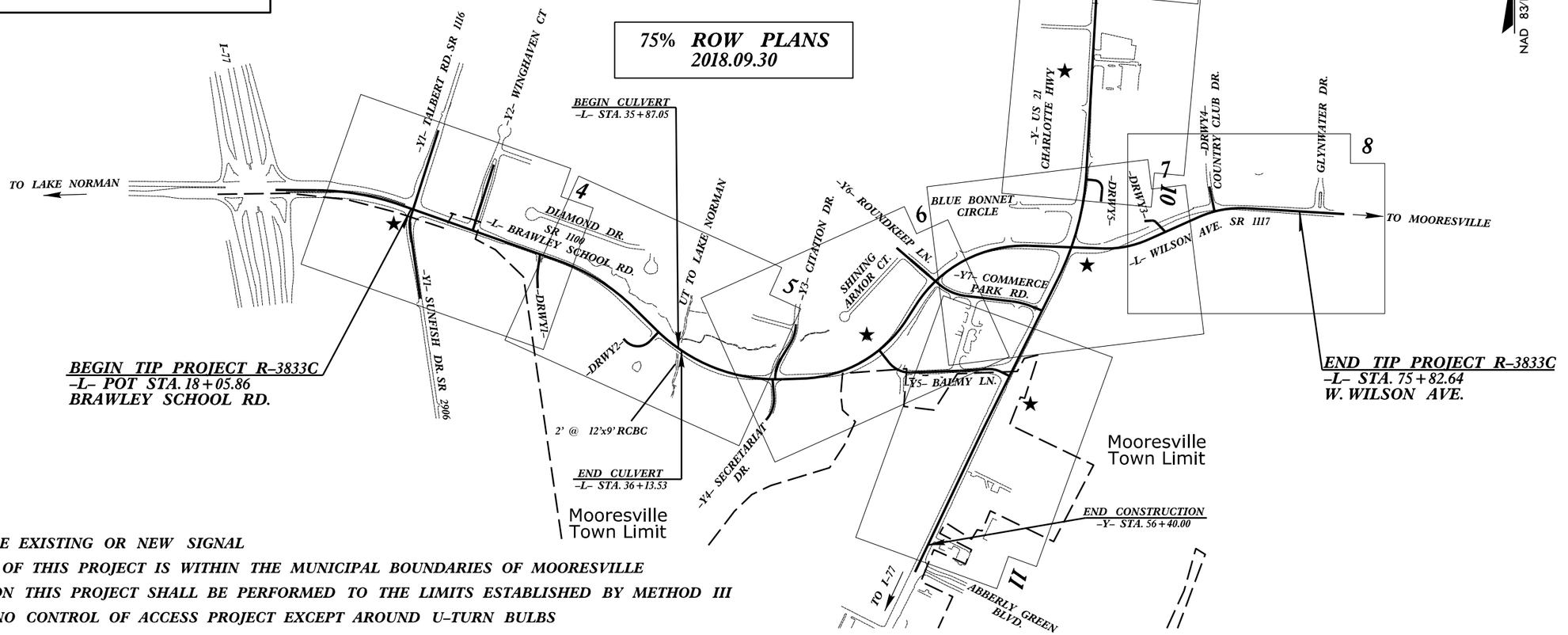
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34554.1.FD1		P.E
34554.2.4		R/W
34554.2.5		UTIL

LOCATION: SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERT, WALLS, SIGNALS, PAVEMENT MARKERS

VICINITY MAP

75% ROW PLANS
2018.09.30



BEGIN TIP PROJECT R-3833C
-L- POT STA. 18+05.86
BRAWLEY SCHOOL RD.

END TIP PROJECT R-3833C
-L- STA. 75+82.64
W. WILSON AVE.

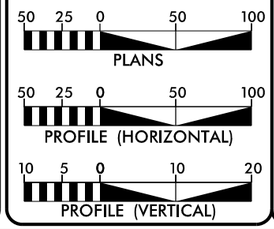
★ *UPGRADE EXISTING OR NEW SIGNAL*

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF MOORESVILLE

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

THIS IS A NO CONTROL OF ACCESS PROJECT EXCEPT AROUND U-TURN BULBS

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 18500
ADT 2040 = 28200
K = 10 %
D = 55 %
T = 4 % *
V = 45 MPH
* TTST = 1% DUAL = 3%
FUNC CLASS =
MAJOR RURAL
COLLECTOR

PROJECT LENGTH

ROADWAY LENGTH TIP PROJECT R-3833C = 1.090 miles
STRUCTURE LENGTH TIP PROJECT R-3833C = 0.005 miles
TOTAL LENGTH TIP PROJECT R-3833C = 1.094 miles

Prepared In The Office of:

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Stantec Consulting Services Inc.
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Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866 Fax. (919) 851-7024
www.stantec.com License No. F-0672

for the North Carolina Department of Transportation

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 30, 2018

LETTING DATE: JUNE 16, 2020

STANTEC CONTACT:
A. DEAN SARVIS, P.E.
PROJECT ENGINEER

NCDOT DIVISION 12 CONTACT:
BRYAN SOWELL, PE
PROJECT MANAGER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

Roadway Subsurface Investigation Report - Inventory

Brawley School Road (SR 1100) from
Talbert Road (SR 1116) to 1000' East of US 21
Iredell County, North Carolina
WBS No.: 34554.1.3, TIP: R-3833C
Falcon Project No.: G18063.00

Prepared for:
STANTEC, Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

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

July 3, 2019

TIP:	R-3833C
WBS NO.:	34554.1.3
COUNTY:	Iredell
DESCRIPTION:	Brawley School Road (SR 1100) from Talbert Road (SR 1116) to 1000' East of US 21
SUBJECT:	Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of 1.09 miles of proposed widening and intersection improvements on Brawley School Road in Mooresville in Iredell County. Brawley School Road will be widened from Talbert Road to east of US 21. Tie-ins and minor improvements to Y-lines and small drives are also included at various locations. Five retaining walls will be constructed at various locations throughout the project corridor. A dual reinforced concrete box culvert will be constructed at an existing stream crossing across the -L- line. A noise wall will be constructed between Citation Drive and Roundkeep Lane. Investigations for these structures will be provided under separate cover.

The investigation was conducted between January 30th and February 26th, 2019 in general accordance with our Scope and Fee Estimate for Geotechnical Investigation and Engineering Services. The information provided in this report is 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-eight (48) Standard Penetration Test (SPT) borings were drilled for the proposed roadway alignments. All mechanical borings were drilled using a CME-550 ATV mounted drill rig equipped with 2 ¼-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler 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 twenty-five (25) 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.

Portions of the following alignment, totaling approximately 2.17 miles were investigated. Other minor Y-lines and driveways are included on the project but improvements are not anticipated to be significant enough to warrant investigation.

Alignment	Station (ft)
-L- (Brawley School Road)	18+05.86 to 75+82.64
-Y- (US 21)	13+75 to 56+40
-Y1- (Talbert Road)	13+00 to 18+84.36
-Y5- (Balmy Lane)	10+00 to 18+22.77

AREAS OF SPECIAL GEOTECHNICAL INTEREST

I. 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:

Alignment	Station (ft)
-L-	35+91
-L-	35+94

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

Alignment	Station (ft)
-L-	35+91
-L-	35+94
-L-	42+61
-Y-	43+97
-Y-	48+25

III. The following locations contain highly plastic soils with plasticity indices (PI) greater than 35, or marginal soils with moisture content greater than the plastic limit:

Alignment	Station (ft)
-L-	22+35
-L-	65+00
-L-	71+04
-Y-	20+01
-Y5-	15+84

PHYSIOGRAPHY AND GEOLOGY

According to the ***Geologic Map of North Carolina*** (1985), the site is in the Charlotte Belt Physiographic Province of North Carolina. Specifically, rocks at the site are noted as Granitic Rock (**Ppg**) – megacrystic to equigranular. Castilia, Lillington, Medoc Mountain, Sims, Contentnea Creek and Elm City intrusives.

Existing site topography is rolling terrain typical of North Carolina's Piedmont Physiographic Province. The site lies approximately 2,000 feet north an arm of Lake Norman – the largest man-made freshwater body in the State of North Carolina. One stream crosses the -L- alignment flowing north to south toward Lake Norman. An existing culvert will be replaced at this location.

The existing corridor is heavily populated with residential (multi-family as well as single family), commercial, and municipal properties. Residential properties are generally located to the west of the project corridor with more commercial properties to the east.

SOIL PROPERTIES

A variety of soils were encountered along the project, including existing Roadway Embankment fill, Alluvial soils and Residual soils.

Roadway Embankment soils were encountered at the ground surface adjacent to existing roadways. Where encountered, these soils consist of up to 5.5 feet of dry to wet, soft to stiff, sandy silt and sandy and silty clay (A-4, A-6, A-7) and very loose to loose, silty sand (A-2-4, A-2-5).

Alluvial soils were encountered at the ground surface or beneath roadway embankment fills. Where encountered, these soils consist of up to 22 feet of moist to saturated, very soft to soft, sandy silt and silty sandy clay (A-4, A-6, A-7) and very loose to loose silty sand and clayey sand (A-2-4, A-2-6).

Residual soils were encountered at ground surface or beneath the roadway embankment fills or alluvial soils. These soils consist of dry to wet, medium stiff to very stiff, sandy silt and sandy and silty clay (A-4, A-6, A-7) and very loose to very dense, silty and clayey sand (A-2-4, A-2-6).

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 were backfilled immediately after completion due to safety considerations. Groundwater measurements were generally dry, with some groundwater measured greater than 6 feet below proposed grade.

Detailed groundwater measurements are included in the attached subsurface profiles and cross sections, and noted areas of shallow groundwater are included in the Areas of Special Geotechnical Interest earlier in this report.

ADDITIONAL LABORATORY TESTING

The following bulk samples were obtained:

Sample	Location	Depth (ft)	Test
BS-1	30+04, 56' RT, -L-	3.0 – 10.0	California Bearing Ratio, Standard Proctor
BS-2	25+50, 63' RT, -L-	3.0 – 10.0	California Bearing Ratio, Standard Proctor
BS-3	50+04, 47' RT, -Y-	3.5 – 8.5	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:

W. Scott Hunsberger, PE
Geotechnical Engineer

Report Reviewed By:

Jeremy R. Hamm, PE
Geotechnical Engineering Manager

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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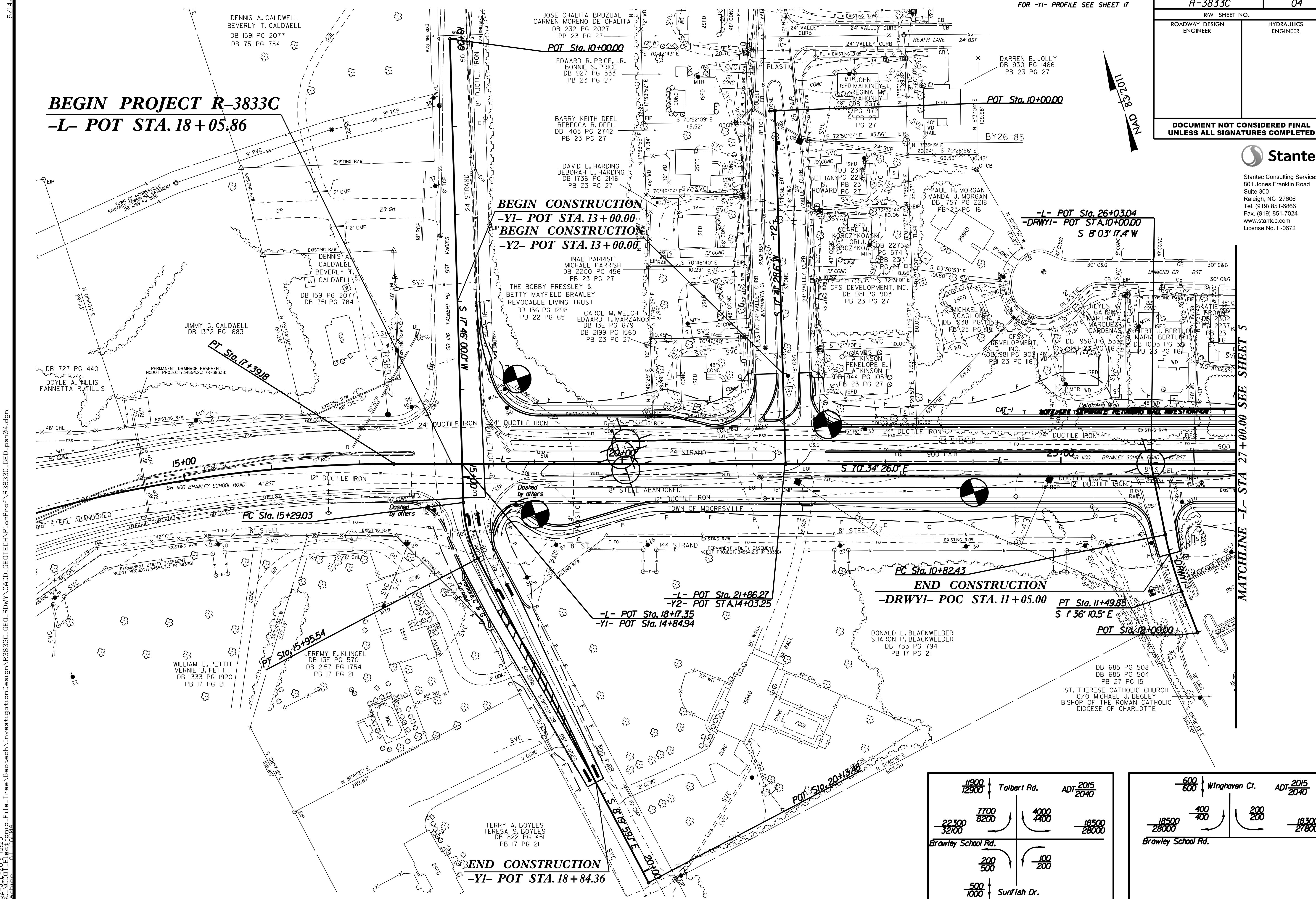
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

FOR -L- PROFILE SEE SHEET 12
FOR -Y1- PROFILE SEE SHEET 17



PROJECT REFERENCE NO.	SHEET NO.
R-3833C	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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www.stantec.com
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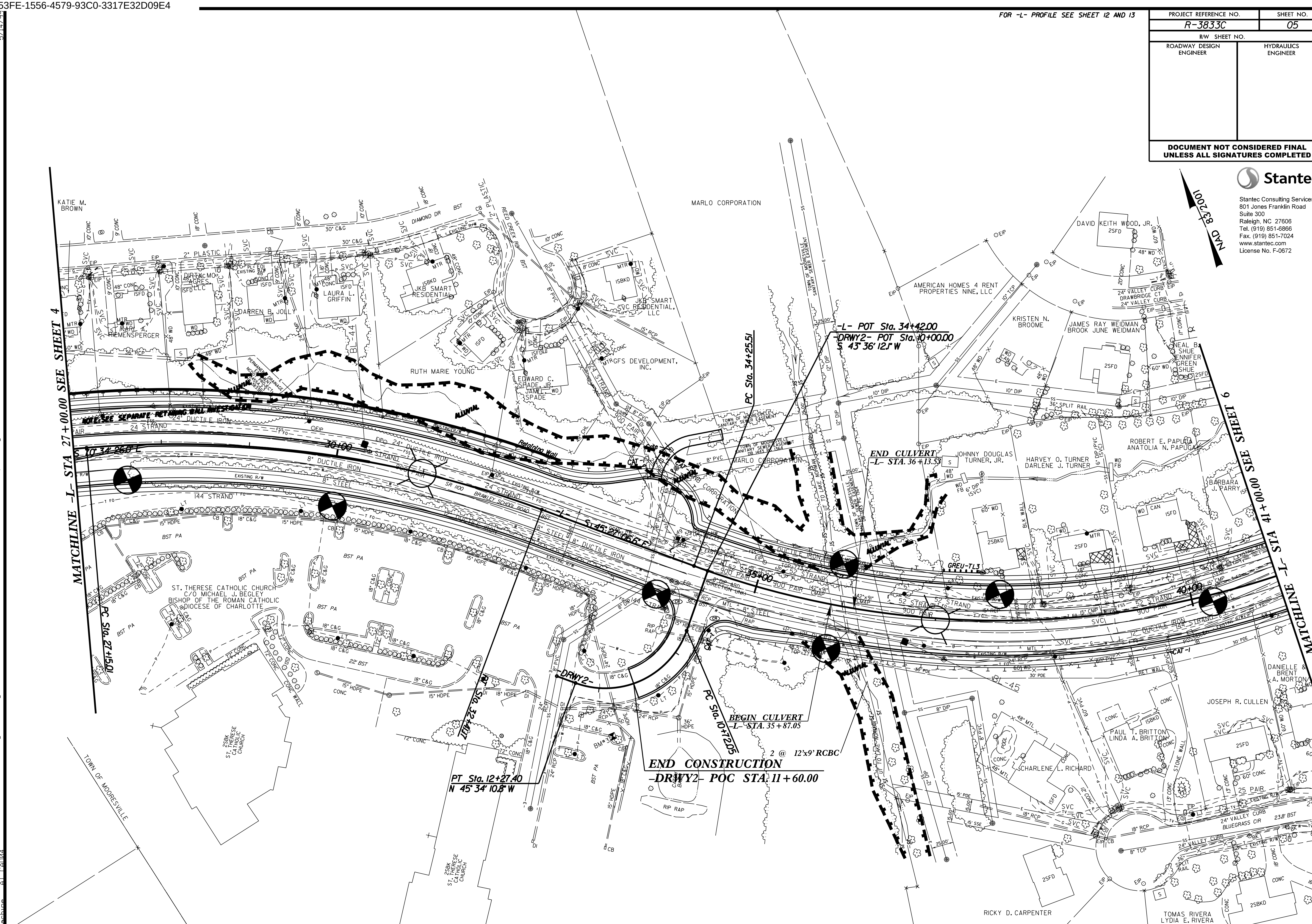
FOR -L- PROFILE SEE SHEET 12 AND 13


NAD 83/2001
MATCHLINE -L- STA 27+00.00 SEE SHEET 4
MATCHLINE -L- STA 41+00.00 SEE SHEET 6
PC Sta. 27+15.01
S 10°34'26.0" E
-L- POT Sta. 34+42.00
-DRWY2- POT Sta. 10+00.00
S 43°36'12.1" W
PC Sta. 34+25.51
-L-
S 45°27'06.6" E
END CULVERT
-L- STA. 36+13.53
BEGIN CULVERT
-L- STA. 35+87.05
2 @ 12'x9' RCBC
END CONSTRUCTION
-DRWY2- POC STA. 11+60.00
PT Sta. 12+27.40
N 45°34'10.8" W
PC Sta. 10+72.05
PT Sta. 32+41.7
NOTE: SEE SEPARATE RETAINING WALL INVESTIGATION
Retaining Wall
SR 1100 BRAWLEY SCHOOL ROAD
KATIE M. BROWN
MARLO CORPORATION
DAVID KEITH WOOD, JR.
AMERICAN HOMES 4 RENT PROPERTIES NINE, LLC
KRISTEN N. BROOME
JAMES RAY WEIDMAN
BROOK JUNE WEIDMAN
NEAL B. SHUE
JENNIFER GREEN SHUE
RUTH MARIE YOUNG
EDWARD C. SPADE, JR.
JAMIE SPADE
GFS DEVELOPMENT, INC.
JKB SMART RESIDENTIAL LLC
LAURA L. GRIFFIN
DARREN B. JOLLY
KARL A. RIEMENSPERGER
ROBERT E. PAPUGA
ANATOLIA N. PAPUGA
JOHNNY DOUGLAS TURNER, JR.
HARVEY O. TURNER
DARLENE J. TURNER
BARBARA J. PARRY
ST. THERESE CATHOLIC CHURCH
C/O MICHAEL J. BEGLEY
BISHOP OF THE ROMAN CATHOLIC DIOCESE OF CHARLOTTE
TOWN OF MOORESVILLE
DANIELLE & BRENT A. MORTON
JOSEPH R. CULLEN
PAUL T. BRITTON
LINDA A. BRITTON
SCHARLENE L. RICHARD
RICKY D. CARPENTER
TOMAS RIVERA
LYDIA E. RIVERA
DIAMOND DR
REED CREEK RD
BLUEGRASS CIR
DRAWBRIDGE CT
GREU-TL3
CAT-I
BL-44
BL-45
30+00
35+00
40+00

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	06
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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License No. F-0672

FOR -L- PROFILE SEE SHEET 13
FOR -Y5- PROFILE SEE SHEET 18

NAD 83/2011

POT Sta. 10+00.00
S 49° 17' 00.9" E -Y6-

BEGIN CONSTRUCTION
-Y6- POT STA. 11 + 70.00

-L- POT Sta. 53+62.11
-Y6- POT Sta. 13+00.00
S 49° 17' 00.9" E

BEGIN CONSTRUCTION
-Y3- POC STA. 12 + 22.00

POT Sta. 10+00.00
S 4° 24' 51.5" W

-L- STA 41+00.00 SEE SHEET 5

-L- STA 55+00.00 SEE SHEET 7

MATCHLINE -L- STA 14+00.00 SEE SHEET 11

MATCHLINE -Y5- STA 14+00.00 SEE SHEET 11

END CONSTRUCTION
-Y4- POC STA. 11 + 65.00

-L- POT Sta. 48+40.00
-Y5- POT Sta. 10+60.00
S 38° 52' 30.2" E

-L- POT Sta. 41+94.06
-Y3- POT Sta. 13+50.00
S 4° 13' 08.8" E

-L- POT Sta. 41+79.47
-Y4- POT Sta. 10+00.00
S 4° 13' 08.8" E

-L- POT Sta. 53+62.13
-Y5- POT Sta. 10+00.00
S 49° 17' 00.9" E

END CONSTRUCTION
-Y7- POT STA. 10 + 78.94

PC Sta. 10+13.48
PT Sta. 11+25.13
PC Sta. 12+91.48
PT Sta. 13+36.68
S 12° 43' 39.8" W
S 12° 03' 49.5" W -Y1-
PC Sta. 42+38.68
PT Sta. 42+51.87
PC Sta. 43+51.87
N 87° 56' 25.8" E
PC Sta. 11+03.35
PT Sta. 12+40.37
POT Sta. 12+50.60
S 38° 52' 30.2" W
PC Sta. 12+37.04
PT Sta. 12+78.05
PC Sta. 10+94.05
PC Sta. 11+39.95
PT Sta. 11+82.23
N 87° 55' 26.8" E
N 32° 37' 11.4" E
S 87° 56' 25.8" W
N 87° 56' 25.8" E

KELLY A. PENNARIO
JANSON J. GAWORECKI
WEBB A. BEULAH
VENUS R. BEULAH
JERRY W. PARTIN
MICHAEL NORMAN WAGNER
BARBARA J. PARRY
RWS REAL ESTATE INVESTMENTS, LLC
SHINNING ARMOR CT
TAMMY L. BURNS
P. JEAN NESTER
CHARLES L. MCCURDY
DAVID M. MCGINNIS
ELIZABETH A. MCGINNIS
CURTIS BARTEAU
BARBARA BARTEAU
DAVID F. HACKETT
MARIANNA A. HACKETT
THEISEN FAMILY TRUST
DIANNE R. ROBINSON
WILLIAM A. HUTCHISON
FAYE A. HUTCHISON
SNH SE MOORESVILLE LLC
DONALD JAMES RANDAZZO, II
ANGELA RANDAZZO
DANIEL JOSEPH DEW
DANIEL B. L. MORTON
BRENT A. MORTON
KATHY BOGGS
TOWN OF MOORESVILLE
CHARLES B. ALEXANDER REVOCABLE LIVING TRUST
WARREN GREENLEE
ROGER WAY, JR.
MICHAEL SHEA
LISA M. QUALLS
JAMES W. WILBURN
MICHAEL CAPPUCCETTI, II
ELIZABETH CAPPUCCETTI
VICKI M. BRAWLEY
THOMAS A. BRAWLEY
TERRY WAYNE BROWN
BARBARA J. BROWN
TOWN OF MOORESVILLE
BK FIRE STATION
STATE EMPLOYEES CREDIT UNION
DB 1370 DB 859
PB 40 PG 42
TUTOR TIME MOORESVILLE, LLC
BANK OF NORTH CAROLINA
ARTIFICIAL TURF

MATCHLINE -L- STA 41+00.00 SEE SHEET 5
MATCHLINE -L- STA 55+00.00 SEE SHEET 7
MATCHLINE -Y5- STA 14+00.00 SEE SHEET 11

02-JUL-2019 15:03
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PROJECT REFERENCE NO.	SHEET NO.
R-3833C	07
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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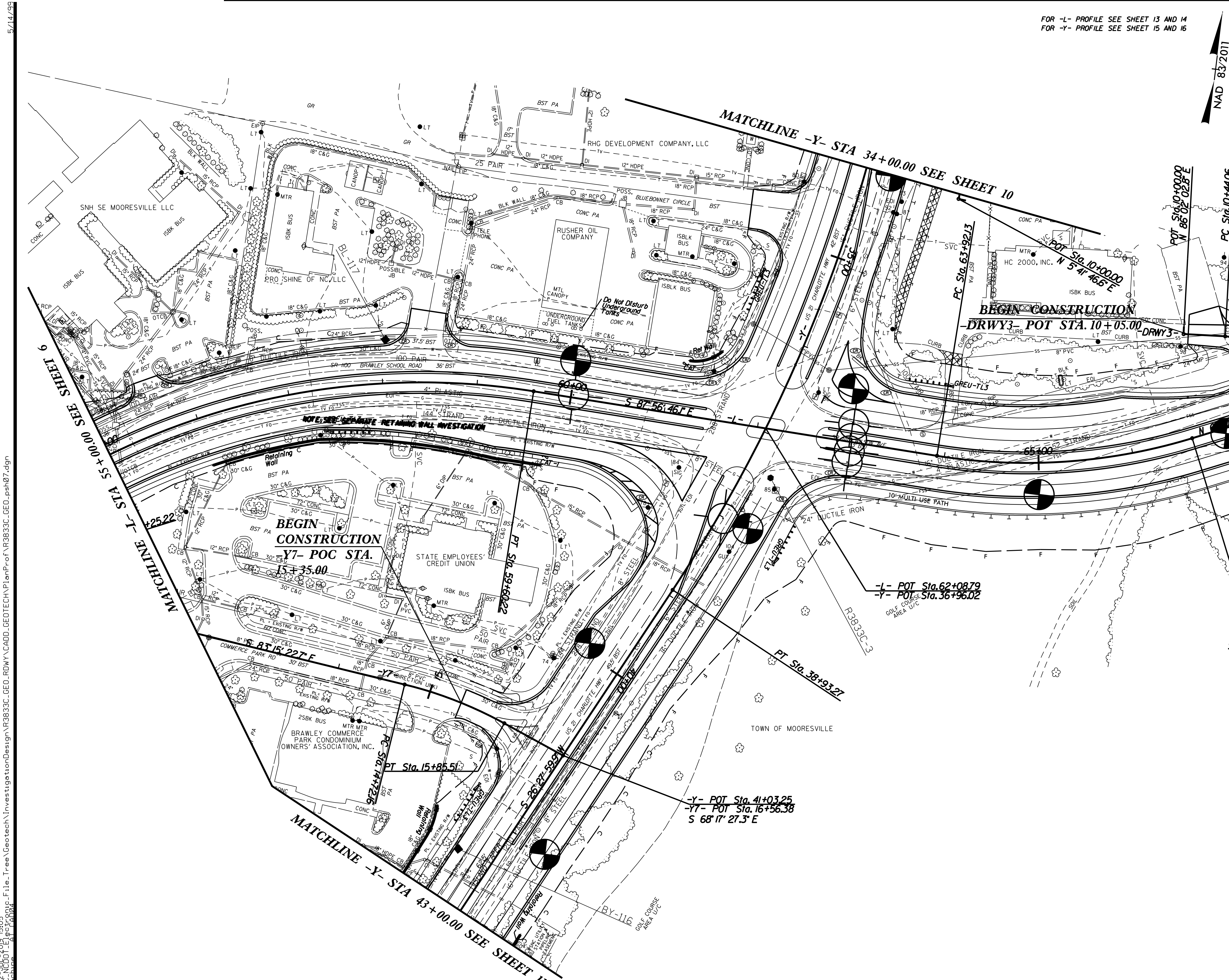
FOR -L- PROFILE SEE SHEET 13 AND 14
FOR -Y- PROFILE SEE SHEET 15 AND 16


