REFERENCE: U-4424

PROJECT: 39062

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	13+90.00 - 133+98.00	4-13	
-Y2-	11+11.55 - 11+83.65	5	
-Y3-	10+98.00 - 11+82.99	6	
-Y4-	10+18.14 - 11+04.71	6	
-Y5-	11+03.35 - 11+85.06	10	
-Y6-	10+18.14 - 11+30.00	10	
-Y7-	11+39.18 - 12+22.09	11	
-Y8-	12+28.47 - 13+87.11	11	
-DRI-	11+45.00 - 11+80.96	12	

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	15+00.00	14
-L-	17+00.00	15
-L-	19+00.00	16
-L-	21+00.00	17
-L-	23+00.00	18
-L-	25+00.00	19
-L-	27+00.00	20
-L-	29+00.00 - 33+00.00	21-28
-L-	35+00.00	29
-L-	37+00.00	30
-L-	39+00.00	31
-L-	41+00.00	32
-L-	42+50.00	33
-L-	45+00.00	34
-L-	47+00.00	35
-L-	49+00.00	36
-L-	51+00.00	37
-L-	53+00.00	38
-L-	55+00.00	39
-L-	57+00.00	40
-L-	59+00.00	41
-L-	60+00.00 - 64+50.00	42-46
-L-	68+00.00 - 73+00.00	47-52
-L-	75+00.00	53
-L-	77+00.00	54
-L-	79+00.00	55
-L-	81+00.00	56
-L-	83+00.00	57
-L-	85+00.00	58
-L-	87+00.00	59
-L-	89+00.00	60
-L-	91+00.00	61
-L-	93+00.00	62
-L-	95+00.00	63
-L-	97+00.00	64
-L-	99+00.00	65
-L-	101+00.00	66
-L-	103+00.00	67
-L-	105+00.00	68
-L-	107+00.00	69
-L-	109+00.00	70
-L-	111+00.00	71
-L-	113+00.00	72
-L-	115+00.00	73
-L-	117+00.00	74
-L-	119+00.00	75
-L-	121+00.00	76
-L-	123+00.00	77
-L-	125+00.00	78
-L-	127+00.00	79
-L-	129+00.00	80
-L-	131+00.00 - 132+50.00	81-84
-Y2-	11+50.00	85
-Y3-	11+50.00	86
-Y4-	10+75.00	87
-Y5-	10+75.00	88
-Y6-	11+00.00	89
-Y7-	11+50.00	90
-Y8-	13+00.00	91

APPENDICES

APPENDIX	TITLE	SHEETS
A	CBR RESULTS	92-96
B	SHELBY TUBE RESULTS	97-116

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *EDGECOMBE*

PROJECT DESCRIPTION *NC 111 (WILSON STREET) FROM NC 122 (MCNAIR ROAD) TO US 64 ALTERNATE (WESTERN BOULEVARD)*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4424	1	116

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.

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DATE *OCTOBER, 2019*

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12/17/2019 DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-4424	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-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 3.25" HOLLOW STEM 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
- [X] 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:

ELEVATION: FEET

NOTES:

Elevations obtained from u4424_ls_tin.tin (file dated 6/26/19).

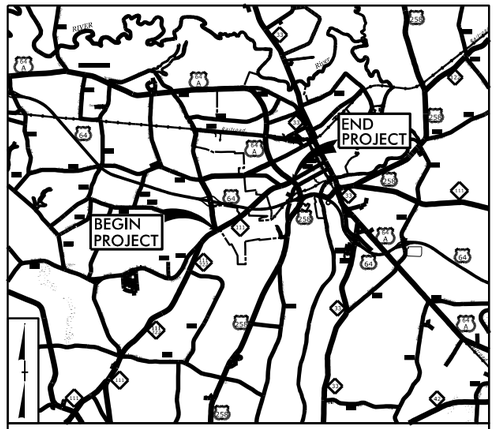
DATE: 8-15-14

09/08/99

TIP PROJECT: U-4424

CONTRACT:

See Sheet 1A For Index of Sheets (NOT INCLUDED)
See Sheet 1B For Conventional Symbols



VICINITY MAP

RIGHT OF WAY PLAN SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

EDGECOMBE COUNTY

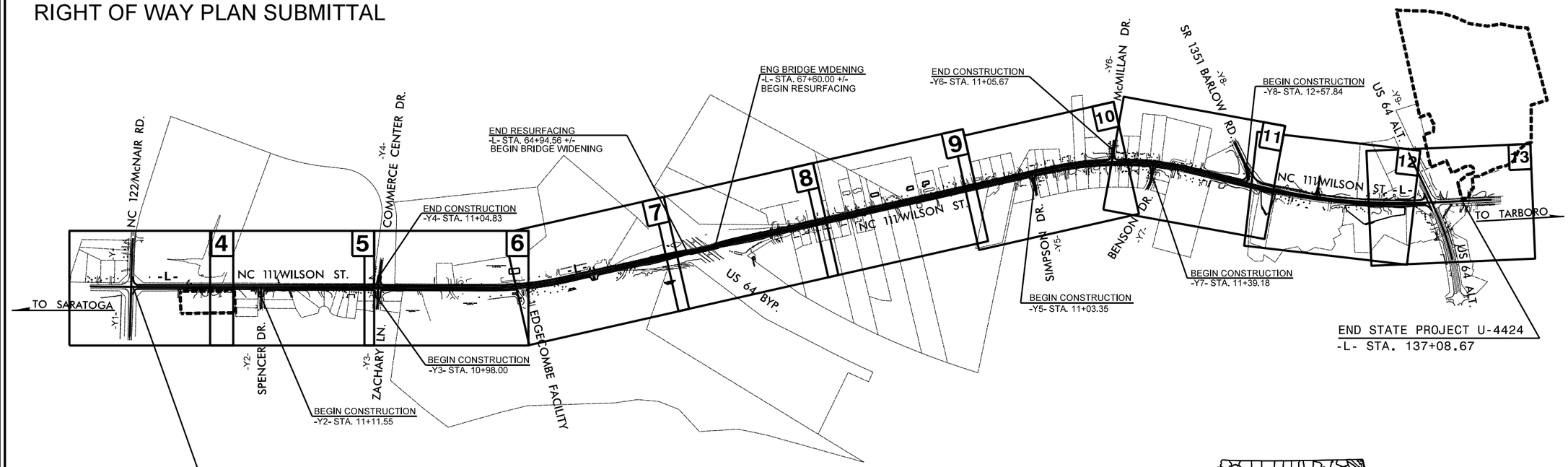
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4424	3	116

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
39062.1.2	N/A	PE
39062.2.2	N/A	R/W & UTILITIES

LOCATION: NC 111 (WILSON STREET) FROM NC 122 (MCNAIR ROAD) TO US 64 ALTERNATE (WESTERN BOULEVARD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND BRIDGE WIDENING

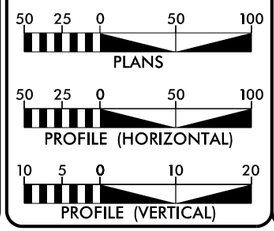
NAD 83-2011



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF TOWN OF TARBORO.
CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2016	=	9,100
ADT 2045	=	10,400
K	=	8%
D	=	55%
T	=	3% *
V	=	50 MPH

* TTST = 1% DUAL 2%
FUNC CLASS = MINOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-4424	=	2.283 MI
LENGTH STRUCTURE TIP PROJECT U-4424	=	0.050 MI
TOTAL LENGTH TIP PROJECT U-4424	=	2.333 MI

PREPARED IN THE OFFICE OF:

WSP USA
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
TEL: 1.919.836.4040
FAX: 1.919.836.4099
LICENSE NO. F-0165

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 21, 2019

LETTING DATE: FEBRUARY 2021

RONYELL THIGPEN, PE
PROJECT ENGINEER

ERIC MISAK
PROJECT DESIGN ENGINEER

NCDOT CONTACT: RUSSELL BROADWELL, PE
DIVISION 4

HYDRAULICS ENGINEER

SIGNATURE: _____ *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

22-OCT-2019 11:01
C:\Users\brett.smith\Desktop\U4424_GEO_RDWY_InventoryREV2_Summit\CADD_GEOTECH\PlanProf\U4424_GEO_
$$$$USERNAME$$$$

SUMMIT
DESIGN AND ENGINEERING SERVICES
919.732.3883 SUMMIT-ENGINEER.COM
504 Meadowland Drive, Hillsborough, NC 27278

October 22, 2019

WBS Number: 39062.1.2
TIP Number: U-4424
Project ID: 35427
County: Edgecombe
Description: NC 111 (Wilson Street) from NC 122 (McNair Road) to US 64 Alternate (Western Boulevard)

SUBJECT: Geotechnical Report - Roadway Subsurface Inventory

Project Description

The proposed 2.333-mile project is located both within and just outside of the municipal boundaries of the town of Tarboro. The bulk of the project consists of 2.283 miles of roadway widening along NC 111 from McNair Road to US 64 Alternate. New sidewalk will be constructed along the south side of the project from Spencer Drive to US 64 Alternate. To help accommodate the widening, some minor improvements are planned at intersecting secondary roads, driveways, and business entrances, including a 109-foot gravity wall. In addition, the NC 111 bridge over US 64 Bypass will be also be widened. The proposed earthworks are generally minor throughout the project corridor with proposed grade elevations typically falling within a few feet of the existing grade of NC 111. The most significant earthworks will be the bridge approach fills associated with the bridge widening. The Subsurface Inventory Report for the bridge was submitted by Summit on September 5th, 2019. No boring data from the bridge investigation is included within this report.

The geotechnical investigation was conducted from August 9th to August 28th, 2019. Borings at the bridge approach fills were advanced using a CME-550X drill machine equipped with an automatic hammer. Standard Penetration Tests (SPT) were performed at these locations to provide subsurface information for roadway foundation and slope design/construction. Drill tooling was advanced using 3.25-inch hollow-stem augers. The remainder of the borings, which were proposed in areas of relatively minor earthworks, were advanced using a hand auger. Representative soil samples were collected and eighty-one were submitted to Summit's soils laboratory for classification and moisture content testing. Two bulk samples were also collected and submitted to Summit's soils laboratory for California Bearing Ratio (CBR) testing. Four undisturbed samples were obtained at the bridge approach fills and two were submitted to the laboratory of Geotechnics, Inc for testing. All borings were left open for a minimum of 24 hours to collect groundwater data. In many instances, 24-hour cave in depths were interpreted as the groundwater level. This interpretation was made based on the 0-hour groundwater data and/or soil moisture data obtained from the lab results. All investigations and reporting were performed in accordance with the NCDOT Geotechnical Engineering Unit's 2016 "Geotechnical Investigation and Recommendations Manual."

The following alignments were investigated for this project:

Alignment	Station(±)
-L-	13+90.00 - 133+98.00
-Y2-	11+11.55 - 11+83.65
-Y3-	10+98.00 - 11+82.99
-Y4-	10+18.14 - 11+04.71
-Y5-	11+03.35 - 11+85.06
-Y6-	10+18.14 - 11+30.00
-Y7-	11+39.18 - 12+22.09
-Y8-	12+28.47 - 13+87.11
-DR1-	11+45.00 - 11+80.96

Physiography, Geography, and Geology

The project is located in northeastern North Carolina within the Coastal Plain Physiographic Province. Topography in the project area is characterized by flat land to gently rolling hills and valleys. In general, the topography within the project corridor would fit this description. Elevations along the project range from approximately 115 feet to approximately 56 feet above sea level. The topographic high occurs near the beginning of the project corridor. From there, the project gradually descends in elevation to the topographic low which occurs at very end of the project.

The project corridor is located within the Tar-Pamlico River Basin. The headwaters of Holly Creek intersect the project corridor at the site of the NC 111 bridge over US 64 Bypass. Holly Creek approaches the project corridor a second time but does not intersect it near the intersection of NC 111 and US 64 Alternate. Holly Creek flows northeast into Hendricks Creek which then flows southeast into the Tar River. Surface drainage from the project corridor would be expected to mostly flow towards the east-southeast.

Geologically, the project corridor is underlain by the Coastal Plain soils of the Yorktown Formation. This marine formation is approximately 4 million years old and is primarily composed of alternating sands and clays. These soils were deposited during repeated cycles of marine transgression and regression. At depth, the Yorktown typically has a signature blue-gray color and can contain some highly fossiliferous zones. Closer to the surface, the signature blue-gray color as well as the fossiliferous zones are typically lost to weathering processes.

Soil Properties

Coastal Plain soils are the dominant soil origin within the project corridor and will be commonly encountered during the roadway construction. In general, the Coastal Plain soils underlying the project follow the typical alternating pattern of sand and clay. Coastal Plain soils are typically more moisture

sensitive than those in the piedmont or mountains. Therefore, soils with a Plastic Index (PI) above 20 or with greater than 50% of material passing the # 200 sieve can be problematic during or after construction. Moderate to highly plastic Coastal Plain soils could negatively affect embankment stability, embankment settlement, subgrade stability, or may not be suitable for use as embankment material on the project.

Sands are the most prevalent Coastal Plain soil within the project corridor. The Coastal Plain sands primarily consist of silty sands (A-2-4) with a lesser amount of clayey sands (A-2-6 & A-2-7) and pure fine to coarse sands (A-3 & A-1-b). The sands are typically present at the ground surface after which point, they become interbedded with clays in some areas. They are estimated to be mostly loose to medium dense based on hand auger advancing difficulty. Below is a summary of the results of laboratory testing conducted on the Coastal Plain sands present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
S-2	15	0	15.7%	34%	A-2-4
S-10	15	0	13.1%	33%	A-2-4
S-21	27	6	19.3%	33%	A-2-4
S-31	18	0	17.7%	25%	A-2-4
S-12	17	0	16.3%	34%	A-2-4
S-15	18	0	15.8%	11%	A-1-b
S-18	18	0	12.2%	9%	A-1-b
S-59	16	0	10.1%	17%	A-2-4
S-36	35	13	18.5%	27%	A-2-6
S-39	19	1	17.9%	13%	A-2-4
S-46	18	0	17.0%	27%	A-2-4
S-52	23	1	17.9%	22%	A-2-4
S-56	22	3	19.7%	35%	A-2-4
S-57	18	0	16.2%	22%	A-2-4
S-60	30	8	18.2%	33%	A-2-4
S-64	21	3	18.4%	32%	A-2-4
S-67	18	0	17.7%	28%	A-2-4
S-70	24	1	21.8%	20%	A-2-4
S-72	27	5	16.3%	25%	A-2-4
S-69	14	0	8.9%	17%	A-2-4
S-71	15	0	7.4%	16%	A-2-4
S-83	29	10	17.7%	34%	A-2-4
S-114	31	10	12.6%	25%	A-2-4
S-126	41	15	15.9%	32%	A-2-7
S-138	24	2	15.9%	27%	A-2-4
S-143	18	0	9.1%	15%	A-2-4
S-95	16	0	9.9%	18%	A-3
S-104	18	0	3.6%	25%	A-2-4
S-107	19	0	8.8%	29%	A-2-4
S-137	20	0	14.2%	33%	A-2-4
S-139	17	0	9.4%	24%	A-2-4
S-147	21	0	17.0%	19%	A-2-4
S-154	22	0	6.6%	30%	A-2-4
S-45	17	1	6.6%	28%	A-2-4
S-156	19	1	12.0%	35%	A-2-4
AVERAGES	**21**	**2**	**14.2%**	**25%**	

Coastal Plain clays are common throughout the project corridor. The Coastal Plain clays predominantly consist of sandy clays (A-6) with a lesser amount of silty clays (A-7-6). The clays are interbedded with the sands and typically underly the sands in most areas of the project. There are a few areas where clays are at or very near the ground surface. They are estimated to be mostly soft to medium stiff based on hand auger advancing difficulty. Below is a summary of the results of laboratory testing conducted on the Coastal Plain clays present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
S-22	38	15	24.9%	38%	A-6
S-33	32	16	20.7%	42%	A-6
S-20	42	21	43.6%	78%	A-7-6
S-23	34	13	21.6%	37%	A-6
S-49	33	16	18.1%	47%	A-6
S-75	36	20	22.1%	60%	A-6
S-81	32	12	21.8%	39%	A-6
S-105	33	13	20.9%	41%	A-6
S-116	31	16	29.4%	60%	A-6
S-125	42	18	18.5%	42%	A-7-6
S-131	39	19	14.2%	43%	A-6
S-141	36	16	14.9%	37%	A-6
S-151	35	17	21.1%	59%	A-6
AVERAGES	**36**	**16**	**22.4%**	**48%**	

Sandy silts (A-4) are also present within the Coastal Plain soils. The sandy silts represent slight gradational changes within the sand layers and are not significantly different in appearance to the sands. They are estimated to be mostly soft to medium stiff based on hand auger advancing difficulty. Below is a summary of the results of laboratory testing conducted on the Coastal Plain silts present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
S-5	16	0	18.0%	39%	A-4
S-7	16	0	15.9%	43%	A-4
S-30	24	6	18.2%	41%	A-4
S-35	17	1	10.1%	42%	A-4
S-88	27	9	30.6%	48%	A-4
S-90	24	6	28.2%	39%	A-4
S-134	30	7	14.1%	40%	A-4
S-152	25	6	18.4%	50%	A-4
S-128	30	10	17.6%	42%	A-4
S-4	16	1	8.5%	37%	A-4
S-6	15	0	14.3%	40%	A-4
S-9	15	1	12.9%	42%	A-4
S-130	26	7	9.7%	38%	A-4
AVERAGES	**22**	**4**	**16.7%**	**42%**	

From looking at the lab data, some general assumptions can be made about the Coastal Plain soils within the project corridor. When encountered during construction, the Coastal Plain sands and silts should be suitable as a subgrade material and acceptable as embankment fill material. They are also generally moist with moisture content increasing with depth into the subsurface. Coastal Plain clays in general should be suitable as a subgrade material and are marginally acceptable as embankment fill material. They are also generally moist to wet with moisture content increasing with depth. It should be noted that some areas of higher PI (>20) Coastal Plain clays that were not encountered during the geotechnical investigation could still potentially be discovered during construction. Approximate locations where moderate to highly plastic Coastal Plain soils were encountered during the investigation and are believed to be present within the project corridor will be highlighted in the “Areas of Special Geotechnical Interest” section of this text report.

Alluvial soils, soils that have been transported and deposited by water, were encountered in at least one area within the project corridor. The Alluvial soils are believed to be associated with the headwaters and associated floodplain of Holly Creek. Within the project corridor, these soils are now buried under the construction of existing NC 111 and US 64 Bypass. Alluvial deposition typically occurs in topographically low areas. These soils are often very near or even below the water table and are typically wet to saturated. As a consequence of their high moisture content and nature of deposition, alluvial soils typically exhibit very soft to soft/very loose to loose soil densities. They also can contain highly plastic clays and sometimes significant amounts of organic matter. Depending on their characteristics, Alluvial soils can be problematic during and after construction. They can negatively impact embankment stability, embankment settlement, and subgrade stability.

Clays were commonly encountered within the former floodplain of Holly Creek. The Alluvial clays typically consist of silty clays (A-7-6) with a lesser amount of sandy clays (A-6). SPT results in the Alluvial clays showed soil densities that typically ranged from very soft to medium stiff. Below is a summary of the results of laboratory testing conducted on the Alluvial clays present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
SS-20	63	37	42.3%	94%	A-7-6
SS-21	51	30	46.9%	87%	A-7-6
SS-29	32	16	47.6%	56%	A-6
SS-30	70	45	43.6%	94%	A-7-6
SS-24	33	16	59.2%	61%	A-6
SS-25	63	37	43.2%	89%	A-7-6
SS-26	54	32	34.5%	82%	A-7-6
SS-15	39	23	36.7%	67%	A-6
SS-6	55	32	37.4%	82%	A-7-6
SS-7	46	25	61.5%	72%	A-7-6
SS-11	54	34	51.8%	75%	A-7-6
AVERAGES	**51**	**30**	**45.9%**	**78%**	

Alluvial silty sands (A-2-4) were less commonly encountered but are also present within the former floodplain of Holly Creek. SPT results in the Alluvial sands showed soil densities that typically ranged from very loose to medium dense. Below is a summary of the results of the laboratory testing conducted on the Alluvial sands present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
SS-19	22	1	19.8%	28	A-2-4

Upon reviewing the lab data, some general assumptions can be made about the Alluvial soils within the project corridor. The Alluvial clays are generally saturated and highly plastic. This can present potential issues during construction such as embankment stability and/or settlement issues. Approximate locations where Alluvial soils are believed to be present within the project corridor will be highlighted in the “Areas of Special Geotechnical Interest” section of this text report.

Roadway Embankment soils from the construction of existing NC 111 as well as some of the secondary roads intersecting it are present in many areas throughout the project corridor and will be impacted during construction. Roadway Embankment soils are often quite similar to the local soils that they are typically sourced from. However, they often have a “reworked” appearance, with a large variation in grain size reflecting the mixing of soils that occurs during construction. They can contain little to trace amounts of organic material, gravel, cobbles, boulders and/or other types of debris. If properly constructed, Roadway Embankment soils typically do not present issues during future construction projects. However, some older Roadway Embankment fills across the state can be poorly compacted, contain highly plastic clays, perched water, and even miscellaneous debris such as tree trunks.

Sandy silts (A-4) were commonly encountered in the existing Roadway Embankment fills within the project corridor. SPT results in the Roadway Embankment silts showed soil densities that typically range from soft to stiff. Below is a summary of the results of the laboratory testing conducted on the Roadway Embankment silts present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
SS-14	23	7	30.1%	46%	A-4
SS-2	19	0	15.5%	37%	A-4
SS-13	23	4	16.3%	42%	A-4
S-77	24	6	13.8%	40%	A-4
AVERAGES	**22**	**4**	**18.9%**	**41%**	

Silty sands (A-2-4) are equally common in the existing Roadway Embankment fills within the project corridor. SPT results in the Roadway Embankment sands showed soil densities that typically range from loose to medium dense. Below is a summary of the results of the laboratory testing conducted on the Roadway Embankment sands present within the project corridor:

Sample No.	Liquid Limit (L.L)	Plasticity Index (P.I.)	Natural Moisture	Passing # 200 Sieve	AASHTO Classification
SS-5	19	1	25.7%	34%	A-2-4
SS-28	19	0	12.5%	20%	A-2-4
SS-9	18	0	13.5%	16%	A-2-4
S-87	15	0	12.4%	21%	A-2-4
AVERAGES	**18**	**0**	**16.0%**	**23%**	

Some general assumptions can be made about the Roadway Embankment soils based on the lab data. When encountered during construction, the Roadway Embankment soils should be suitable as a subgrade material and acceptable for use as embankment fill material. They are also generally moist to wet with moisture content increasing with depth into the fill.

Rock Properties

Coastal Plain Sedimentary Rock was not encountered during the geotechnical investigation and is not expected to be a factor during the construction of this project.

Groundwater Properties

The field investigation was conducted during a period of average rainfall. Groundwater was encountered in the majority of the borings. Top of water table elevations varied from 109.3 feet to 53.3 feet above sea level. The water table generally mimics the topography of the project corridor with the highest elevations occurring near the beginning of the project and then slowly descending along the project to the lowest elevations occurring near the end. Groundwater flow appears to be topographically driven likely moving to the east-southeast across the project corridor. An average water table elevation of 87.2 feet above sea level was calculated within the project corridor. Approximate locations where groundwater is present within six feet of proposed subgrade will be highlighted in the following section, “Areas of Special Geotechnical Interest.”

A visual reconnaissance for water wells was conducted throughout the project corridor. This was used in conjunction with the final survey file to attempt to identify water wells within or adjacent to the proposed right of way of the project. Some water well locations are well hidden, and it is possible that some wells were missed or misidentified by the final survey and/or visual reconnaissance. No water wells were identified within the project corridor during this investigation.