NAD 83/2011
MATCHLINE -Y- STA 34+00.00 SEE SHEET 10
MATCHLINE -L- STA 55+00.00 SEE SHEET 6
MATCHLINE -L- STA 68+00.00 SEE SHEET 8
MATCHLINE -Y- STA 43+00.00 SEE SHEET 11
SNH SE MOORESVILLE LLC
PRO SHINE OF NC LLC
RHG DEVELOPMENT COMPANY, LLC
RUSHER OIL COMPANY
HC 2000, INC.
STATE EMPLOYEES' CREDIT UNION
BRAWLEY COMMERCE PARK CONDOMINIUM OWNERS' ASSOCIATION, INC.
TOWN OF MOORESVILLE
BEGIN CONSTRUCTION -Y7- POC STA. 15+35.00
BEGIN CONSTRUCTION -DRWY3- POT STA. 10+05.00
-L- POT Sta.62+08.79
-Y- POT Sta.36+96.02
-Y- POT Sta. 41+03.25
-Y7- POT Sta. 16+56.38
S 68° 17' 27.3" E
-L- POT Sta. 67+75.00
-DRWY3- POT Sta. 11+50.00
PT Sta. 38+93.27
PT Sta. 15+85.51
PC Sta. 14+72.16
PT Sta. 59+60.22
PC Sta. 63+92.13
PT Sta. 66+64.96
POT Sta. 10+00.00
N 5° 41' 46.6" E
S 87° 56' 46.1" E
S 83° 15' 22.7" E
S 26° 27' 59.5" W
SR 1100 BRAWLEY SCHOOL ROAD
US 21 CHARLOTTE HWY
COMMERCE PARK RD
BLUEBONNET CIRCLE
Do Not Disturb Underground Tanks
10' MULTI USE PATH
R3833C_GEO_psh07.dgn

FOR -L- PROFILE SEE SHEET 14

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	08
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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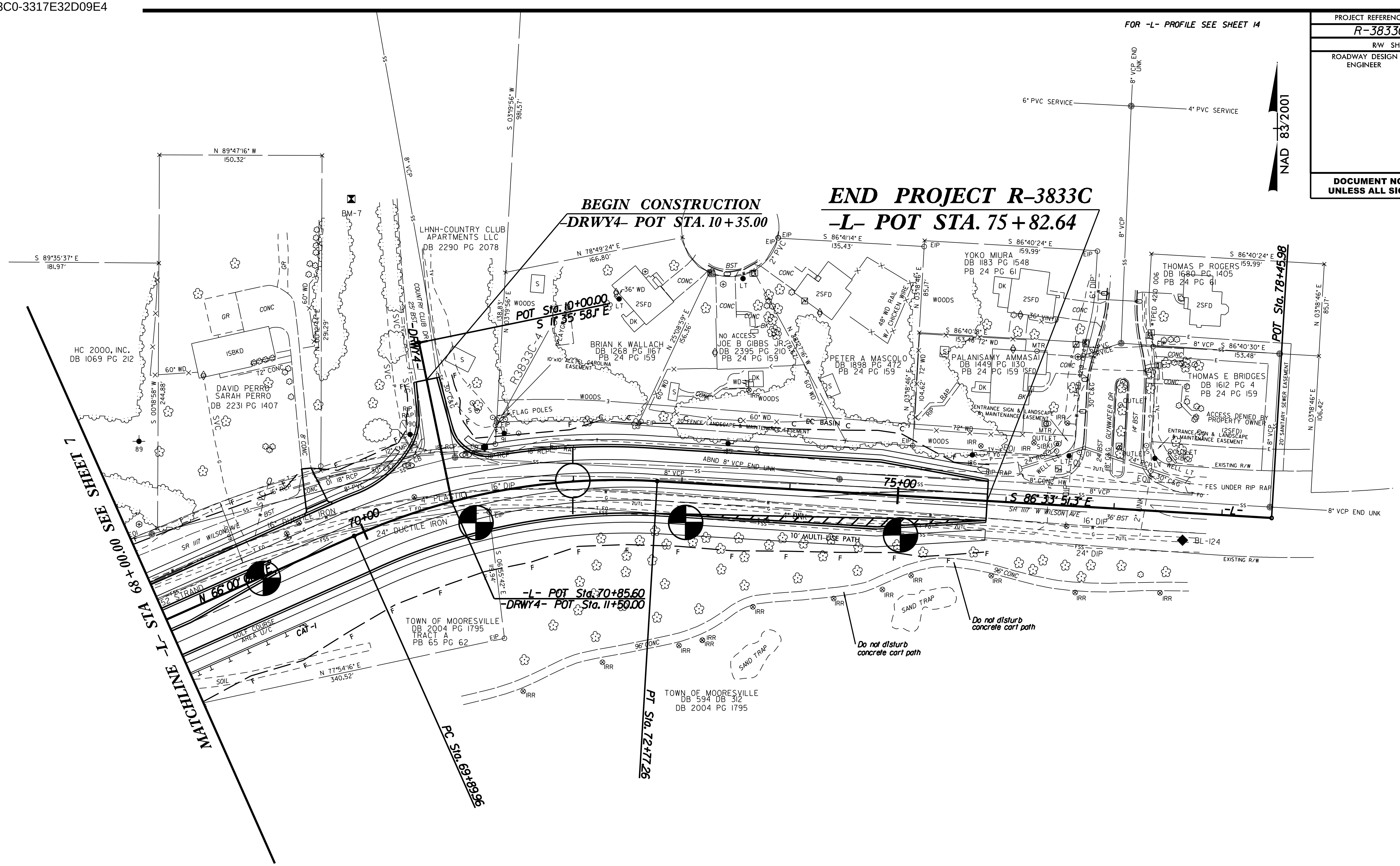
BEGIN CONSTRUCTION
-DRWY4- POT STA. 10+35.00
END PROJECT R-3833C
-L- POT STA. 75+82.64
NAD 83/2001
MATCHLINE -L- STA 68+00.00 SEE SHEET 7
-L- POT Sta. 70+85.60
-DRWY4- POT Sta. 11+50.00
PC Sta. 69+89.96
PT Sta. 72+77.26
POT Sta. 78+45.98
POT Sta. 10+00.00
S 16°35'58.1" E
S 86°33'51.3" E
N 66°00'
70+00
75+00
LHNH-COUNTRY CLUB APARTMENTS LLC
DB 2290 PG 2078
HC 2000, INC.
DB 1069 PG 212
DAVID PERRO
SARAH PERRO
DB 2231 PG 1407
BRIAN K WALLACH
DB 1268 PG 1167
PB 24 PG 159
JOE B GIBBS JR
DB 2395 PG 210
PB 24 PG 159
PETER A MASCOLO
DB 1898 PG 472
PB 24 PG 159
YOKO MIURA
DB 1183 PG 1548
PB 24 PG 61
PALANISAMY AMMASAI
DB 1449 PG 1130
PB 24 PG 159
THOMAS P ROGERS
DB 1680 PG 1405
PB 24 PG 61
THOMAS E BRIDGES
DB 1612 PG 4
PB 24 PG 159
TOWN OF MOORESVILLE
DB 2004 PG 1795
TRACT A
PB 65 PG 62
TOWN OF MOORESVILLE
DB 594 DB 312
DB 2004 PG 1795
SR 1117 WILSON AVE
BM-7
BL-124
10' MULTI-USE PATH
24" DUCTILE IRON
16" DIP
8" VCP
ABND 8" VCP END UNK
EXISTING R/W
FES UNDER RIP RAP
8" VCP END UNK
6" PVC SERVICE
4" PVC SERVICE
ACCESS DENIED BY PROPERTY OWNER
NO ACCESS
ENTRANCE SIGN & LANDSCAPE MAINTENANCE EASEMENT
20' SANITARY SEWER EASEMENT
GLYNWATER DR
FLAG POLES
WOODS
SAND TRAP
Do not disturb concrete cart path
GOLF COURSE AREA U/C
N 89°47'16" W 150.32'
S 89°35'37" E 181.97'
N 78°49'24" E 166.80'
S 86°41'14" E 135.43'
S 86°40'24" E 159.99'
S 86°40'30" E 153.48'
N 77°54'16" E 340.52'
S 03°19'56" W 981.57'

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	09
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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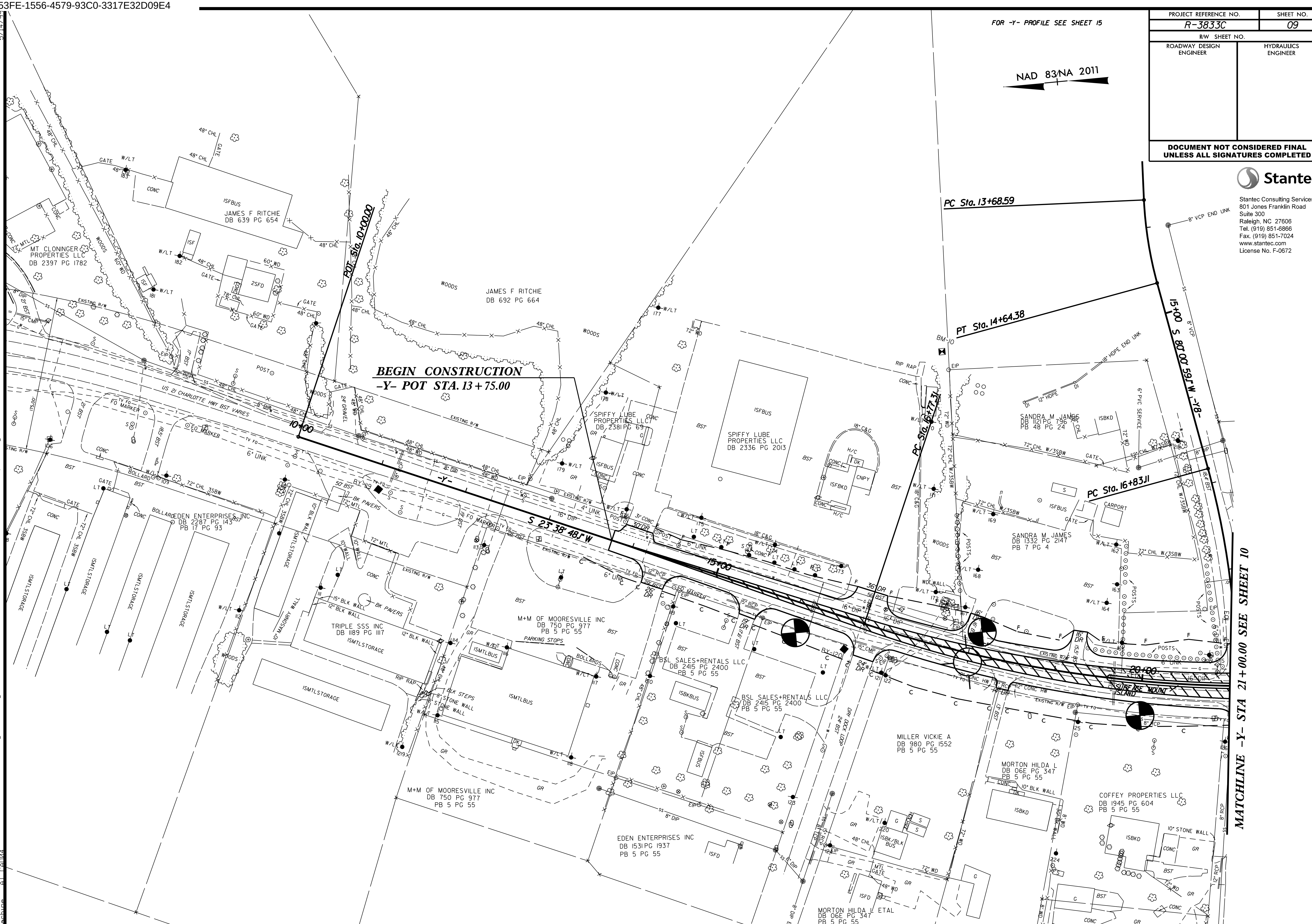
FOR -Y- PROFILE SEE SHEET 15


NAD 83/NA 2011
BEGIN CONSTRUCTION
-Y- POT STA. 13+75.00
POT Sta. 10+00.00
PC Sta. 13+68.59
PT Sta. 14+64.38
PC Sta. 15+77.31
PC Sta. 16+83.11
S 23°38' 48.1" W
S 80°00' 59.1" W -Y8-
MATCHLINE -Y- STA 21+00.00 SEE SHEET 10
US 21 CHARLOTTE HWY BST VARIES
JAMES F RITCHIE
DB 639 PG 654
JAMES F RITCHIE
DB 692 PG 664
MT CLONINGER PROPERTIES LLC
DB 2397 PG 1782
EDEN ENTERPRISES INC
DB 2287 PG 143
PB 17 PG 93
SPIFFY LUBE PROPERTIES LLC
DB 2381 PG 69
SPIFFY LUBE PROPERTIES LLC
DB 2336 PG 2013
SANDRA M JAMES
DB 1121 PG 796
PB 48 PG 24
SANDRA M JAMES
DB 1332 PG 2147
PB 7 PG 4
TRIPLE SSS INC
DB 1189 PG 1117
M+M OF MOORESVILLE INC
DB 750 PG 977
PB 5 PG 55
BSL SALES+RENTALS LLC
DB 2415 PG 2400
PB 5 PG 55
MILLER VICKIE A
DB 980 PG 1552
PB 5 PG 55
MORTON HILDA L
DB 06E PG 347
PB 5 PG 55
COFFEY PROPERTIES LLC
DB 1945 PG 604
PB 5 PG 55
EDEN ENTERPRISES INC
DB 1531 PG 1937
PB 5 PG 55
MORTON HILDA L ETAL
DB 06E PG 347
PB 5 PG 55
COFFEY PROPERTIES LLC
BM-10
WOODS

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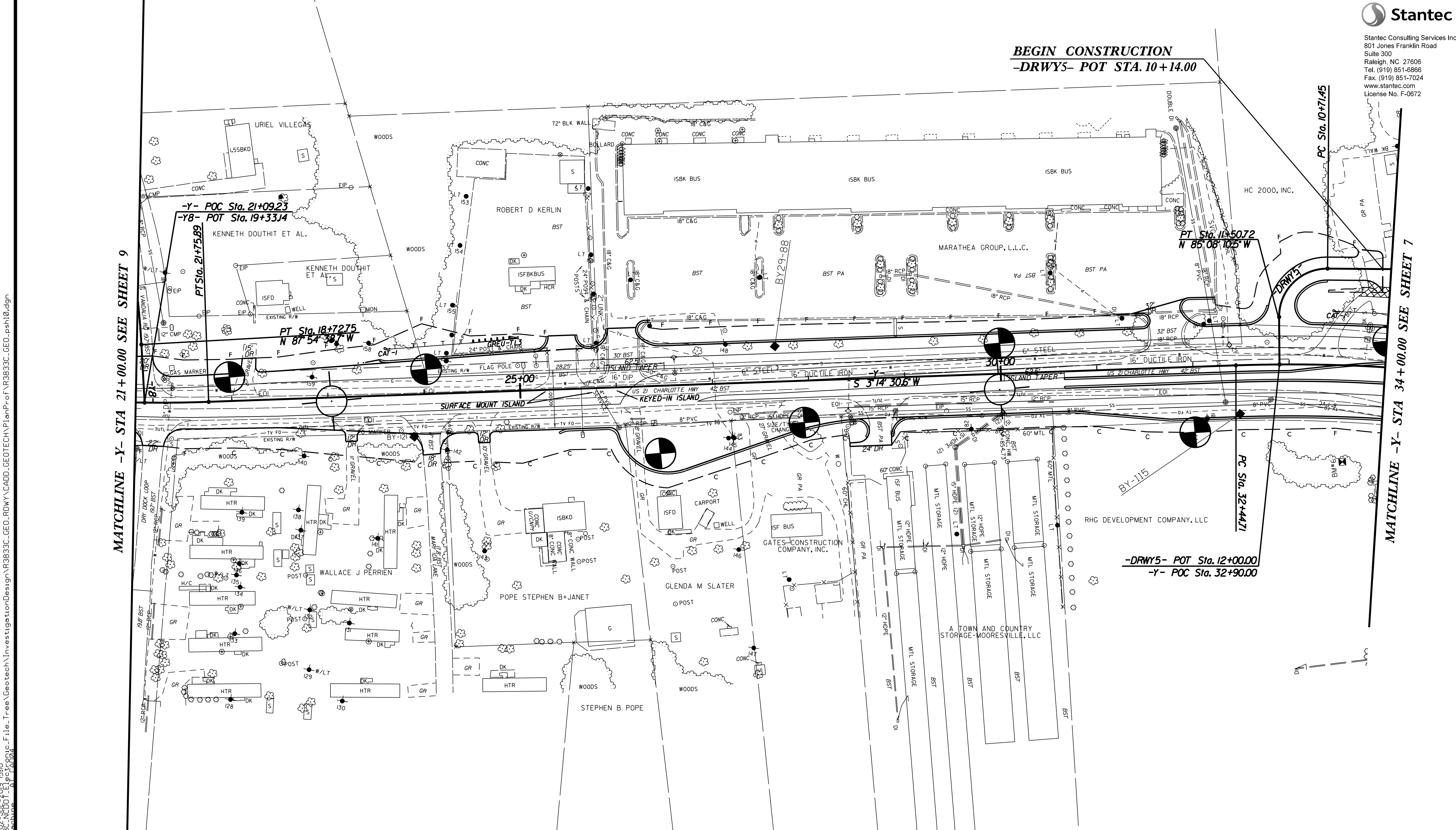
R3833C_NCDOT_Electronic_File_Tree\Geotech\InvestigationDesign\R3833C_GEO_RDWY\CADD_GEOTECH\PlanProf\R3833C_GEO_psh09.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Stantec
Stantec Consulting Services Inc
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

FOR -Y- PROFILE SEE SHEET 15


NAD 83/NA 2011
BEGIN CONSTRUCTION
-DRWY5- POT STA. 10+14.00
MATCHLINE -Y- STA 21+00.00 SEE SHEET 9
MATCHLINE -Y- STA 34+00.00 SEE SHEET 7
-Y- POC Sta. 21+09.23
-Y8- POT Sta. 19+33.14
PT Sta. 21+75.89
PT Sta. 18+72.75
N 87° 54' 38.7" W
PT Sta. 11+50.72
N 85° 08' 10.5" W
PC Sta. 10+71.45
PC Sta. 32+44.71
-DRWY5- POT Sta. 12+00.00
-Y- POC Sta. 32+90.00
S 3° 14' 30.6" W
25+00
30+00
US 21 CHARLOTTE HWY
SURFACE MOUNT ISLAND
KEYED-IN ISLAND
ISLAND TAPER
URIEL VILLEGAS
KENNETH DOUTHIT ET AL.
ROBERT D KERLIN
MARATHEA GROUP, L.L.C.
HC 2000, INC.
WALLACE J PERRIEN
POPE STEPHEN B+JANET
STEPHEN B POPE
GLENDA M SLATER
GATES CONSTRUCTION COMPANY, INC.
A TOWN AND COUNTRY STORAGE-MOORESVILLE, LLC
RHG DEVELOPMENT COMPANY, LLC
BY29-88
BY-121
BY-115

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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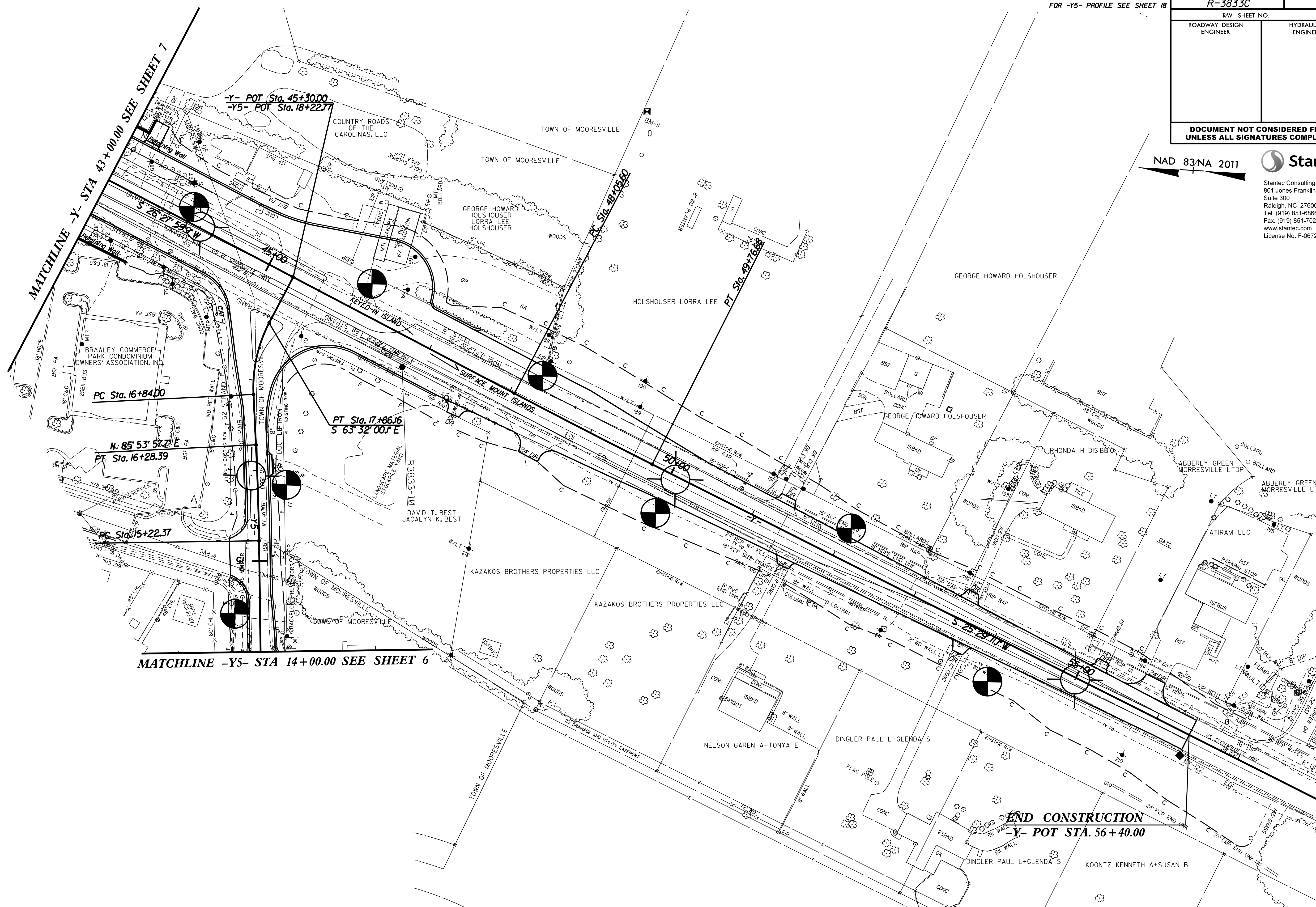
FOR -Y- PROFILE SEE SHEET 16
FOR -Y5- PROFILE SEE SHEET 18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MATCHLINE -Y5- STA 14+00.00 SEE SHEET 6
END CONSTRUCTION
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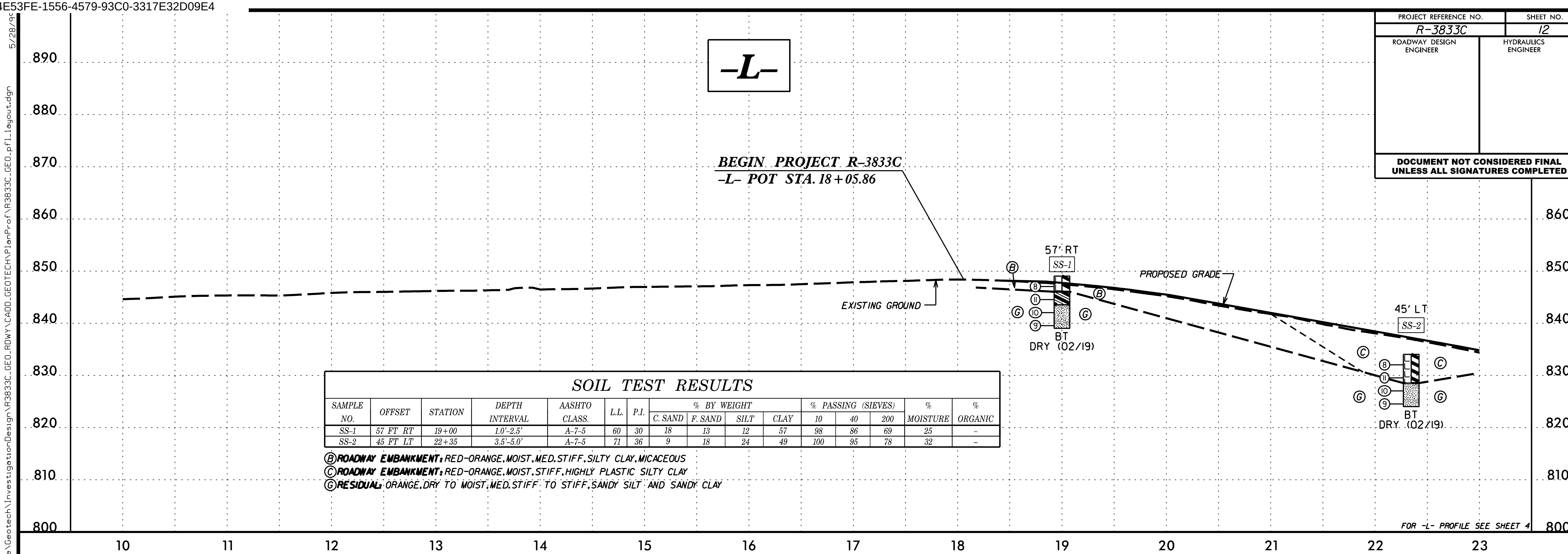
-Y- POT Sta. 45+30.00
-Y5- POT Sta. 18+22.77
PC Sta. 48+05.60
PT Sta. 49+76.68
PT Sta. 17+66.16
S 63° 32' 00.1" E
PC Sta. 16+84.00
N 85° 53' 57.7" E
PT Sta. 16+28.39
PC Sta. 15+22.37
S 26° 27' 59.6" W
S 25° 29' 10" W
KEYED-IN ISLAND
SURFACE MOUNT ISLANDS
BM-11
COUNTRY ROADS OF THE CAROLINAS, LLC
TOWN OF MOORESVILLE
GEORGE HOWARD HOLSHOUSER
LORRA LEE HOLSHOUSER
HOLSHOUSER LORRA LEE
BRAWLEY COMMERCE PARK CONDOMINIUM OWNERS' ASSOCIATION, INC.
DAVID T. BEST
JACALYN K. BEST
KAZAKOS BROTHERS PROPERTIES LLC
RHONDA H DISIBBIO
ABBERLY GREEN MORRESVILLE LTDP
ATIRAM LLC
NELSON GAREN A+TONYA E
DINGLER PAUL L+GLENDA S
KOONTZ KENNETH A+SUSAN B
R3833-10
LANDSCAPE MATERIAL STOCKPILE YARD
BALM LN
US 21 CHARLOTTE HWY
20' DRAINAGE AND UTILITY EASEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

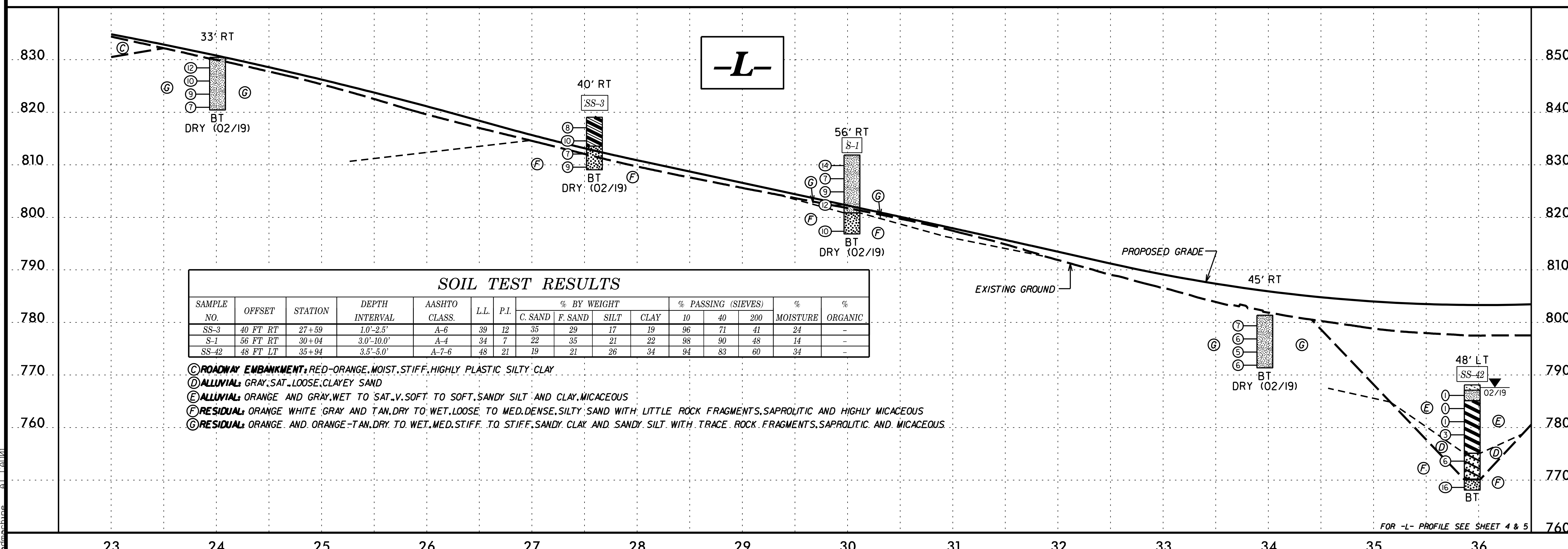
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	-
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	-

(B) **ROADWAY EMBANKMENT:** RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS
(C) **ROADWAY EMBANKMENT:** RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
(G) **RESIDUAL:** ORANGE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SANDY CLAY



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-3	40 FT RT	27+59	1.0'-2.5'	A-6	39	12	35	29	17	19	96	71	41	24	-
S-1	56 FT RT	30+04	3.0'-10.0'	A-4	34	7	22	35	21	22	98	90	48	14	-
SS-42	48 FT LT	35+94	3.5'-5.0'	A-7-6	48	21	19	21	26	34	94	83	60	34	-

(C) **ROADWAY EMBANKMENT:** RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
(D) **ALLUVIAL:** GRAY, SAT., LOOSE, CLAYEY SAND
(E) **ALLUVIAL:** ORANGE AND GRAY, WET TO SAT., V. SOFT TO SOFT, SANDY SILT AND CLAY, MICACEOUS
(F) **RESIDUAL:** ORANGE WHITE GRAY AND TAN, DRY TO WET, LOOSE TO MED. DENSE, SILTY SAND WITH LITTLE ROCK FRAGMENTS, SAPROLITIC AND HIGHLY MICACEOUS
(G) **RESIDUAL:** ORANGE AND ORANGE-TAN, DRY TO WET, MED. STIFF TO STIFF, SANDY CLAY AND SANDY SILT WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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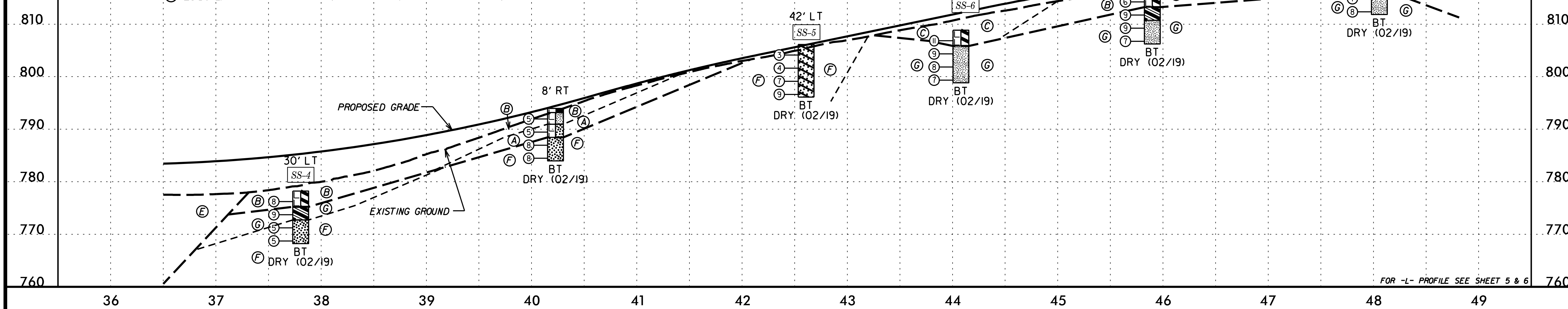
-L-

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-4	30 FT LT	37+81	1.0'-2.5'	A-7-6	47	25	37	23	10	30	84	63	37	19	-
SS-5	42 FT LT	42+61	1.0'-2.5'	A-2-7	43	16	54	16	12	18	65	40	21	19	-
SS-6	34 FT RT	44+08	1.0'-2.5'	A-7-5	63	29	25	17	17	41	90	73	54	27	-
SS-7	16 FT LT	45+90	1.0'-2.5'	A-7-6	43	14	26	31	15	28	78	62	37	24	-

(A) **ROADWAY EMBANKMENT:** ORANGE, DRY, LOOSE, SILTY SAND, MICACEOUS
(B) **ROADWAY EMBANKMENT:** ORANGE GRAY AND TAN, MOIST, SOFT TO STIFF, SILTY SANDY CLAY AND SANDY SILT, MICACEOUS
(C) **ROADWAY EMBANKMENT:** ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
(E) **ALLUVIAL:** ORANGE AND GRAY, WET TO SAT., V. SOFT TO SOFT, SANDY SILT AND CLAY, MICACEOUS
(F) **RESIDUAL:** ORANGE TAN AND WHITE, DRY TO WET, V. LOOSE TO LOOSE, SILTY SAND AND CLAYEY SAND, SAPROLITIC AND MICACEOUS WITH TRACE TO SOME ROCK FRAGMENTS
(G) **RESIDUAL:** ORANGE TAN AND RED, DRY TO MOIST, MED. STIFF TO STIFF, SANDY CLAY AND SANDY SILT, SAPROLITIC AND MICACEOUS

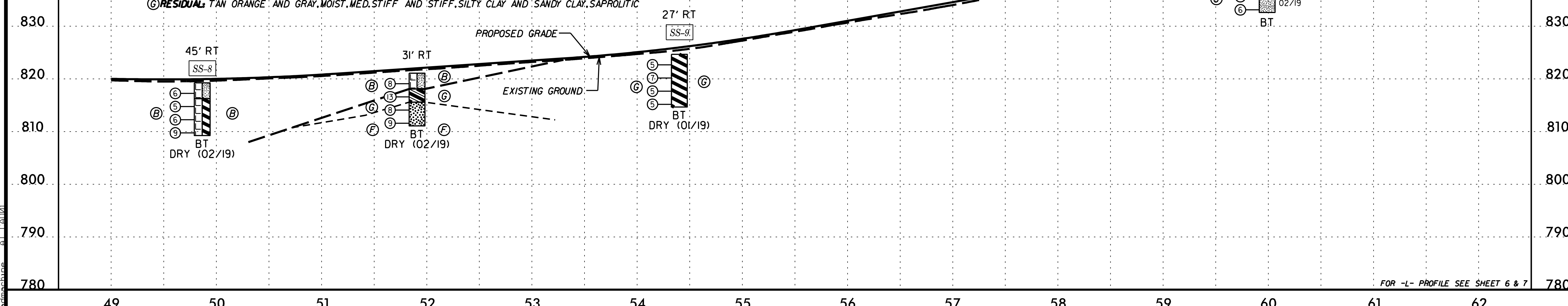


-L-

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	45 FT RT	49+87	3.5'-5.0'	A-7-5	59	22	22	19	17	42	92	77	57	28	-
SS-9	27 FT RT	54+40	1.0'-2.5'	A-7-5	43	13	29	34	23	14	100	84	46	27	-
SS-10	39 FT LT	59+99	1.0'-2.5'	A-7-5	59	25	27	17	13	43	94	76	55	23	-

(B) **ROADWAY EMBANKMENT:** ORANGE TAN ORANGE-TAN AND RED-ORANGE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SILTY CLAY, MICACEOUS
(F) **RESIDUAL:** TAN AND WHITE, DRY, LOOSE, SILTY SAND
(G) **RESIDUAL:** TAN ORANGE AND GRAY, MOIST, MED. STIFF AND STIFF, SILTY CLAY AND SANDY CLAY, SAPROLITIC



PROJECT REFERENCE NO.	SHEET NO.
R-3833C	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-L-

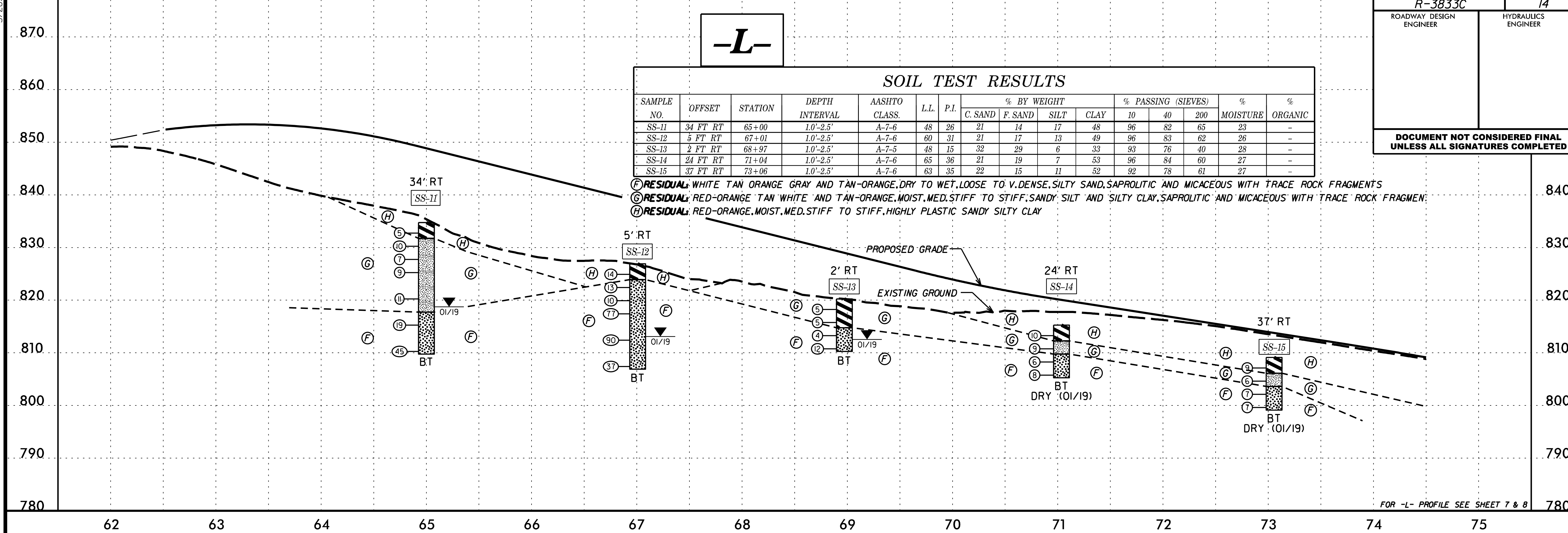
SOIL TEST RESULTS

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	34 FT RT	65+00	1.0'-2.5'	A-7-6	48	26	21	14	17	48	96	82	65	23	-
SS-12	5 FT RT	67+01	1.0'-2.5'	A-7-6	60	31	21	17	13	49	96	83	62	26	-
SS-13	2 FT RT	68+97	1.0'-2.5'	A-7-5	48	15	32	29	6	33	93	76	40	28	-
SS-14	24 FT RT	71+04	1.0'-2.5'	A-7-6	65	36	21	19	7	53	96	84	60	27	-
SS-15	37 FT RT	73+06	1.0'-2.5'	A-7-6	63	35	22	15	11	52	92	78	61	27	-

(F) **RESIDUAL:** WHITE TAN ORANGE GRAY AND TAN-ORANGE,DRY TO WET,LOOSE TO V.DENSE,SILTY SAND,SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

(G) **RESIDUAL:** RED-ORANGE TAN WHITE AND TAN-ORANGE,MOIST,MED.STIFF TO STIFF,SANDY SILT AND SILTY CLAY,SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMEN

(H) **RESIDUAL:** RED-ORANGE,MOIST,MED.STIFF TO STIFF,HIGHLY PLASTIC SANDY SILTY CLAY



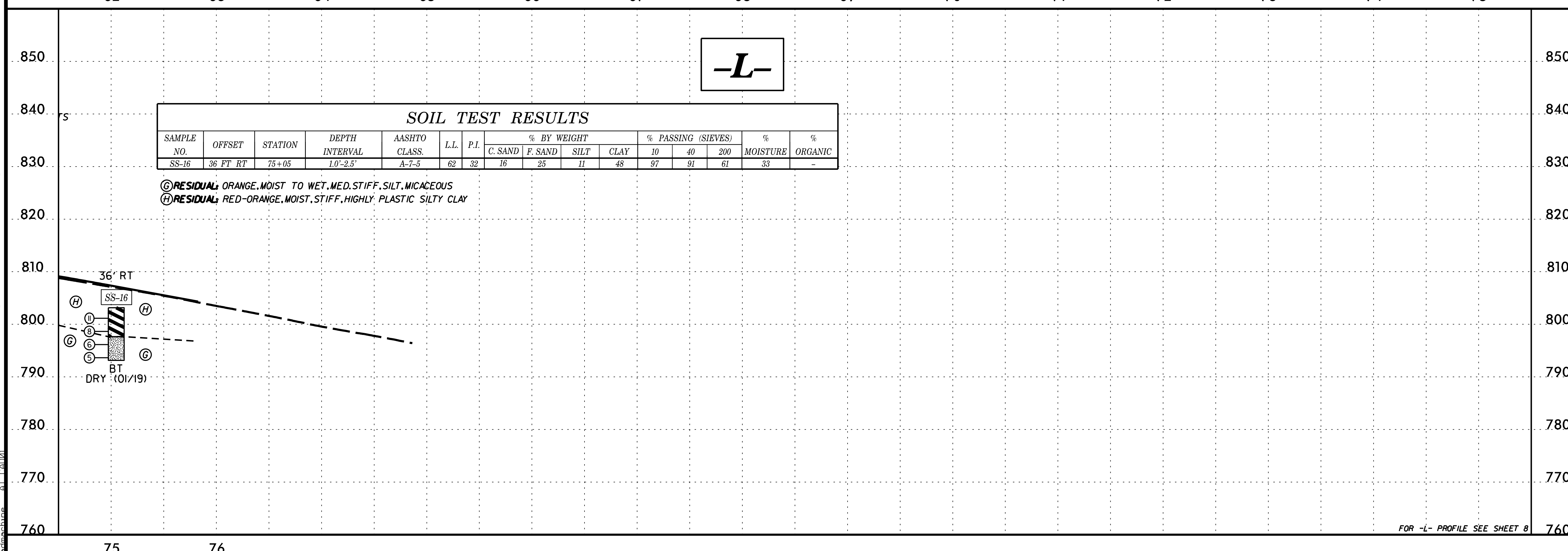
-L-

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-16	36 FT RT	75+05	1.0'-2.5'	A-7-5	62	32	16	25	11	48	97	91	61	33	-

(G) **RESIDUAL:** ORANGE,MOIST TO WET,MED.STIFF,SILT,MICACEOUS

(H) **RESIDUAL:** RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY



ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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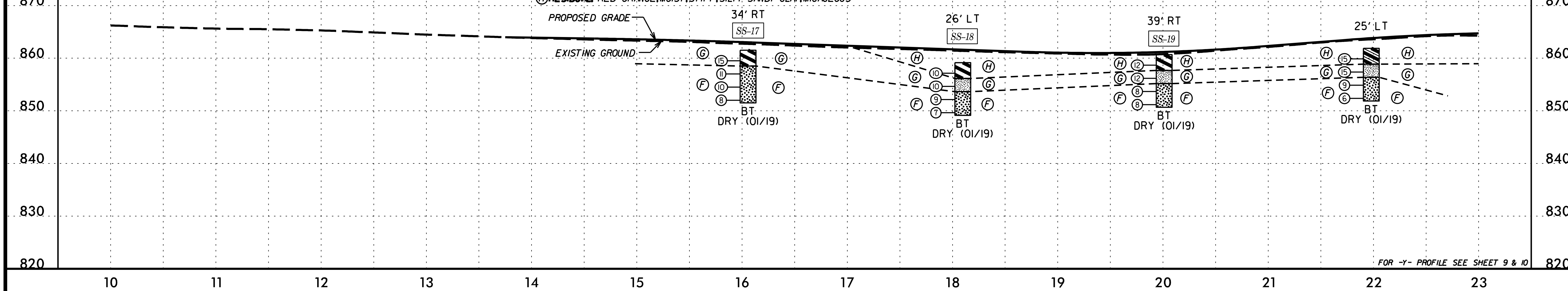
-Y-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-17	34 FT RT	16+06	1.0'-2.5'	A-7-5	62	23	19	18	18	45	97	85	63	28	-
SS-18	26 FT LT	18+10	1.0'-2.5'	A-7-5	71	34	20	21	9	50	95	83	59	30	-
SS-19	39 FT RT	20+01	1.0'-2.5'	A-7-5	66	35	12	16	18	54	100	92	77	34	-

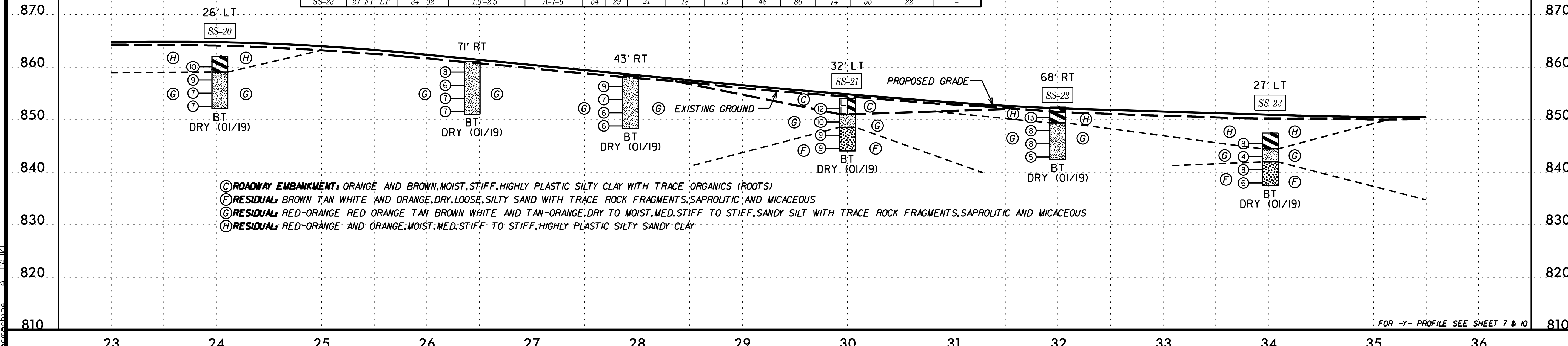
(F) **RESIDUAL:** ORANGE TAN-ORANGE AND WHITE,DRY,LOOSE TO MED.DENSE,SILTY SAND WITH TRACE ROCK FRAGMENTS,SAPROLITIC AND MICACEOUS
(G) **RESIDUAL:** RED-ORANGE AND ORANGE,MOIST TO DRY,STIFF,SILTY CLAY AND SANDY SILT,MICACEOUS
(H) **RESIDUAL:** RED-ORANGE,MOIST,STIFF,SILTY SANDY CLAY,MICACEOUS



-Y-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-20	26 FT LT	24+03	1.0'-2.5'	A-7-5	65	27	20	21	11	48	92	81	57	42	-
SS-21	32 FT LT	30+00	1.0'-2.5'	A-7-5	67	34	18	15	11	56	78	69	54	31	-
SS-22	68 FT RT	32+00	1.0'-2.5'	A-7-5	70	29	18	24	9	49	97	88	60	30	-
SS-23	27 FT LT	34+02	1.0'-2.5'	A-7-6	54	29	21	18	13	48	86	74	55	22	-



(C) **ROADWAY EMBANKMENT:** ORANGE AND BROWN,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY WITH TRACE ORGANICS (ROOTS)
(F) **RESIDUAL:** BROWN TAN WHITE AND ORANGE,DRY,LOOSE,SILTY SAND WITH TRACE ROCK FRAGMENTS,SAPROLITIC AND MICACEOUS
(G) **RESIDUAL:** RED-ORANGE RED ORANGE TAN BROWN WHITE AND TAN-ORANGE,DRY TO MOIST,MED.STIFF TO STIFF,SANDY SILT WITH TRACE ROCK FRAGMENTS,SAPROLITIC AND MICACEOUS
(H) **RESIDUAL:** RED-ORANGE AND ORANGE,MOIST,MED.STIFF TO STIFF,HIGHLY PLASTIC SILTY SANDY CLAY

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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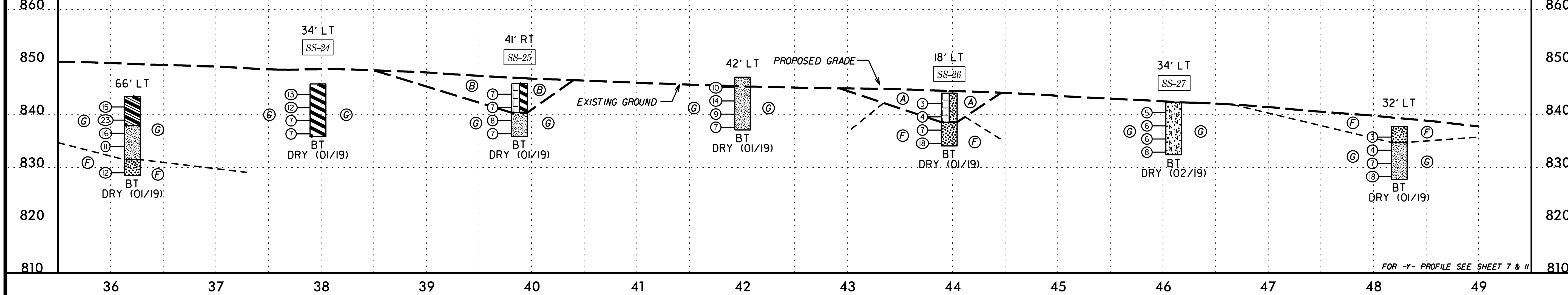
-Y-

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-24	34 FT LT	37+97	3.5'-5.0'	A-7-5	55	12	30	32	13	25	97	80	42	28	-
SS-25	41 FT RT	39+89	1.0'-2.5'	A-7-6	48	21	24	26	15	35	100	89	54	25	-
SS-26	18 FT LT	43+97	1.0'-2.5'	A-2-5	45	6	28	43	16	13	98	88	34	19	-
SS-27	34 FT LT	46+10	1.0'-2.5'	A-5	42	7	37	32	14	17	100	80	36	20	-

(A) **ROADWAY EMBANKMENT:** ORANGE, DRY TO MOIST, V. LOOSE, SILTY SAND, MICACEOUS
(B) **ROADWAY EMBANKMENT:** RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS
(F) **RESIDUAL:** ORANGE TAN AND WHITE, DRY TO MOIST, V. LOOSE TO MED. DENSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS
(G) **RESIDUAL:** RED-ORANGE ORANGE TAN AND WHITE, DRY TO MOIST, MED. STIFF TO V. STIFF, SANDY CLAYEY SILT AND SILTY CLAY, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS



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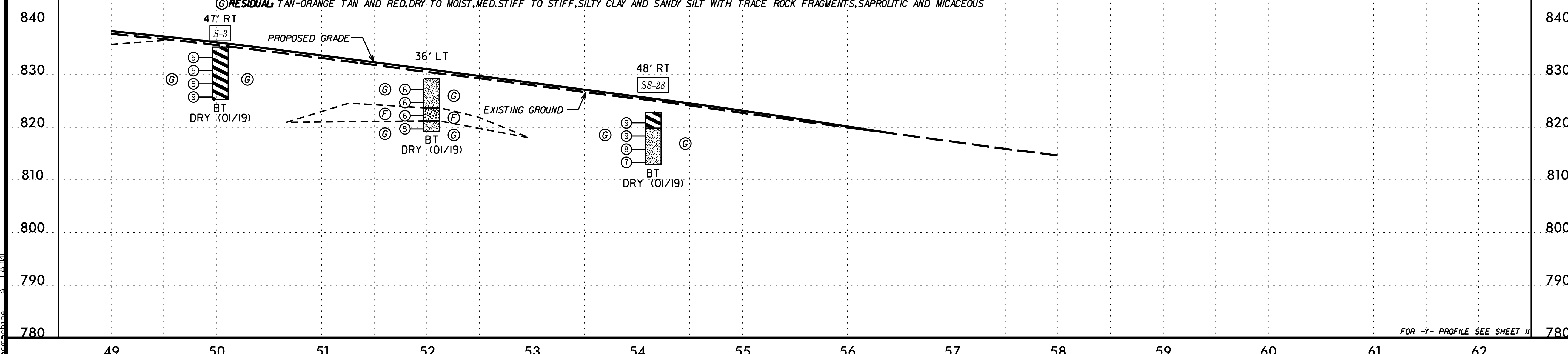
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-3	47 FT RT	50+04	3.5'-8.5'	A-7-5	46	14	32	29	14	25	90	74	40	25	-
SS-28	48 FT RT	54+15	1.0'-2.5'	A-7-5	56	22	16	32	12	40	100	95	57	30	-

(F) **RESIDUAL:** TAN AND WHITE, DRY, LOOSE, SILTY SAND WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS
(G) **RESIDUAL:** TAN-ORANGE TAN AND RED, DRY TO MOIST, MED. STIFF TO STIFF, SILTY CLAY AND SANDY SILT WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS



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PROJECT REFERENCE NO.	SHEET NO.
R-3833C	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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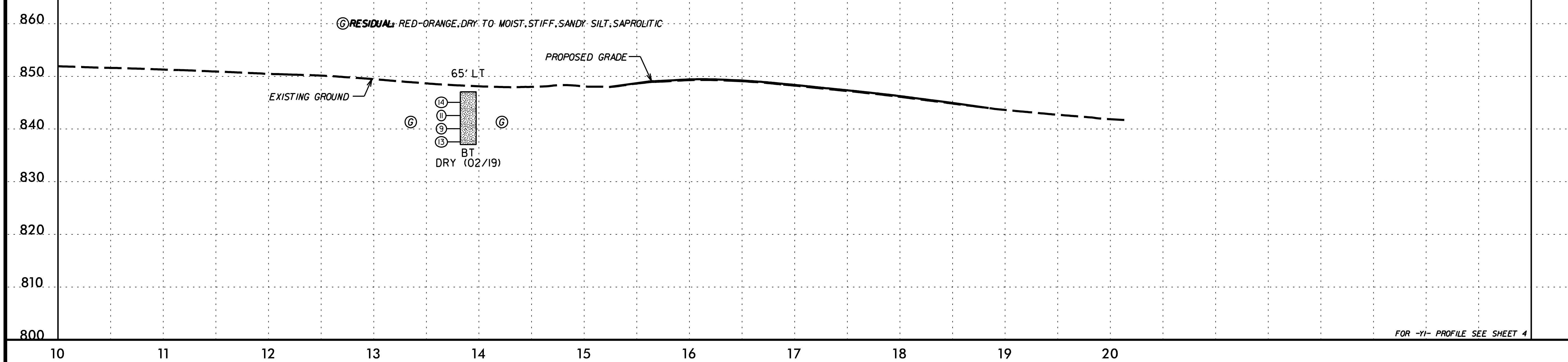
-Y1-



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-Y4-

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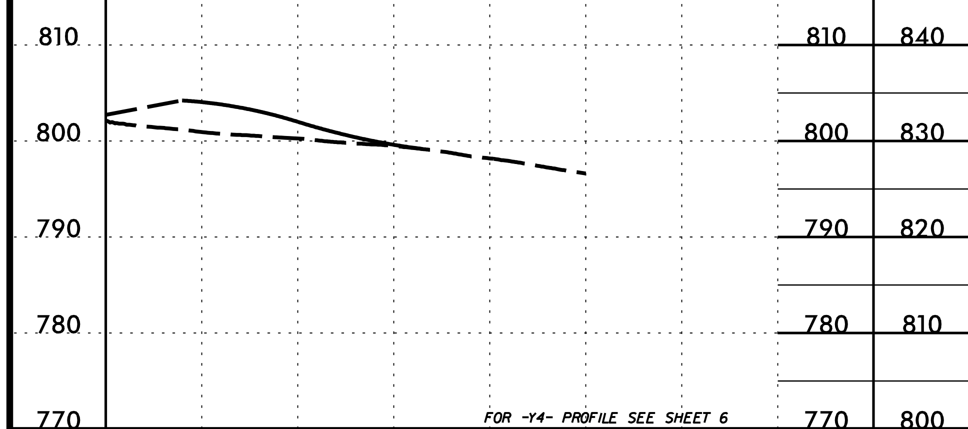
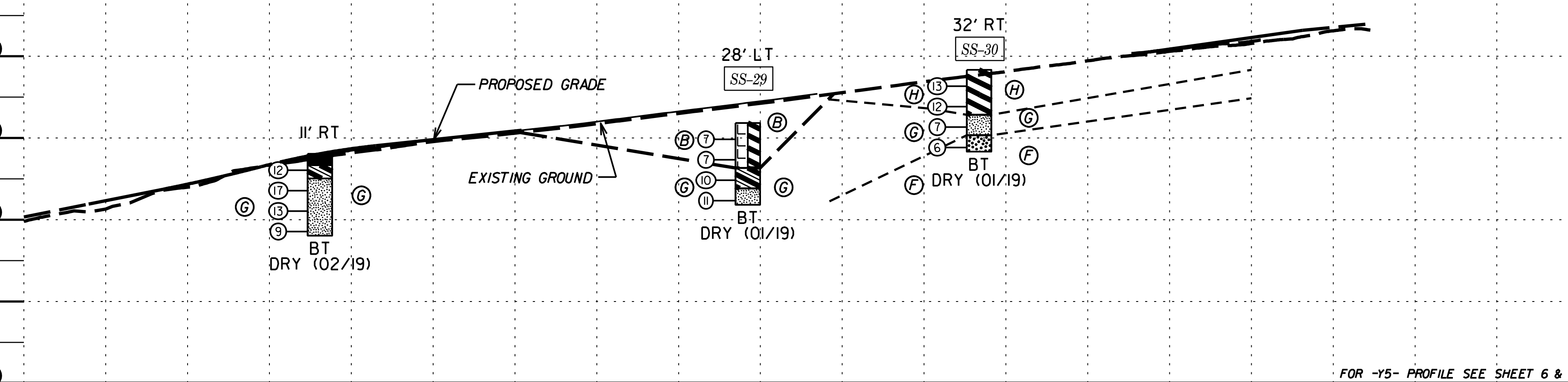