Areas of Special Geotechnical Interest

Plastic Soils - During the geotechnical investigation, moderate to highly plastic clays were encountered in several areas within the project corridor. Moderate to highly plastic soils can be problematic during and after construction. They can negatively affect embankment stability, embankment settlement, subgrade stability, and may not be suitable for use as embankment material. More detailed information on these soils can be found in the “Soil Properties” section of this text report. The following approximate locations listed below show areas where moderate to highly plastic clays are present within the project corridor:

Alignment	Station(±)	Offset
-L-	30+00.00 - 32+00.00	Left & Right
-L-	40+00.00 - 41+50.00	Left & Right
-L-	60+00.00 - 72+00.00	Left & Right
-L-	100+00.00 - 110+00.00	Left & Right
-L-	114+00.00 - 116+00.00	Left & Right
-L-	120+00.00 - 124+00.00	Left & Right
-L-	131+50.00 - 133+98.00	Left & Right

Alluvial Soils - During the geotechnical investigation, areas of Alluvial soils were observed and encountered. Alluvial soils can be problematic during and after construction. They can negatively impact embankment stability, embankment settlement, and subgrade stability. More detailed information on these soils can be found in the “Soil Properties” section of this text report. The following approximate locations listed below show areas where Alluvial soils are present within the project corridor:

Alignment	Station(±)	Offset
-L-	61+25 - 72+25	Left & Right

Groundwater - During the geotechnical investigation, groundwater was encountered across much of the project corridor. Groundwater can present issues during and after construction if not properly dealt with. More detailed information on the groundwater underlying the project corridor can be found in the “Groundwater Properties” section of this text report. The following approximate locations listed below show areas where groundwater is within 6 feet of proposed subgrade:

Alignment	Station(±)	Offset
-L-	13+90 - 16+00	Left & Right

Alignment	Station(±)	Offset
-L-	36+00 - 40+00	Left & Right
-L-	46+00 - 50+00	Left & Right
-L-	52+00 - 58+00	Left & Right
-L-	76+00 - 80+00	Left & Right
-L-	82+00 - 84+00	Left & Right
-L-	94+00 - 102+00	Left & Right
-L-	110+00 - 112+00	Left & Right
-L-	128+00 - 133+98	Left & Right
-Y2-	11+11.55 - 11+83.65	Left & Right
-Y3-	10+98.00 - 11+82.99	Left & Right
-Y4-	10+18.14 - 11+04.71	Left & Right
-Y5-	11+03.35 - 11+85.06	Left & Right
-Y6-	10+18.14 - 11+30.00	Left & Right

Appendix A

Bulk Samples

Sample No.	Alignment	Station(±)	Offset	Depth(ft)	Test Type
S-161	-L-	15+00	46’RT	1.0 - 3.0	California Bearing Ratio (CBR)
S-162	-L-	29+00	25’LT	1.0 - 3.0	California Bearing Ratio (CBR)

Appendix B

Undisturbed (Shelby Tube) Samples

Sample No.	Alignment	Station(±)	Offset	Depth(ft)	Test Type
ST-1	-L-	62+95	71’RT	6.0 - 8.0	D4767 C.U.-BAR Triaxial (Und.)
ST-2	-L-	64+42	82’RT	4.0 - 6.0	D2435 Consol. 16tsf - W/Cv
ST-3	-L-	69+02	67’RT	9.0 - 11.0	Not Tested
ST-4	-L-	69+05	76’LT	5.0 - 7.0	Not Tested

References

North Carolina Geological Survey, 1985, Geologic map of North Carolina: North Carolina Geological Survey, General Geologic Map, scale 1:500000.

The Geology of the Carolinas, J. Wright Horton, Jr., and Victor A. Zullo

Groundwater Science, Charles R. Fitts

Respectfully Submitted,

Brett Smith, PG
Project Geologist
Summit Design and Engineering Services, PLLC

PROJECT REFERENCE NO.	SHEET NO.
U-4424	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011

-Y- POT Sta. 14+44.64

-Y- PT Sta. 14+12.93

-Y- PC Sta. 13+09.30

END CONSTRUCTION
-Y- STA. 10+96.64

-L- PT Sta. 14+80.18

COASTAL PLAIN

17+04
22'LT

COASTAL PLAIN

POND

SEE SHEET 05
21+50.00
-L- STA.

TO SARATOGA

NC 111/WILSON ST. 33' BST

NC 111/WILSON ST. 28' BST

-L- POT Sta. 10+00.00

-L- PC Sta. 10+13.43

BEGIN CONSTRUCTION
-L- STA. 12+50.00

-L- POC Sta. 13+73.49 =
-Y- POT Sta. 10+00.00
-Y1- POT Sta. 14+55.21

BEGIN STATE PROJECT U-4424
-L- STA. 13+90.00

BEGIN CONSTRUCTION
-Y1- STA. 13+84.87

15+00
46'RT

COASTAL PLAIN

U4424 GPS-2

19+00
17'RT

COASTAL PLAIN

21+00
11'RT

-Y1- POT Sta. 10+00.00

NC 122/McNAIR RD. 35' BST

TO NC 258

REVISIONS

8/17/99

15-OCT-2019 10:53
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PROJECT REFERENCE NO.	SHEET NO.
U-4424	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83'2011

8/17/99

REVISIONS

25 30 35

MATCH LINE SEE SHEET 04 -L- STA. 21+50.00

MATCH LINE SEE SHEET 06 -L- STA. 35+50.00

-L- POT Sta. 25+61.29=
-Y2- POT Sta. 12+01.65

-L- PC Sta. 33+79.45

23+00 32'LT

25+00 28'LT

29+00 25'LT

31+00 28'LT

27+00 26'RT

11+50 25'RT

33+01 21'RT

34+99 21'RT

COASTAL PLAIN

COASTAL PLAIN

COASTAL PLAIN

COASTAL PLAIN

COASTAL PLAIN

COASTAL PLAIN

24" RCP

18" RCP

15" RCP

12" RCP

6" HDPE

WOODS

4" VINYL

6" CHL

CONC

POOL

BL-102

BL-103

BEGIN CONSTRUCTION
-Y2- STA. 11+11.55
-Y2- POT Sta. 10+00.00

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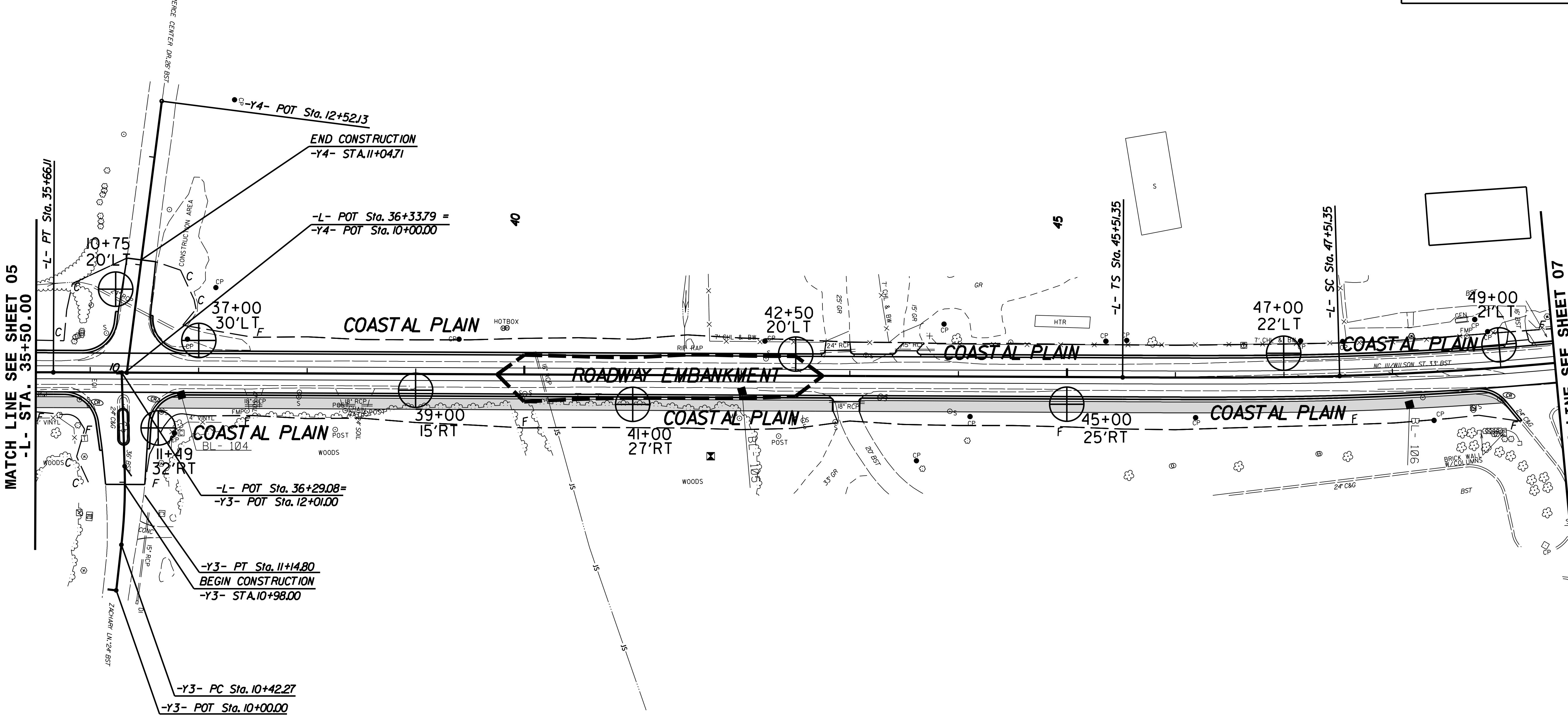
PROJECT REFERENCE NO.	SHEET NO.
U-4424	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011



REVISIONS

8/17/99

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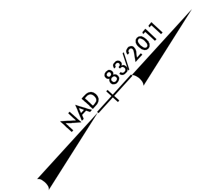
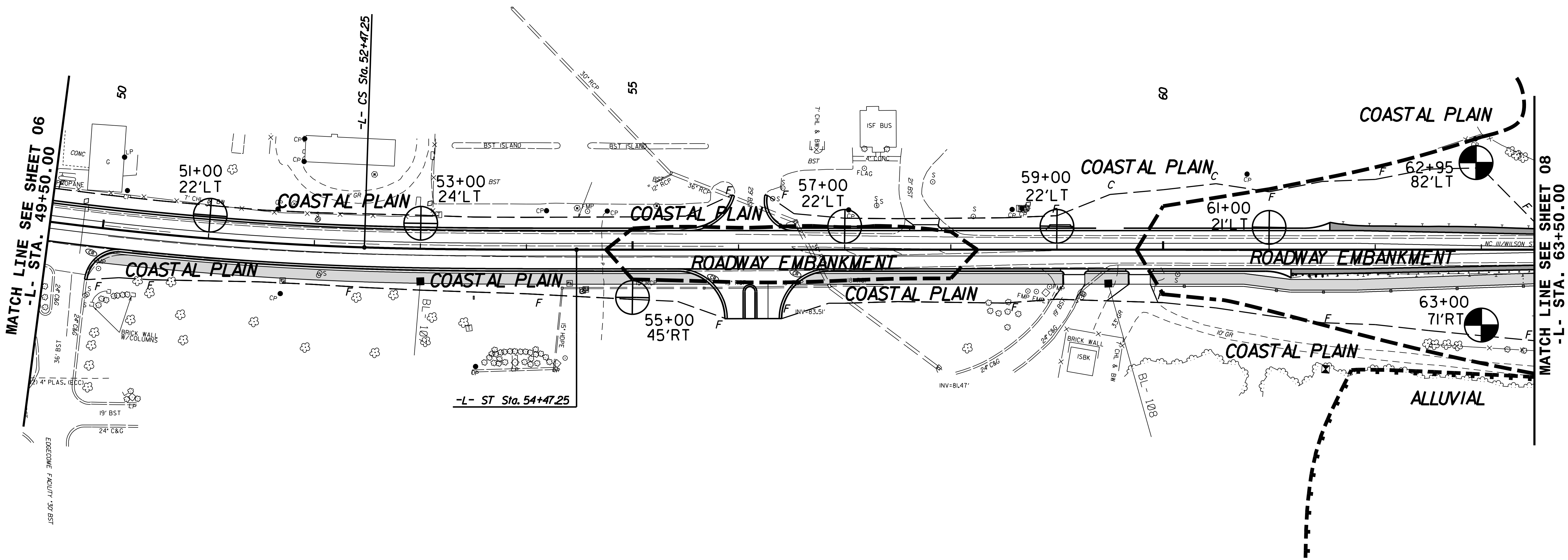
PROJECT REFERENCE NO.	SHEET NO.
U-4424	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4424	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011

REVISIONS 8/17/99

MATCH LINE SEE SHEET 07 -L- STA. 63+50.00

MATCH LINE SEE SHEET 09 -L- STA. 77+50.00

65 70 75

COASTAL PLAIN

ROADWAY EMBANKMENT

69+00 F 72'LT

70+96 60'LT

COASTAL PLAIN

ROADWAY EMBANKMENT

COASTAL PLAIN

75+00 21'LT

77+00 21'LT

ROADWAY EMBANKMENT

73+00 18'RT

69+00 60'RT

70+97 62'RT

ROADWAY EMBANKMENT

COASTAL PLAIN

COASTAL PLAIN

64+50 83'RT

ROADWAY EMBANKMENT

ALLUVIAL

WOODS

US 64 BYP.

4.5' WW & BM

CONC

27" BST

24" BST

15" RCP

18" RCP

ISBLKD

ISFD

FMP

15-OCT-2019 11:25
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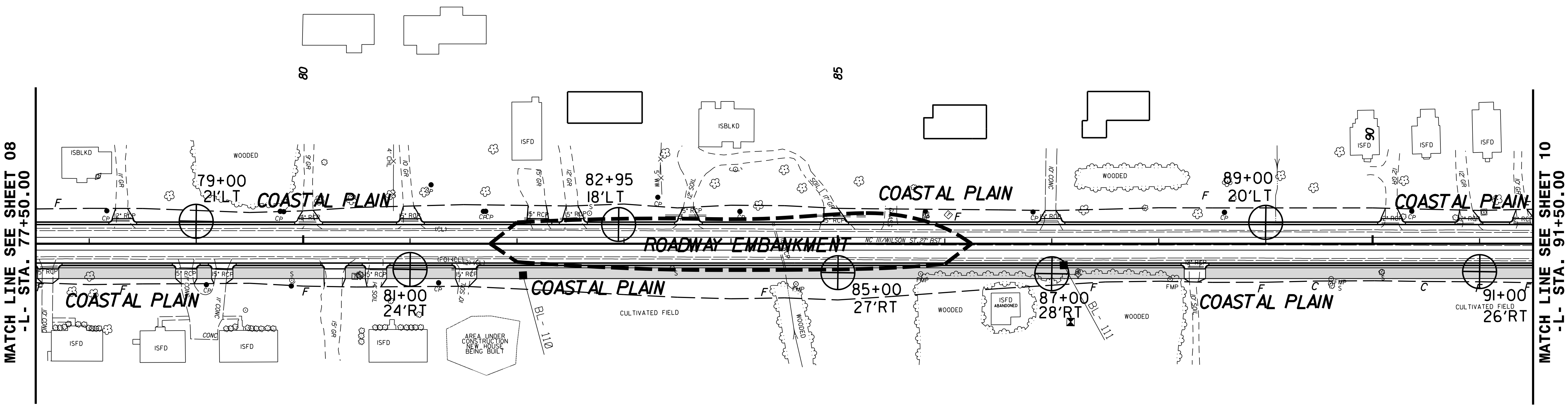
PROJECT REFERENCE NO.	SHEET NO.
U-4424	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011



REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-4424	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011

REVISIONS

8/17/99

MATCH LINE SEE SHEET 09
-L- STA. 91+50.00

-L- POT Sta. 97+24.94 =
-Y5- POT Sta. 12+03.06

-L- TS Sta. 97+75.72

-L- SC Sta. 99+75.72

-Y6- POT Sta. 12+00.86

END CONSTRUCTION
-Y6- STA. 11+30.00

-L- POC Sta. 104+68.35 =
-Y6- POT Sta. 9+98.97

ROADWAY EMBANKMENT

95+00
25'LT

97+00
29'LT

101+00
25'LT

11+00
15'LT

105+00
28'LT

93+00
25'RT

99+00
21'RT

103+00
26'RT

10+75
19'LT

COASTAL PLAIN

ROADWAY EMBANKMENT

-Y5- PT Sta. 10+92.58

-Y5- PC Sta. 10+32.07

BEGIN CONSTRUCTION
-Y5- STA. 10+50.00

-Y5- POT Sta. 10+00.00

MATCH LINE SEE SHEET 11
-L- STA. 105+50.00

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PROJECT REFERENCE NO.	SHEET NO.
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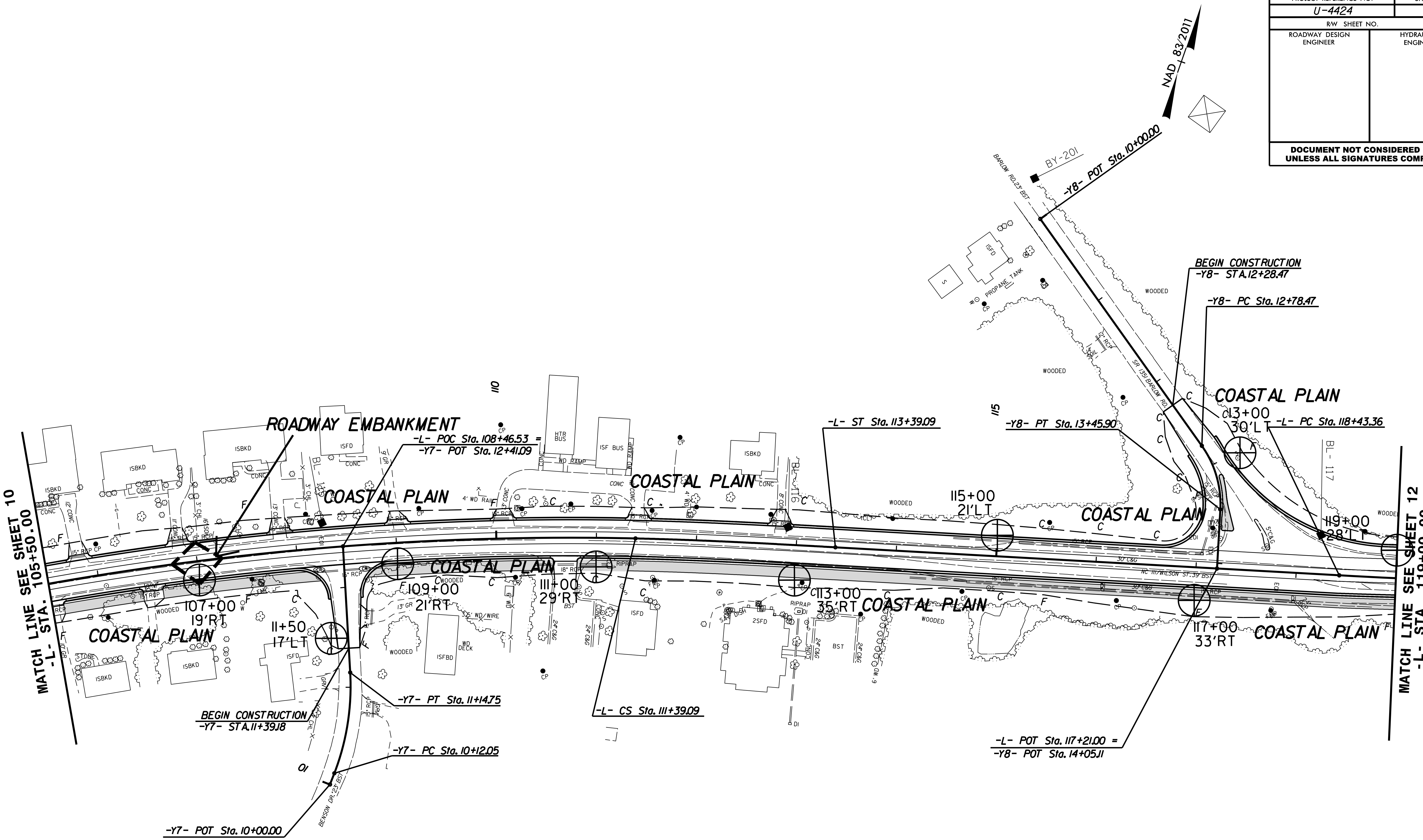
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



REVISIONS

8/17/99

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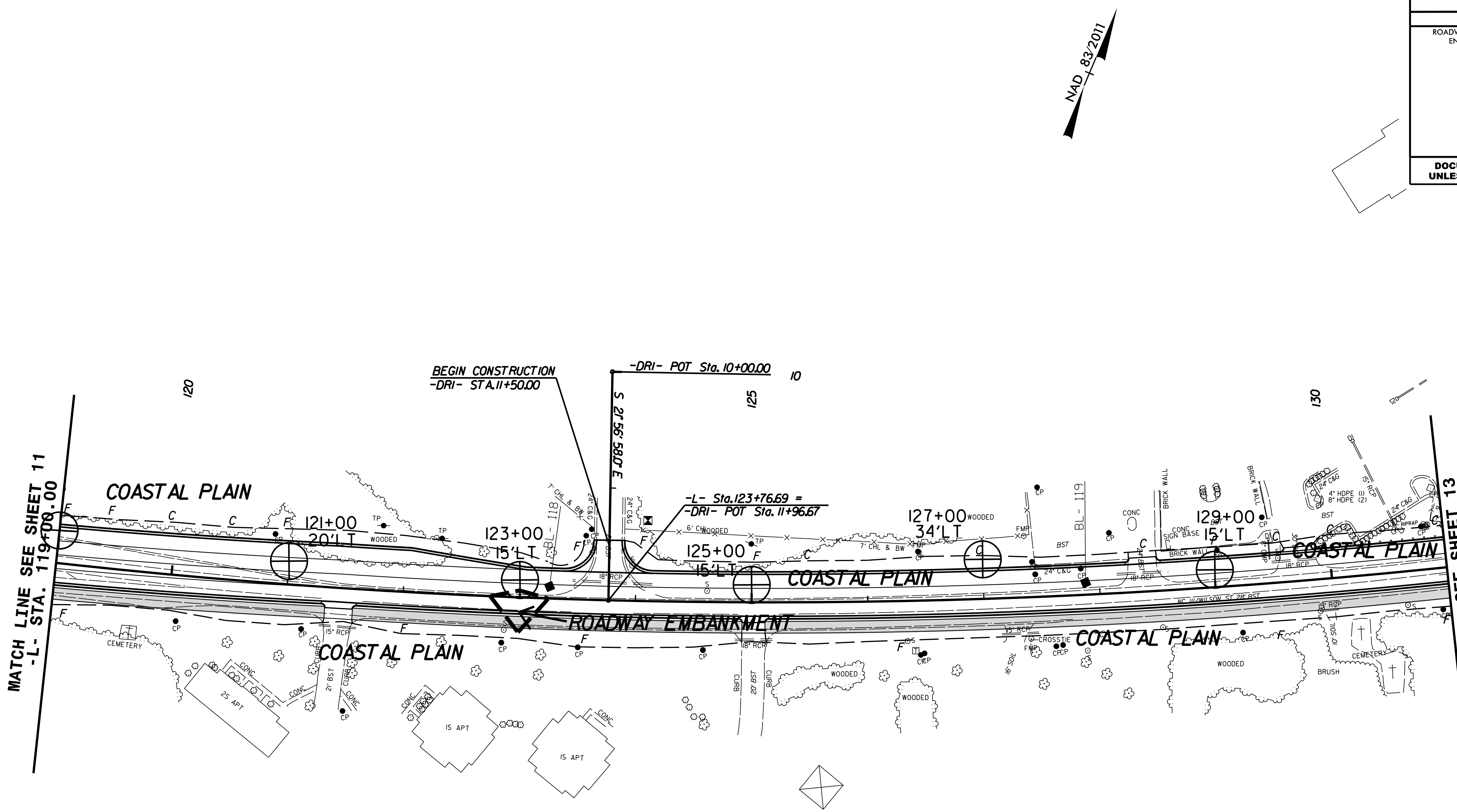
PROJECT REFERENCE NO.	SHEET NO.
U-4424	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/17/99

REVISIONS



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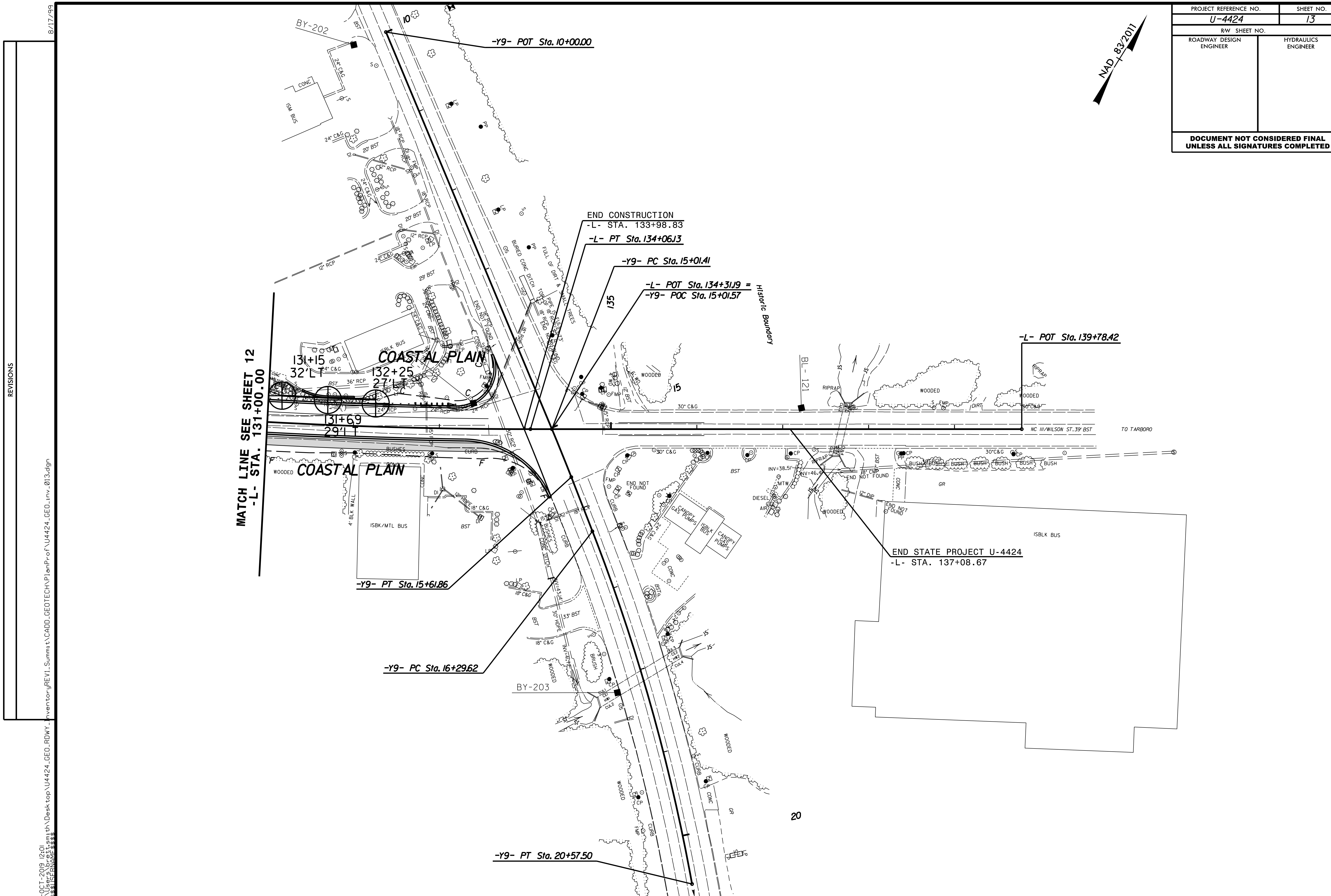
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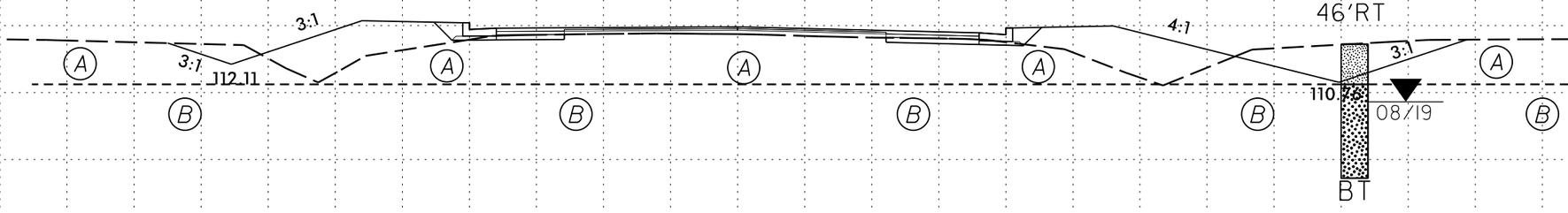
U-4424
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/2011
-Y9- POT Sta. 10+00.00
END CONSTRUCTION
-L- STA. 133+98.83
-L- PT Sta. 134+06.13
-Y9- PC Sta. 15+01.41
-L- POT Sta. 134+31.19 =
-Y9- POC Sta. 15+01.57
Historic Boundary
-L- POT Sta. 139+78.42
MATCH LINE SEE SHEET 12
-L- STA. 131+00.00
COASTAL PLAIN
131+15
32'LT
132+25
27'LT
131+69
29'LT
COASTAL PLAIN
END STATE PROJECT U-4424
-L- STA. 137+08.67
NC 111/WILSON ST. 39' BST
TO TARBORO
-Y9- PT Sta. 15+61.86
-Y9- PC Sta. 16+29.62
BY-202
BY-203
BL-121
-Y9- PT Sta. 20+57.50
ISBLK BUS
ISBK/MTL BUS
WOODED
20
REVISIONS
8/17/99
15-OCT-2019 12:01

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	14

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-161	46'RT	15+00	1.0' - 3.0'	A-4(0)	16	1	5.3	61.2	16.7	16.7	100	99	41	N/A	N/A
S-2	46'RT	15+00	4.3' - 7.5'	A-2-4(0)	15	0	6.6	65.2	14.6	13.6	100	99	34	15.7	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, and gray, moist, medium stiff to stiff, sandy SILT (A-4) with little clay

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to gray, wet to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

15+00.00

—L—

11-OCT-2019 11:53
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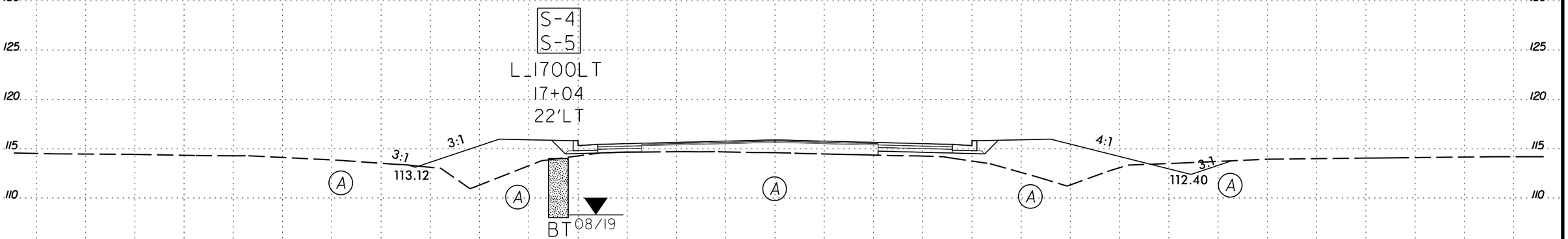
SOIL TEST RESULTS

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-4	22'LT	17+04	0.0' - 3.0'	A-4(0)	16	1	10.5	57.9	13.9	17.7	98	94	37	8.5	N/A
S-5	22'LT	17+04	5.0' - 6.0'	A-4(0)	16	0	5.6	60.5	13.9	19.9	100	99	39	18.0	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** *gray, brown, and tan, moist to saturated, soft to stiff, sandy SILT (A-4) with little clay*

Notes:
- Soil densities are estimated.

17+00.00

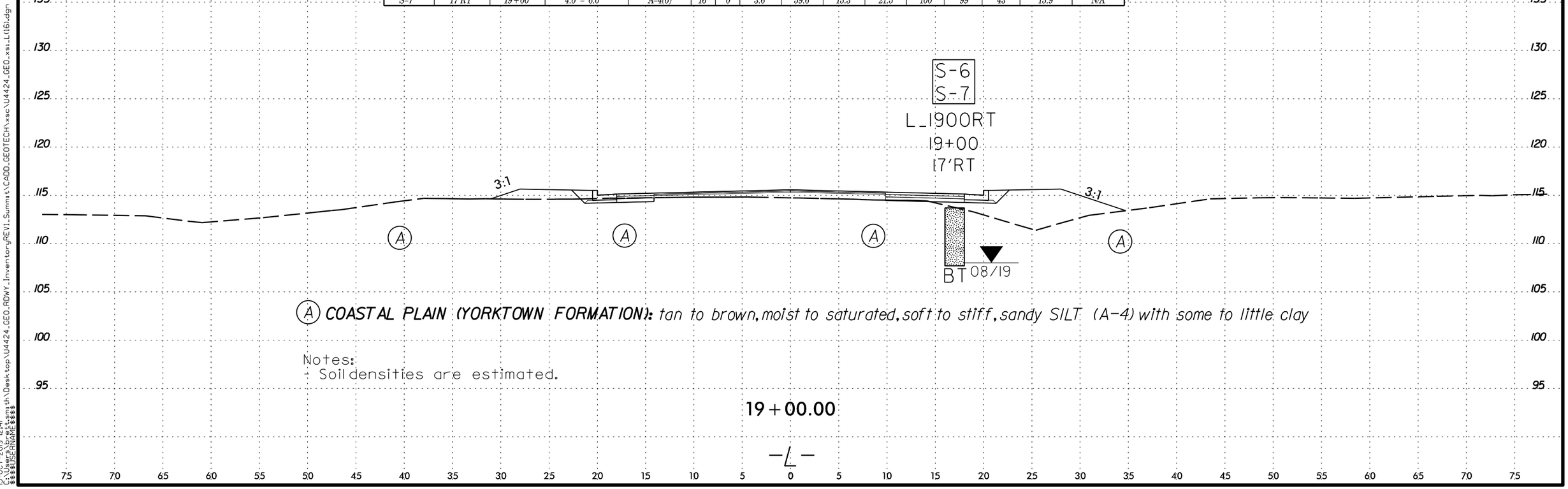
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	16

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
S-6	17'RT	19+00	0.0' - 1.5'	A-4(0)	15	0	7.9	59.2	17.4	15.5	99	96	40	14.3	N/A
S-7	17'RT	19+00	4.0' - 6.0'	A-4(0)	16	0	3.6	59.6	15.3	21.5	100	99	43	15.9	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to brown, moist to saturated, soft to stiff, sandy SILT (A-4) with some to little clay

Notes:
- Soil densities are estimated.

19+00.00

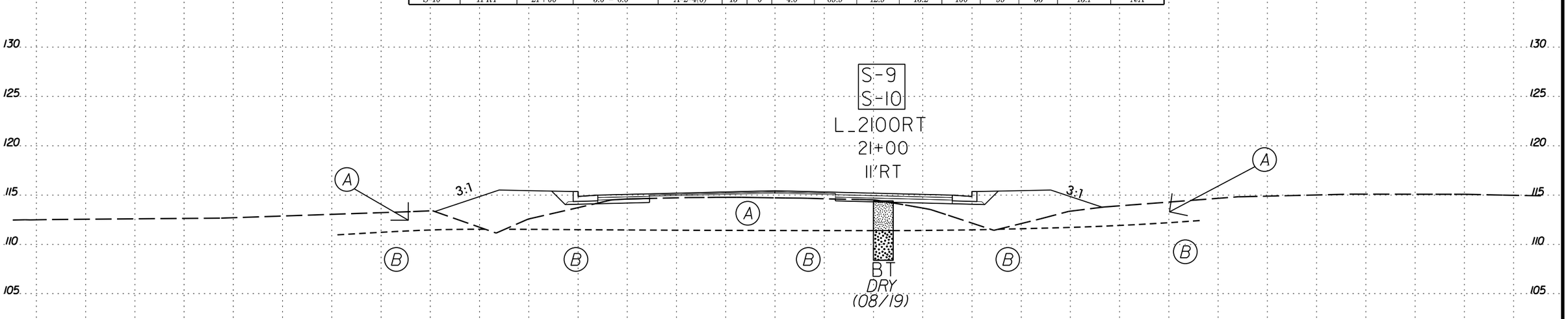
—L—

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	17

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-9	11'RT	21+00	1.0' – 3.0'	A-4(0)	15	1	7.0	58.2	19.4	15.5	100	97	42	12.9	N/A
S-10	11'RT	21+00	3.0' – 6.0'	A-2-4(0)	15	0	4.0	69.9	12.9	13.2	100	99	33	13.1	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, moist, medium stiff to stiff, sandy SILT (A-4) with little clay

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, orange, and white, moist to wet, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

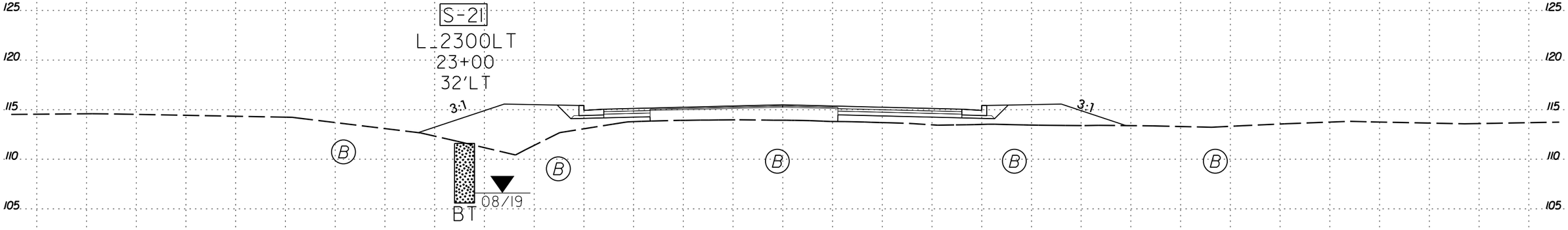
21+00.00
—L—

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	18

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-21	32'LT	23+00	0.0' - 3.0'	A-2-4(0)	27	6	5.1	66.1	6.5	22.2	100	99	33	19.3	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, moist to saturated, loose to medium dense, silty SAND (A-2-4) with some clay

Notes:
- Soil densities are estimated.

23+00.00
—L—

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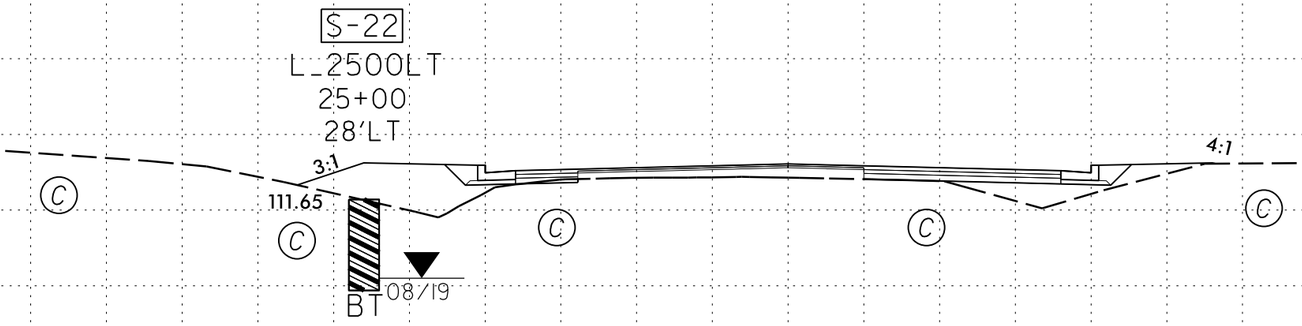
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	19

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-22	28'LT	25+00	0.0' - 3.0'	A-6(2)	38	15	18.0	46.4	6.4	29.2	100	95	38	24.9	N/A



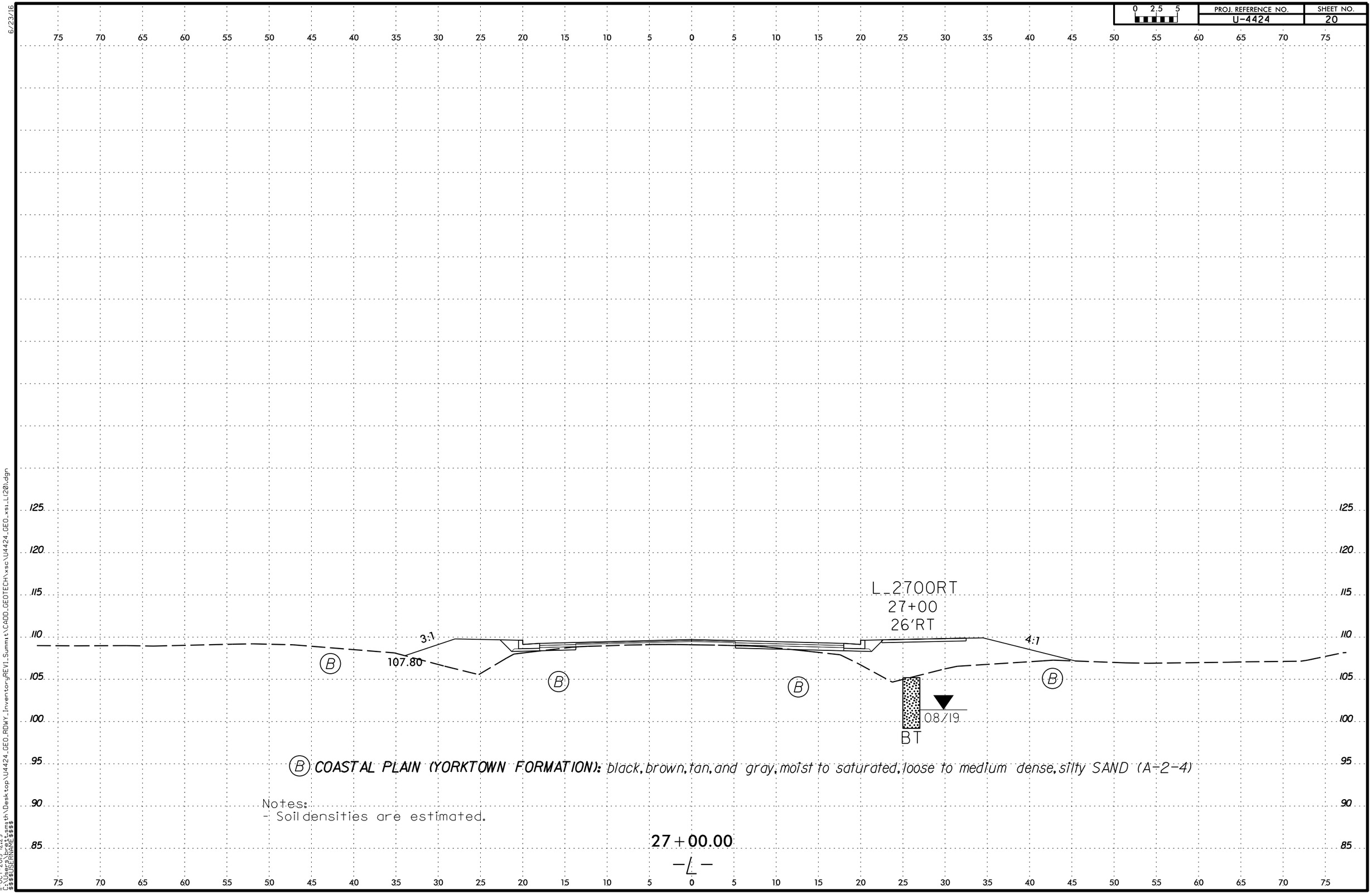
(C) **COASTAL PLAIN (YORKTOWN FORMATION):** orange to gray, moist to saturated, soft to medium stiff, slightly plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

25+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	20



B **COASTAL PLAIN (YORKTOWN FORMATION):** *black, brown, tan, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4)*

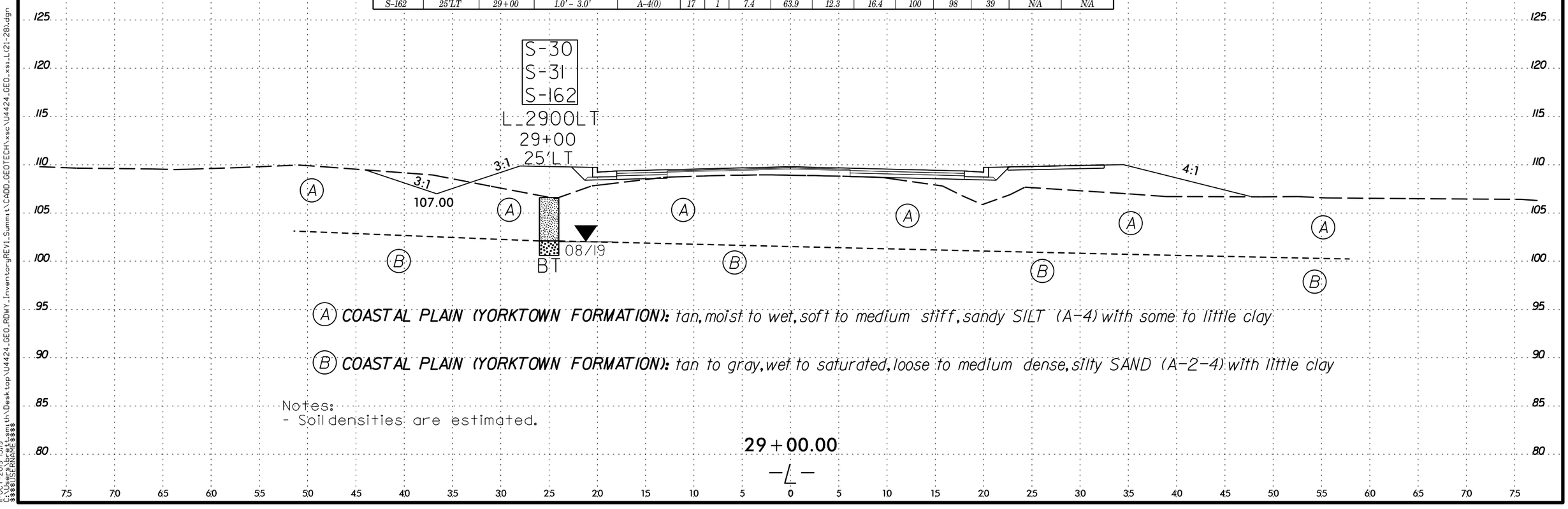
Notes:
- Soil densities are estimated.