-Y5-

SOIL TEST RESULTS

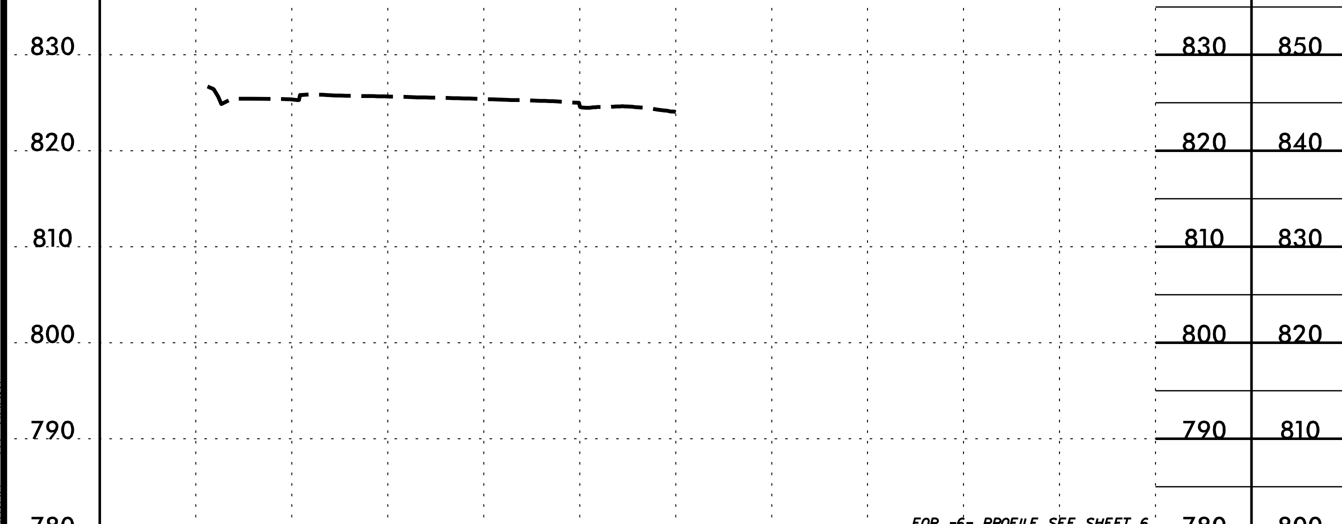
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	-
SS-30	32 FT RT	15+84	1.0'-2.5'	A-7-5	75	42	16	12	9	63	100	90	74	30	-

(B) **ROADWAY EMBANKMENT:** BROWN,MOIST,MED.STIFF,SILTY CLAY WITH TRACE ORGANICS,MICACEOUS
(F) **RESIDUAL:** TAN AND WHITE,MOIST,LOOSE,SILTY SAND WITH TRACE ROCK FRAGMENTS,SAPROLITIC AND MICACEOUS
(G) **RESIDUAL:** ORANGE TAN AND TAN-ORANGE,DRY TO MOIST,MED.STIFF TO V.STIFF,SANDY CLAY AND SANDY SILT,SAPROLITIC AND MICACEOUS
(H) **RESIDUAL:** ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY,MICACEOUS



-Y6-

NO BORINGS ON THIS ALIGNMENT



-Y7-

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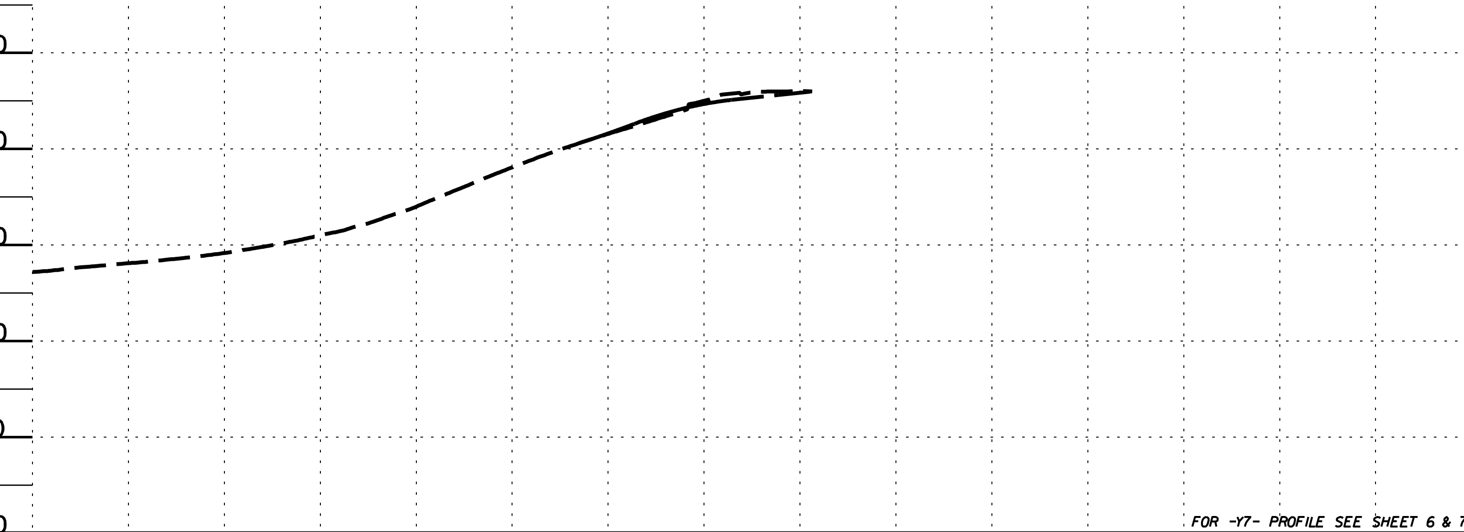
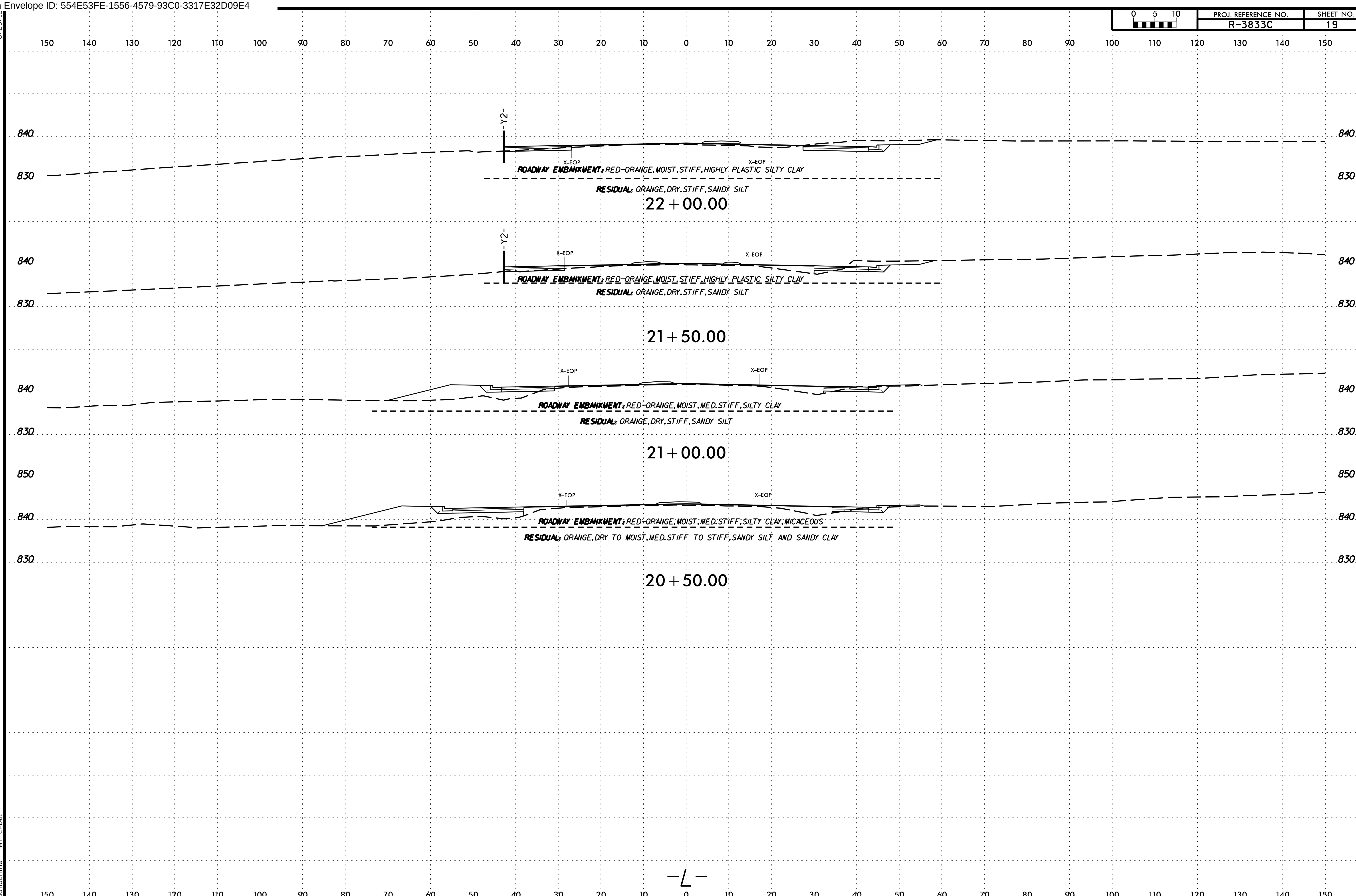



0 5 10
PROJ. REFERENCE NO.
R-3833C
SHEET NO.
19
ROADWAY EMBANKMENT: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
RESIDUAL: ORANGE, DRY, STIFF, SANDY SILT
22+00.00
ROADWAY EMBANKMENT: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
RESIDUAL: ORANGE, DRY, STIFF, SANDY SILT
21+50.00
ROADWAY EMBANKMENT: RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY
RESIDUAL: ORANGE, DRY, STIFF, SANDY SILT
21+00.00
ROADWAY EMBANKMENT: RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS
RESIDUAL: ORANGE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SANDY CLAY
20+50.00
-Y2-
X-EOP
-L-

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

840 830 820 810

24+01

X-EOP X-EOP

RESIDUAL: ORANGE AND BLACK,DRY TO MOIST,MED.STIFF TO STIFF,SILT

12 10 9 7

BT
DRY (02/19)

24+00.00

840 830 820

X-EOP X-EOP

RESIDUAL: ORANGE AND BLACK,DRY TO MOIST,MED.STIFF TO STIFF,SILT

23+50.00

840 830 820

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY
RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

23+00.00

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	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	–
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	–

840 830 820

22+35
SS-2
Y2-

4:1

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY
RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

8 11 10 9

BT
DRY (02/19)

22+50.00

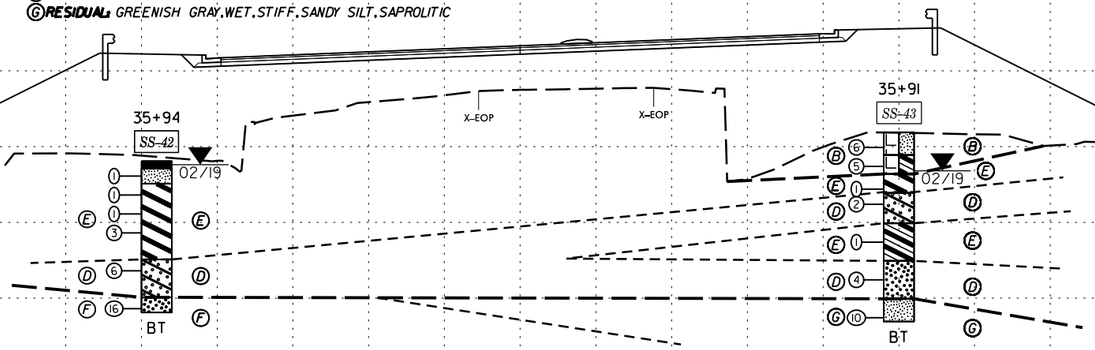
—L—

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

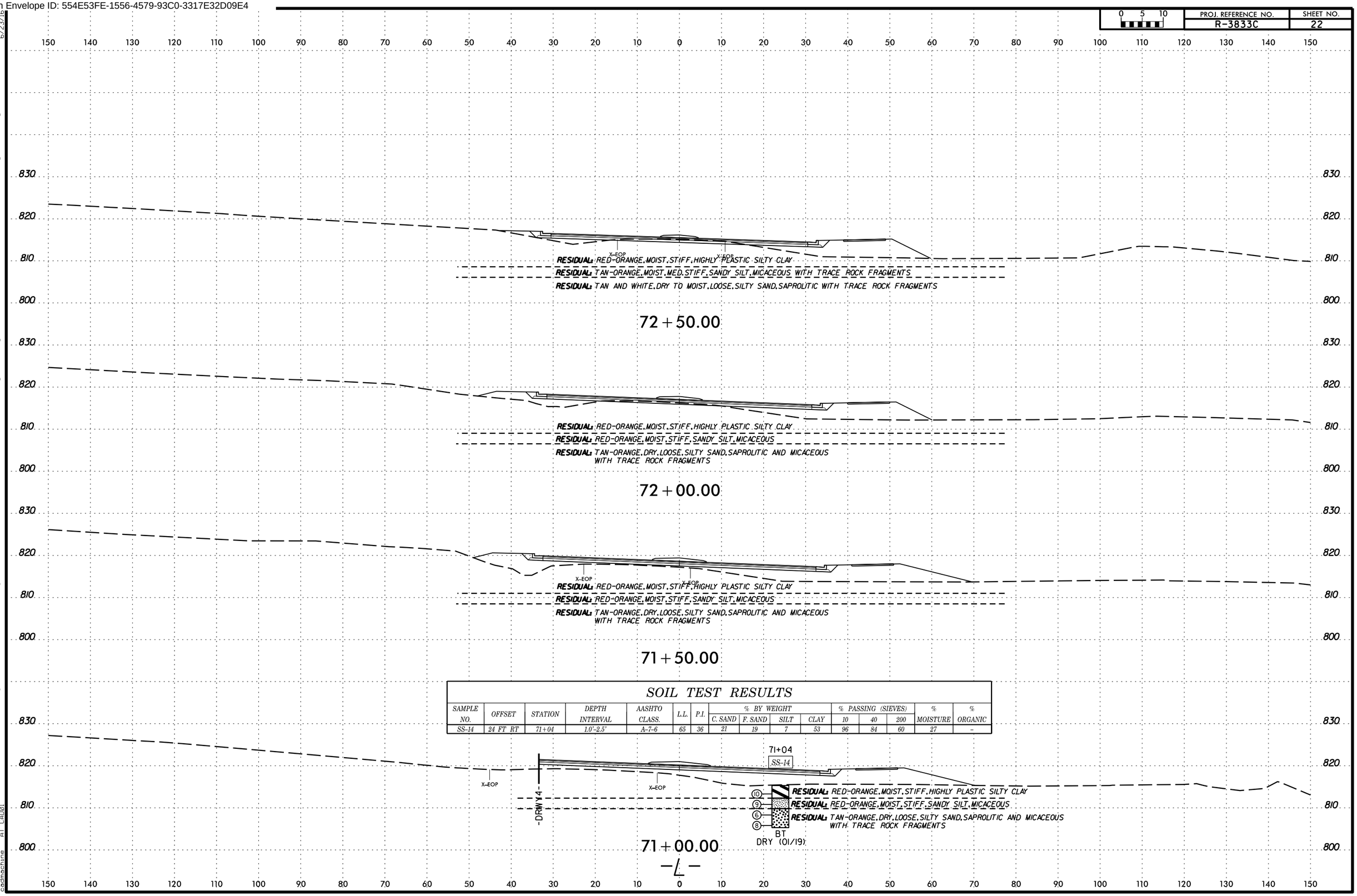
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-43	50 FT RT	35+91	6.0'-7.5'	A-7-6	44	24	24	25	16	35	95	81	52	37	-
SS-42	48 FT LT	35+94	3.5'-5.0'	A-7-6	48	21	19	21	26	34	94	83	60	34	-

(B) **ROADWAY EMBANKMENT:** GRAY TAN-ORANGE AND ORANGE, MOIST, MED. STIFF, SANDY SILT AND SANDY CLAY
(D) **ALLUVIAL:** GRAY, SAT., V. LOOSE TO LOOSE, SILTY SAND AND CLAYEY SAND
(E) **ALLUVIAL:** GRAY AND ORANGE, WET TO SAT., V. SOFT TO SOFT, SANDY SILT AND SILTY SANDY CLAY
(F) **RESIDUAL:** TAN, GRAY AND WHITE, WET, MED. DENSE, SILTY SAND, SAPROLITIC AND HIGHLY MICACEOUS
(G) **RESIDUAL:** GREENISH GRAY, WET, STIFF, SANDY SILT, SAPROLITIC



36 + 00.00

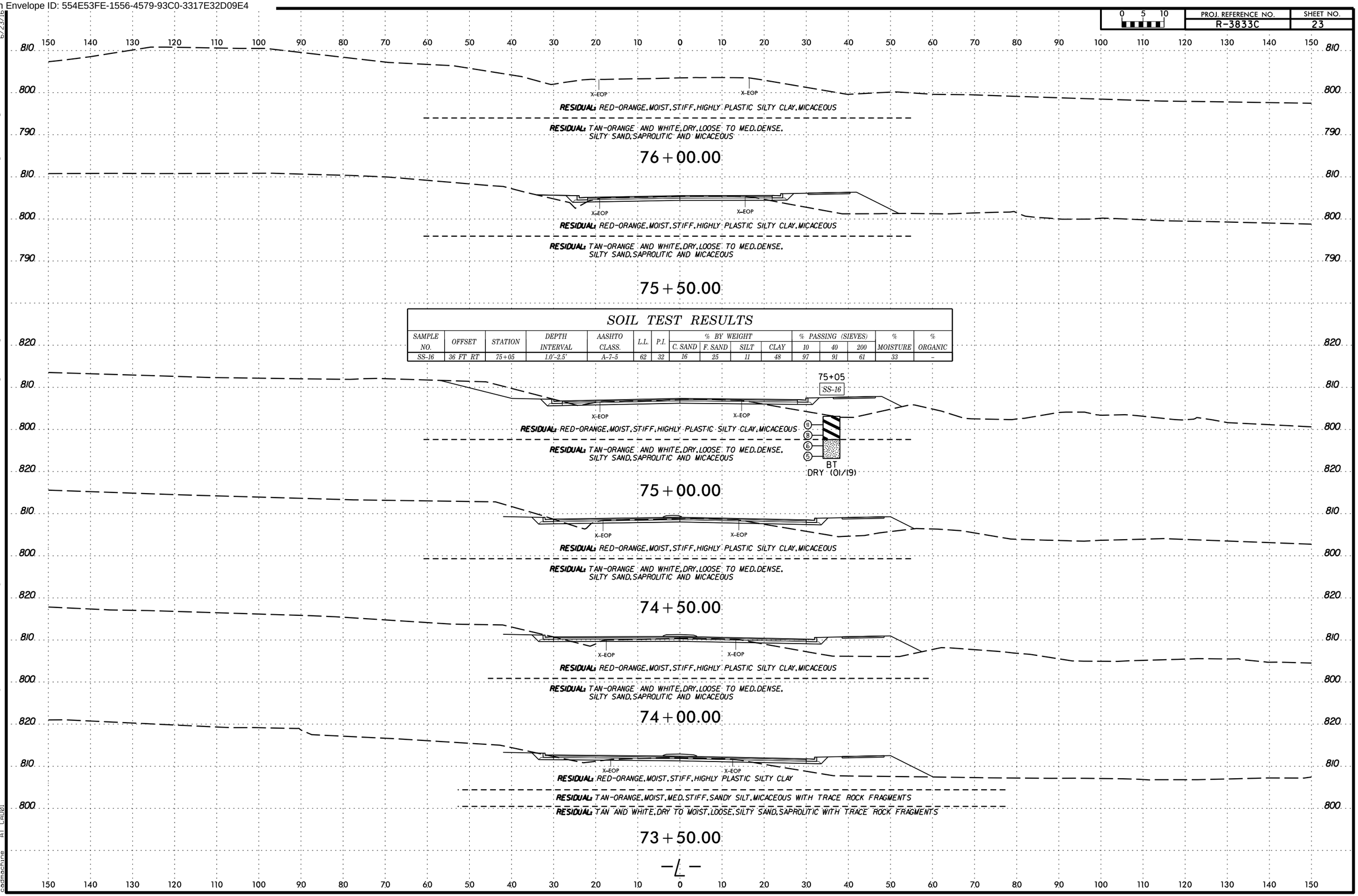
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	22



SOIL TEST RESULTS

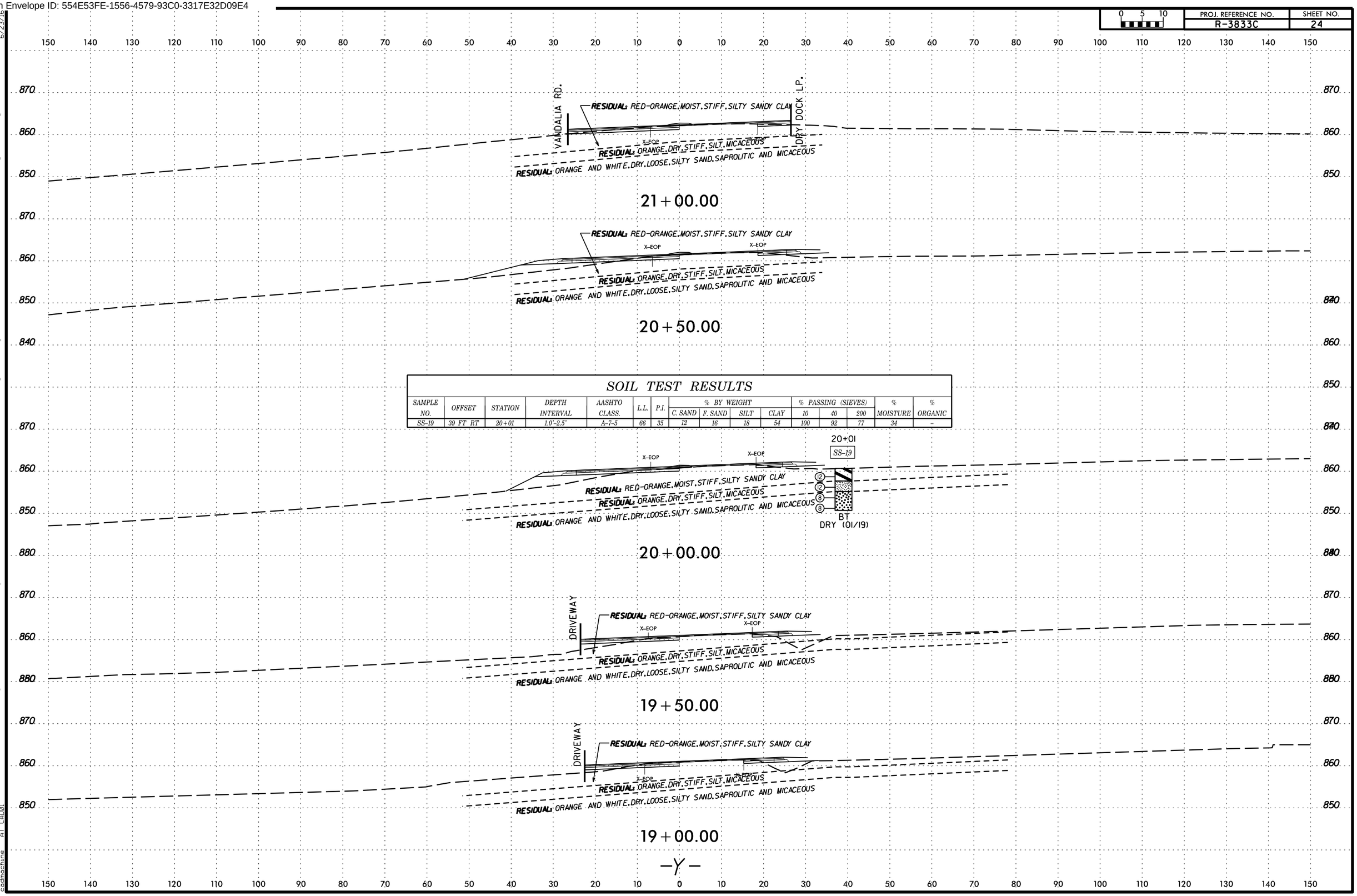
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-14	24 FT RT	71+04	1.0'-2.5'	A-7-6	65	36	21	19	7	53	96	84	60	27	-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	23



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-16	36 FT RT	75+05	1.0'-2.5'	A-7-5	62	32	16	25	11	48	97	91	61	33	–

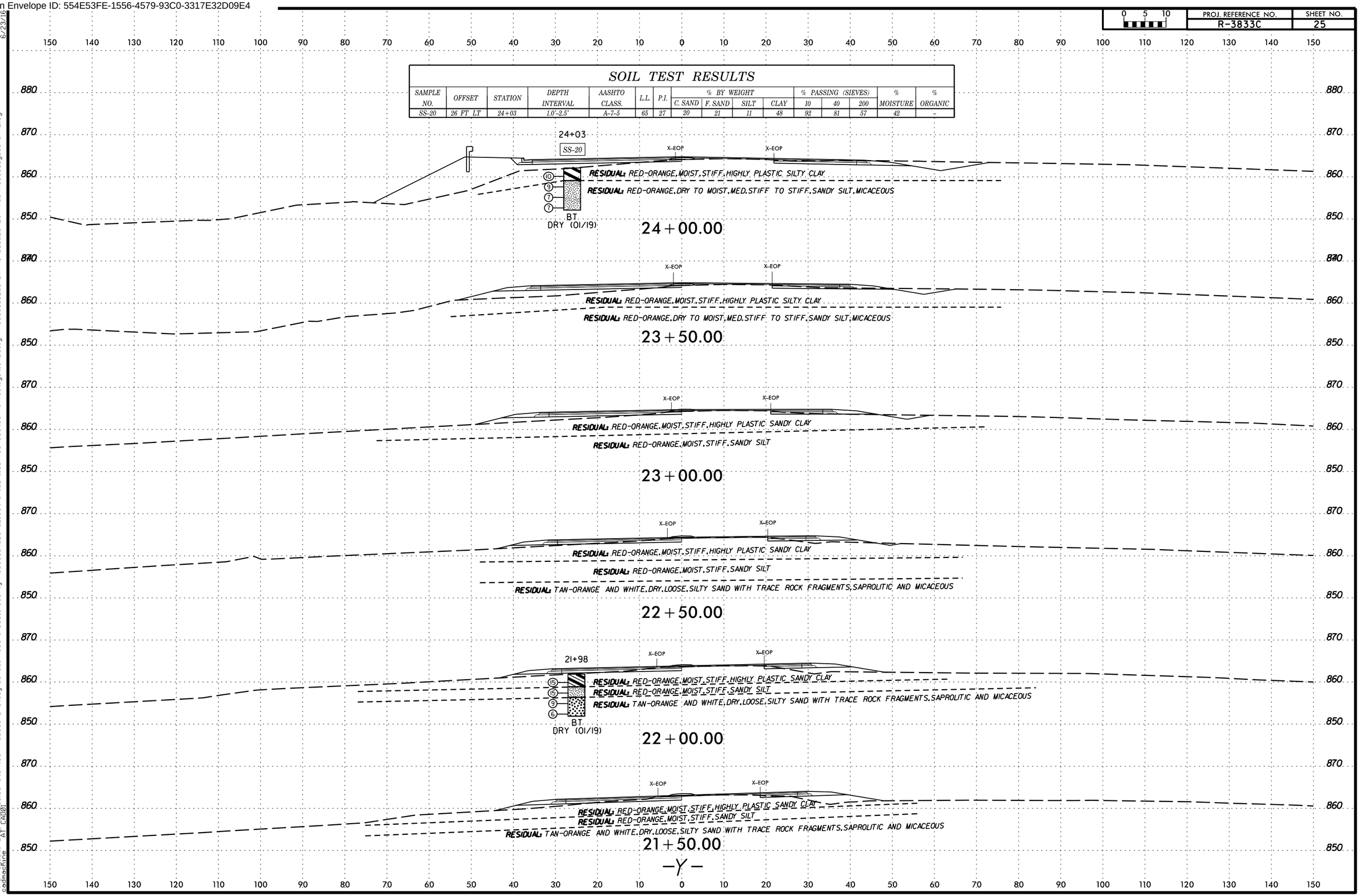


SOIL TEST RESULTS

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-19	39 FT RT	20+01	1.0'-2.5'	A-7-5	66	35	12	16	18	54	100	92	77	34	–