27+00.00
—L—

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	21

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-30	25'LT	29+00	3.0' - 4.5'	A-4(0)	24	6	6.8	60.5	12.7	20.0	100	98	41	18.2	N/A
S-31	25'LT	29+00	4.5' - 5.5'	A-2-4(0)	18	0	7.7	71.3	5.1	16.0	100	98	25	17.7	N/A
S-162	25'LT	29+00	1.0' - 3.0'	A-4(0)	17	1	7.4	63.9	12.3	16.4	100	98	39	N/A	N/A



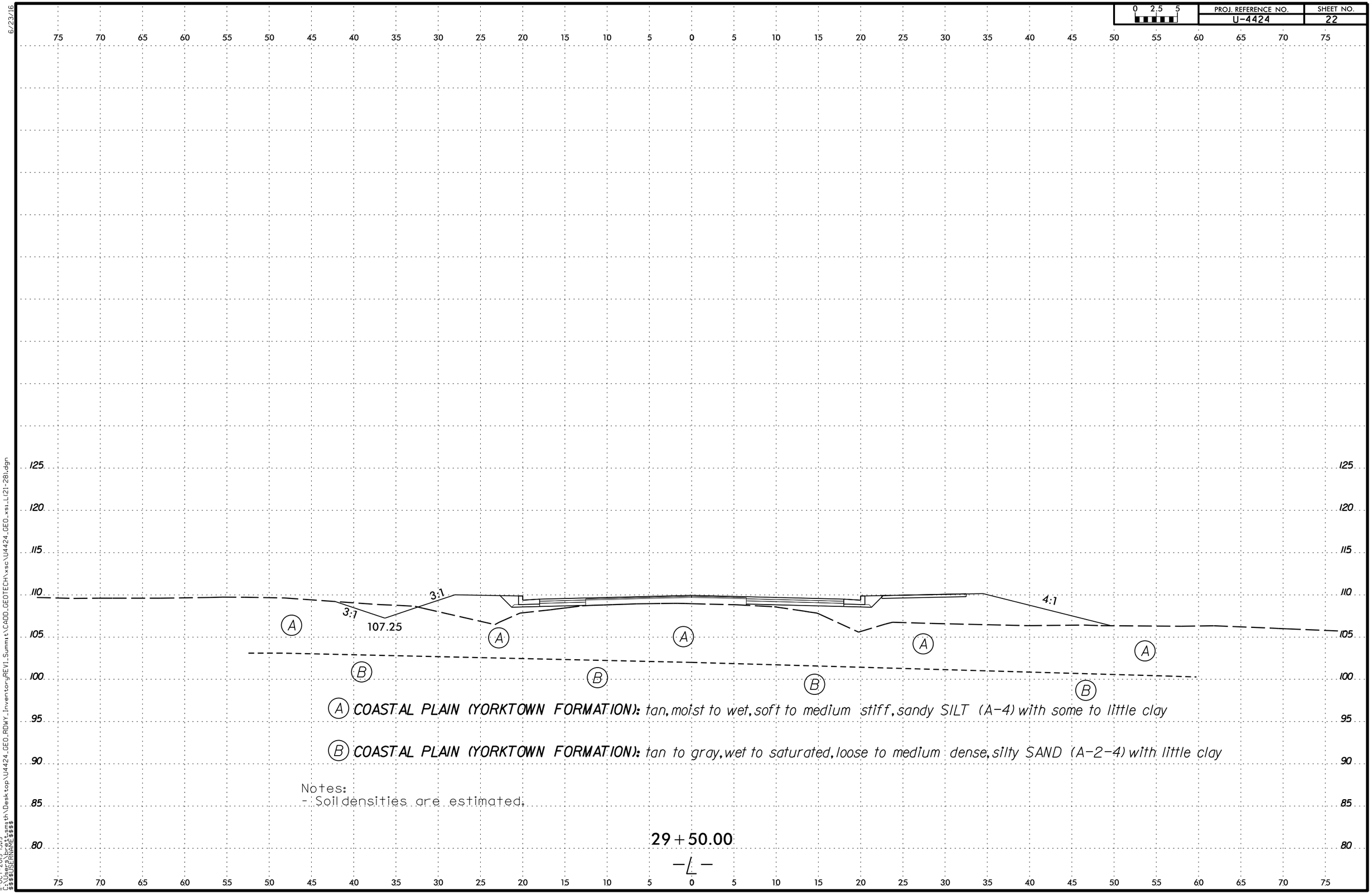
(A) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, moist to wet, soft to medium stiff, sandy SILT (A-4) with some to little clay

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to gray, wet to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

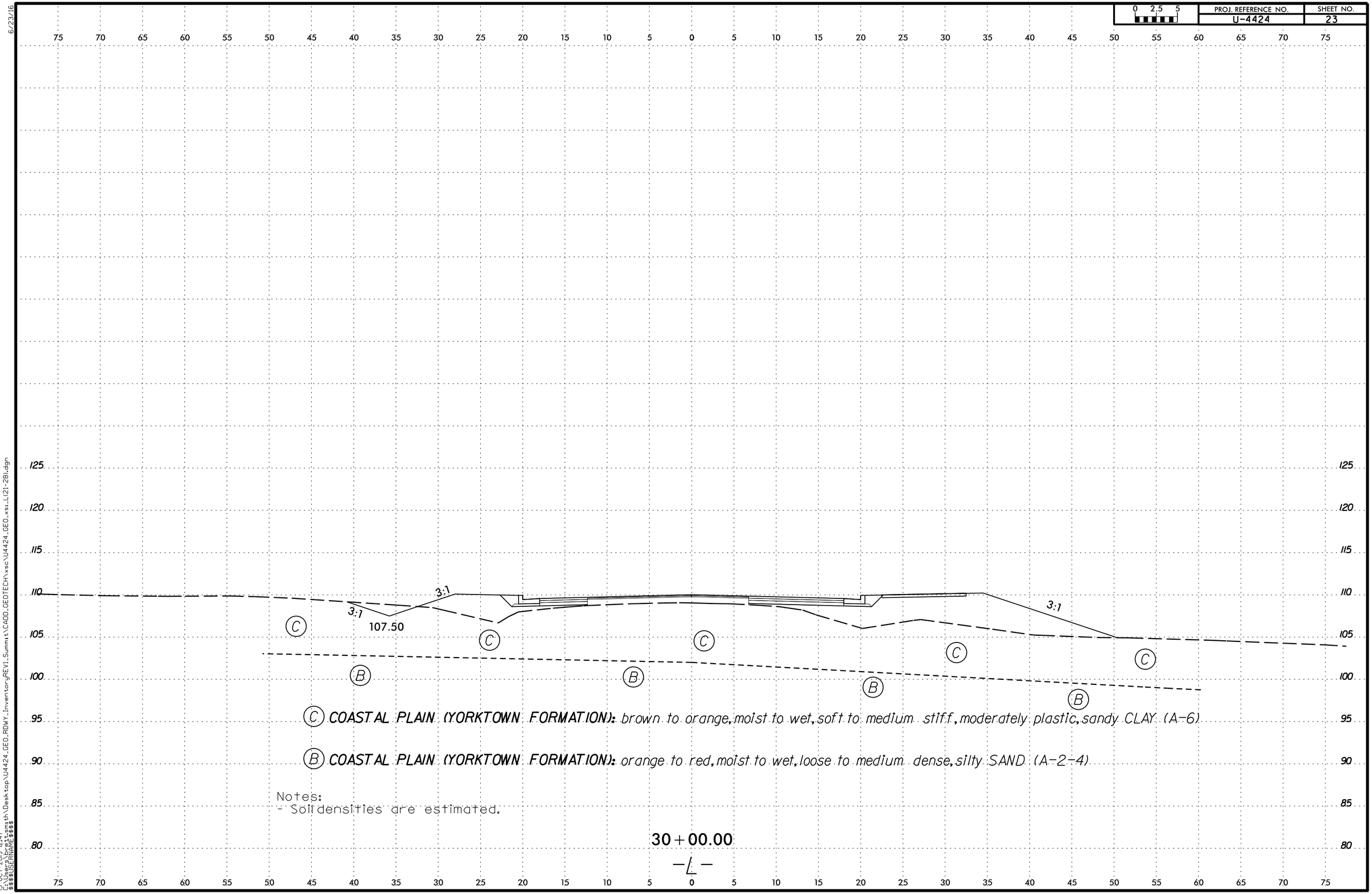
Notes:
- Soil densities are estimated.

29+00.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	22



0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	23



(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to orange, moist to wet, soft to medium stiff, moderately plastic, sandy CLAY (A-6)*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange to red, moist to wet, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

30+00.00
-L-

6/23/16

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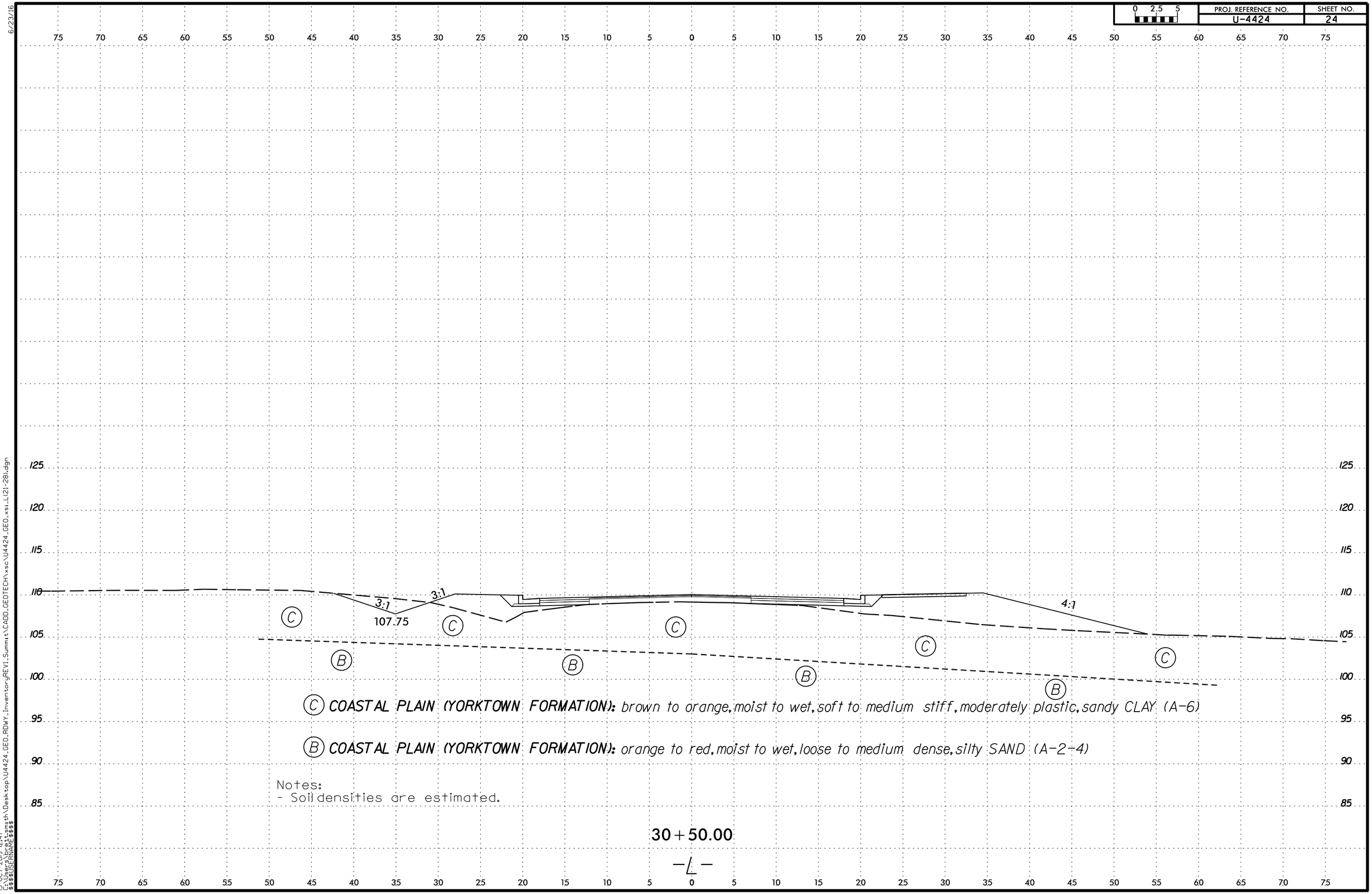
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	24



6/23/16

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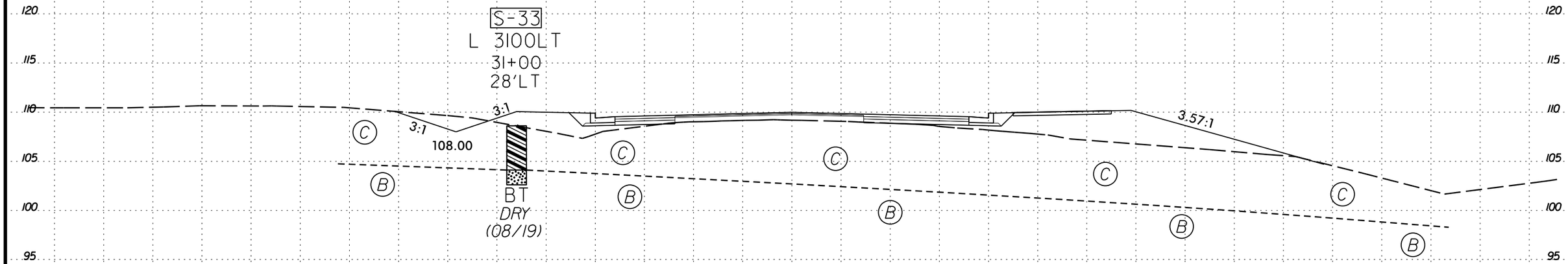
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	25

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-33	28'LT	31+00	0.0' - 3.0'	A-6(3)	32	16	7.3	53.8	8.3	30.6	100	97	42	20.7	N/A



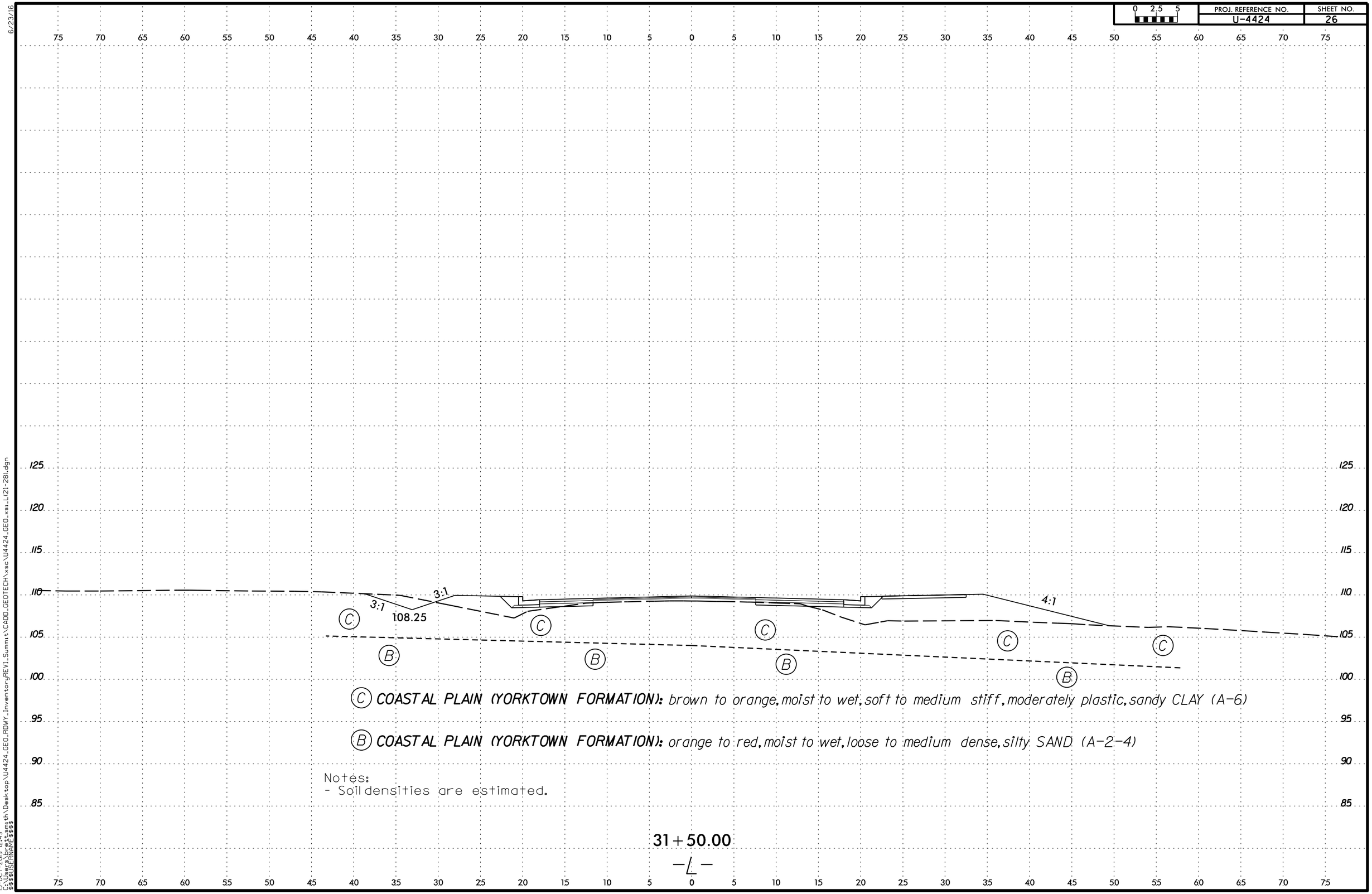
(C) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to orange, moist to wet, soft to medium stiff, moderately plastic, sandy CLAY (A-6)

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** orange to red, moist to wet, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

31+00.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	26



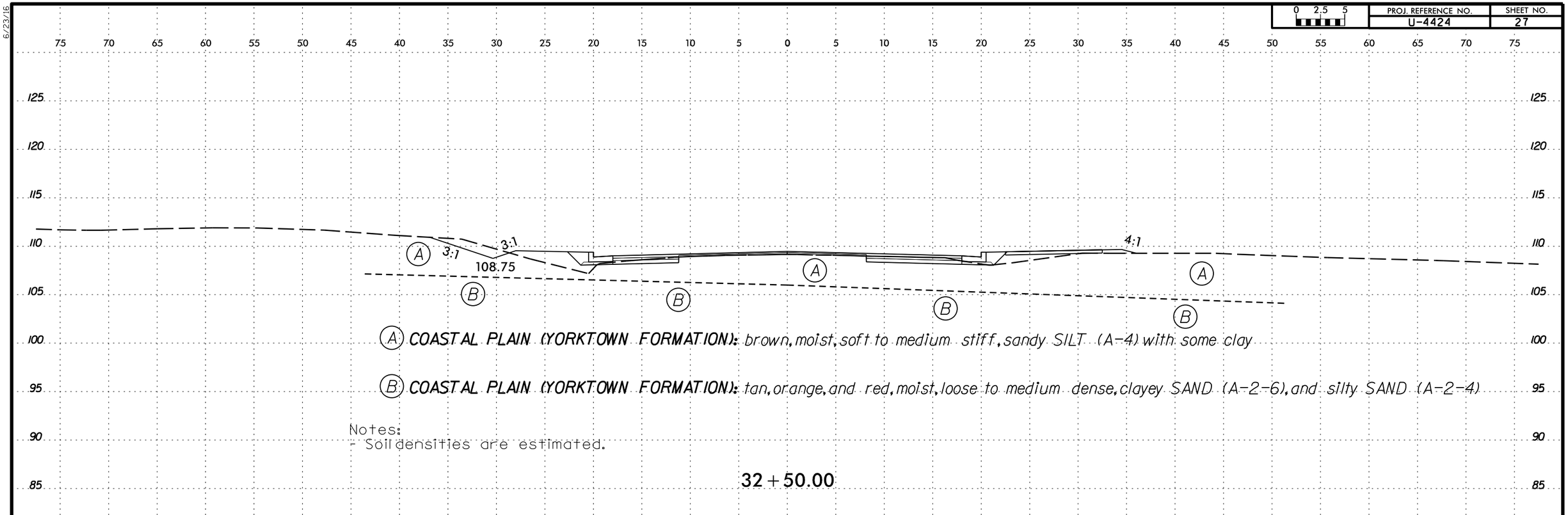
(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to orange, moist to wet, soft to medium stiff, moderately plastic, sandy CLAY (A-6)*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange to red, moist to wet, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

31+50.00

-L-

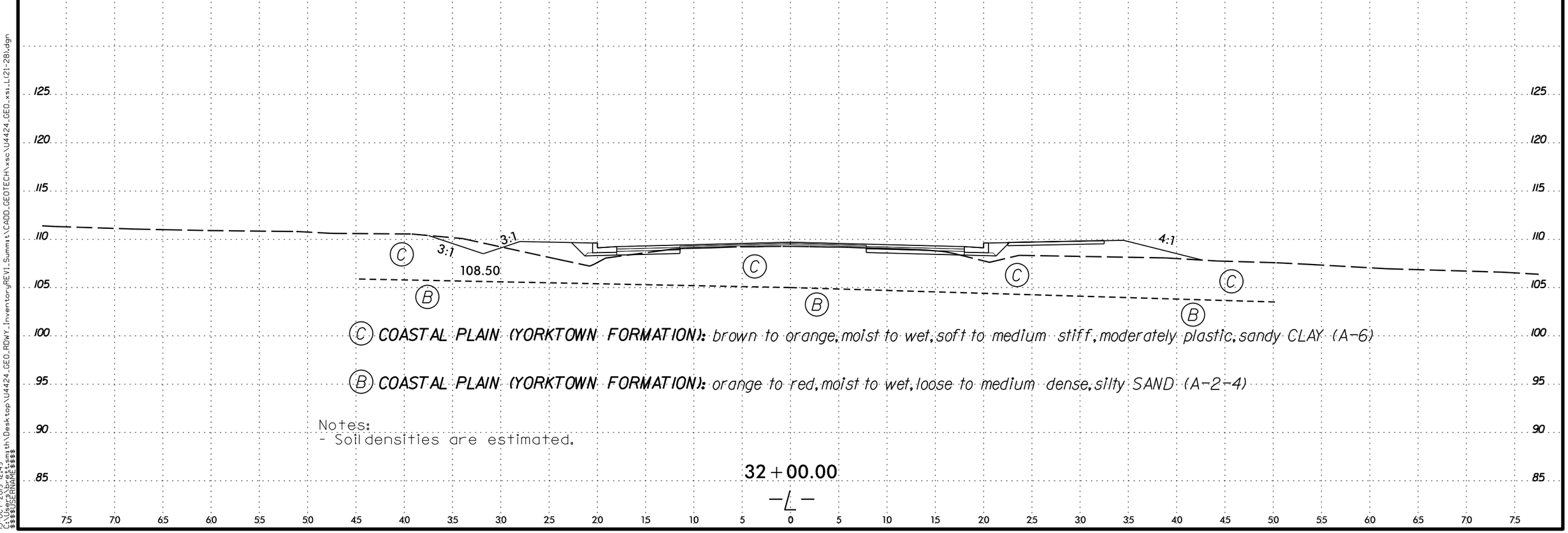


(A) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, moist, soft to medium stiff, sandy SILT (A-4) with some clay*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, orange, and red, moist, loose to medium dense, clayey SAND (A-2-6), and silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

32 + 50.00



(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to orange, moist to wet, soft to medium stiff, moderately plastic, sandy CLAY (A-6)*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange to red, moist to wet, loose to medium dense, silty SAND (A-2-4)*

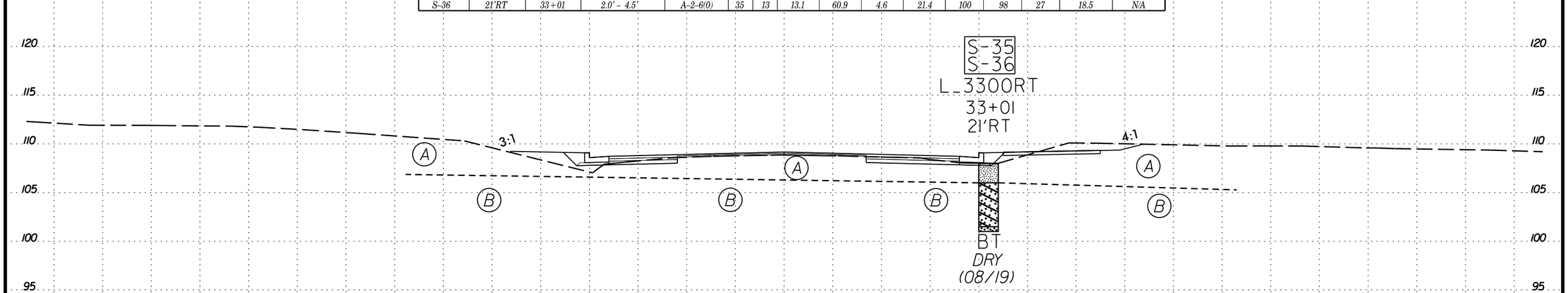
Notes:
- Soil densities are estimated.

32 + 00.00

—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		
S-35	21'RT	33+01	0.0' - 2.0'	A-4(0)	17	1	4.9	61.1	12.3	21.7	100	98	42	10.1	N/A
S-36	21'RT	33+01	2.0' - 4.5'	A-2-6(0)	35	13	13.1	60.9	4.6	21.4	100	98	27	18.5	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, moist, soft to medium stiff, sandy SILT (A-4) with some clay

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, orange, and red, moist, loose to medium dense, clayey SAND (A-2-6), and silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

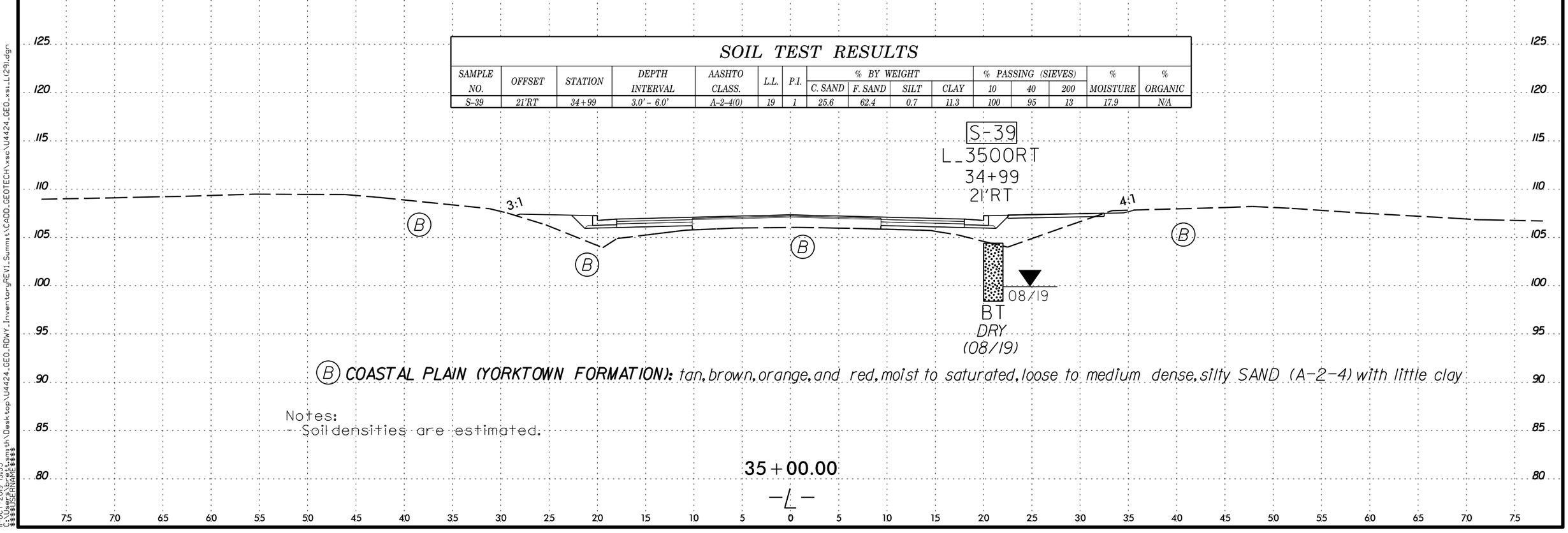
33+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	29

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-39	21'RT	34+99	3.0' - 6.0'	A-2-4(0)	19	1	25.6	62.4	0.7	11.3	100	95	13	17.9	N/A



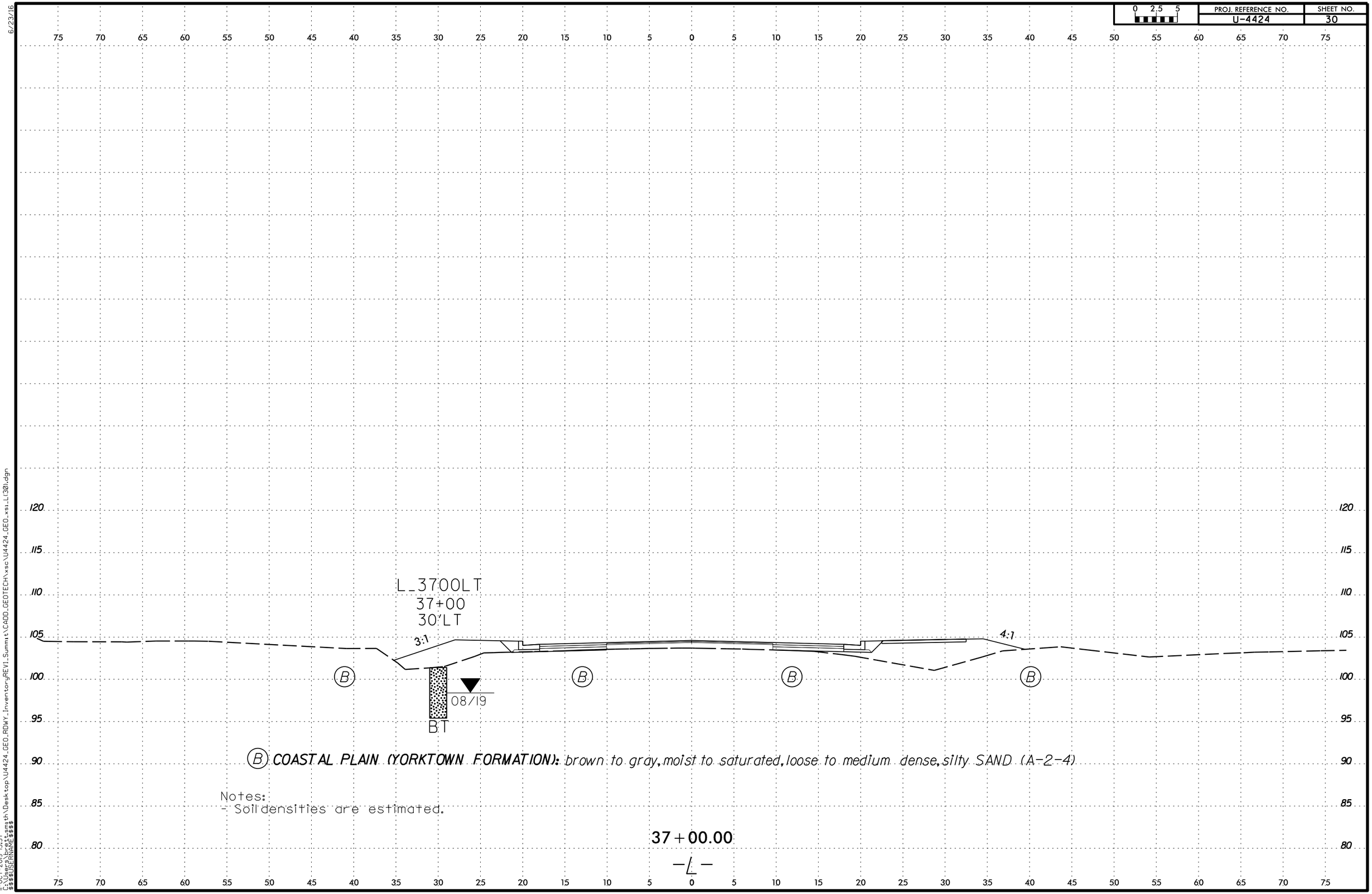
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, brown, orange, and red, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay*

Notes:
- Soil densities are estimated.

35+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	30



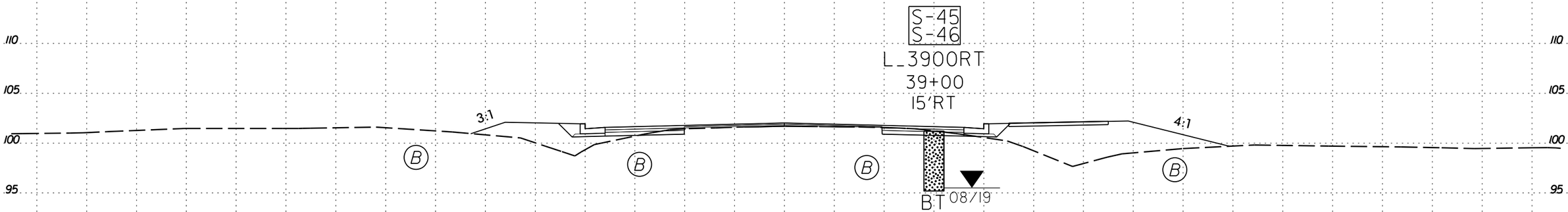
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to gray, moist to saturated, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

37+00.00
—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		
S-45	15'RT	39+00	0.0' - 3.5'	A-2-4(0)	17	1	10.4	67.0	11.1	11.5	100	95	28	6.6	N/A
S-46	15'RT	39+00	3.5' - 5.0'	A-2-4(0)	18	0	7.8	69.7	7.4	15.2	100	98	27	17.0	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, brown, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

39+00.00
-L-

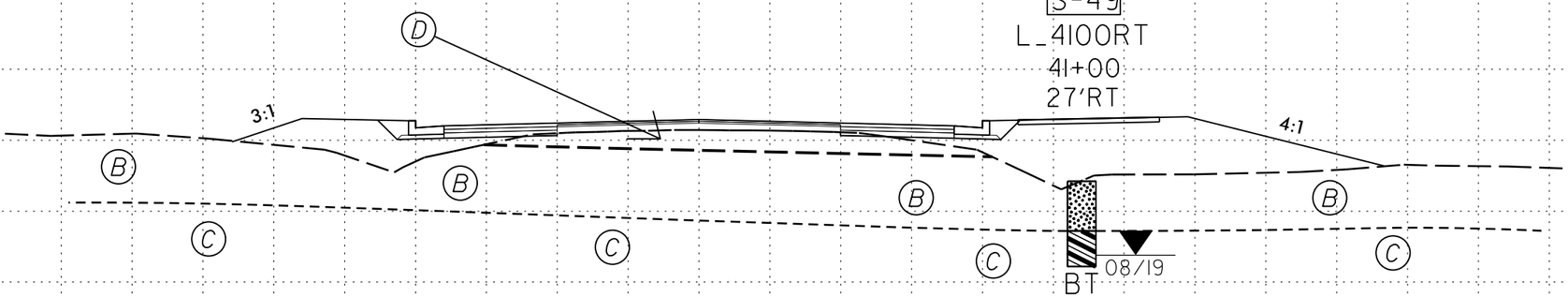
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	32

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-49	27'RT	41+00	3.5' - 5.0'	A-6(4)	33	16	5.0	52.5	10.6	31.8	100	99	47	18.1	N/A

(D) **ROADWAY EMBANKMENT:** tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, moist, loose to medium dense, silty SAND (A-2-4)

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to gray, moist to saturated, soft to medium stiff, moderately plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

41+00.00
—L—

115 110 105 100 95 90 85 80 75 70

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

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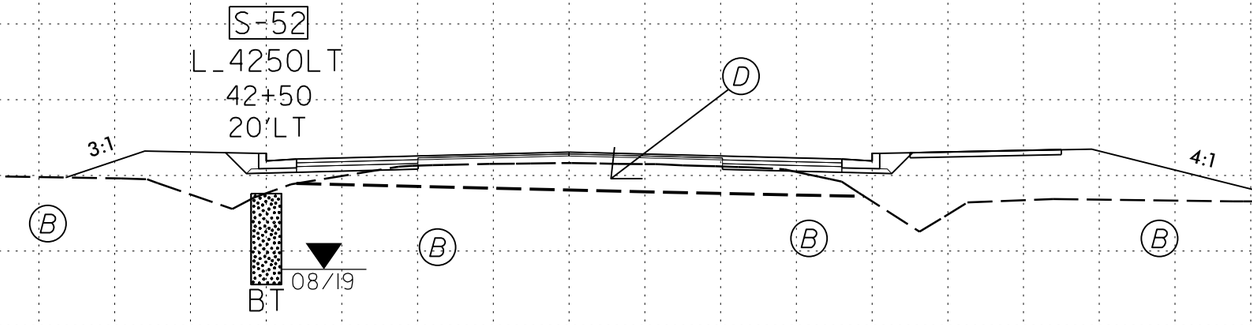
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	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		
S-52	20'LT	42+50	1.5' - 3.5'	A-2-4(0)	23	1	17.5	62.8	2.5	17.3	100	94	22	17.9	N/A

Ⓓ **ROADWAY EMBANKMENT:** tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay



Ⓑ **COASTAL PLAIN (YORKTOWN FORMATION):** tan, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

42+50.00
-L-

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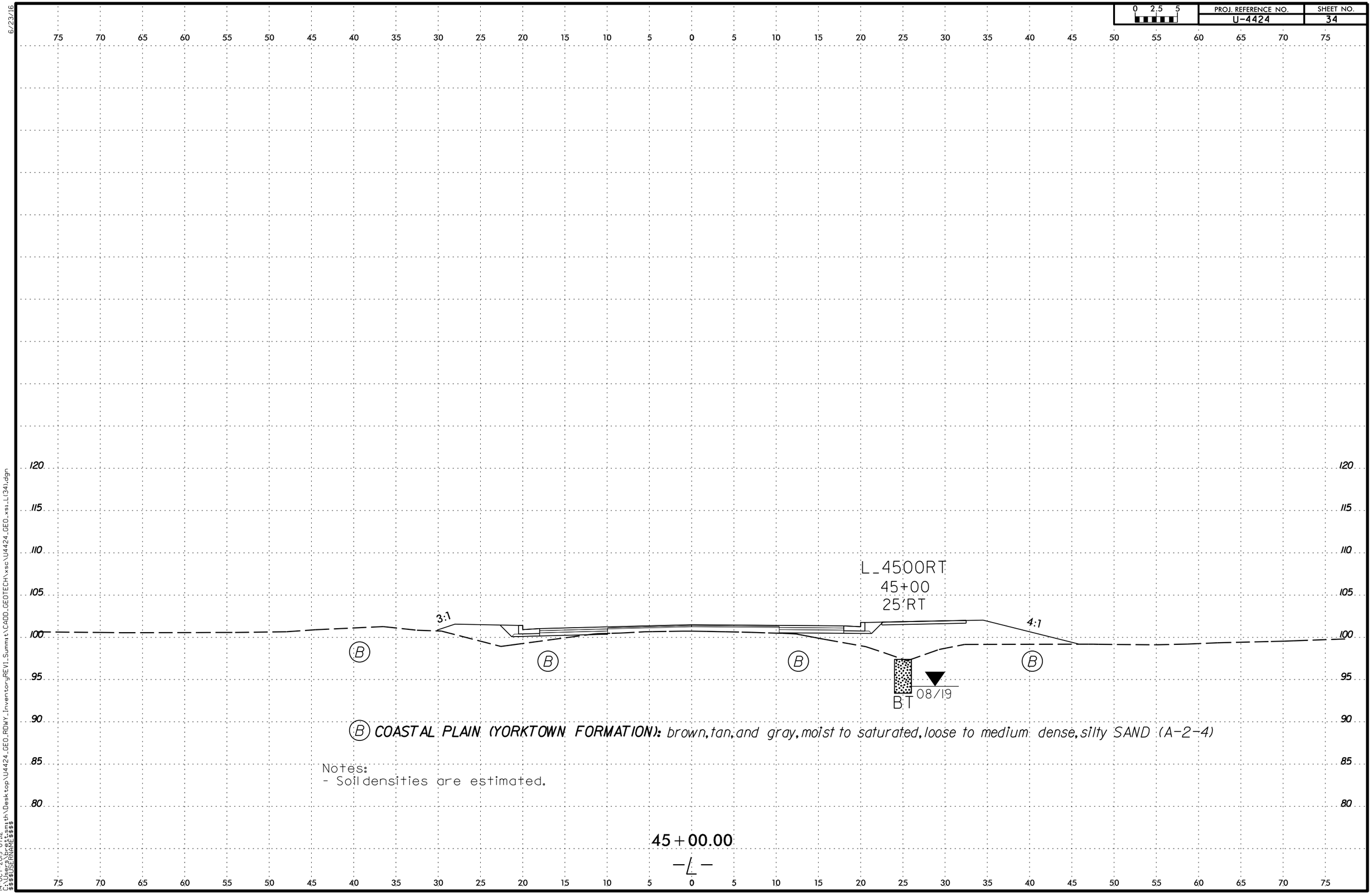
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	34



(B) COASTAL PLAIN (YORKTOWN FORMATION): *brown, tan, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

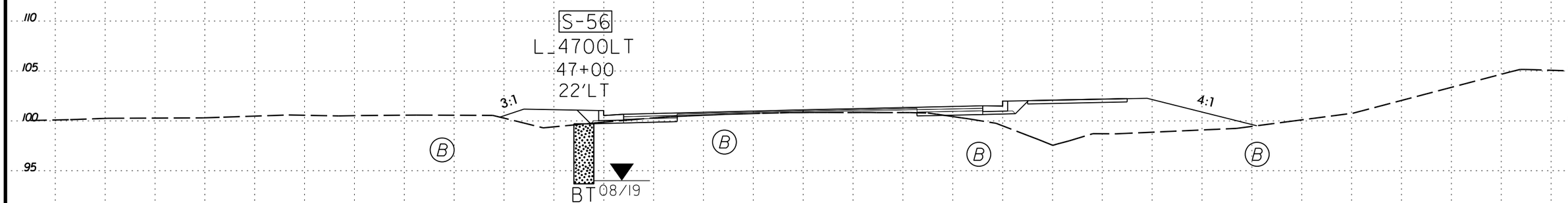
45+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	35

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-56	22'LT	47+00	0.0' - 3.0'	A-2-4(0)	22	3	4.9	66.6	9.1	19.4	98	96	35	19.7	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to gray, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

47+00.00
—L—

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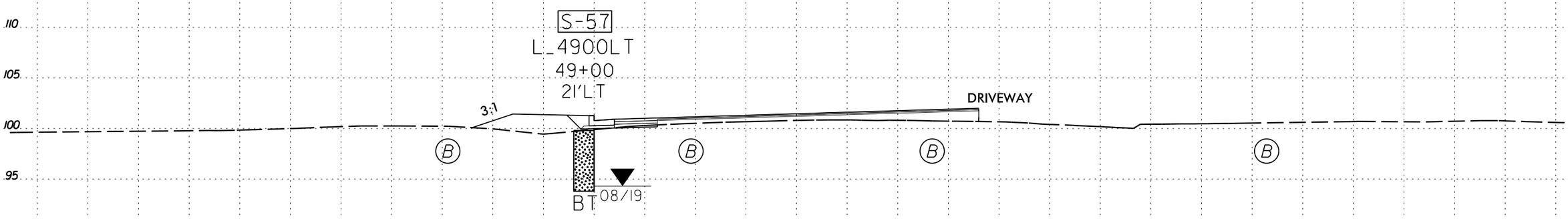
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	36

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-57	21'LT	49+00	2.0' - 5.0'	A-2-4(0)	18	0	18.7	60.6	5.1	15.6	99	95	22	16.2	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, orange, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

49+00.00
—L—

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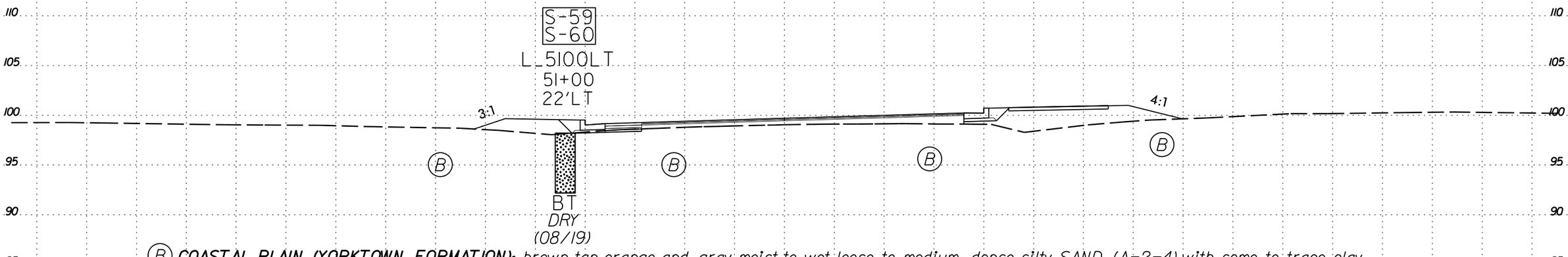
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	37

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-59	22'LT	51+00	0.0' - 2.0'	A-2-4(0)	16	0	37.8	47.1	5.4	9.7	90	72	17	10.1	N/A
S-60	22'LT	51+00	2.0' - 3.5'	A-2-4(0)	30	8	7.1	64.7	4.4	23.9	100	98	33	18.2	N/A



(B) COASTAL PLAIN (YORKTOWN FORMATION): brown, tan, orange, and gray, moist to wet, loose to medium dense, silty SAND (A-2-4) with some to trace clay

Notes:
- Soil densities are estimated.

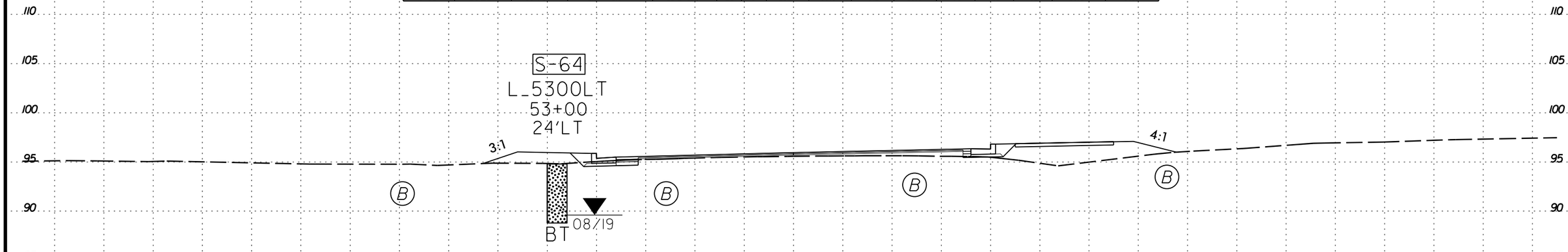
51+00.00
—L—

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	38

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-64	24'LT	53+00	1.0' - 4.0'	A-2-4(0)	21	3	14.2	57.0	9.2	19.6	96	91	32	18.4	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay and trace gravel

Notes:
- Soil densities are estimated.

53+00.00
-L-

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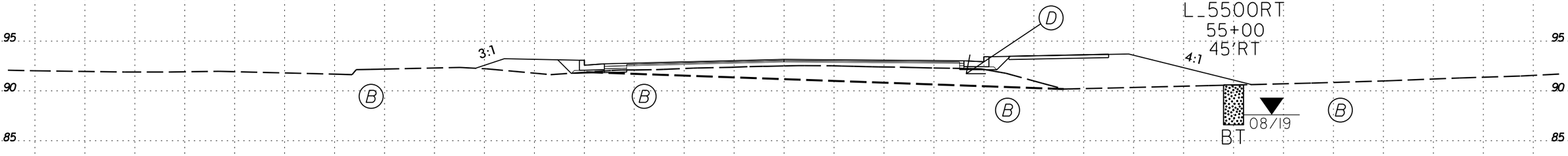
0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	39

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-67	45'RT	55+00	0.5' - 2.5'	A-2-4(0)	18	0	8.1	68.1	6.3	17.5	100	99	28	17.7	N/A

(D) **ROADWAY EMBANKMENT:** tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** dark brown, brown, and gray, moist to saturated, very loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

55+00.00
-L-

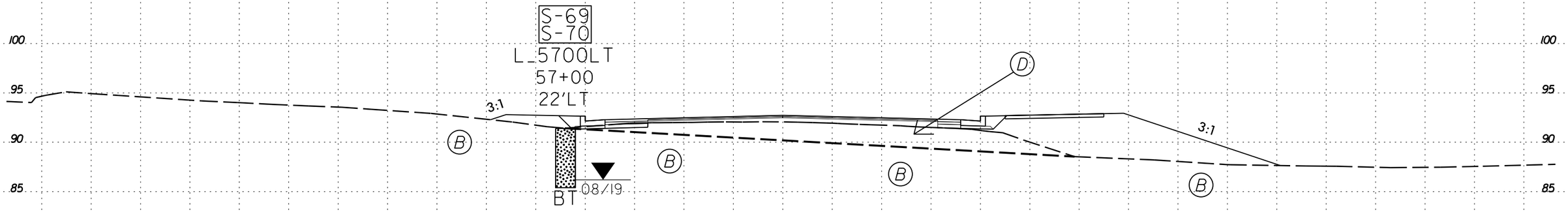
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	40

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-69	22'LT	57+00	0.0' - 3.0'	A-2-4(0)	14	0	34.4	50.1	8.2	7.4	89	73	17	8.9	N/A
S-70	22'LT	57+00	3.0' - 6.0'	A-2-4(0)	24	1	9.6	70.6	2.0	17.8	100	100	20	21.8	N/A

(D) **ROADWAY EMBANKMENT:** tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown and tan, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little to trace clay

Notes:
- Soil densities are estimated.

57+00.00
—L—

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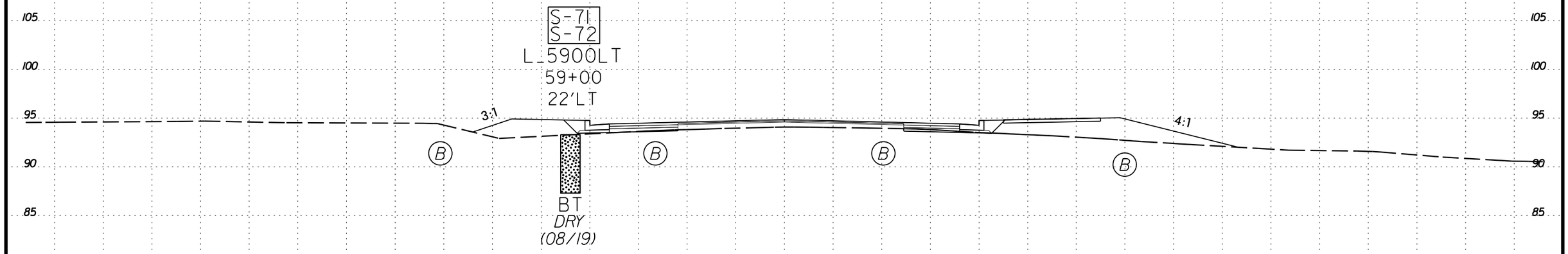
SOIL TEST RESULTS

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-71	22'LT	59+00	0.0' - 4.0'	A-2-4(0)	15	0	16.2	69.6	4.9	9.3	90	82	16	7.4	N/A
S-72	22'LT	59+00	4.0' - 4.5'	A-2-4(0)	27	5	2.0	73.8	2.3	21.9	100	100	25	16.3	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, and orange, moist to wet, loose to medium dense, silty SAND (A-2-4) with some to trace clay

Notes:
- Soil densities are estimated.