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-20	26 FT LT	24+03	1.0'-2.5'	A-7-5	65	27	20	21	11	48	92	81	57	42	-



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	26

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

870
860
850

X-EOP X-EOP

RESIDUAL: RED ORANGE AND TAN,MOIST,MED.STIFF,SANDY SILT,MICACEOUS WITH TRACE ROCK FRAGMENTS

25+50.00

870
860

X-EOP X-EOP

RESIDUAL: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

25+00.00

880
870
860

RESIDUAL: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

X-EOP X-EOP

DRIVEWAY

RESIDUAL: RED-ORANGE,DRY TO MOIST,MED.STIFF TO STIFF,SANDY SILT,MICACEOUS

24+50.00

850

-Y-

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

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS

RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS

RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND, SAPROLITIC & MICACEOUS WITH TRACE ROCK FRAGMENTS

16 + 50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-30	32 FT RT	15+84	1.0'-2.5'	A-7-5	75	42	16	12	9	63	100	90	74	30	–

15+84
SS-30

BT
DRY (01/19)

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS

RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS

RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND, SAPROLITIC & MICACEOUS WITH TRACE ROCK FRAGMENTS

16 + 00.00

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS

RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS

RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND, SAPROLITIC & MICACEOUS WITH TRACE ROCK FRAGMENTS

15 + 50.00

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS

RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS

RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND, SAPROLITIC & MICACEOUS WITH TRACE ROCK FRAGMENTS

15 + 00.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	–

14+42
SS-29

ROADWAY EMBANKMENT: BROWN, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS WITH TRACE ORGANICS

RESIDUAL: ORANGE, MOIST, STIFF, SANDY SILT AND SANDY CLAY

BT
DRY (01/19)

14 + 50.00

-Y5-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	28

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

850
840
830

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS
RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND WITH TRACE ROCK FRAGMENTS, SAPROLITIC & MICACEOUS

17 + 50.00

850
840
830

RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS
RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND, SAPROLITIC & MICACEOUS WITH TRACE ROCK FRAGMENTS

17 + 00.00

-Y5-

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6/23/16

25-APR-2019 15:21
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cadmachine
A1 CAD01

PROJECT REFERENCE NO.	SHEET NO.
R–3833C	29

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
PAVEMENT INVESTIGATION

REFERENCE: R–3833C

PROJECT: 34554

DS
WSH 7/3/2019
INITIALS DATE

Falcon Engineering, Inc. 1210 Trinity Road, Suite 110 Cary, NC 27513

PAVEMENT SECTION AND SUBGRADE CONDITION SUMMARY

BRAWLEY SCHOOL ROAD (SR 1100) FROM TALBERT ROAD (SR 1116) TO 1000' EAST OF US 21

IREDELL COUNTY, NORTH CAROLINA
WBS: 34554.1.3 ; TIP: R-3833C
Falcon Project No.: G18063.00

TEST LOCATION				PAVEMENT SECTION THICKNESS (INCHES)			SUBGRADE	NOTES
ALIGNMENT	STATION	OFFSET	LANE	HMA	AGGREGATE BASE	TOTAL	IN-SITU CBR	
-L-	19+99	10' LT	WESTBOUND, TURN LANE	23.00	6.00	29.00	13	Multiple Layers, delaminated at 11 inches
-L-	20+04	23' LT	WESTBOUND, TRAVEL LANE	12.00	0.00	12.00	8	Multiple Layers
-L-	20+04	7' RT	EASTBOUND, TRAVEL LANE	24.00	0.00	24.00	15	Multiple Layers, delamination at 11, 18 and 23 inches, base course crumbling
-L-	26+03	CL	EASTBOUND, TRAVEL LANE	9.00	0.00	9.00	7	Multiple Layers
-L-	30+99	CL	WESTBOUND, TRAVEL LANE	8.00	0.00	8.00	8	Multiple Layers
-L-	37+07	2' RT	EASTBOUND, TRAVEL LANE	6.00	6.00	12.00	9	Multiple Layers
-L-	43+02	9' LT	EASTBOUND, TRAVEL LANE	7.00	0.00	7.00	12	Multiple Layers
-L-	48+07	23' RT	EASTBOUND, TRAVEL LANE	7.00	0.00	7.00	15	Multiple Layers, broken at base
-L-	51+97	17' RT	EASTBOUND, TURN LANE	12.00	0.00	12.00	10	Multiple Layers, delaminated at 6 inches
-L-	54+40	30' LT	WESTBOUND, TRAVEL LANE	6.00	11.00	17.00	9	Multiple Layers, base course broken
-L-	60+04	3' LT	EASTBOUND, TURN LANE	7.00	7.00	14.00	6	Multiple Layers
-L-	62+99	22' RT	WESTBOUND, TRAVEL LANE	24.00	7.00	31.00	5	Multiple Layers, delaminated at 19 inches
-L-	63+00	10' RT	EASTBOUND, INSIDE TURN LANE	25.00	6.00	31.00	5	Multiple Layers, delaminated at 14 and 20 inches
-L-	63+00	4' LT	EASTBOUND, TRAVEL LANE	26.00	0.00	26.00	6	Multiple Layers, delaminated at 14 and 21 inches
-L-	63+01	19' LT	EASTBOUND, OUTSIDE TURN LANE	21.00	0.00	21.00	6	Multiple Layers, delaminated at 14 inches
-L-	71+99	1' LT	EASTBOUND, TRAVEL LANE	6.00	8.00	14.00	7	Multiple Layers
-Y-	18+01	10' RT	SOUTHBOUND, TRAVEL LANE	12.00	8.00	20.00	10	Multiple Layers
-Y-	23+04	4' RT	NORTHBOUND, TRAVEL LANE	12.00	7.00	19.00	8	Multiple Layers, delaminated at 7 inches
-Y-	29+38	16' RT	SOUTHBOUND, TRAVEL LANE	14.00	7.00	21.00	11	Multiple Layers, delaminated at 6 and 11 inches
-Y-	38+01	5' LT	NORTHBOUND, TURN LANE	11.00	0.00	11.00	4	Multiple Layers
-Y-	44+13	1' LT	NORTHBOUND, TRAVEL LANE	12.00	10.00	22.00	10	Multiple Layers
-Y-	50+07	3' RT	CENTRAL TURN LANE	13.00	9.00	22.00	8	Multiple Layers, Delaminated at 7, 9 and 10 inches. Full depth cracking in older layers
-Y-	55+00	2' RT	CENTRAL TURN LANE	12.00	8.00	20.00	4	Multiple Layers, delaminated at 8 inches
-Y5-	11+81	12' RT	EASTBOUND, TRAVEL LANE	11.00	6.00	17.00	10	Multiple Layers
-Y5-	15+95	7' LT	WESTBOUND, TRAVEL LANE	9.00	0.00	9.00	5	Multiple layers
REPRESENTATIVE AVERAGE				13.16	4.24	17.40	N/A	-

TOP

BOTTOM

PAVEMENT CORE - L_19+99_10'LT

TOP

BOTTOM

PAVEMENT CORE - L_20+04_23'LT

TOP

BOTTOM

PAVEMENT CORE - L_20+04_7'RT

TOP

BOTTOM

PAVEMENT CORE - L_26+03

FALCON ENGINEERING

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

PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS

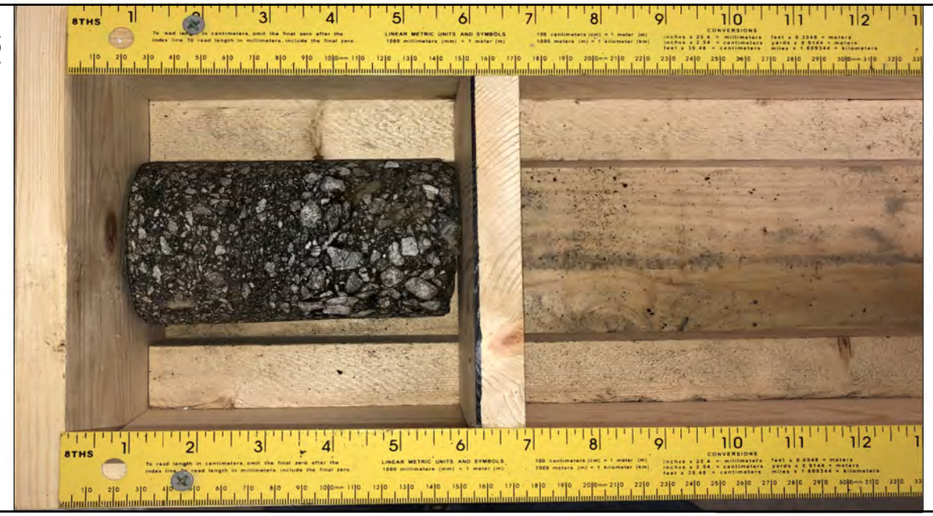
SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - L_30+99

TOP



BOTTOM

PAVEMENT CORE - L_37+07_2'RT

TOP

BOTTOM

PAVEMENT CORE - L_43+02_9'LT

TOP

BOTTOM

PAVEMENT CORE - L_48+07_23'RT

FALCON ENGINEERING, INC.
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CARY, NC 27513

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PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - L_51+97_17'RT

TOP

BOTTOM

PAVEMENT CORE - L_54+40_30'LT

TOP

BOTTOM

PAVEMENT CORE - L_60+04_3'LT

TOP

BOTTOM

PAVEMENT CORE - L_62+99_22'RT

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1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

PHONE: 919.871.0800]

PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - L_63+00_10'RT

TOP

BOTTOM

PAVEMENT CORE - L_63+00_4'LT

TOP

BOTTOM

PAVEMENT CORE - L_63+00_19'LT

TOP

BOTTOM

PAVEMENT CORE - L_71+99_1'LT

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CARY, NC 27513

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PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - Y_18+01_10'RT

TOP

BOTTOM

PAVEMENT CORE - Y_23+04_4'RT

TOP

BOTTOM

PAVEMENT CORE - Y_29+38_16'RT

TOP

BOTTOM

PAVEMENT CORE - Y_38+01_5'LT

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CARY, NC 27513

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PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - Y_44+13_1'LT

TOP

BOTTOM

PAVEMENT CORE - Y_50+07_3'RT

TOP

BOTTOM

PAVEMENT CORE - Y_55+00_2'RT

TOP

BOTTOM

PAVEMENT CORE - Y5_11+81_12RT

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CARY, NC 27513

PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

TOP

BOTTOM

PAVEMENT CORE - Y5_15+95_7'LT

FALCON ENGINEERING

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

PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
IREDELL / NORTH CAROLINA
WBS NO.:34554.1.1 | TIP NO.: R-3833C
FALCON PROJECT NO.: G18063.00

DCP TEST DATA

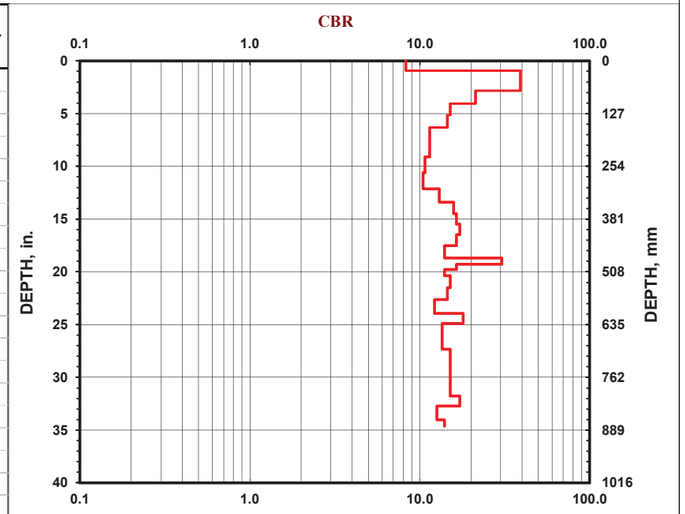
File Name: L_19+99_10'LT

Project: R-3833C
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	24	1
4	48	1
4	72	1
3	103	1
2	131	1
2	160	1
2	196	1
2	232	1
2	270	1
2	309	1
2	341	1
2	368	1
2	394	1
2	419	1
2	445	1
2	475	1
2	490	1
1	503	1
1	518	1
2	546	1
2	575	1
2	609	1
2	633	1
2	664	1
2	695	1
2	723	1
2	751	1
2	779	1
2	807	1
2	832	1
2	865	1
1	880	1



DCP TEST DATA

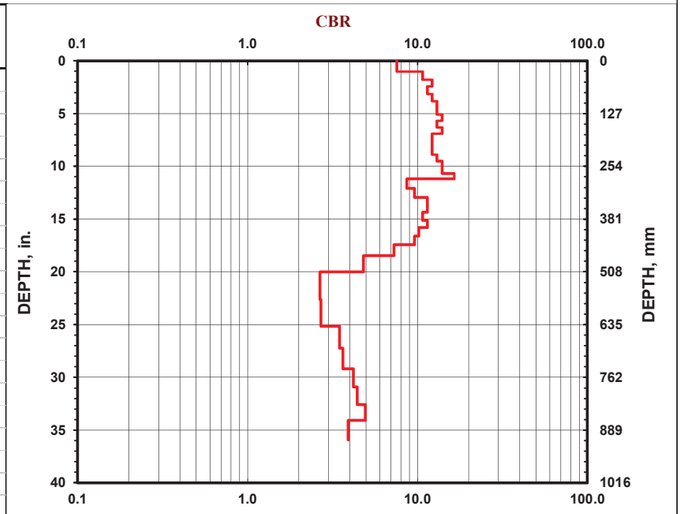
File Name: L_20_04_23'LT

Project: R-3833C
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	26	1
1	45	1
1	62	1
1	80	1
1	97	1
1	113	1
1	129	1
1	144	1
1	160	1
1	175	1
1	192	1
1	209	1
1	226	1
1	242	1
1	257	1
1	272	1
1	285	1
1	308	1
1	329	1
1	347	1
1	365	1
1	384	1
1	402	1
1	422	1
1	443	1
1	470	1
1	509	1
1	575	1
1	640	1
1	692	1
1	742	1
1	786	1
1	828	1
1	866	1
1	913	1



DCP TEST DATA

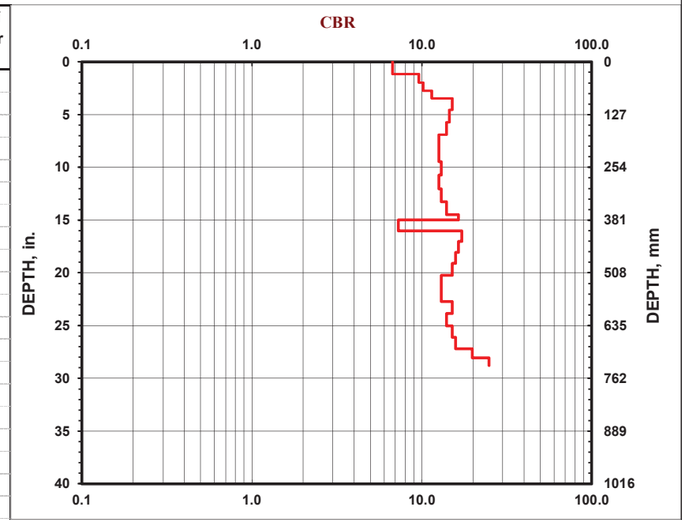
File Name: L_20+04_7'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	29	1
1	50	1
1	70	1
1	88	1
2	116	1
2	145	1
2	175	1
2	208	1
2	241	1
2	273	1
2	306	1
2	338	1
2	368	1
1	381	1
1	408	1
2	433	1
2	459	1
2	486	1
2	514	1
2	546	1
2	578	1
2	606	1
2	636	1
2	664	1
2	691	1
2	713	1
2	731	1



DCP TEST DATA

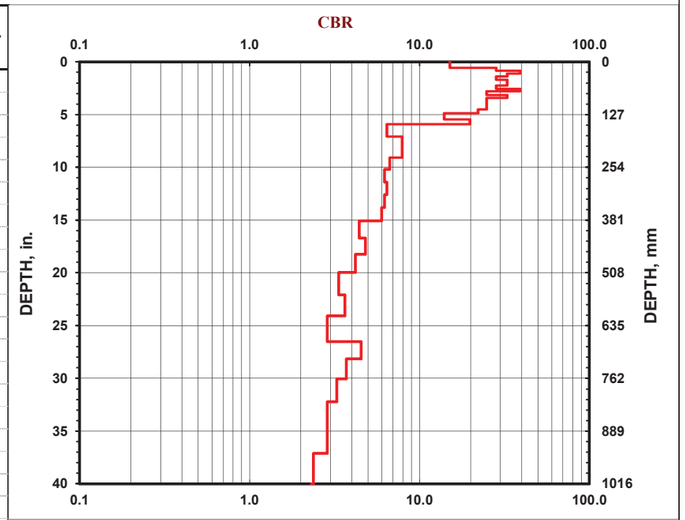
File Name: L_26+03

Project: *R-3833c*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	22	1
1	28	1
1	35	1
1	43	1
1	50	1
1	57	1
1	65	1
1	71	1
1	80	1
1	87	1
1	96	1
1	105	1
1	114	1
1	124	1
1	139	1
1	150	1
1	180	1
1	205	1
1	230	1
1	259	1
1	290	1
1	320	1
1	351	1
1	383	1
1	425	1
1	464	1
1	508	1
1	562	1
1	612	1
1	674	1
1	715	1
1	764	1
1	819	1
1	881	1
1	943	1
1	1016	1
1	1091	1



DCP TEST DATA

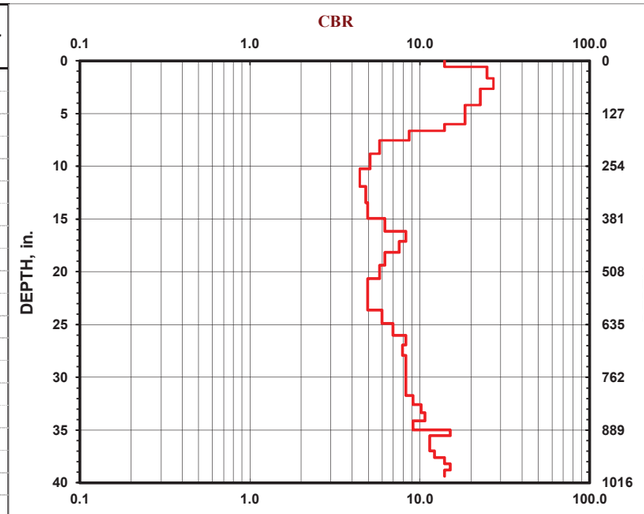
File Name: L_30+99

Project: *R-3833C*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	15	1
3	42	1
3	67	1
4	106	1
4	153	1
1	168	1
1	191	1
1	224	1
1	261	1
1	303	1
1	342	1
1	380	1
1	411	1
1	435	1
1	461	1
1	492	1
1	525	1
1	563	1
1	601	1
1	633	1
1	661	1
1	685	1
1	710	1
1	734	1
1	758	1
1	782	1
1	806	1
1	828	1
1	848	1
1	867	1
1	889	1
1	903	1
1	921	1
1	939	1
1	956	1
1	971	1
1	985	1
1	1000	1



DCP TEST DATA

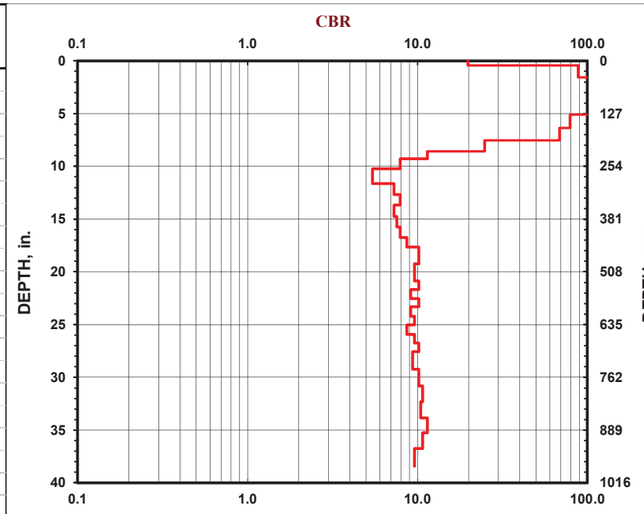
File Name: L_37+07_2'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	11	1
10	40	1
15	68	1
15	95	1
15	130	1
10	162	1
8	191	1
3	218	1
1	236	1
1	261	1
1	296	1
1	323	1
1	348	1
1	375	1
1	401	1
1	426	1
1	449	1
2	489	1
1	510	1
1	531	1
1	551	1
1	573	1
1	593	1
1	615	1
1	636	1
1	659	1
1	680	1
1	700	1
2	743	1
2	783	1
2	821	1
2	860	1
2	896	1
2	934	1
2	976	1



DCP TEST DATA

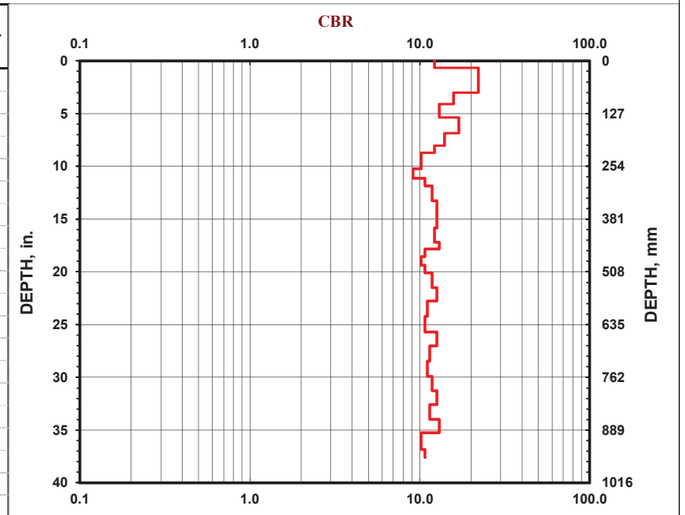
File Name: L_43+02_9'LT

Project: *R-3833C*
Location: Moorseville, NC
Date: 25-Feb-19
Soil Type(s): 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	17	1
3	47	1
3	77	1
2	104	1
2	136	1
3	174	1
2	204	1
1	221	1
1	241	1
1	261	1
1	283	1
1	302	1
2	337	1
2	370	1
2	403	1
2	437	1
1	453	1
1	472	1
1	492	1
1	511	1
2	546	1
2	579	1
2	616	1
1	635	1
1	654	1
2	687	1
1	705	1
1	723	1
2	760	1
2	795	1
2	828	1
2	864	1
2	896	1
2	936	1
1	955	1



DCP TEST DATA

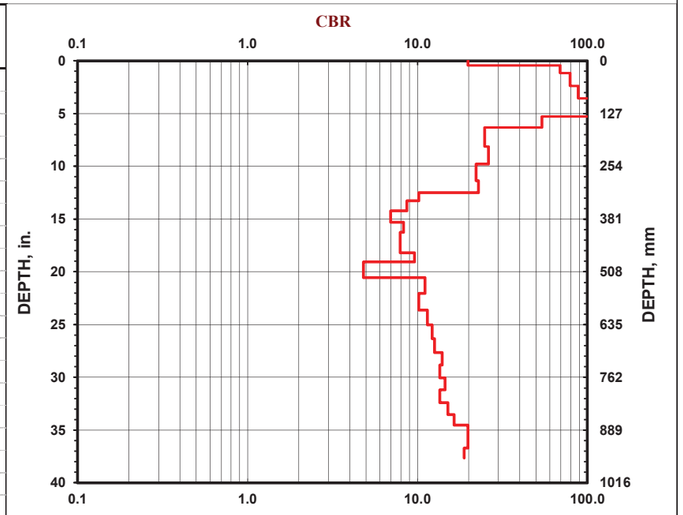
File Name: L_48+07_23'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	11	1
5	29	1
10	61	1
10	90	1
10	110	1
10	134	1
6	161	1
5	206	1
5	249	1
4	289	1
3	318	1
1	338	1
1	361	1
1	389	1
1	413	1
1	438	1
1	463	1
1	484	1
1	523	1
2	560	1
2	600	1
2	636	1
2	670	1
2	703	1
2	733	1
2	764	1
2	793	1
2	824	1
2	852	1
2	878	1
2	900	1
1	911	1
2	933	1
2	956	1



DCP TEST DATA

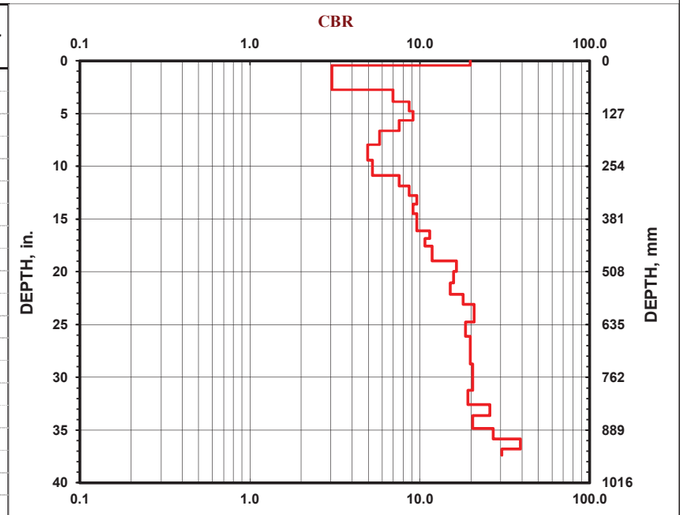
File Name: L_51+97_17'RT

Project: *R-3833C* **Date:** 24-Feb-19
Location: Mooresville, NC **Soil Type(s):** A-2-6

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	11	1
1	70	1
1	98	1
1	121	1
1	143	1
1	169	1
1	202	1
1	240	1
1	276	1
1	302	1
1	325	1
1	346	1
1	368	1
1	389	1
1	410	1
1	428	1
1	447	1
2	482	1
2	508	1
2	535	1
2	563	1
2	587	1
2	608	1
2	629	1
3	664	1
3	697	1
3	730	1
3	762	1
3	794	1
3	828	1
3	854	1
3	886	1
3	911	1
4	935	1
2	950	1



DCP TEST DATA

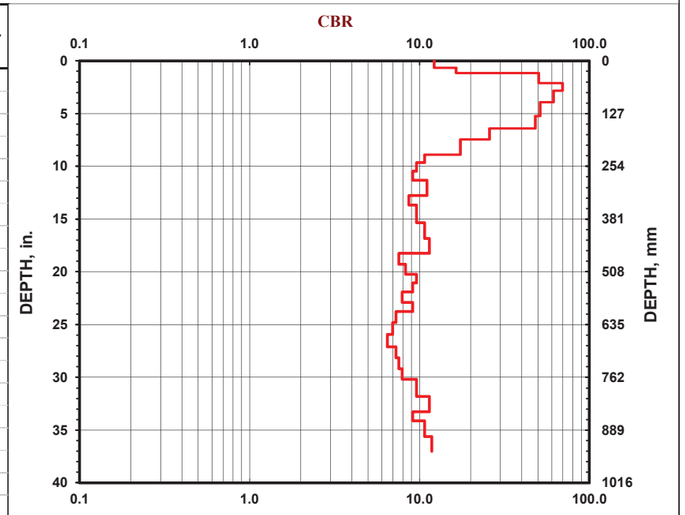
File Name: L_54+40_30'LT

Project: *R-3833C* **Date:** 25-Feb-19
Location: Mooresville, NC **Soil Type(s):** A-2-4

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	17	1
1	30	1
5	54	1
5	72	1
7	100	1
7	133	1
6	163	1
3	189	1
3	226	1
1	245	1
1	266	1
1	288	1
2	325	1
1	348	1
1	369	1
1	390	1
2	428	1
2	464	1
1	490	1
1	514	1
1	535	1
1	557	1
1	582	1
1	604	1
1	631	1
1	659	1
1	689	1
1	716	1
1	742	1
1	767	1
1	788	1
1	809	1
2	845	1
1	867	1
2	905	1
2	940	1



DCP TEST DATA

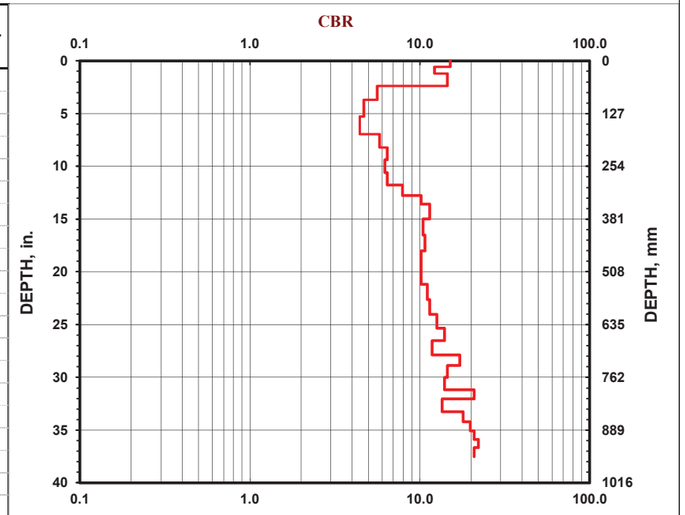
File Name: L_60+04_3'LT

Project: *R-3833C* **Date:** 24-Feb-19
Location: Mooresville, NC **Soil Type(s):** 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	31	1
2	60	1
1	94	1
1	134	1
1	176	1
1	209	1
1	239	1
1	270	1
1	300	1
1	325	1
1	345	1
2	381	1
2	420	1
2	458	1
2	498	1
2	538	1
2	575	1
2	611	1
2	644	1
2	674	1
2	709	1
2	734	1
2	763	1
2	793	1
2	814	1
2	845	1
2	869	1
2	891	1
2	912	1
2	932	1
2	953	1



DCP TEST DATA

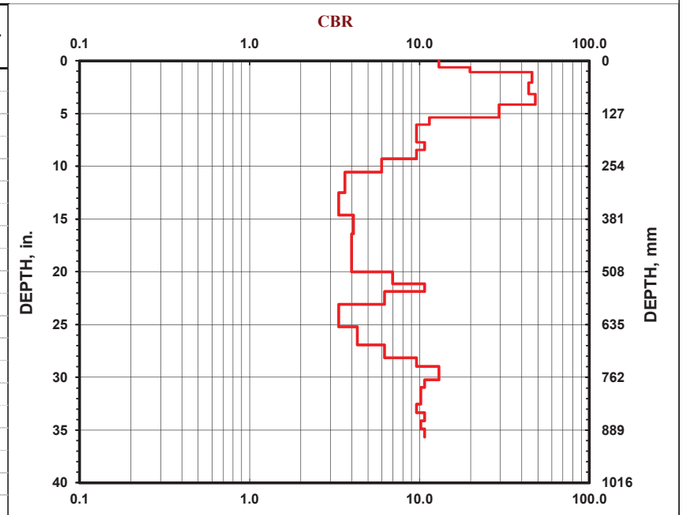
File Name: L_62+99_22'RT

Project: *R-3833C* **Date:** 24-Feb-19
Location: Mooresville, NC **Soil Type(s):** 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	16	1
1	27	1
5	53	1
5	80	1
5	105	1
4	136	1
1	154	1
1	175	1
1	196	1
1	215	1
1	236	1
1	268	1
1	318	1
1	372	1
1	417	1
1	463	1
1	509	1
1	537	1
1	556	1
1	587	1
1	641	1
1	684	1
1	715	1
1	736	1
2	768	1
1	787	1
1	807	1
1	827	1
1	848	1
1	867	1
1	887	1
1	906	1



DCP TEST DATA

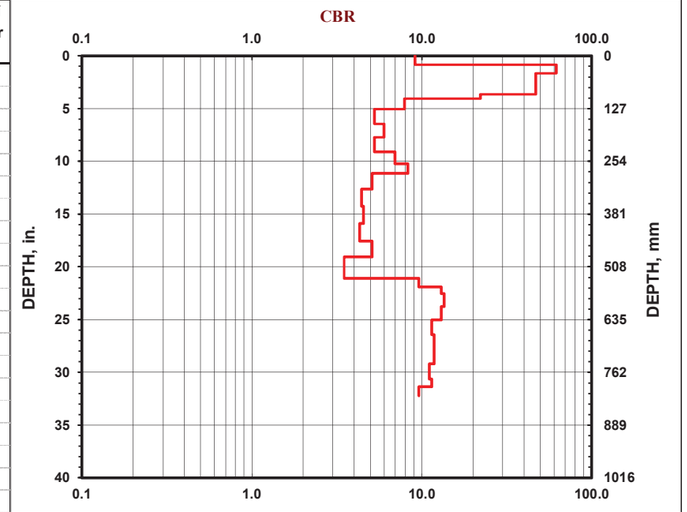
File Name: L_63+00_10'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	22	1
5	42	1
10	93	1
1	103	1
1	128	1
1	164	1
1	196	1
1	232	1
1	260	1
1	284	1
1	321	1
1	363	1
1	404	1
1	447	1
1	484	1
1	536	1
1	557	1
1	573	1
2	604	1
2	636	1
2	672	1
2	707	1
2	742	1
2	779	1
1	797	1
1	818	1



DCP TEST DATA

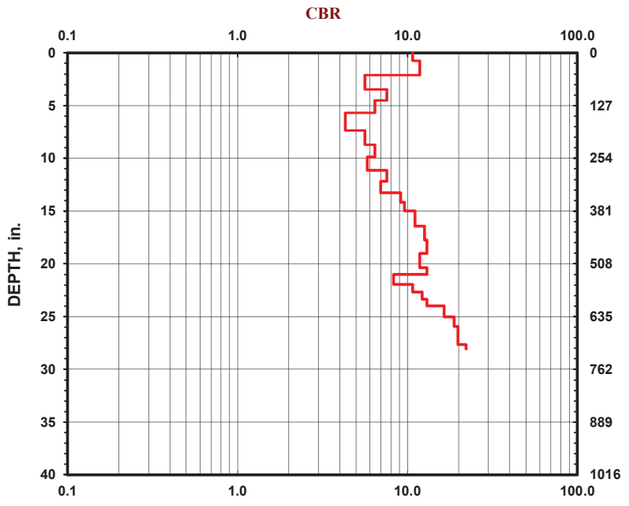
File Name: L_63+00_4'LT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	19	1
2	54	1
1	88	1
1	114	1
1	144	1
1	187	1
1	221	1
1	251	1
1	284	1
1	310	1
1	338	1
1	360	1
1	381	1
2	418	1
2	451	1
2	483	1
2	518	1
1	534	1
1	558	1
1	577	1
1	594	1
1	610	1
1	623	1
1	636	1
2	659	1
2	681	1
2	703	1
1	713	1



DCP TEST DATA

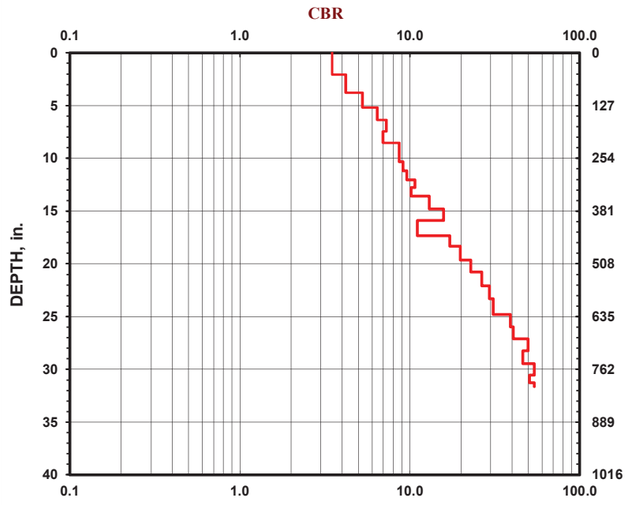
File Name: L_63+00_19'LT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	52	1
1	96	1
1	132	1
1	162	1
1	189	1
1	217	1
1	240	1
1	263	1
1	285	1
1	306	1
1	325	1
1	345	1
2	377	1
2	404	1
2	441	1
2	466	1
3	499	1
3	528	1
4	562	1
4	593	1
5	630	1
5	660	1
5	689	1
6	718	1
6	749	1
6	776	1
4	795	1
2	804	1



DCP TEST DATA

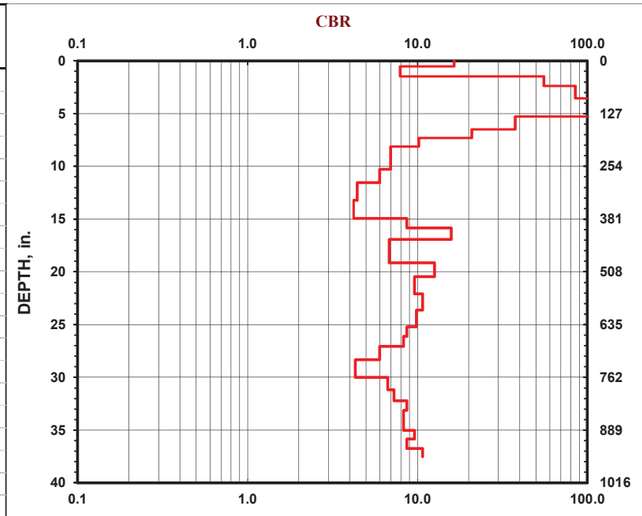
File Name: L_71+99_1'LT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	13	1
1	38	1
5	60	1
10	90	1
10	114	1
10	134	1
5	165	1
2	186	1
1	206	1
1	234	1
1	262	1
1	294	1
1	336	1
1	380	1
1	403	1
2	430	1
2	487	1
2	520	1
2	562	1
2	600	1
2	641	1
1	664	1
1	688	1
1	720	1
1	763	1
1	792	1
1	819	1
1	842	1
1	866	1
1	890	1
1	911	1
1	934	1
1	953	1



DCP TEST DATA

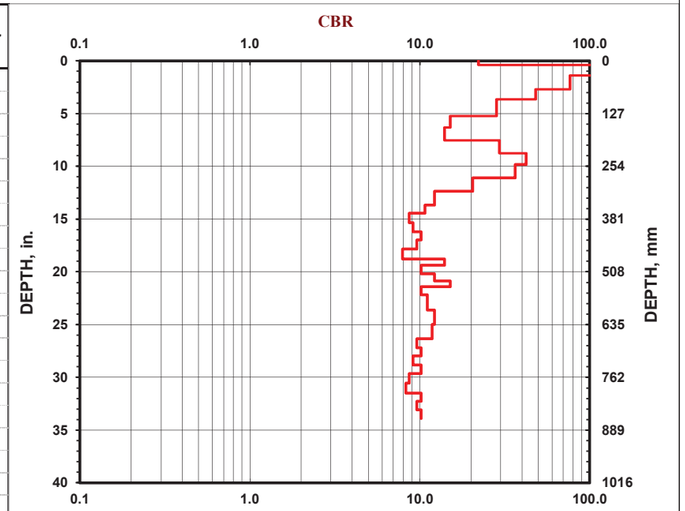
File Name: Y_18+01_10'RT

Project: *R-3833C* **Date:** 24-Feb-19
Location: Mooresville, NC **Soil Type(s):** A-2-4

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	10	1
10	35	1
10	68	1
5	93	1
5	133	1
2	161	1
2	191	1
4	222	1
5	250	1
5	282	1
3	314	1
2	348	1
1	367	1
1	390	1
1	412	1
1	432	1
1	453	1
1	478	1
1	493	1
1	513	1
1	530	1
1	544	1
1	564	1
2	601	1
2	635	1
2	670	1
1	691	1
1	711	1
1	733	1
1	753	1
1	776	1
1	800	1
1	820	1
1	841	1
1	861	1



DCP TEST DATA

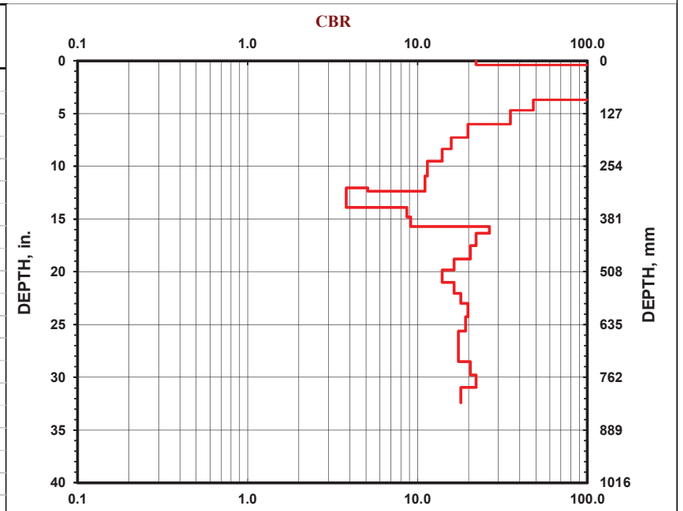
File Name: Y_23+04_4'RT

Project: *R-3833C* **Date:** 24-Feb-19
Location: Mooresville, NC **Soil Type(s):** 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	10	1
10	30	1
15	62	1
15	94	1
5	119	1
5	152	1
3	185	1
2	212	1
2	242	1
2	278	1
2	315	1
1	306	1
1	354	1
1	377	1
1	399	1
2	416	1
3	446	1
3	478	1
2	504	1
2	534	1
2	560	1
2	584	1
3	617	1
3	651	1
3	688	1
3	725	1
3	757	1
3	787	1
3	823	1



DCP TEST DATA

File Name: Y_29+38_16'RT

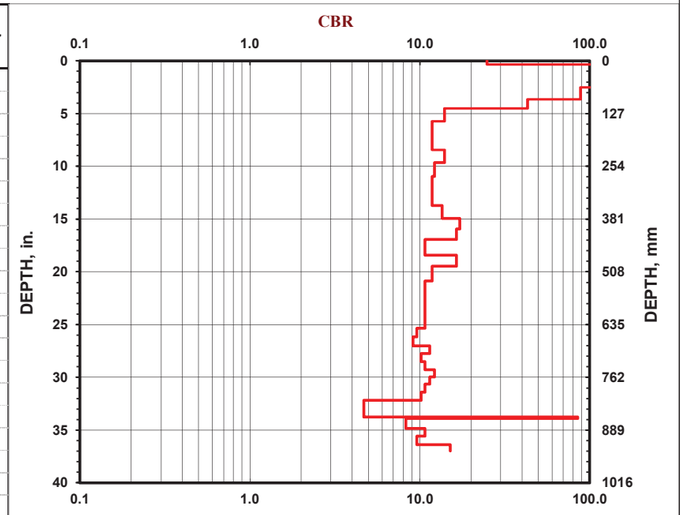
Project: *R-3833C* **Date:** 24-Feb-19

Location: Mooresville, NC **Soil Type(s):** 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	9	1
10	28	1
10	45	1
15	64	1
10	93	1
4	115	1
2	145	1
2	180	1
2	215	1
2	245	1
2	279	1
2	314	1
2	349	1
2	380	1
2	405	1
2	431	1
2	469	1
2	495	1
2	530	1
2	568	1
2	606	1
2	644	1
1	665	1
1	687	1
1	705	1
1	725	1
1	744	1
1	761	1
1	779	1
1	798	1
1	818	1
1	858	1
1	861	1
1	885	1
1	904	1
1	925	1
1	939	1



DCP TEST DATA

File Name: Y_38+01_5'LT

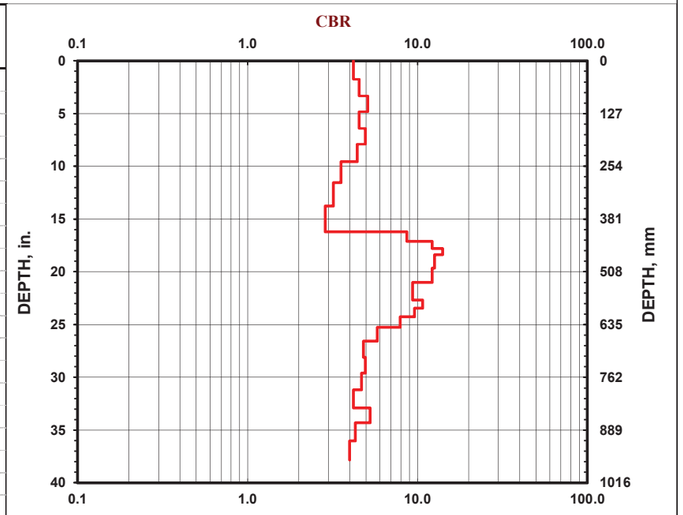
Project: *R-3833C* **Date:** 24-Feb-19

Location: Mooresville, NC **Soil Type(s):** 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	44	1
1	85	1
1	122	1
1	163	1
1	201	1
1	243	1
1	294	1
1	350	1
1	412	1
1	435	1
1	452	1
1	467	1
2	500	1
2	534	1
2	577	1
1	596	1
1	617	1
1	642	1
1	675	1
1	714	1
1	752	1
1	792	1
1	836	1
1	872	1
1	915	1
1	961	1



DCP TEST DATA

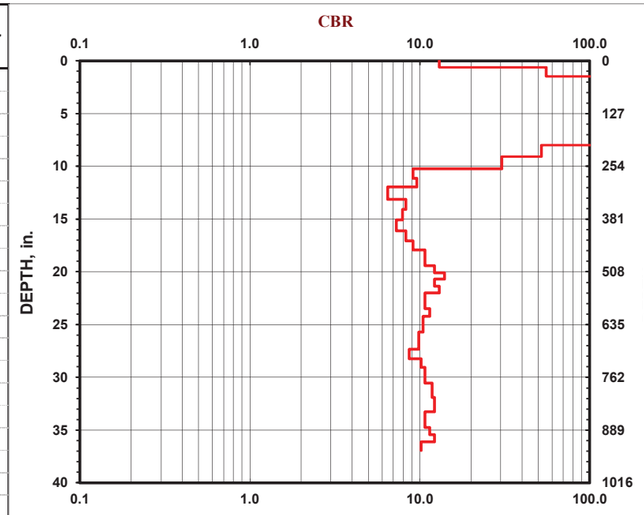
File Name: Y_44+13_1'LT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	16	1
5	38	1
10	54	1
15	72	1
15	86	1
15	103	1
15	118	1
15	137	1
15	166	1
15	203	1
6	231	1
4	261	1
1	283	1
1	304	1
1	334	1
1	358	1
1	383	1
1	410	1
1	434	1
1	456	1
1	475	1
1	494	1
1	511	1
1	526	1
1	543	1
1	559	1
1	578	1
1	597	1
1	615	1
2	654	1
2	695	1
1	718	1
1	738	1
2	776	1
2	811	1
2	845	1
2	883	1
1	901	1
1	918	1
1	938	1



DCP TEST DATA

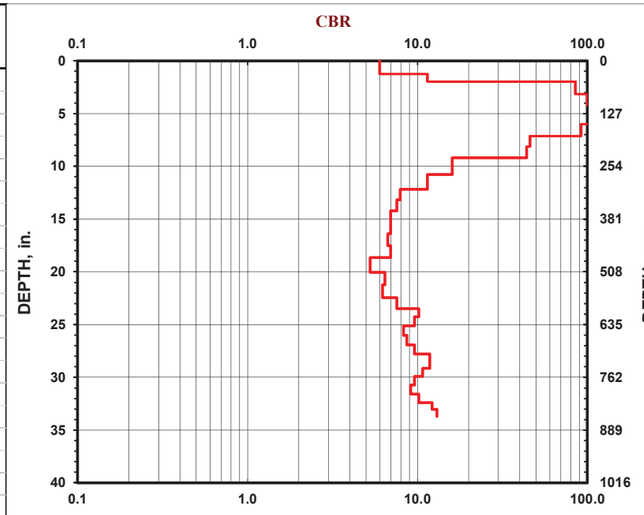
File Name: Y_50+07_3'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	32	1
1	50	1
10	80	1
10	106	1
10	131	1
10	153	1
10	181	1
5	207	1
5	234	1
3	274	1
2	310	1
1	335	1
1	361	1
1	389	1
1	417	1
1	446	1
1	474	1
1	510	1
1	540	1
1	571	1
1	597	1
1	617	1
1	638	1
1	662	1
1	685	1
1	706	1
2	741	1
1	760	1
1	781	1
1	803	1
1	823	1
1	840	1
1	856	1



DCP TEST DATA

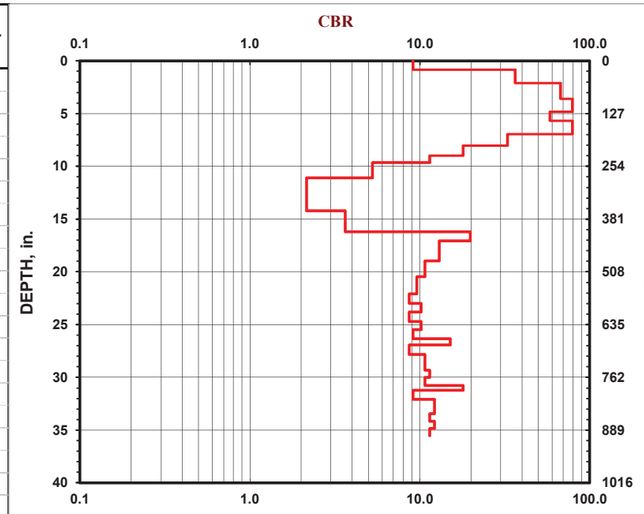
File Name: Y_55+00_2'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): 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	22	1
5	54	1
10	91	1
10	123	1
5	144	1
10	176	1
4	204	1
2	228	1
1	246	1
1	282	1
1	362	1
1	412	1
2	434	1
2	466	1
1	482	1
1	501	1
1	520	1
1	541	1
1	562	1
1	585	1
1	605	1
1	628	1
1	648	1
1	670	1
1	684	1
1	707	1
1	726	1
1	745	1
1	763	1
1	782	1
1	794	1
1	816	1
1	833	1
1	850	1
1	868	1
1	885	1
1	903	1



DCP TEST DATA

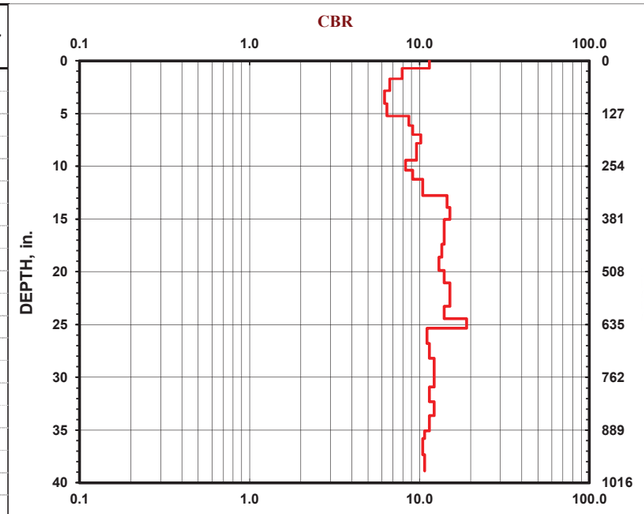
File Name: Y5_11+81_12'RT

Project: *R-3833C*
Location: Mooresville, NC
Date: 25-Feb-19
Soil Type(s): 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	18	1
1	43	1
1	72	1
1	103	1
1	133	1
1	156	1
1	178	1
1	198	1
1	219	1
1	240	1
1	264	1
1	286	1
2	325	1
2	354	1
2	382	1
2	412	1
2	442	1
2	473	1
2	505	1
2	535	1
2	563	1
2	591	1
2	621	1
2	644	1
2	681	1
2	717	1
2	751	1
2	785	1
2	821	1
2	855	1
2	891	1
1	910	1
2	949	1
2	987	1
		1
		1
		1
		1
		1
		1
		1
		1



DCP TEST DATA

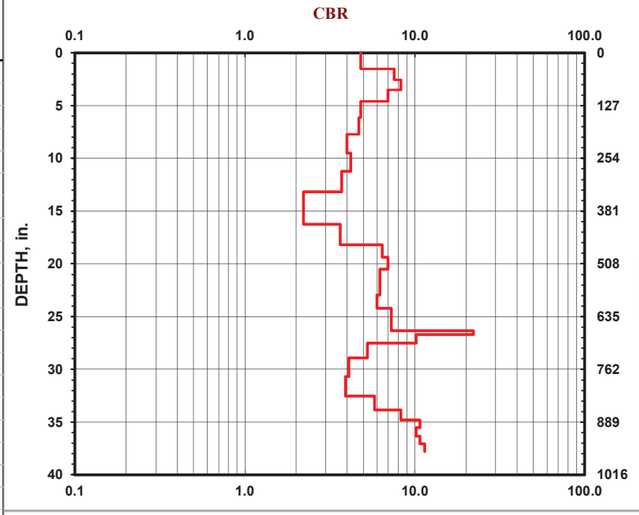
File Name: Y5_15+95_7'LT

Project: *R-3833C*
Location: Mooresville, NC
Date: 24-Feb-19
Soil Type(s): A-2-6

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	39	1
1	65	1
1	89	1
1	117	1
1	156	1
1	196	1
1	242	1
1	286	1
1	335	1
1	413	1
1	463	1
1	493	1
1	521	1
1	552	1
1	583	1
1	615	1
1	642	1
1	669	1
1	679	1
1	699	1
1	735	1
1	780	1
1	827	1
1	860	1
1	884	1
1	903	1
1	923	1
1	942	1
1	960	1



PROJECT REFERENCE NO.	SHEET NO.
R–3833C	51

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
LABORATORY RESULTS

REFERENCE: R–3833C

PROJECT: 34554

DS
WSH 7/3/2019
INITIALS DATE

FALCON ENGINEERING 1210 TRINITY RD., SUITE 110, Cary, NC 27513

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

AASHTO T-193 \ ASTM D-1883

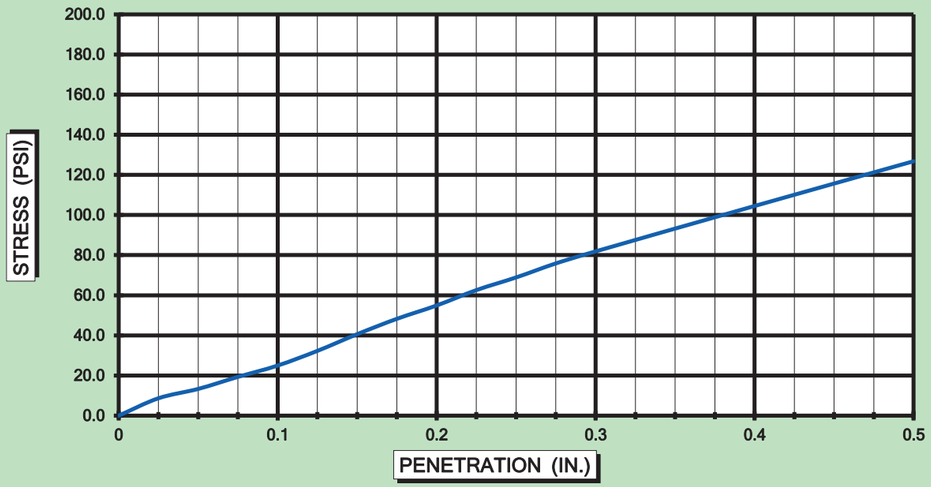
PROJECT #:	G18063.00	DATE:	3/3/2019
PROJECT NAME:	R-3833C | Brawley School Road		
BORING:	R-05	SAMPLE: BS-01	DEPTH: 3.0 - 10.0

SOIL DESCRIPTION: Tan Very Micaceous Sandy Silt (A-4)

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	102.0 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.2%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	100.3 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	17.9%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.3%	SWELL	6.03%