59+00.00
-L-

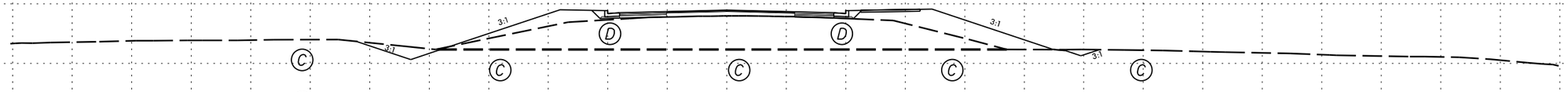
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	42

6/23/16

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

120
110
100
90
80

Ⓓ **ROADWAY EMBANKMENT:** *tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*



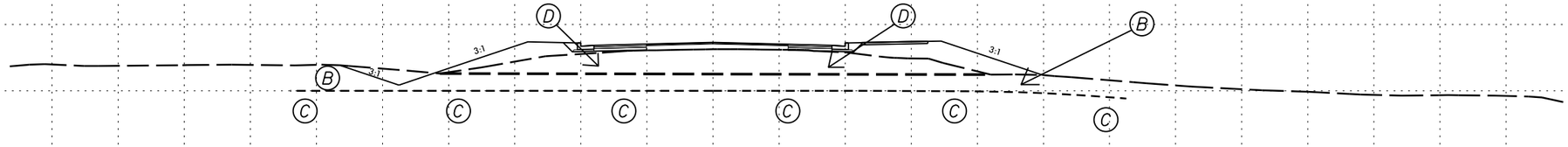
Ⓒ **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, moist to wet, stiff to very stiff, moderately plastic, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

60 + 50.00

120
110
100
90
80
70
60

Ⓓ **ROADWAY EMBANKMENT:** *tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*



Ⓑ **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, tan, and orange, moist to wet, loose to medium dense, silty SAND (A-2-4) with some to trace clay*

Ⓒ **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, moist to wet, stiff to very stiff, moderately plastic, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

60 + 00.00

$-\underline{L}-$

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

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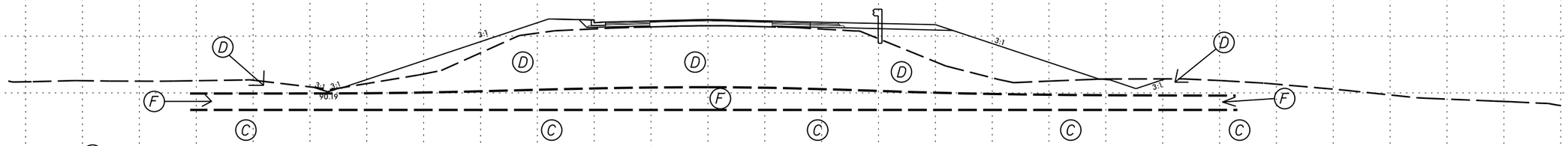


(D) **ROADWAY EMBANKMENT:** *tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*

(F) **ALLUVIAL:** *dark gray, orange, and brown, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with little sand, and sandy CLAY (A-6) with trace organics*

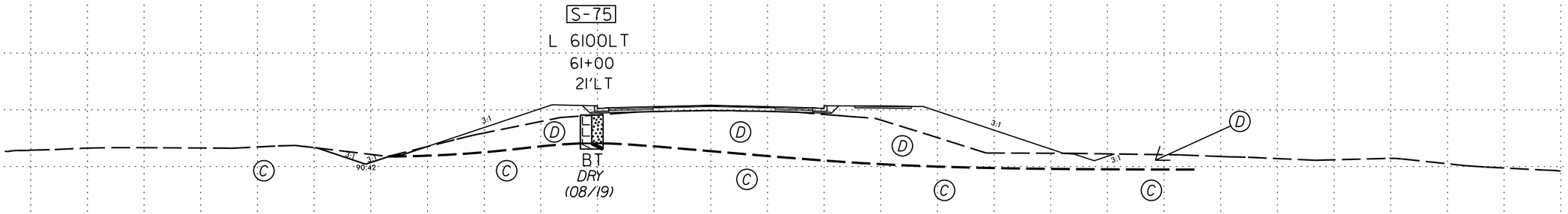
(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, moist to wet, stiff to very stiff, moderately plastic, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

61+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		
S-75	21'LT	61+00	5.0' - 6.0'	A-6(9)	36	20	3.7	49.1	8.7	38.4	100	99	60	22.1	N/A



(D) **ROADWAY EMBANKMENT:** *tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, moist to wet, stiff to very stiff, moderately plastic, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

61+00.00

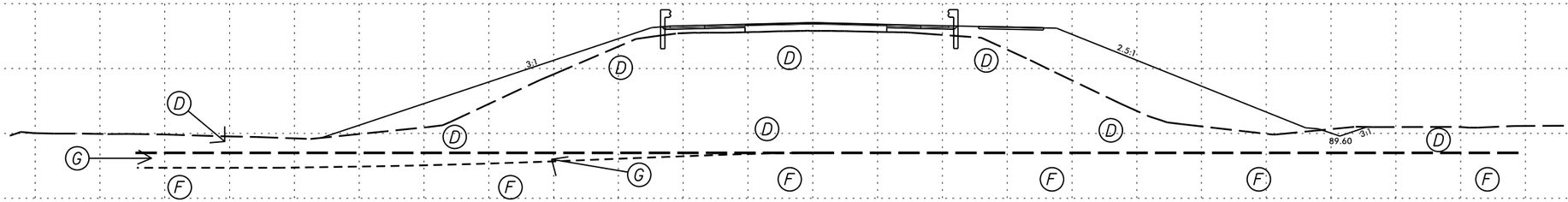
—L—

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	44

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

120 110 100 90 80 70

(D) **ROADWAY EMBANKMENT:** *tan, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*



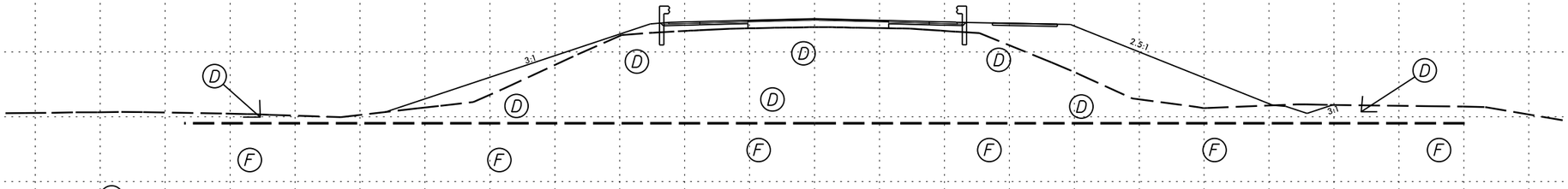
(G) **ALLUVIAL:** *gray to brown, wet to saturated, loose, silty SAND (A-2-4) with some clay*

(F) **ALLUVIAL:** *dark gray, orange, and brown, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with little sand, and sandy CLAY (A-6) with trace organics*

62 + 50.00

120 110 100 90 80 70

(D) **ROADWAY EMBANKMENT:** *tan, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay*

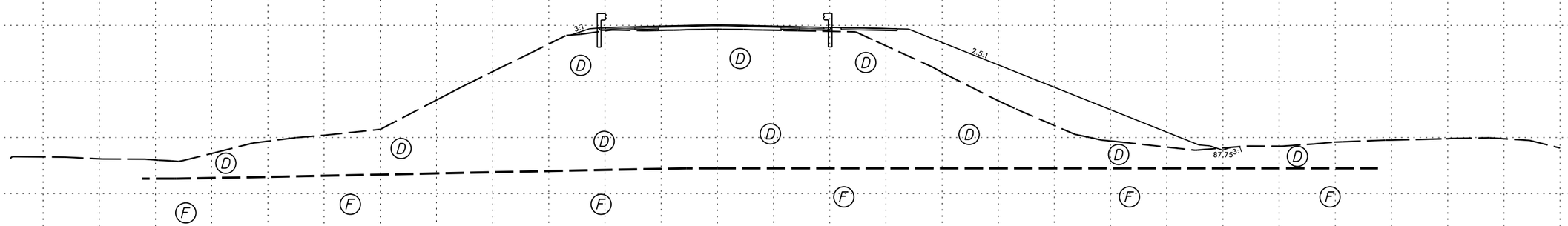


(F) **ALLUVIAL:** *dark gray, orange, and brown, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with little sand, and sandy CLAY (A-6) with trace organics*

62 + 00.00

— 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



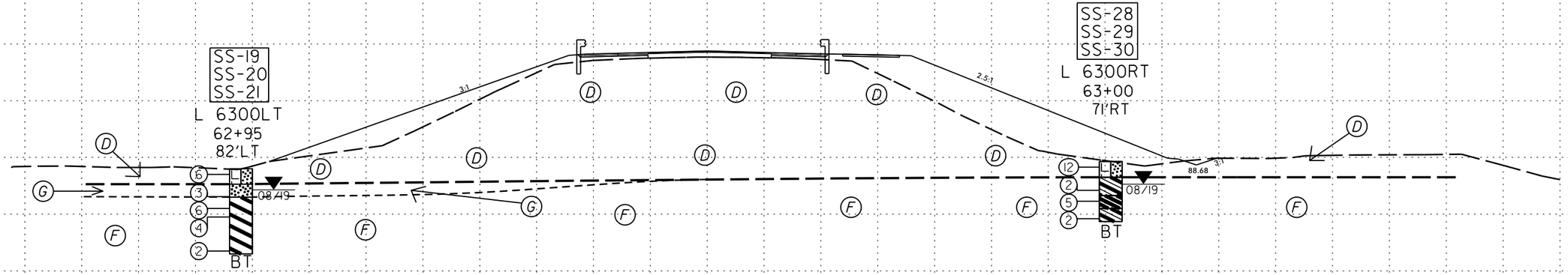
(D) **ROADWAY EMBANKMENT:** tan, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay

(F) **ALLUVIAL:** dark gray, orange, and brown, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with little sand, and sandy CLAY (A-6) with trace organics

63+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-19	82'LT	62+95	3.9' - 5.0'	A-2-4(0)	22	1	7.0	67.7	3.7	21.7	100	98	28	19.8	N/A
SS-20	82'LT	62+95	6.0' - 7.5'	A-7-6(40)	63	37	0.6	17.3	14.6	67.5	100	100	94	42.3	N/A
SS-21	82'LT	62+95	7.5' - 9.0'	A-7-6(28)	51	30	1.5	16.6	20.6	61.3	100	99	87	46.9	N/A
SS-28	71'RT	63+00	0.0' - 1.5'	A-2-4(0)	19	0	6.7	76.9	2.9	13.5	100	98	20	12.5	N/A
SS-29	71'RT	63+00	4.1' - 5.6'	A-6(6)	32	16	21.3	25.3	13.4	40.0	99	90	56	47.6	N/A
SS-30	71'RT	63+00	6.0' - 7.5'	A-7-6(48)	70	45	1.2	9.7	18.9	70.2	100	99	94	43.6	N/A



(D) **ROADWAY EMBANKMENT:** tan, moist, loose to medium dense, silty SAND (A-2-4) with some to little clay

(G) **ALLUVIAL:** gray to brown, wet to saturated, loose, silty SAND (A-2-4) with some clay

(F) **ALLUVIAL:** dark gray, orange, and brown, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with little sand, and sandy CLAY (A-6) with trace organics

63+00.00

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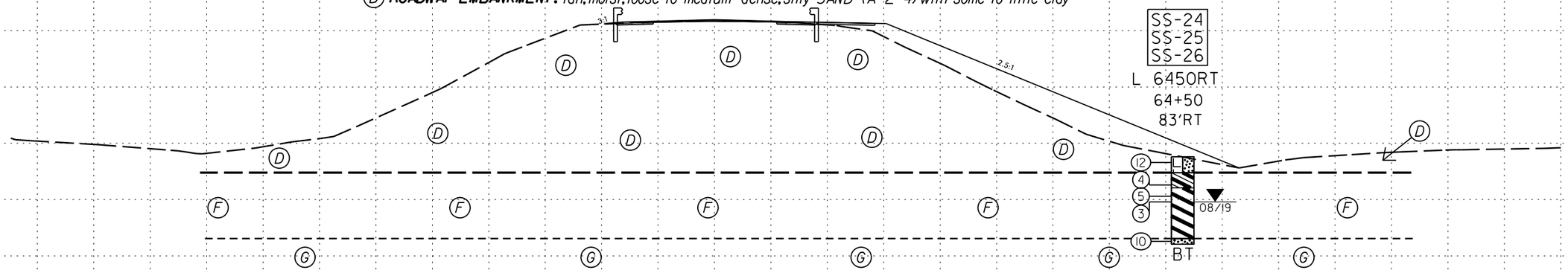
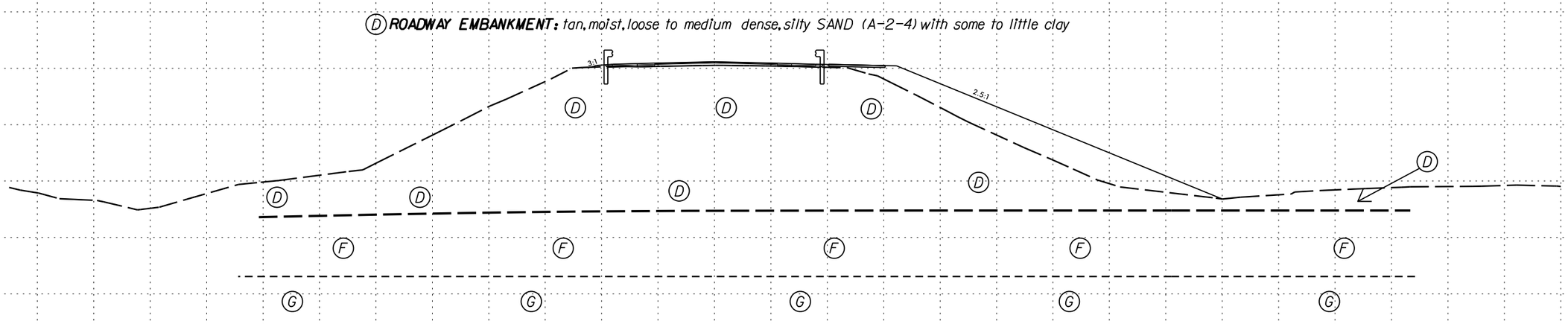
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-24	83'RT	64+50	4.0' - 5.5'	A-6(7)	33	16	5.0	34.7	15.2	45.0	92	90	61	59.2	N/A
SS-25	83'RT	64+50	6.0' - 7.5'	A-7-6(37)	63	37	1.5	13.7	16.8	67.9	99	98	89	43.2	N/A
SS-26	83'RT	64+50	9.0' - 10.5'	A-7-6(27)	54	32	1.2	15.3	21.9	61.6	93	92	82	34.5	N/A



64+50.00



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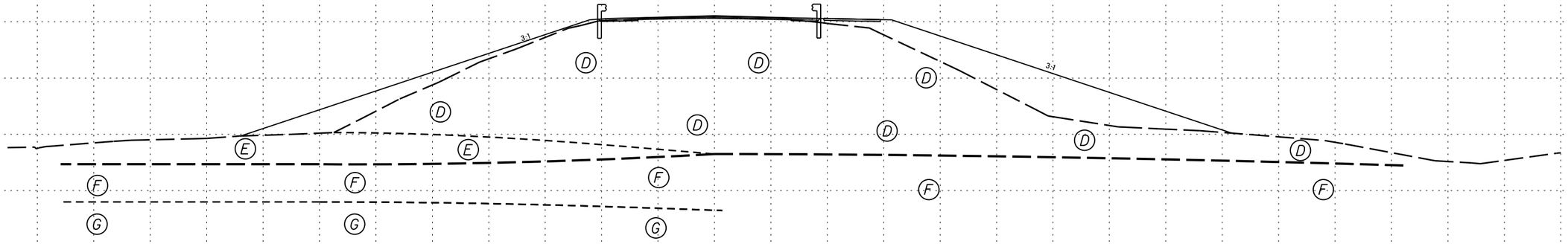


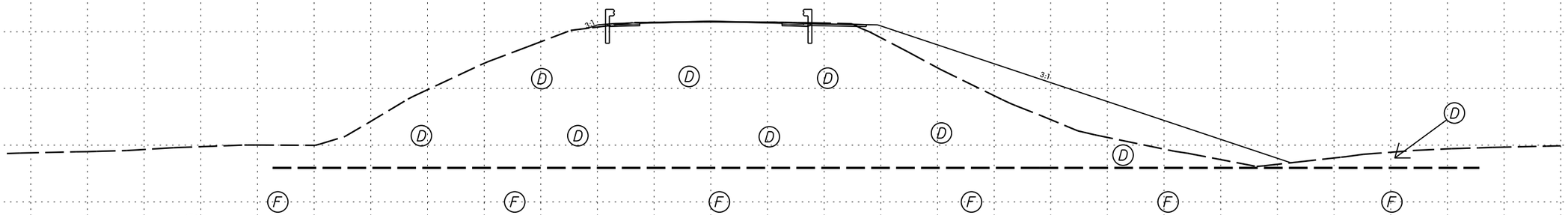
(D) **ROADWAY EMBANKMENT:** *tan and dark gray, moist to saturated, loose, silty SAND (A-2-4) with little clay*

(E) **ROADWAY EMBANKMENT:** *tan to dark brown, moist to wet, soft to stiff, sandy SILT (A-4) with some clay and trace organics*

(F) **ALLUVIAL:** *gray, dark gray, and orange, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with some sand, and sandy CLAY (A-6) with trace organics*

(G) **ALLUVIAL:** *dark gray, saturated, loose, silty SAND (A-2-4) with trace organics*

68 + 50.00



(D) **ROADWAY EMBANKMENT:** *tan and dark gray, moist to saturated, loose, silty SAND (A-2-4) with little clay*

(F) **ALLUVIAL:** *gray, dark gray, and orange, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with some sand, and sandy CLAY (A-6) with trace organics*

68 + 00.00

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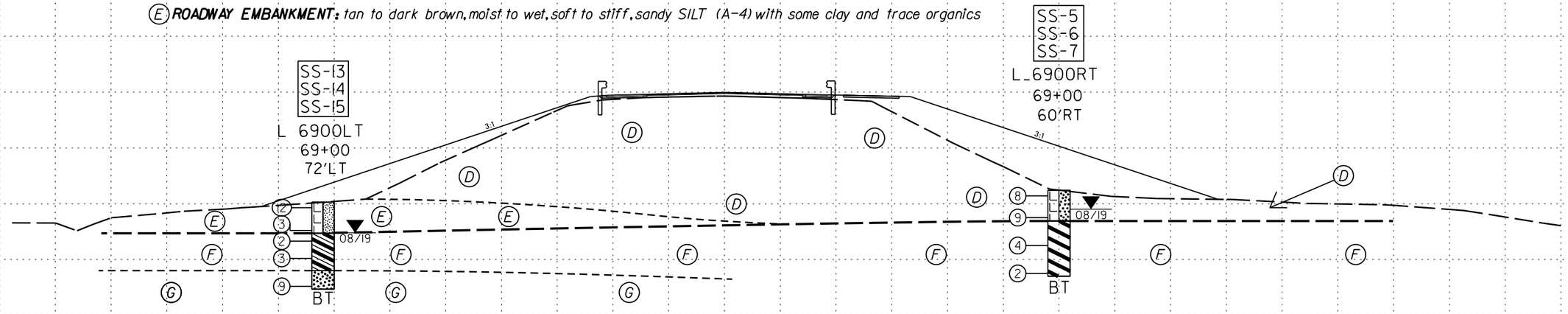
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	48

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-13	72'LT	69+00	0.0' - 1.5'	A-4(0)	23	4	5.4	59.4	11.5	23.7	100	97	42	16.3	N/A
SS-14	72'LT	69+00	4.1' - 5.6'	A-4(0)	23	7	6.7	53.6	12.0	27.6	99	96	46	30.1	N/A
SS-15	72'LT	69+00	6.0' - 7.5'	A-6(13)	39	23	2.9	36.3	14.0	46.8	99	98	67	36.7	N/A
SS-5	60'RT	69+00	3.9' - 5.4'	A-2-4(0)	19	1	4.4	67.1	8.7	19.9	100	98	34	25.7	N/A
SS-6	60'RT	69+00	8.9 - 10.4'	A-7-6(28)	55	32	2.1	23.8	20.7	53.3	100	99	82	37.4	N/A
SS-7	60'RT	69+00	13.9' - 15.4'	A-7-6(17)	46	25	7.2	26.6	19.6	46.5	99	95	72	61.5	N/A

(D) **ROADWAY EMBANKMENT:** tan and dark gray, moist to saturated, loose, silty SAND (A-2-4) with little clay

(E) **ROADWAY EMBANKMENT:** tan to dark brown, moist to wet, soft to stiff, sandy SILT (A-4) with some clay and trace organics



(F) **ALLUVIAL:** gray, dark gray, and orange, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with some sand, and sandy CLAY (A-6) with trace organics

(G) **ALLUVIAL:** dark gray, saturated, loose, silty SAND (A-2-4) with trace organics

69+00.00

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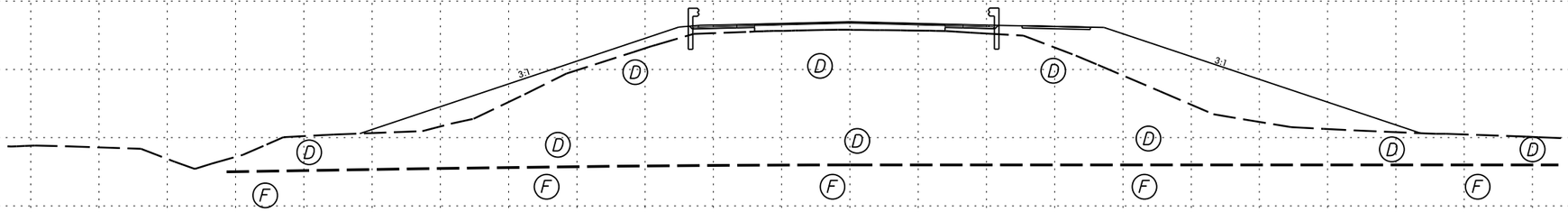
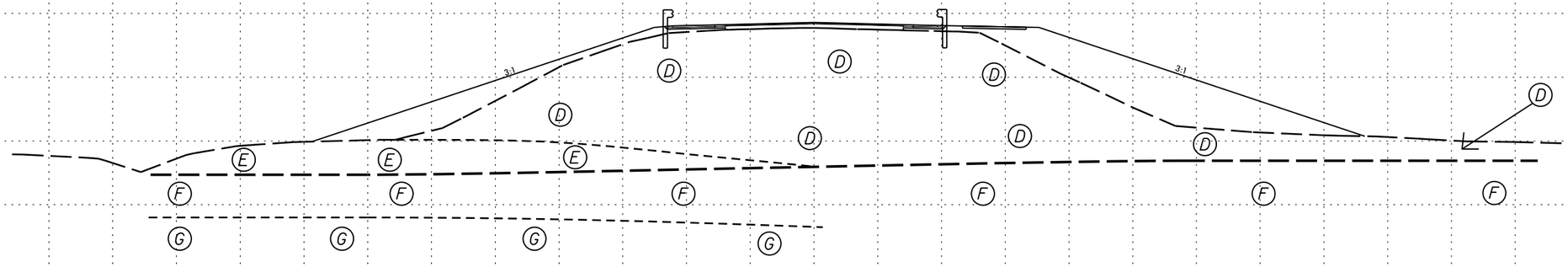
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	49



(D) **ROADWAY EMBANKMENT:** *tan and dark gray, moist to saturated, loose, silty SAND (A-2-4) with little clay*

(F) **ALLUVIAL:** *gray, dark gray, red, and orange, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with some sand, and sandy CLAY (A-6) with trace organics*

70 + 00.00



(D) **ROADWAY EMBANKMENT:** *tan and dark gray, moist to saturated, loose, silty SAND (A-2-4) with little clay*

(E) **ROADWAY EMBANKMENT:** *tan to dark brown, moist to wet, soft to stiff, sandy SILT (A-4) with some clay and trace organics*