CBR VALUE AT .1"	2.5	2.5
CBR VALUE AT .2"	3.7	3.7

STRESS-PENETRATION CURVE

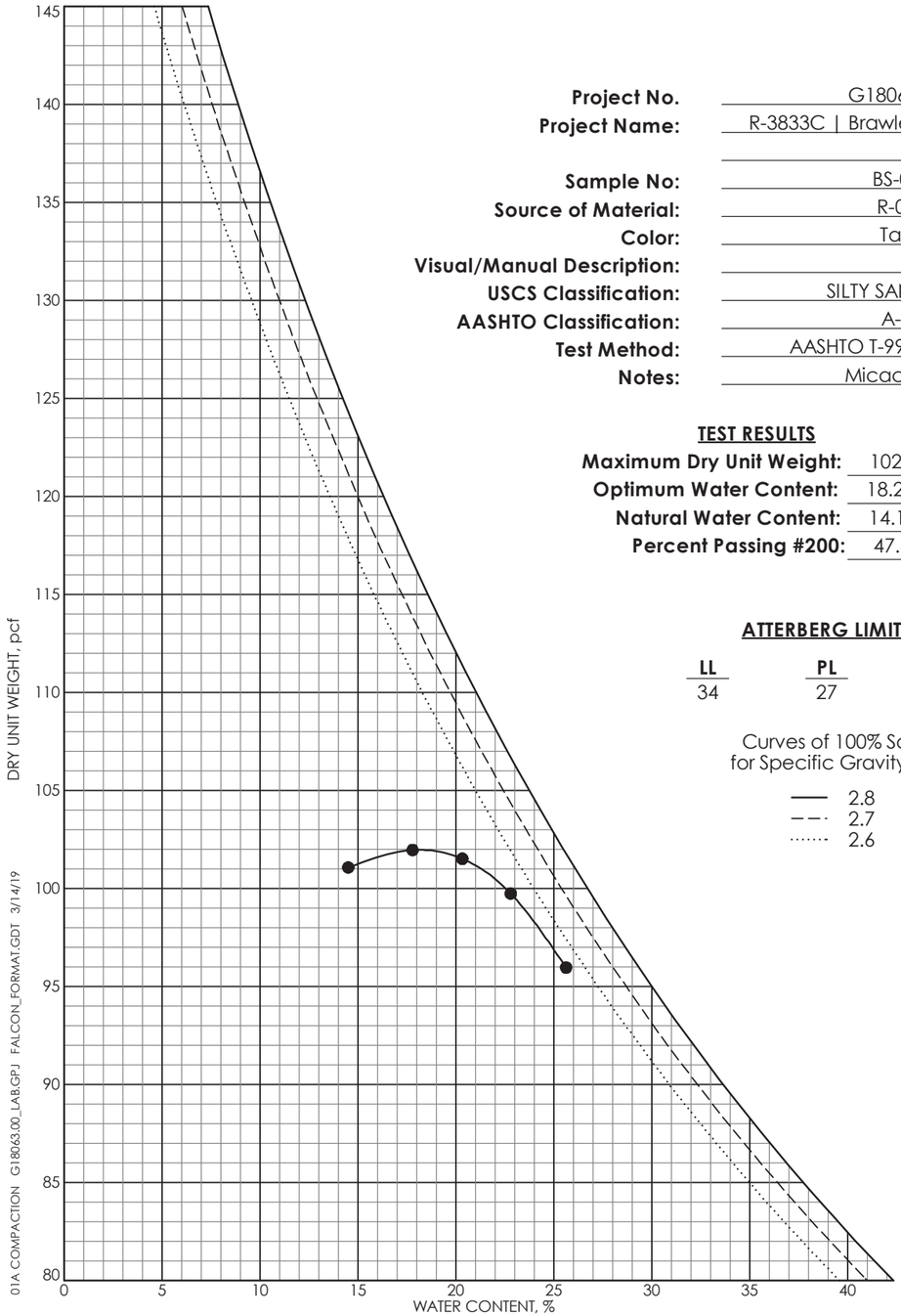


LIQUID LIMIT	34	PLASTIC LIMIT	27	PLASTIC INDEX	7

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

PHONE: 919.871.0800
www.falconengineers.com

LABORATORY COMPACTION TEST RESULTS



Project No.	G18063.00
Project Name:	R-3833C | Brawley School Road
Sample No:	BS-01
Source of Material:	R-05
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SILTY SAND(SM)
AASHTO Classification:	A-4
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

Maximum Dry Unit Weight:	102.0 PCF
Optimum Water Content:	18.2 %
Natural Water Content:	14.1 %
Percent Passing #200:	47.6 %

ATTERBERG LIMITS

LL	PL	PI
34	27	7

Curves of 100% Saturation for Specific Gravity Equal to:

2.8
2.7
2.6

FALCON ENGINEERING 1210 TRINITY RD., SUITE 110, Cary, NC 27513

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

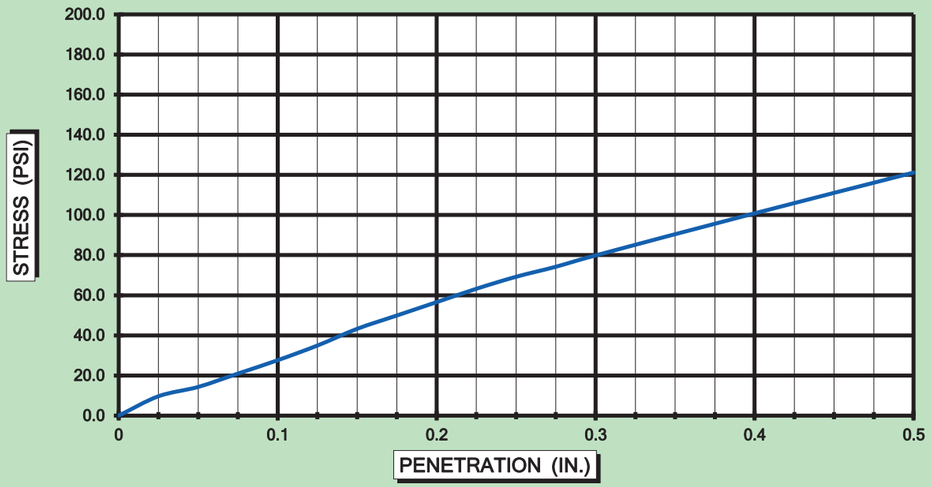
AASHTO T-193 \ ASTM D-1883

PROJECT #:	G18063.00			DATE:	3/3/2019
PROJECT NAME:	R-3833C | Brawley School Road				
BORING:	RW1-1	SAMPLE:	BS-02	DEPTH:	3.0-10.0
SOIL DESCRIPTION:	Tan Very Micaceous Silty Clay (A-7-5)				

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	102.4 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.8%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	100.6 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	18.6%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.3%	SWELL	5.60%

CBR VALUE AT .1"	2.8	2.8
CBR VALUE AT .2"	3.8	3.8

STRESS-PENETRATION CURVE



LIQUID LIMIT	57	PLASTIC LIMIT	33	PLASTIC INDEX	24

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1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

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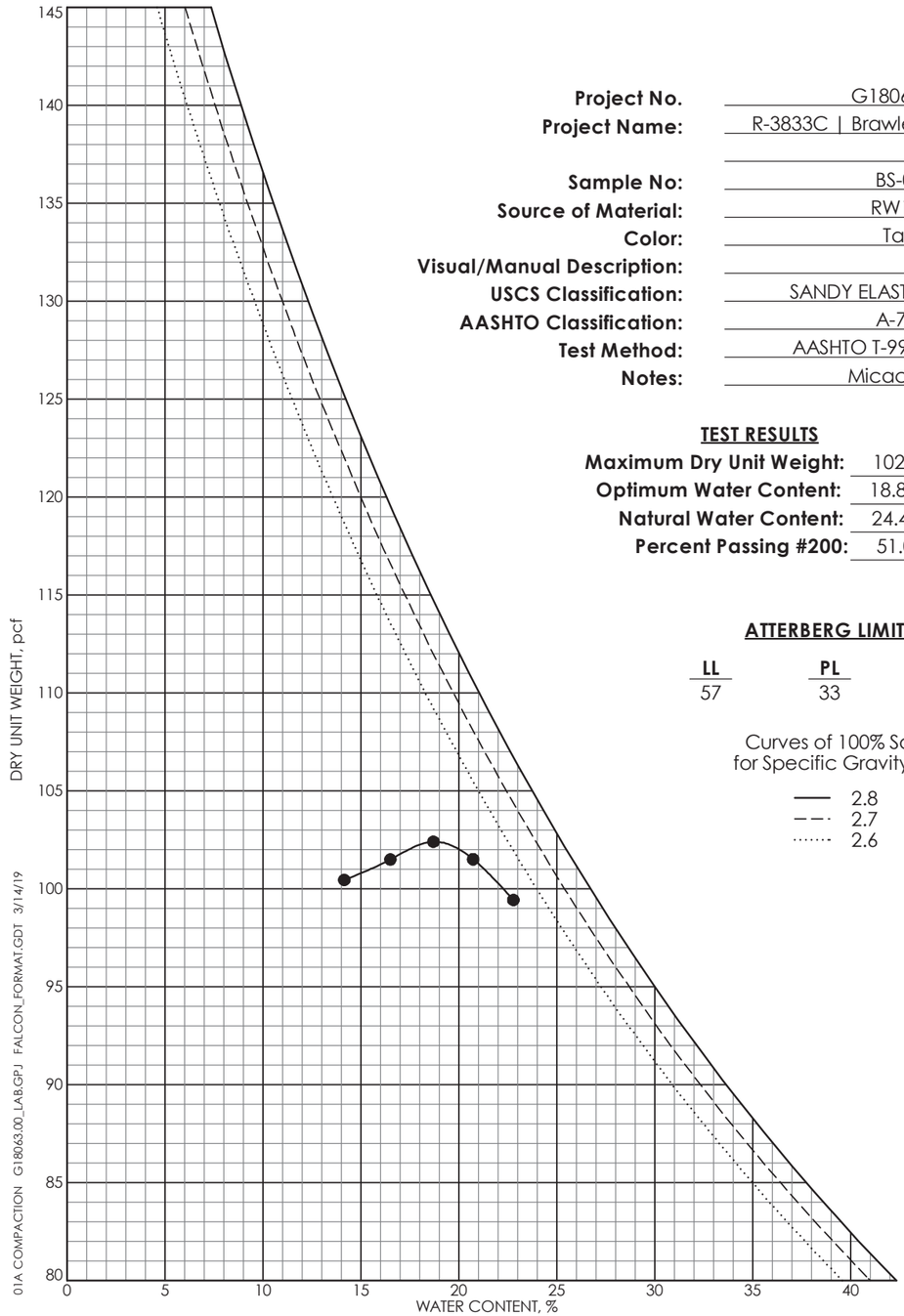
LABORATORY COMPACTION TEST RESULTS



Project No.	G18063.00
Project Name:	R-3833C | Brawley School Road
Sample No:	BS-02
Source of Material:	RW1-1
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SANDY ELASTIC SILT(MH)
AASHTO Classification:	A-7-5
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

Maximum Dry Unit Weight:	102.4 PCF
Optimum Water Content:	18.8 %
Natural Water Content:	24.4 %
Percent Passing #200:	51.0 %

ATTERBERG LIMITS

LL	PL	PI
57	33	24

Curves of 100% Saturation for Specific Gravity Equal to:

2.8
2.7
2.6

FALCON ENGINEERING 1210 TRINITY RD., SUITE 110, Cary, NC 27513

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

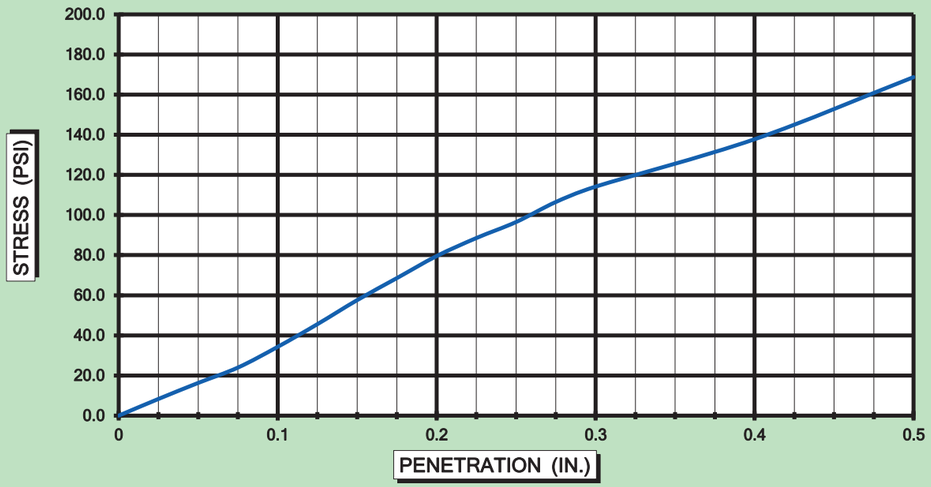
AASHTO T-193 \ ASTM D-1883

PROJECT #:	G18063.00			DATE:	3/3/2019
PROJECT NAME:	R-3833C | Brawley School Road				
BORING:	R-40	SAMPLE:	BS-03	DEPTH:	3.5-8.5
SOIL DESCRIPTION:	Tan Very Micaceous Silty Clay (A-7-5)				

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	103.5 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.7%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	101.6 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	18.6%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.2%	SWELL	2.31%

CBR VALUE AT .1"	3.4	3.4
CBR VALUE AT .2"	5.3	5.3

STRESS-PENETRATION CURVE



LIQUID LIMIT	46	PLASTIC LIMIT	32	PLASTIC INDEX	14

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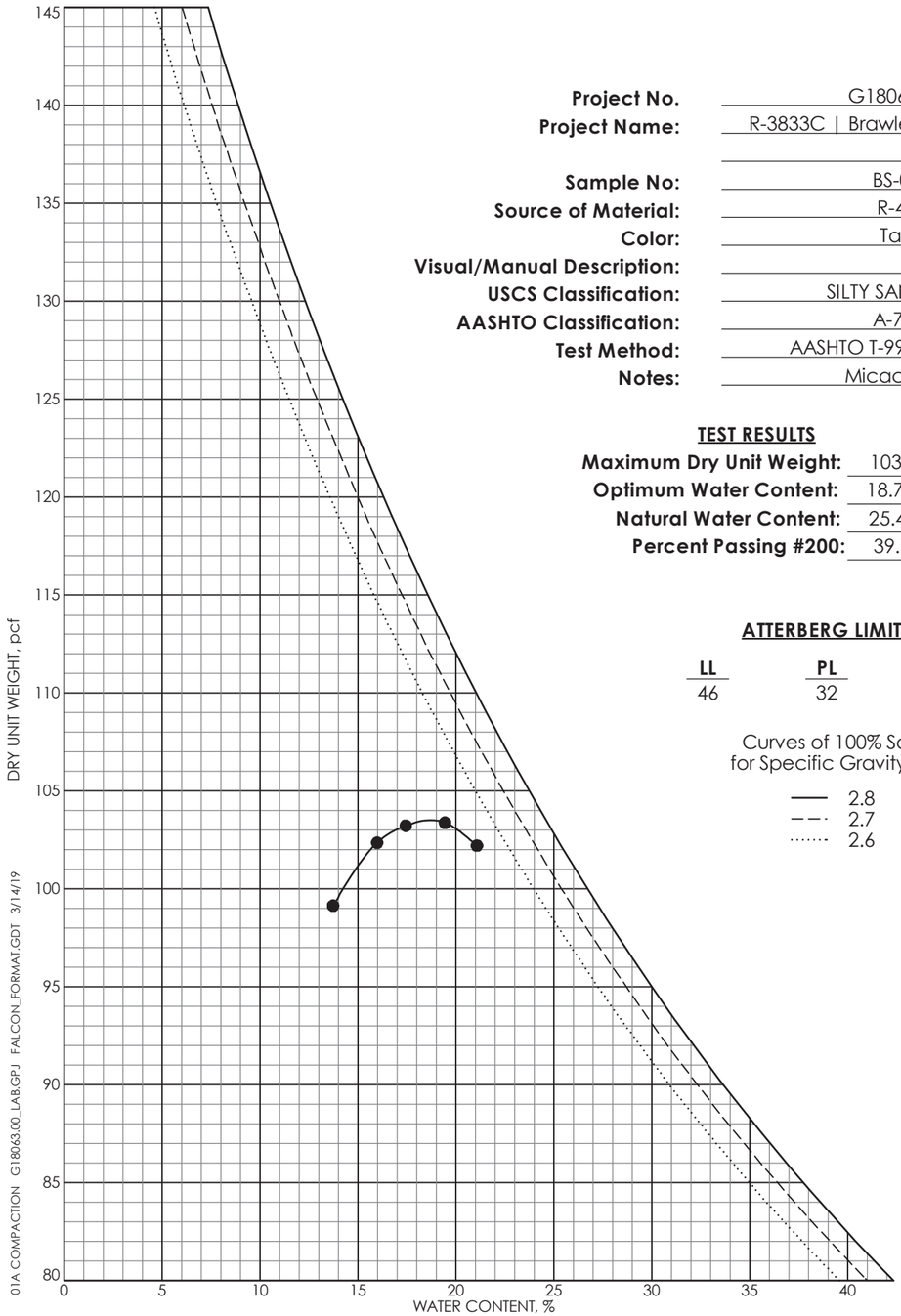
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

PHONE: 919.871.0800
www.falconengineers.com

LABORATORY COMPACTION TEST RESULTS



Project No.	G18063.00
Project Name:	R-3833C | Brawley School Road
Sample No:	BS-03
Source of Material:	R-40
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SILTY SAND(SM)
AASHTO Classification:	A-7-5
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

Maximum Dry Unit Weight:	103.5 PCF
Optimum Water Content:	18.7 %
Natural Water Content:	25.4 %
Percent Passing #200:	39.7 %

ATTERBERG LIMITS

LL	PL	PI
46	32	14

Curves of 100% Saturation for Specific Gravity Equal to:

2.8
2.7
2.6

July 3, 2019

TIP No.:	R-3833C
WBS No.:	34554.1.3
County:	Iredell
Project Description:	Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21
Subject:	Roadway Recommendations

As authorized, Falcon Engineering, Inc. (Falcon) has completed the geotechnical subsurface investigation for the proposed roadway widening for Brawley School Road (SR 1100) from Talbert Road (SR 1116) to 1000' East of US 21 in Mooresville in Iredell County, North Carolina. This report includes roadway geotechnical recommendations for the preparation of final design, right of way plans, construction cost estimates, and construction procedures.

Recommendations and evaluations provided by Falcon are based on the information provided by STANTEC and established NCDOT standards. Modifications of our recommendations and evaluations may be required if there are changes to the design. Recommendations in this report are in part based on data obtained from soil borings. The nature and extent of variations between borings may not become evident until construction.

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Falcon appreciates the opportunity to have provided you with geotechnical engineering services for this project. If you have any questions regarding this report, please contact our office.

Respectfully submitted:

FALCON ENGINEERING, INC.
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 36283 ENGINEER W. SCOTT HUNSBERGER

DocuSigned by:
W. Scott Hunsberger
5A469AC80FCD4BE...
7/3/2019

W. Scott Hunsberger, PE
Geotechnical Engineer

Jeremy R. Hamm, PE
Geotechnical Engineering Manager

TIP No.: R-3833C
WBS No.: 34554.1.3
COUNTY: Iredell
DESCRIPTION: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21
SUBJECT: Roadway Subsurface Investigation – Recommendations

Falcon has completed the subsurface investigation for this project and submits the following recommendations:

I. Slope/Embankment Stability

A. Slope Design

We recommend that all embankment and cut slopes be constructed at a ratio of 2:1 (H:V) or flatter.

B. Undercut for Embankment Stability

Soft surficial soils may be present in portions of the site where new embankments will be placed. These soils may not provide adequate stability for construction of embankments.

To assist in embankment stabilization in such locations, it is recommended that a quantity of **8,300 CY** of undercut be included in the contract as a contingency to be used at the discretion of the engineer.

C. Geotextile for Soil Stabilization

To aid in the placement of fill over unstable soil, it is recommended that a quantity of **8,300 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used in conjunction with the above referenced undercut at the discretion of the engineer.

II. Subgrade Stability

A. Subsurface Drainage – Subsurface Drain

Based on subsurface conditions and the condition of the existing road, we do not anticipate widespread subgrade stability issues due to groundwater. However, it is recommended that a quantity of **500 LF** of 6-inch perforated corrugated plastic pipe be included in the contract as a contingency to be used at the discretion of the Engineer. Construction of underdrains shall follow Standard Specifications, Section 815 "Subsurface Drainage", and Roadway Standard Drawing 815.02 "Subsurface Drain".

B. Grade Point Undercut

It is recommended that a quantity of **50 CY** of undercut be included in the contract for undercut at grade points.

C. Undercut for Subgrade Stability

It is recommended a quantity of **1,000 CY** of undercut be included in the contract as a contingency to be used at the discretion of the Engineer. Undercut of unstable soils should be

made to a depth of three feet, or to competent material, whichever is less, and to a width of one foot beyond edge of pavement or back of curb.

D. Geotextile for Soil Stabilization

The use of Geotextile for Soil Stabilization is anticipated in conjunction with Undercut for Subgrade Stabilization as discussed in Section II. B. It is recommended that a quantity of **1,000 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used at the discretion of the Engineer.

E. Aggregate Subgrade

Moderate to high plasticity soils were encountered at proposed pavement subgrade in cut and near-grade construction areas at many locations throughout the project adjacent to existing pavements. We recommend aggregate subgrade be implemented to replace materials with a Plasticity Index (PI) greater than or equal to 36 from within 1.0 feet of pavement subgrade in these areas to avoid undermining existing pavements and allow for staging of construction and/or avoidance of utilities. Based on our subsurface investigation, aggregate subgrade is anticipated at the following locations.

Station	Offset
21+00 to 23+50, -L-	10 ft to 48 ft LT & 10 ft to 47 ft RT
71+25 to 72+25, -L-	17 ft to 28 ft LT & 3 ft to 19 ft RT
74+00 to 75+50, -L-	17 ft to 35 ft LT & 13 ft to 26 ft RT
19+25 to 25+00, -Y-	2 ft to 44 ft LT & 17 ft to 46 ft RT
15+00 to 17+50, -Y5-	9 ft to 42 ft LT & 9 ft to 50 ft RT

These areas are represented on the subsurface cross sections by a solid filled area. It is recommended that **1,550 CY** of Shallow Undercut, **3,450 Tons** of Class IV Subgrade Stabilization and **5,200 SY** of Geotextile for Soil Stabilization be included in the contract for the above listed areas. If highly plastic or otherwise unsuitable subgrades are present in other areas adjacent to existing pavements or above existing utilities, implement aggregate subgrade. To assist in subgrade stabilization in such locations, it is recommended that a quantity of **400 CY** of Shallow Undercut, **800 Tons** of Class IV Subgrade Stabilization and **1,200 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used at the discretion of the Engineer. Aggregate Subgrade shall be performed in accordance with Section 505 of the Standard Specifications, to a depth of one foot and a width of one foot beyond edge of pavement or back of curb, as necessary.

III. Borrow Specifications

A. Disposal of Waste Materials

Waste Materials may be disposed of in non-structural areas, such as outside of the embankment slopes at the discretion of the engineer.

B. Common Borrow

Common borrow for embankment fill shall meet the Statewide Criteria outlined in the Standard Specification, Article 1018-2 (A).

C. Select Granular Material

Select granular material for embankment/backfill, geotextile for soil stabilization, or for fill in standing water shall meet the criteria outlined in the Standard Specifications, Article 1016-3, Class II and/or III. The select granular material should be placed to a height of 3 feet above geotextile for soil stabilization and/or water level.

It is recommended a quantity of **8,300 CY** of Select Granular Material be included in the contract as a contingency item for use in conjunction with Geotextile for Soil Stabilization in Section I, C or at the discretion of the Engineer. It is recommended a quantity of **1,000 CY** of Select Granular Material be included in the contract as a contingency item for use in conjunction with Geotextile for Soil Stabilization in Section II, D or at the discretion of the Engineer.

D. Shrinkage Factor

A shrinkage factor of **15 percent** is recommended to be used in the earthwork computations for this project.

IV. Miscellaneous

A. Reduction of Unclassified Excavation – Loss Due to Clearing and Grubbing

It is recommended that Unclassified Excavation on the project be reduced by **600 CY** due to clearing and grubbing.

B. Reduction of Unclassified Excavation – Unsuitable Unclassified Excavation

Highly plastic soils are anticipated to be present in cut excavations from the following locations and we recommend unclassified excavation be reduced by the following amounts.

Station	Offset	Quantity (CY)
21+00 to 23+50, -L-	10 ft to 48 ft LT & 10 ft to 67 ft RT	**600**
71+25 to 72+25, -L-	17 ft to 19 ft LT & 8 ft to 10 ft RT	**50**
74+00 to 75+50, -L-	17 ft to 57 ft LT & 13 ft to 21 ft RT	**200**
19+25 to 25+00, -Y-	2 ft to 44 ft LT & 17 ft to 46 ft RT	**250**
15+00 to 17+50, -Y5-	9 ft to 42 ft LT & 9 ft to 50 ft RT	**100**

These areas are represented on the subsurface profiles and cross sections by a single hatch pattern.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: 34554.1.3 | County: Iredell | Project Engineer: Hunsberger, W. S.
TIP Number: R-3833C | Field Office: Consultant | Project Geologist: Lane, R.W.
Description: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	8,300	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. B	Contingency	N/A	N/A	50	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. C	Contingency	N/A	N/A	1,000	CY
						Total Quantity of Undercut Excavation =	**9,350**	**CY**
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	9,300	CY
						Total Quantity of Select Granular Material =	**9,300**	**CY**
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	8,300	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. D	Contingency	N/A	N/A	1,000	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	21+00.00	23+50.00	1,450	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	71+25.00	72+25.00	200	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	74+00.00	75+50.00	550	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-Y-	19+25.00	25+00.00	2,700	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-Y5-	15+00.00	17+50.00	300	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	Contingency	N/A	N/A	1,200	SY
						Total Quantity of Geotextile for Soil Stabilization =	**15,700**	**SY**
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	21+00.00	23+50.00	450	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	71+25.00	72+25.00	50	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	74+00.00	75+50.00	150	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-Y-	19+25.00	25+00.00	800	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-Y5-	15+00.00	17+50.00	100	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	Contingency	N/A	N/A	400	CY
						Total Quantity of Shallow Undercut =	**1,950**	**CY**
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	21+00.00	23+50.00	1,000	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	71+25.00	72+25.00	100	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	74+00.00	75+50.00	350	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-Y-	19+25.00	25+00.00	1,800	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-Y5-	15+00.00	17+50.00	200	TON

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: 34554.1.3 | County: Iredell | Project Engineer: Hunsberger, W. S.

TIP Number: R-3833C | Field Office: Consultant | Project Geologist: Lane, R.W.

Description: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	Contingency	N/A	N/A	800	TON
						Total Quantity of Class IV Subgrade Stabilization =	**4,250**	**TON**
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. A	Contingency	N/A	N/A	500	LF
						Total Quantity of 6" Perforated Subdrain Pipe =	**500**	**LF**

These Items Only Impact Earthwork Totals								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	600	CY
N/A	Shrinkage Factor	235 - Embankments	III. D	N/A	N/A	N/A	15	%
N/A	Unclassified Excavation - Unsuitable Waste	225 - Roadway Excavation	IV. B	N/A	N/A	N/A	1,200	CY

REFERENCE: R-3833C

PROJECT: 34554

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	21+00.00 - 23+50.00	4,5
-L-	71+00.00 - 72+00.00	6
-L-	74+00.00 - 75+50.00	7
-Y-	19+00.00 - 25+00.00	8-10
-Y5-	15+00.00 - 17+50.00	11,12

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *IREDELL*

PROJECT DESCRIPTION *SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21*

RECOMMENDATIONS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833C	1	12

CAUTION NOTICE

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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

HPC

LANE, R.W.

INVESTIGATED BY *FALCON ENG.*

DRAWN BY *HILL, M.J.*

CHECKED BY *HUNSBERGER, W.S.*

SUBMITTED BY *FALCON ENG.*

DATE *JUNE 2019*

NORTH CAROLINA PROFESSIONAL SEAL 36283 ENGINEER W. SCOTT HUNSBERGER

DocuSigned by:
W. Scott Hunsberger
5A469AC80FCD49E...