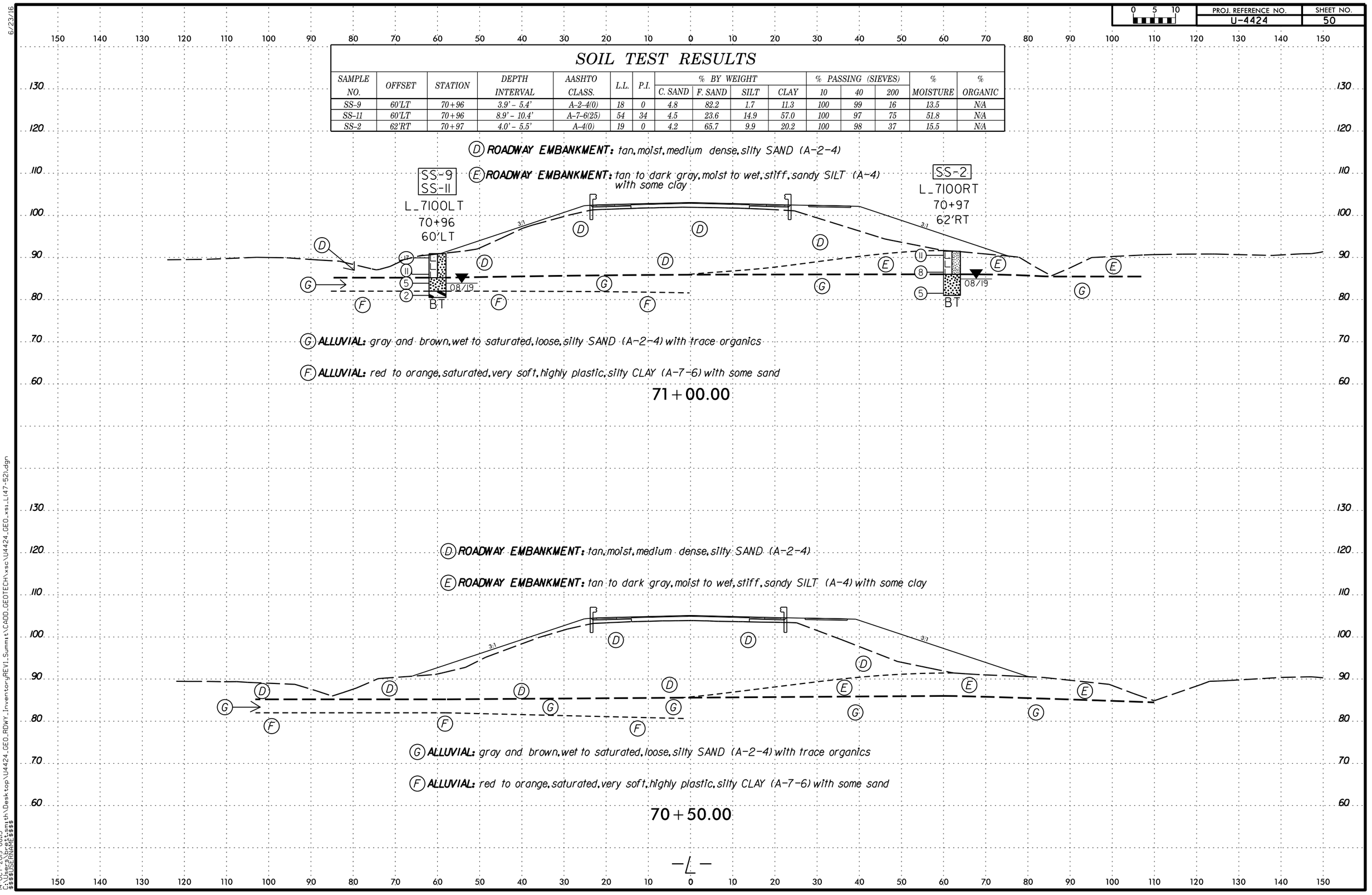
(F) **ALLUVIAL:** *gray, dark gray, and orange, wet to saturated, very soft to medium stiff, moderate to highly plastic, silty CLAY (A-7-6) with some sand, and sandy CLAY (A-6) with trace organics*

(G) **ALLUVIAL:** *dark gray, saturated, loose, silty SAND (A-2-4) with trace organics*

69 + 50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
SS-9	60'LT	70+96	3.9' - 5.4'	A-2-4(0)	18	0	4.8	82.2	1.7	11.3	100	99	16	13.5	N/A
SS-11	60'LT	70+96	8.9' - 10.4'	A-7-6(25)	54	34	4.5	23.6	14.9	57.0	100	97	75	51.8	N/A
SS-2	62'RT	70+97	4.0' - 5.5'	A-4(0)	19	0	4.2	65.7	9.9	20.2	100	98	37	15.5	N/A



(D) **ROADWAY EMBANKMENT:** tan, moist, medium dense, silty SAND (A-2-4)

(E) **ROADWAY EMBANKMENT:** tan to dark gray, moist to wet, stiff, sandy SILT (A-4) with some clay

(G) **ALLUVIAL:** gray and brown, wet to saturated, loose, silty SAND (A-2-4) with trace organics

(F) **ALLUVIAL:** red to orange, saturated, very soft, highly plastic, silty CLAY (A-7-6) with some sand

71+00.00

(D) **ROADWAY EMBANKMENT:** tan, moist, medium dense, silty SAND (A-2-4)

(E) **ROADWAY EMBANKMENT:** tan to dark gray, moist to wet, stiff, sandy SILT (A-4) with some clay

(G) **ALLUVIAL:** gray and brown, wet to saturated, loose, silty SAND (A-2-4) with trace organics

(F) **ALLUVIAL:** red to orange, saturated, very soft, highly plastic, silty CLAY (A-7-6) with some sand

70+50.00

—L—

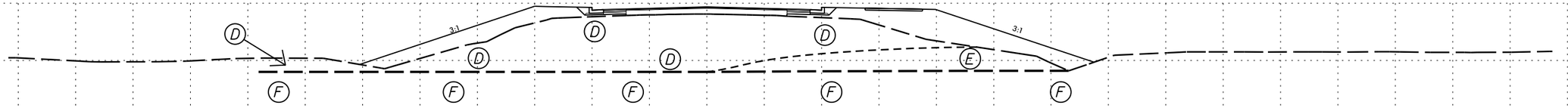
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	51

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

120 110 100 90 80 70

(D) **ROADWAY EMBANKMENT:** *tan, moist, medium dense, silty SAND (A-2-4)*

(E) **ROADWAY EMBANKMENT:** *tan to dark gray, moist to wet, stiff, sandy SILT (A-4) with some clay*



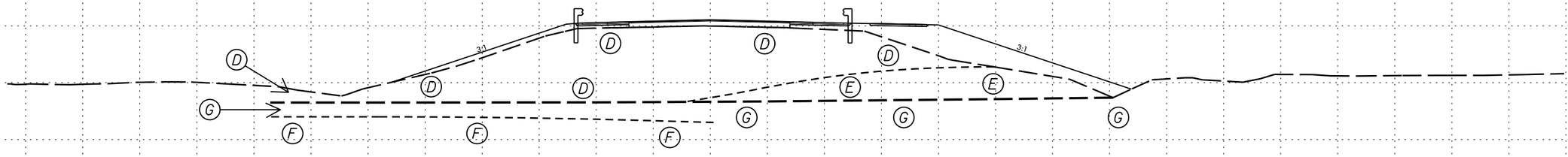
(F) **ALLUVIAL:** *red to orange, saturated, very soft, highly plastic, silty CLAY (A-7-6) with some sand*

72 + 00.00

120 110 100 90 80 70 60

(D) **ROADWAY EMBANKMENT:** *tan, moist, medium dense, silty SAND (A-2-4)*

(E) **ROADWAY EMBANKMENT:** *tan to dark gray, moist to wet, stiff, sandy SILT (A-4) with some clay*



(G) **ALLUVIAL:** *gray and brown, wet to saturated, loose, silty SAND (A-2-4) with trace organics*

(F) **ALLUVIAL:** *red to orange, saturated, very soft, highly plastic, silty CLAY (A-7-6) with some sand*

71 + 50.00

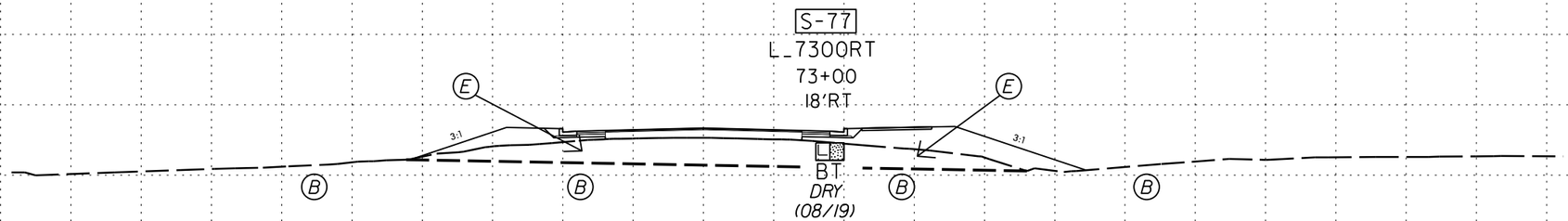
—L—

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				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-77	18'RT	73+00	0.5' - 2.5'	A-4(0)	24	6	7.8	61.2	7.6	23.5	100	97	40	13.8	N/A

(E) **ROADWAY EMBANKMENT:** brown and orange, dry to moist, medium stiff to stiff, sandy SILT (A-4) with some clay

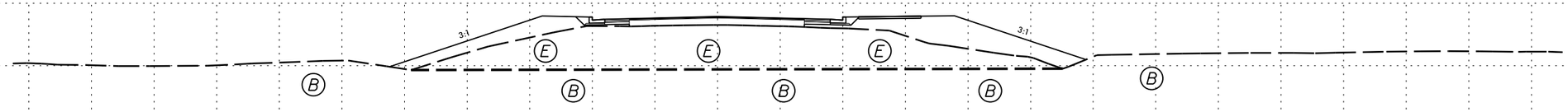


(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, moist, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

73+00.00

(E) **ROADWAY EMBANKMENT:** brown and orange, dry to moist, medium stiff to stiff, sandy SILT (A-4) with some clay



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, moist, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

72+50.00

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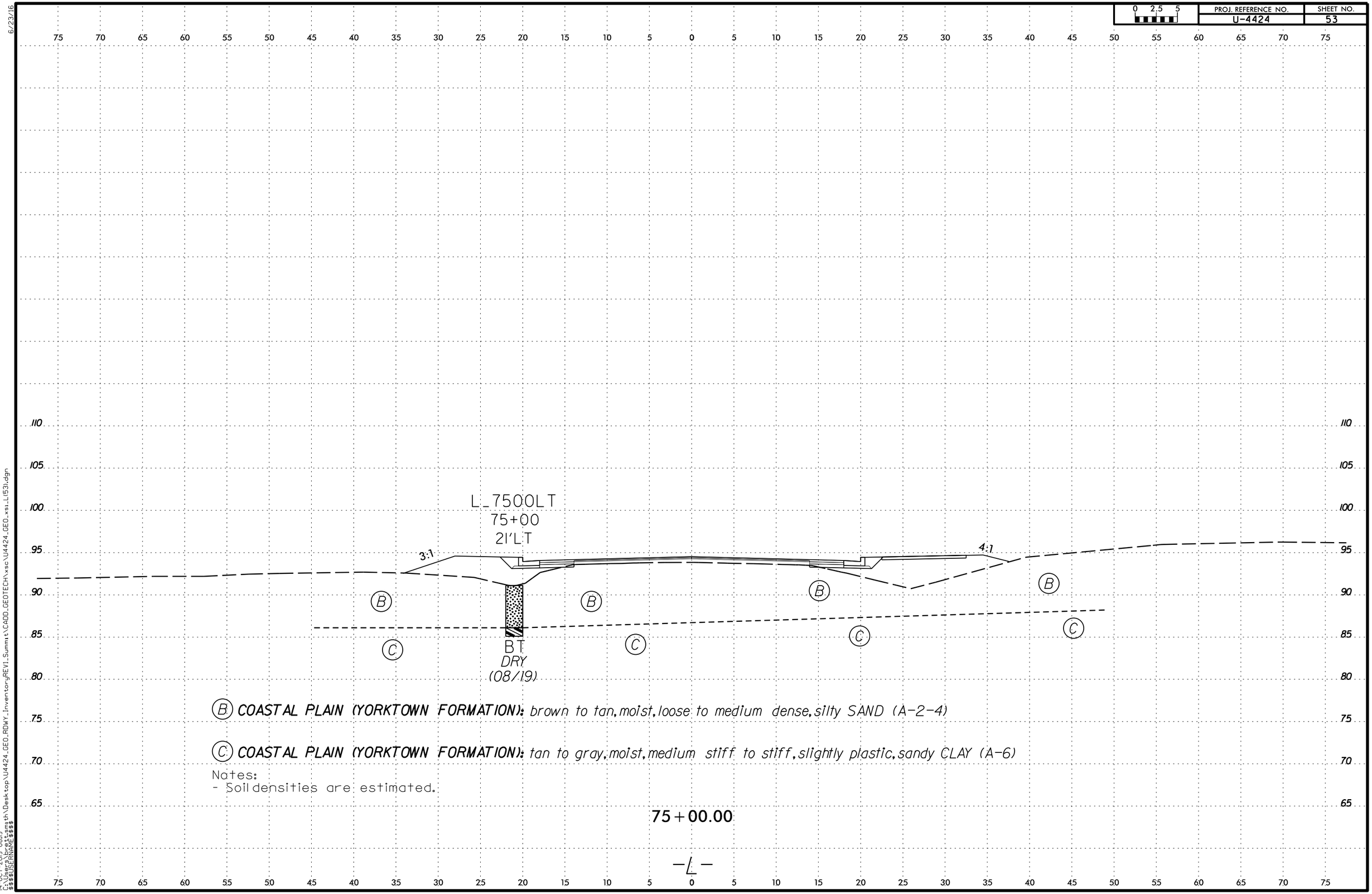
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	53



(B) COASTAL PLAIN (YORKTOWN FORMATION): *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(C) COASTAL PLAIN (YORKTOWN FORMATION): *tan to gray, moist, medium stiff to stiff, slightly plastic, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

75+00.00

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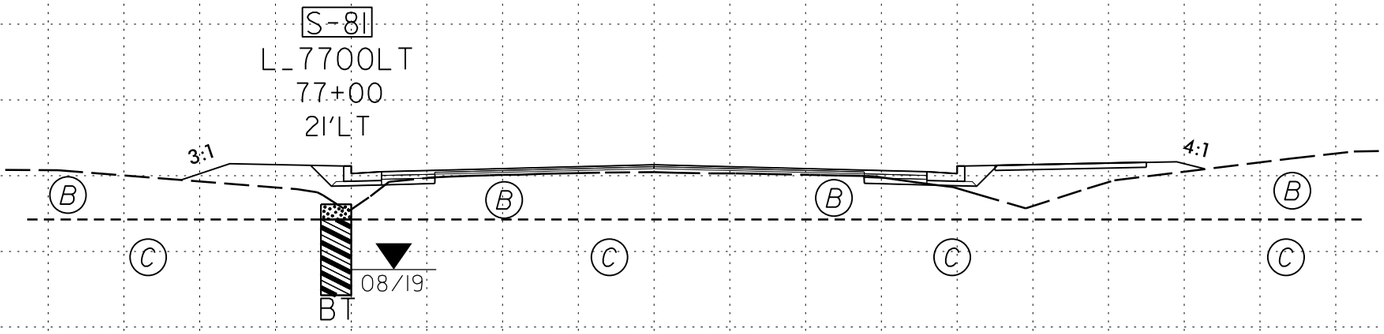
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	54

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-81	21'LT	77+00	1.0' - 3.0'	A-6(1)	32	12	4.5	67.3	2.6	25.5	100	98	39	21.8	N/A



(B) COASTAL PLAIN (YORKTOWN FORMATION): brown, moist, loose to medium dense, silty SAND (A-2-4)

(C) COASTAL PLAIN (YORKTOWN FORMATION): orange to tan, moist to saturated, medium stiff to stiff, slightly plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

77+00.00

—L—

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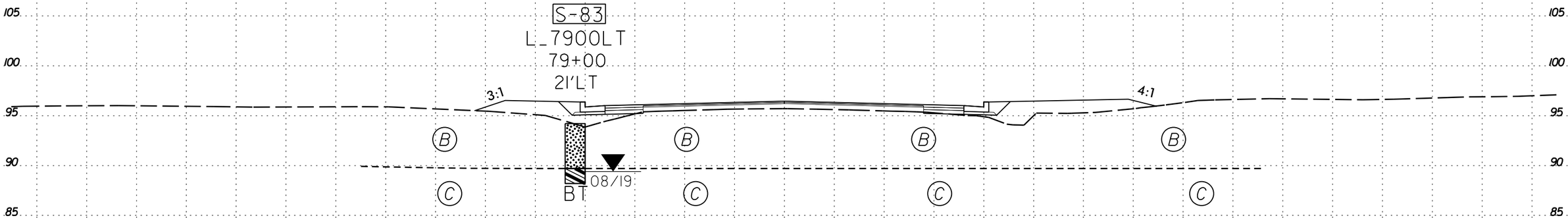
$$$$USERNAME$$$$

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-83	21'LT	79+00	1.5' - 4.5'	A-2-4(0)	29	10	6.6	67.9	2.2	23.4	100	97	34	17.7	N/A



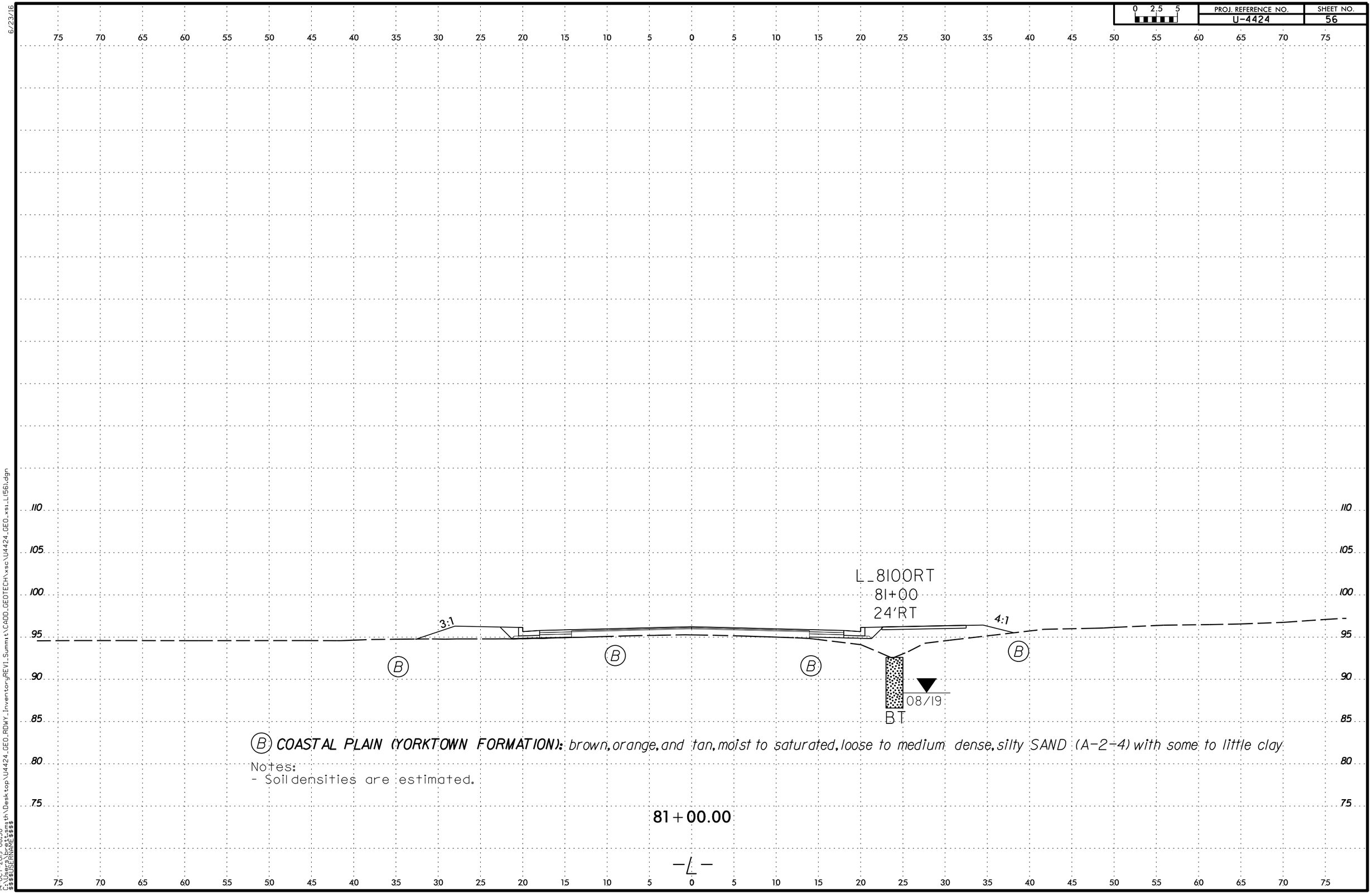
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, and orange, moist to wet, loose to medium dense, silty SAND (A-2-4) with some to little clay

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** orange, red, and gray, wet to saturated, soft to medium stiff, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

79+00.00

—L—



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, orange, and tan, moist to saturated, loose to medium dense, silty SAND (A-2-4) with some to little clay*

Notes:
- Soil densities are estimated.

81+00.00

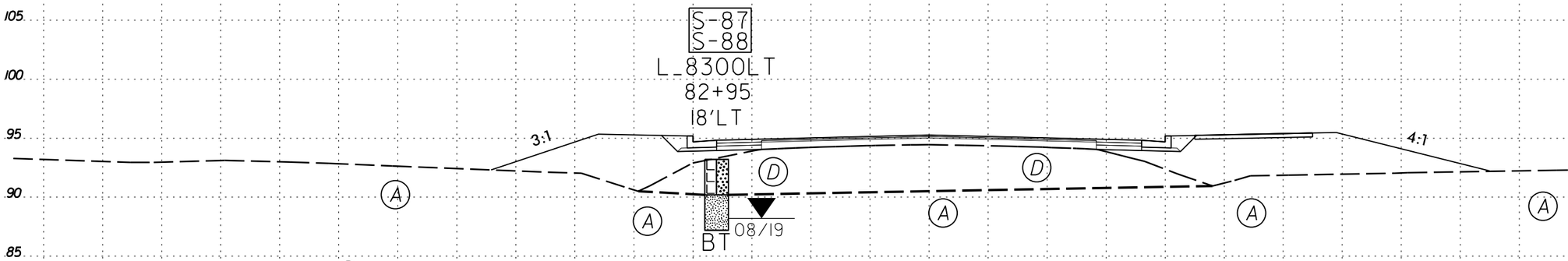
$-L-$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	57

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-87	18'LT	82+95	0.0' - 3.0'	A-2-4(0)	15	0	13.9	71.0	5.9	9.2	94	86	21	12.4	N/A
S-88	18'LT	82+95	3.0' - 6.0'	A-4(1)	27	9	2.9	60.6	8.7	27.7	100	99	48	30.6	N/A

(D) **ROADWAY EMBANKMENT:** brown to tan, moist to wet, loose to medium dense, silty SAND (A-2-4)



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** dark brown to tan, wet to saturated, soft to medium stiff, sandy SILT (A-4) with some clay

Notes:
- Soil densities are estimated.