7/3/2019

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- 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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK:
BORING ELEVATIONS TAKEN FROM r3833c_ls_tnl_170727.tin
DATED 7/27/2017 ELEVATION: FEET

NOTES:
FIAD - FILLED IMMEDIATELY AFTER DRILLING

DATE: 1-XX-17

TIP PROJECT: R-3833C

CONTRACT: 34554

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

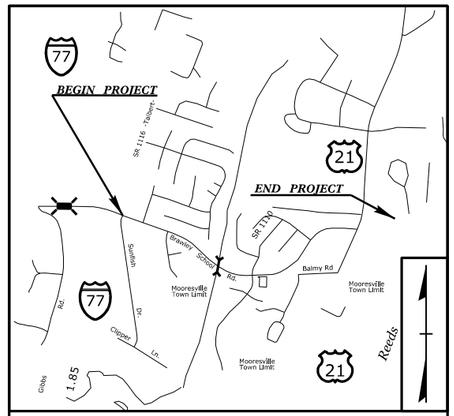
IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833C	3	12

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34554.1.FD1		P.E
34554.2.4		R/W
34554.2.5		UTIL

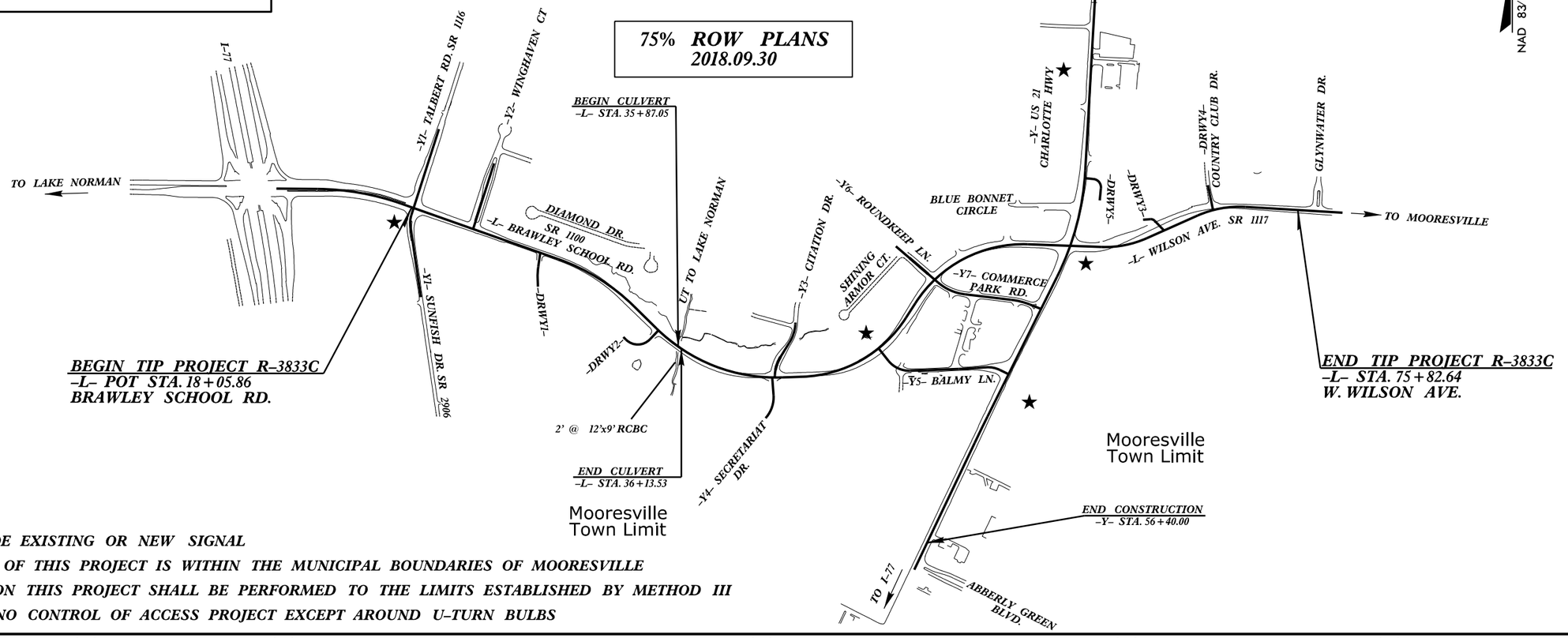
LOCATION: SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERT, WALLS, SIGNALS, PAVEMENT MARKERS



VICINITY MAP

75% ROW PLANS 2018.09.30



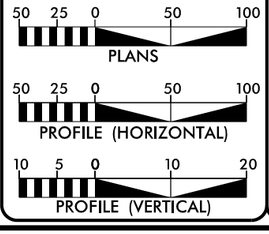
★ *UPGRADE EXISTING OR NEW SIGNAL*

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF MOORESVILLE

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

THIS IS A NO CONTROL OF ACCESS PROJECT EXCEPT AROUND U-TURN BULBS

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 18500
ADT 2040 = 28200
K = 10 %
D = 55 %
T = 4 % *
V = 45 MPH
* TTST = 1% DUAL = 3%
FUNC CLASS = MAJOR RURAL COLLECTOR

PROJECT LENGTH

ROADWAY LENGTH TIP PROJECT R-3833C = 1.090 miles

STRUCTURE LENGTH TIP PROJECT R-3833C = 0.005 miles

TOTAL LENGTH TIP PROJECT R-3833C = 1.094 miles

Prepared In The Office of:

Stantec

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Suite 300
Raleigh, NC 27606
Tel (919) 851-6866 Fax (919) 851-7024
www.stantec.com License No. F-0672

for the North Carolina Department of Transportation

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 30, 2018

LETTING DATE: JUNE 16, 2020

STANTEC CONTACT: A. DEAN SARVIS, P.E. — *PROJECT ENGINEER*

NCDOT DIVISION 12 CONTACT: BRYAN SOWELL, PE — *PROJECT MANAGER*

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P.E.

SIGNATURE:

ROADWAY DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

P.E.

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

PROJ. REFERENCE NO.	SHEET NO.
R-3833C	4

0 5 10

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

840 830 850

Y2-

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

22+00.00

Y2-

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

21+50.00

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,MED.STIFF,SILTY CLAY

RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

BEGIN UNSUITABLE UNCLASSIFIED EXCAVATION AT 21+00
BEGIN SHALLOW UNDERCUT AT 21+00

21+00.00

850 840 830

842.54 842.78

4:1 4:1

X-EOR 0.020 X-EOR 0.020

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,MED.STIFF,SILTY CLAY,MICACEOUS

RESIDUAL: ORANGE,DRY TO MOIST,MED.STIFF TO STIFF,SANDY SILT AND SANDY CLAY

20+50.00

—L—

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

6/23/16

14-JUN-2019 09:44
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cadmachine A1_CA001

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	5

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

840 830 820 810

24+01

X-EOP X-EOP

12 10 9 7

BT

DRY (02/19)

RESIDUAL: ORANGE AND BLACK,DRY TO MOIST,MED.STIFF TO STIFF,SILT

24+00.00

END UNSUITABLE UNCLASSIFIED EXCAVATION AT 23+50
END SHALLOW UNDERCUT AT 23+50

X-EOP X-EOP

RESIDUAL: ORANGE AND BLACK,DRY TO MOIST,MED.STIFF TO STIFF,SILT

23+50.00

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

23+00.00

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	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	–
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	–

22+35

SS-2

8 11 10 9

BT

DRY (02/19)

X-EOP X-EOP

ROADWAY EMBANKMENT: RED-ORANGE,MOIST,STIFF,HIGHLY PLASTIC SILTY CLAY

RESIDUAL: ORANGE,DRY,STIFF,SANDY SILT

22+50.00

-L-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	6

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

830 820 810 800

X-EOP X-EOP

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, MICACEOUS WITH TRACE ROCK FRAGMENTS
RESIDUAL: TAN AND WHITE, DRY TO MOIST, LOOSE, SILTY SAND, SAPROLITIC WITH TRACE ROCK FRAGMENTS

72 + 50.00

END UNSUITABLE UNCLASSIFIED EXCAVATION AT 72+00
END SHALLOW UNDERCUT AT 72+00

X-EOP X-EOP

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
RESIDUAL: RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
RESIDUAL: TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

72 + 00.00

X-EOP X-EOP

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
RESIDUAL: RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
RESIDUAL: TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

71 + 50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-14	24 FT RT	71+04	1.0'-2.5'	A-7-6	65	36	21	19	7	53	96	84	60	27	-

BEGIN UNSUITABLE UNCLASSIFIED EXCAVATION AT 71+00
BEGIN SHALLOW UNDERCUT AT 71+00

71+04
SS-14

X-EOP X-EOP

-DRWY 4-

(10) **RESIDUAL:** RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
(9) **RESIDUAL:** RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
(6)-(8) **RESIDUAL:** TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

BT
DRY (01/19)

71 + 00.00

-L-

END UNSUITABLE UNCLASSIFIED EXCAVATION AT 75+50
END SHALLOW UNDERCUT AT 75+50

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS

RESIDUAL: TAN-ORANGE AND WHITE, DRY, LOOSE TO MED. DENSE, SILTY SAND, SAPROLITIC AND MICACEOUS

X-EOP

76+00.00

75+50.00

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-16	36 FT RT	75+05	1.0'-2.5'	A-7-5	62	32	16	25	11	48	97	91	61	33	-

75+05
SS-16

11
8
6
5
BT
DRY (01/19)

75+00.00

74+50.00

BEGIN UNSUITABLE UNCLASSIFIED EXCAVATION AT 74+00
BEGIN SHALLOW UNDERCUT AT 74+00

74+00.00

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY

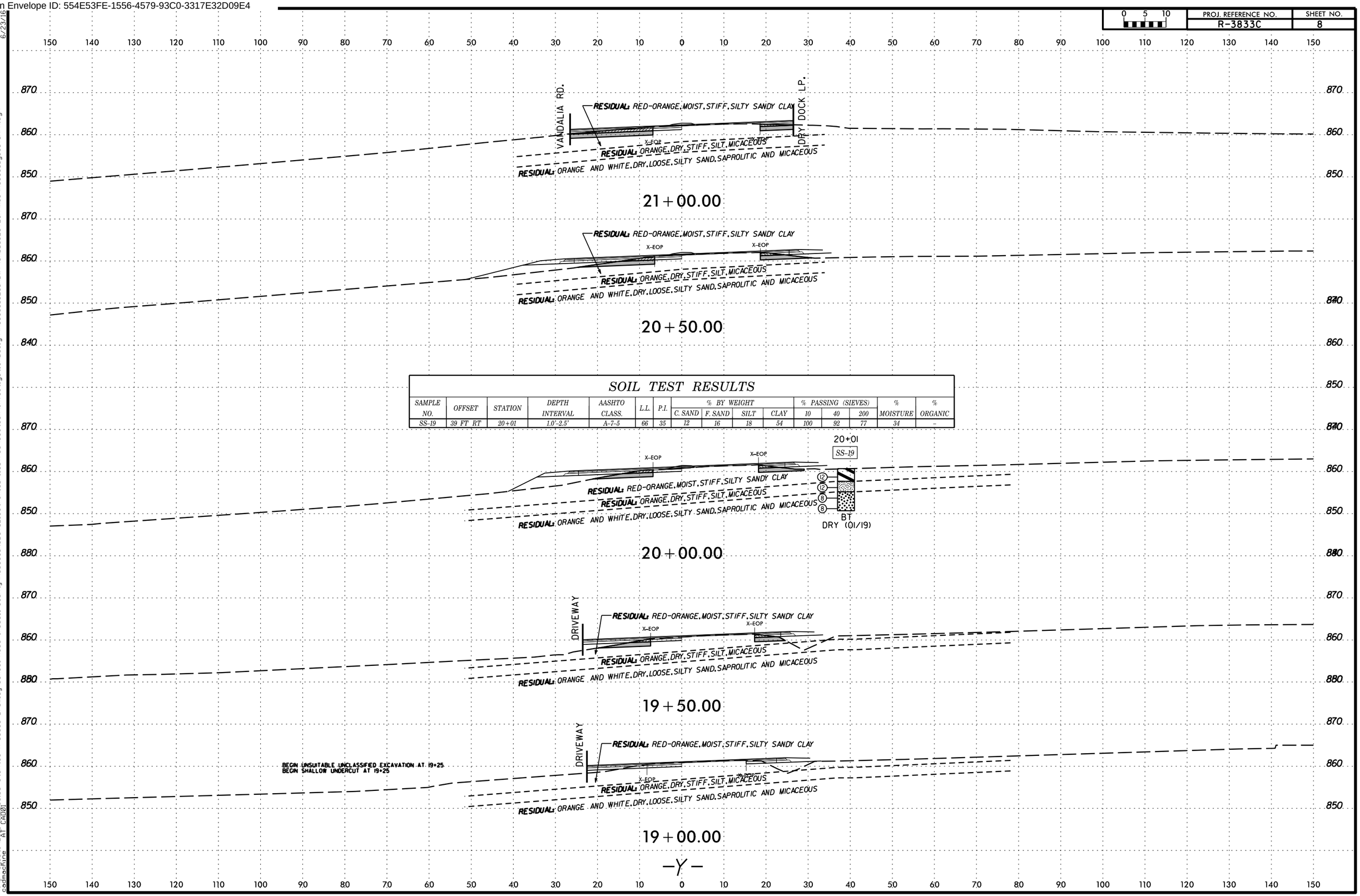
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, MICACEOUS WITH TRACE ROCK FRAGMENTS

RESIDUAL: TAN AND WHITE, DRY TO MOIST, LOOSE, SILTY SAND, SAPROLITIC WITH TRACE ROCK FRAGMENTS

73+50.00

—L—

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	8

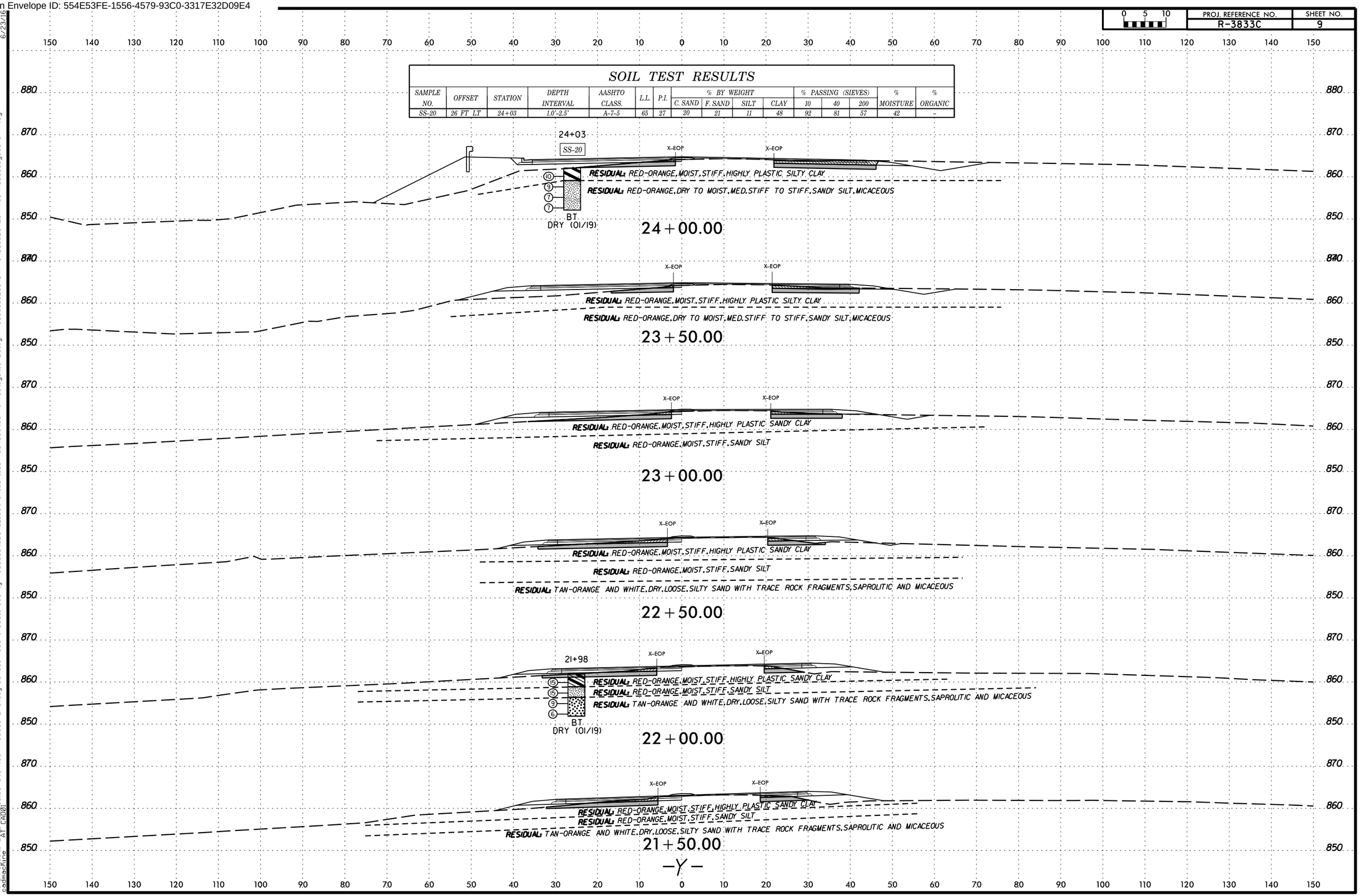


SOIL TEST RESULTS

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-19	39 FT RT	20+01	1.0'-2.5'	A-7-5	66	35	12	16	18	54	100	92	77	34	–

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-20	26 FT LT	24+03	1.0'-2.5'	A-7-5	65	27	20	21	11	48	92	81	57	42	-



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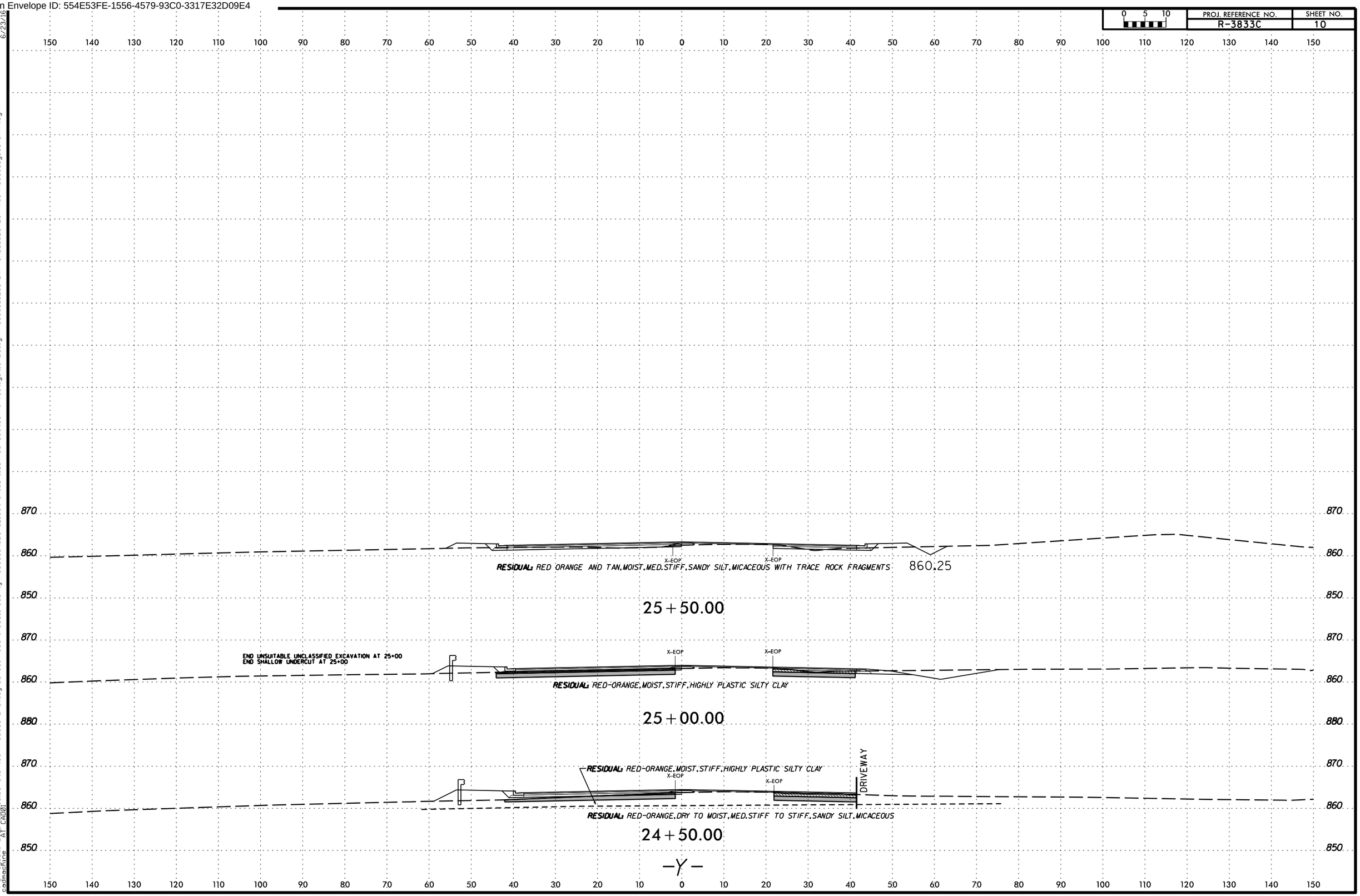
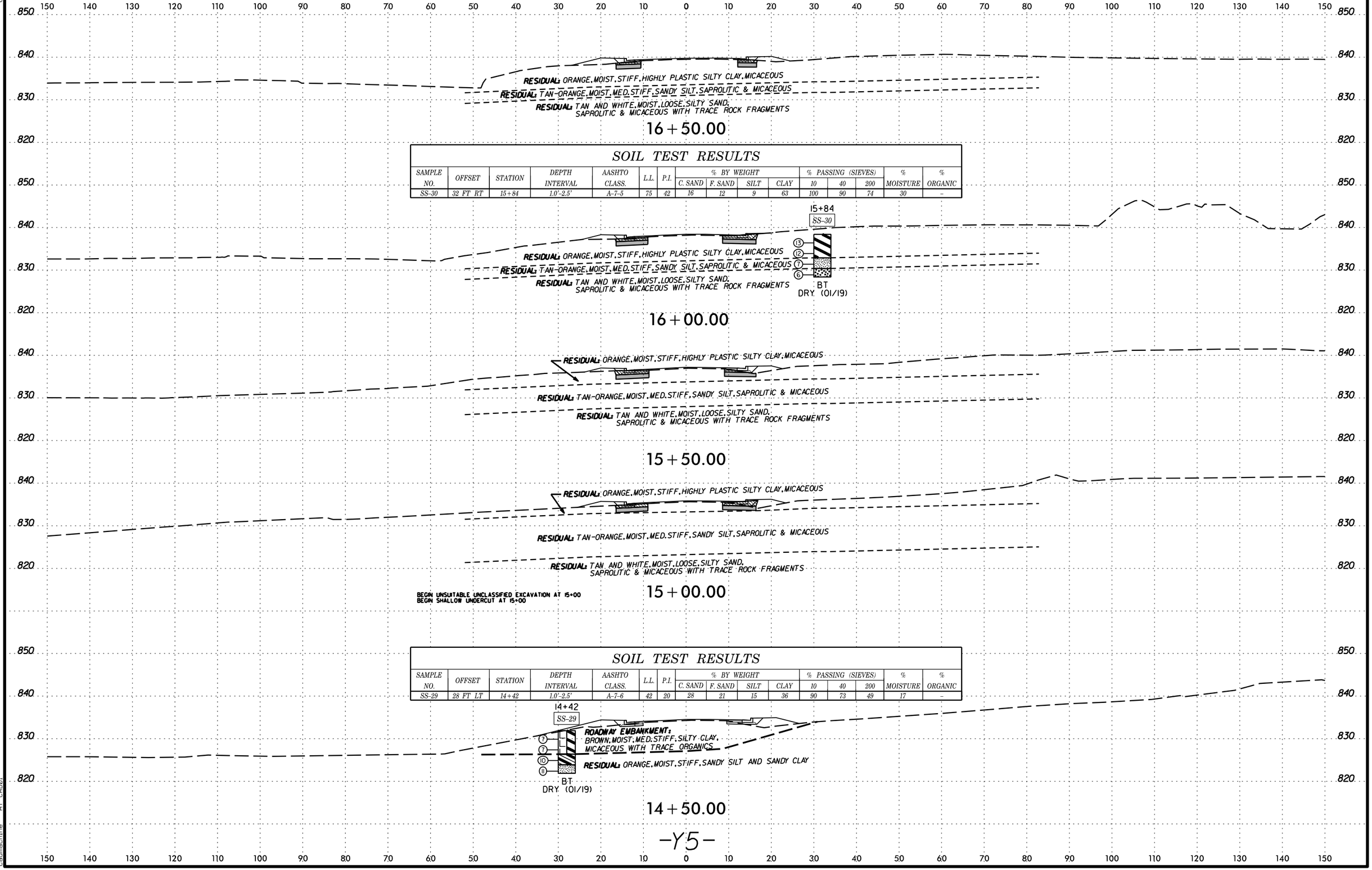
	R-3833C	10





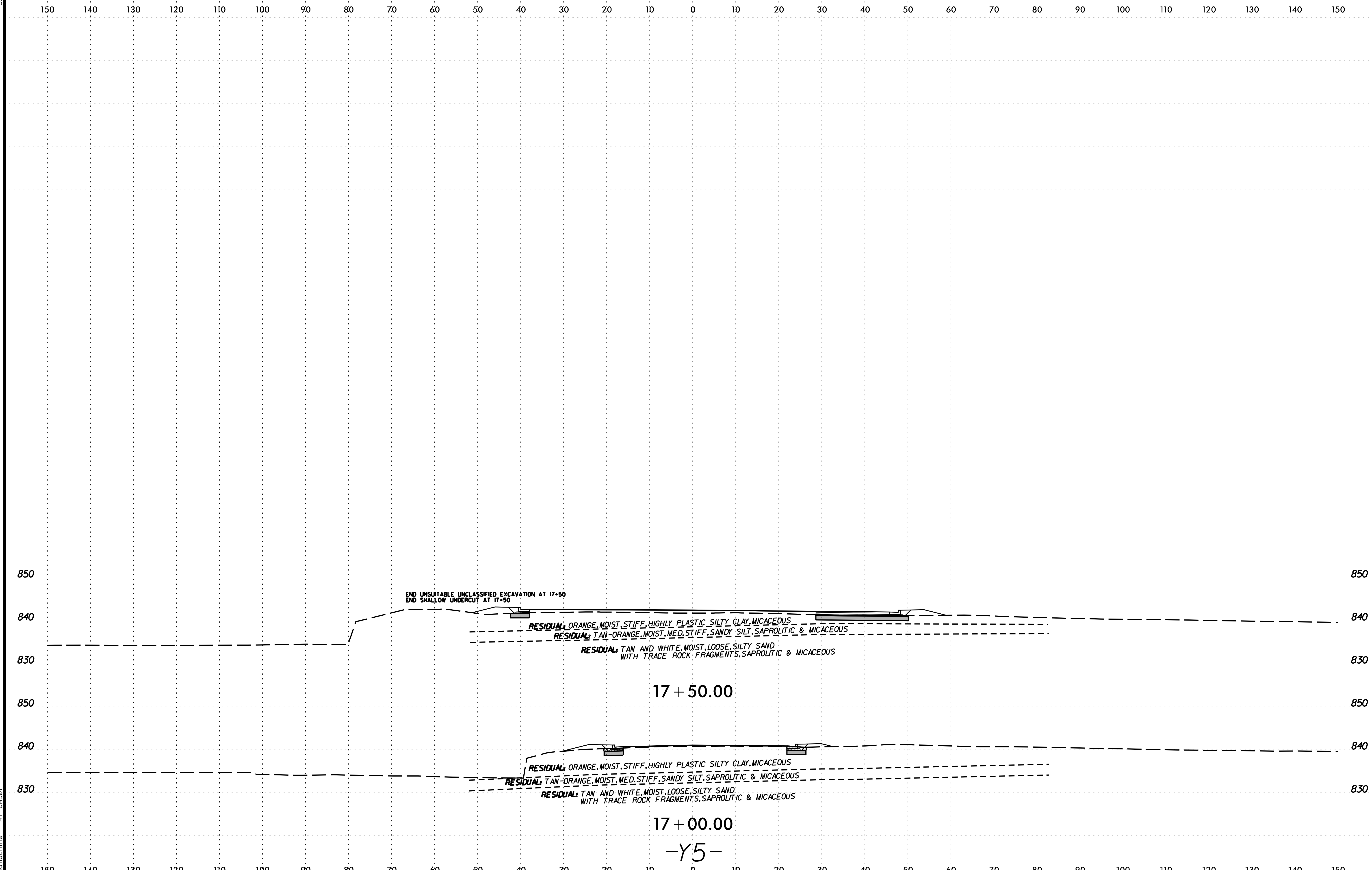
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-30	32 FT RT	15+84	1.0'-2.5'	A-7-5	75	42	16	12	9	63	100	90	74	30	–

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	–

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-3833C	12



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
850
840
830
END UNSUITABLE UNCLASSIFIED EXCAVATION AT 17+50
END SHALLOW UNDERCUT AT 17+50
RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS
RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND
WITH TRACE ROCK FRAGMENTS, SAPROLITIC & MICACEOUS
17 + 50.00
850
840
830
RESIDUAL: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS
RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, SAPROLITIC & MICACEOUS
RESIDUAL: TAN AND WHITE, MOIST, LOOSE, SILTY SAND
WITH TRACE ROCK FRAGMENTS, SAPROLITIC & MICACEOUS
17 + 00.00
-Y5-