83+00.00

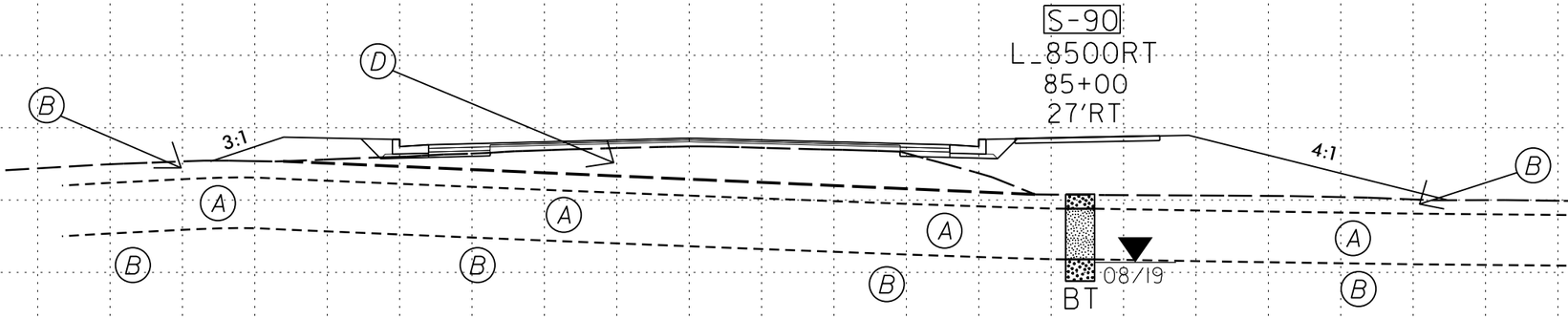
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	58

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-90	27'RT	85+00	1.0' - 4.5'	A-4(0)	24	6	3.3	68.5	4.6	23.6	100	99	39	28.2	N/A

(D) **ROADWAY EMBANKMENT:** brown to tan, moist to wet, loose to medium dense, silty SAND (A-2-4)



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** dark brown to gray, wet to saturated, soft to medium stiff, sandy SILT (A-4) with some clay

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** dark brown to gray, moist to saturated, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

85+00.00

-L-

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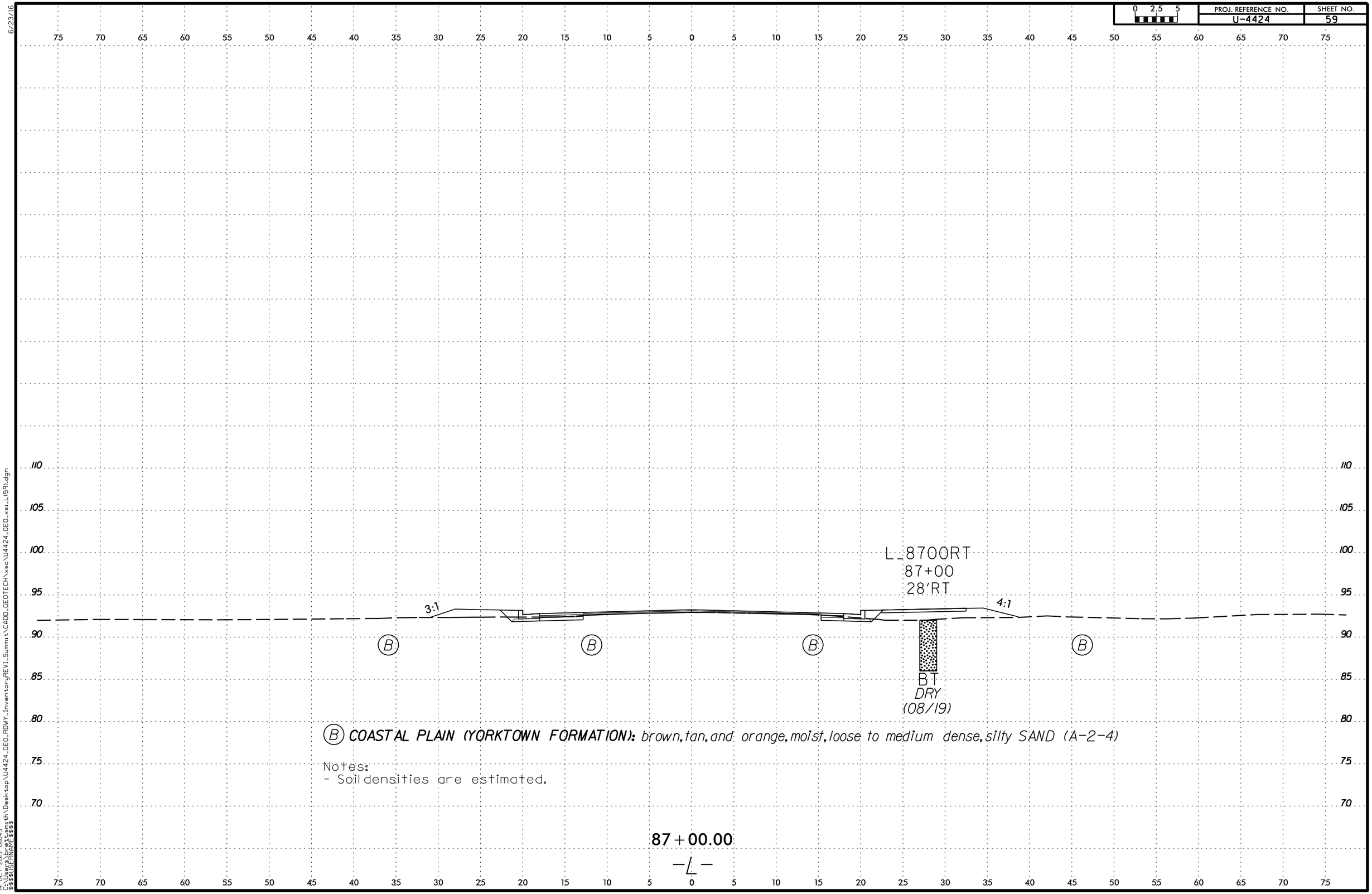
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	59



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, tan, and orange, moist, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

87+00.00
-L-

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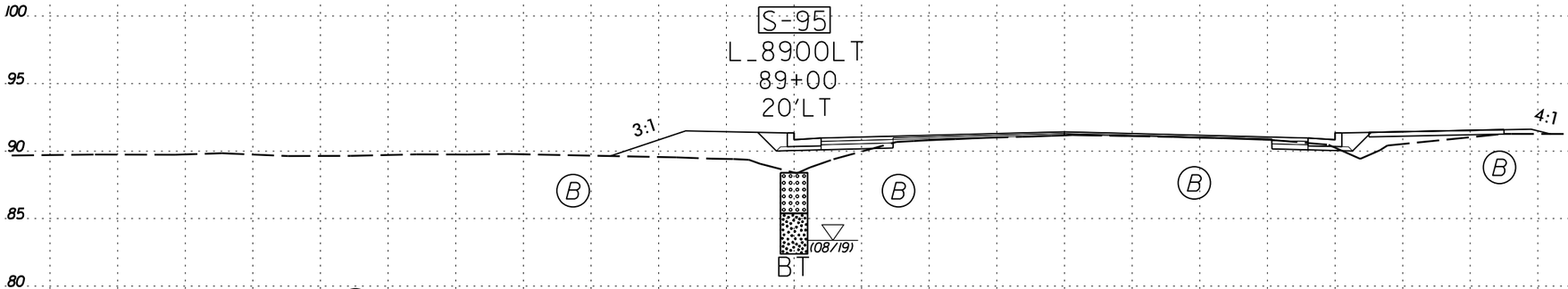
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	60

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-95	20'LT	89+00	0.0' - 3.0'	A-3(0)	16	0	17.7	65.5	5.7	11.1	97	89	18	9.9	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, and gray, moist to saturated, loose to medium dense, fine SAND (A-3), and silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

89+00.00
—L—

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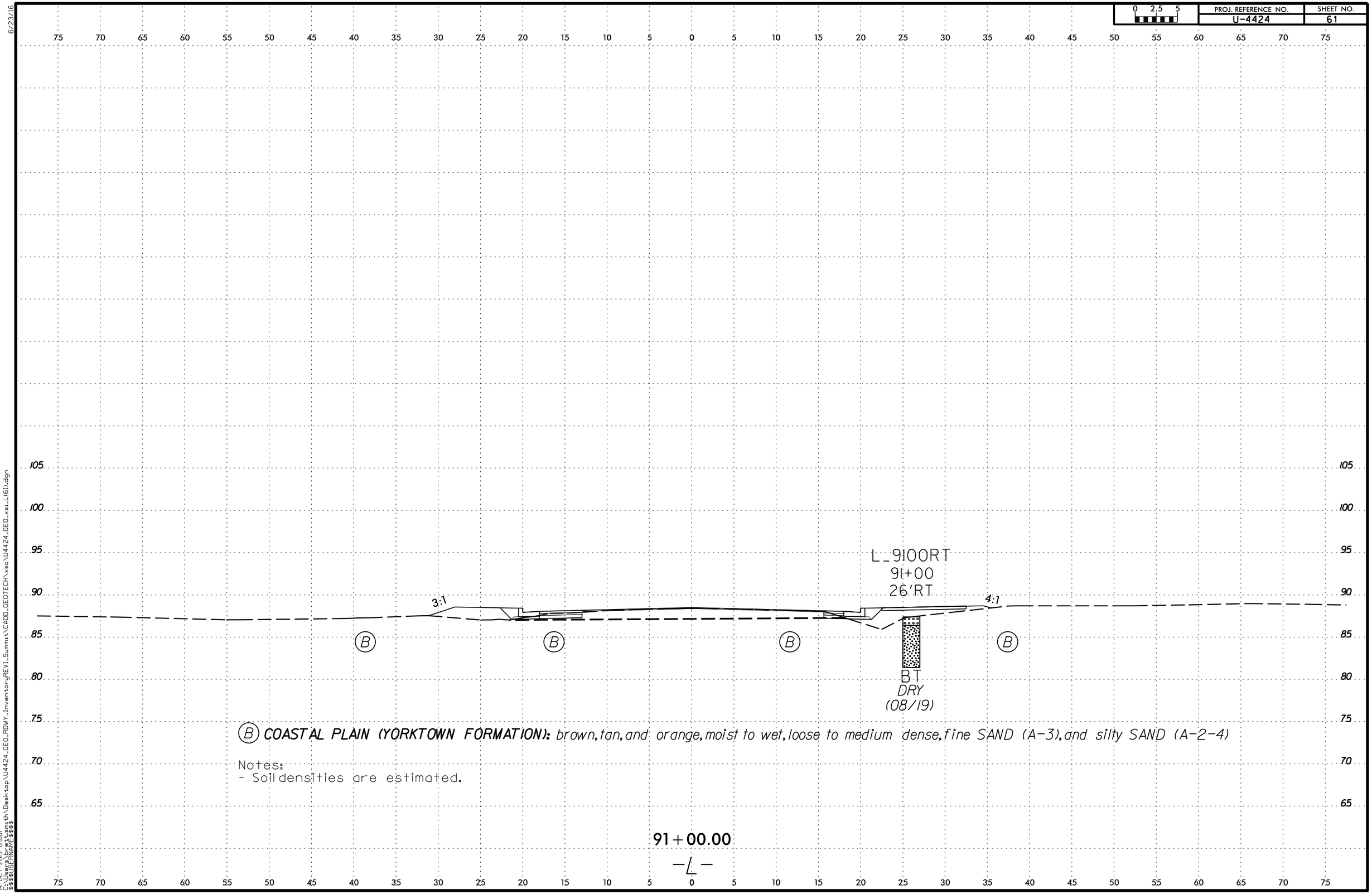
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	61



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, tan, and orange, moist to wet, loose to medium dense, fine SAND (A-3), and silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

91+00.00
-L-

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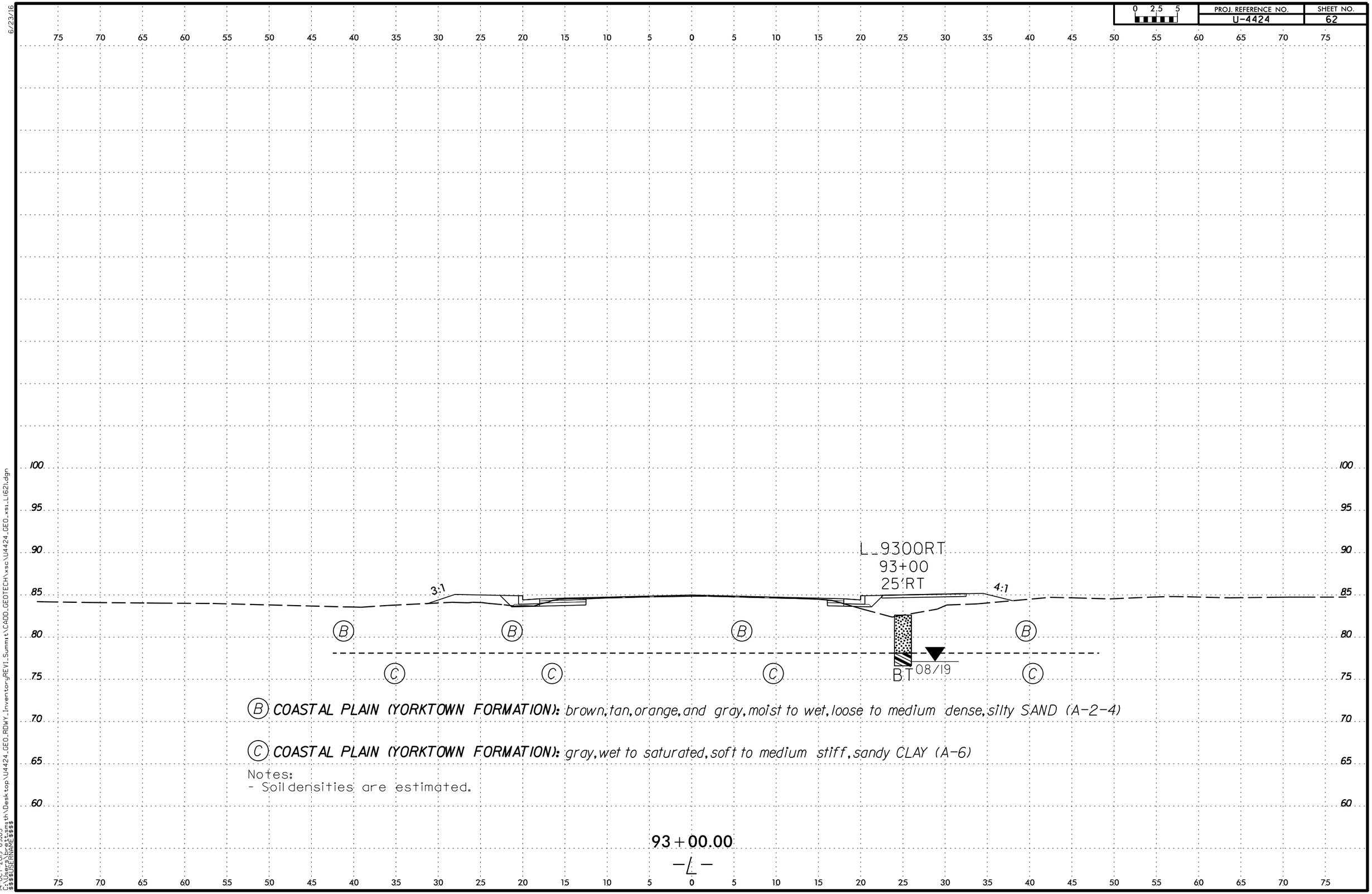
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	62



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, tan, orange, and gray, moist to wet, loose to medium dense, silty SAND (A-2-4)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *gray, wet to saturated, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

93+00.00
-L-

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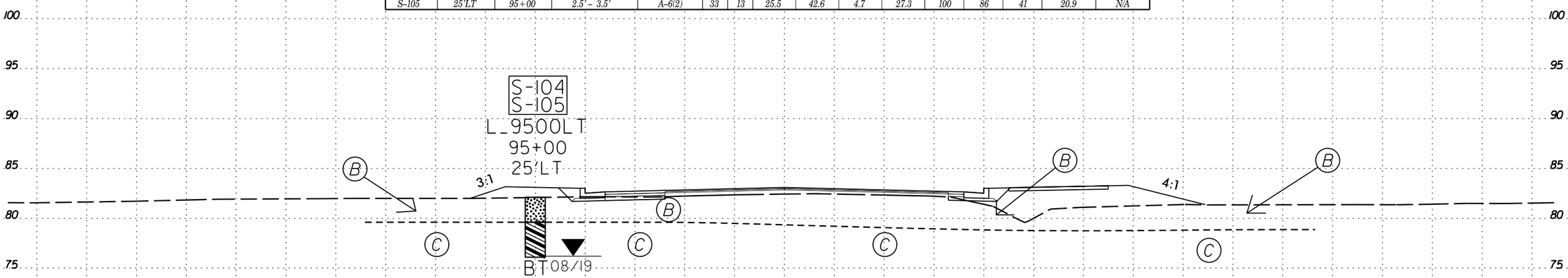
SOIL TEST RESULTS

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-104	25'LT	95+00	0.0' - 2.5'	A-2-4(0)	18	0	13.8	67.2	10.0	9.0	84	77	25	3.6	N/A
S-105	25'LT	95+00	2.5' - 3.5'	A-6(2)	33	13	25.5	42.6	4.7	27.3	100	86	41	20.9	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, dry, loose to medium dense, silty SAND (A-2-4)

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** orange, moist to saturated, soft to stiff, slightly plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

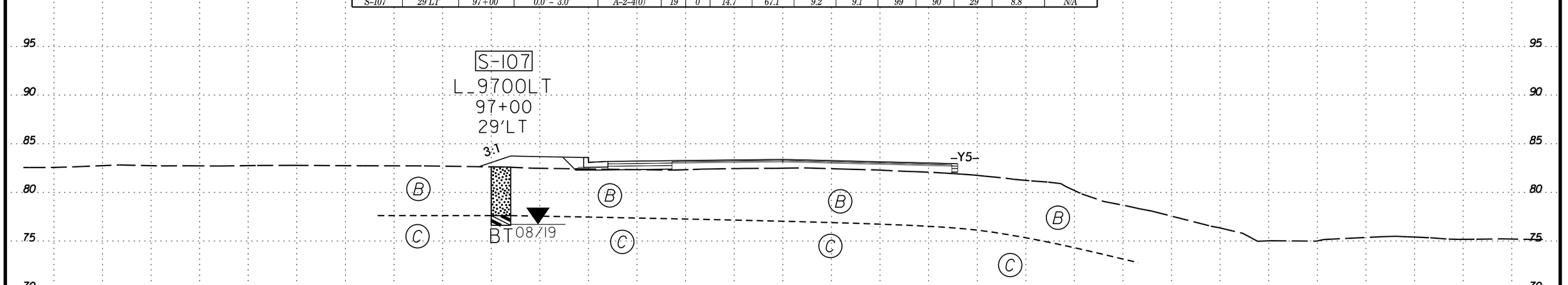
95+00.00
—L—

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	64

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-107	29'LT	97+00	0.0' - 3.0'	A-2-4(0)	19	0	14.7	67.1	9.2	9.1	99	90	29	8.8	NA



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange, wet to saturated, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

97+00.00
-L-

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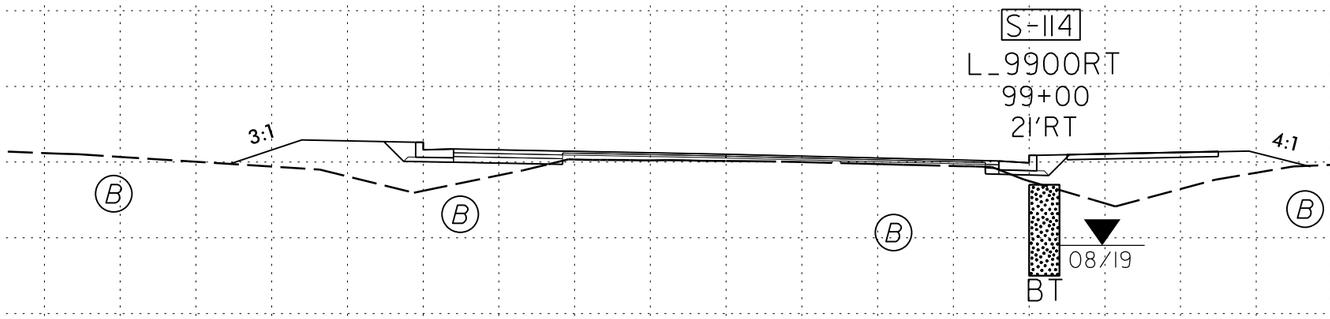
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	65

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-114	21'RT	99+00	1.0' - 4.0'	A-2-4(0)	31	10	61.4	12.9	6.0	19.7	100	53	25	12.6	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** red, orange, brown, and tan, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

99+00.00
-L-

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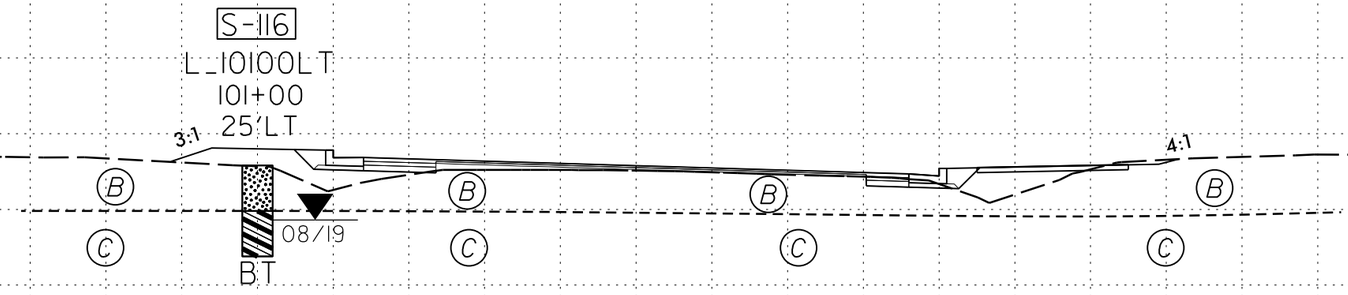
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	66

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-116	25'LT	101+00	3.0' - 4.5'	A-6(6)	31	16	6.4	49.7	12.6	31.2	100	96	60	29.4	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, moist, loose to medium dense, silty SAND (A-2-4)

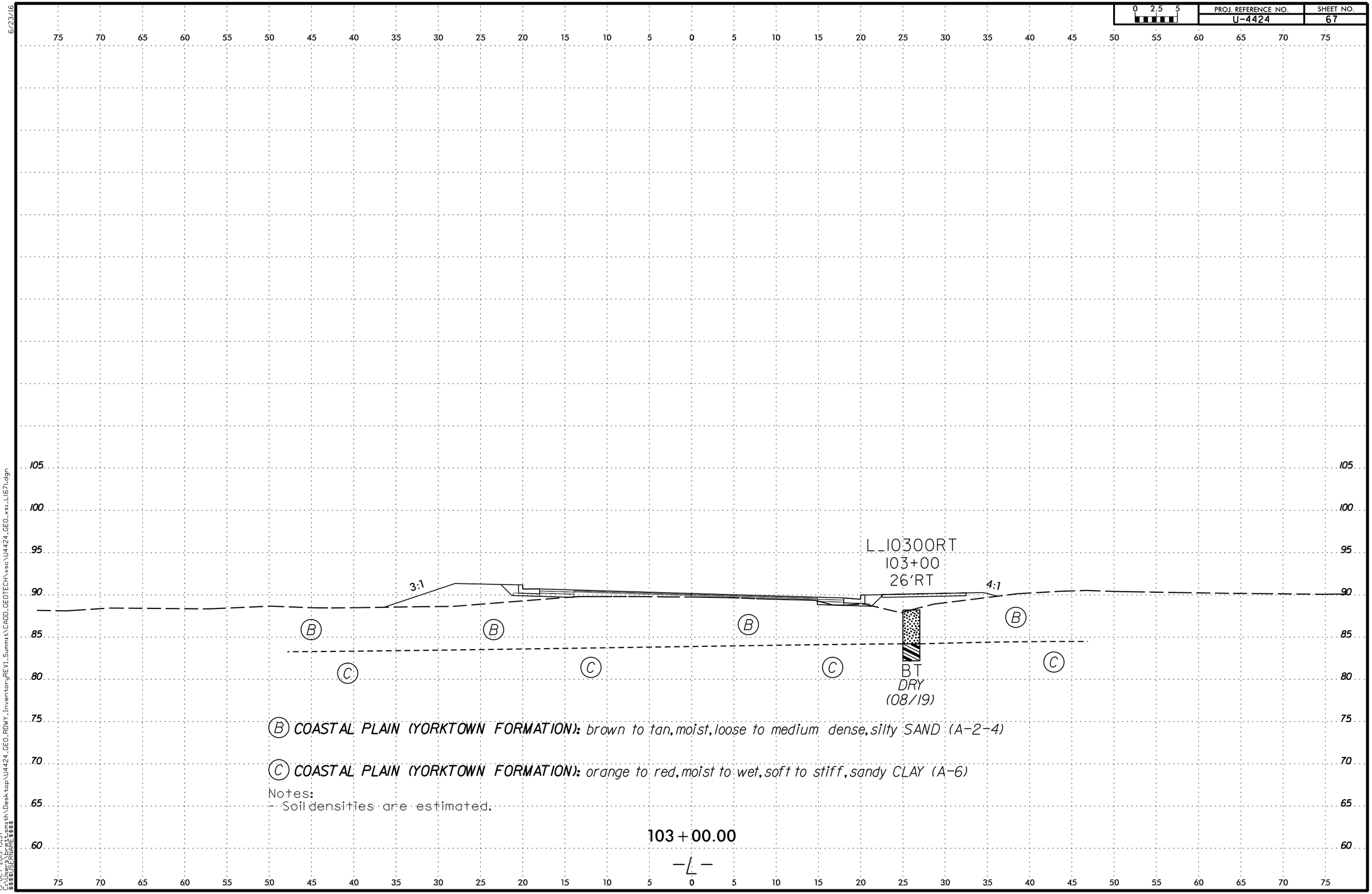
(C) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to orange, wet to saturated, soft to medium stiff, moderately plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

101+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	67



(B) COASTAL PLAIN (YORKTOWN FORMATION): *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(C) COASTAL PLAIN (YORKTOWN FORMATION): *orange to red, moist to wet, soft to stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

103+00.00

-L-

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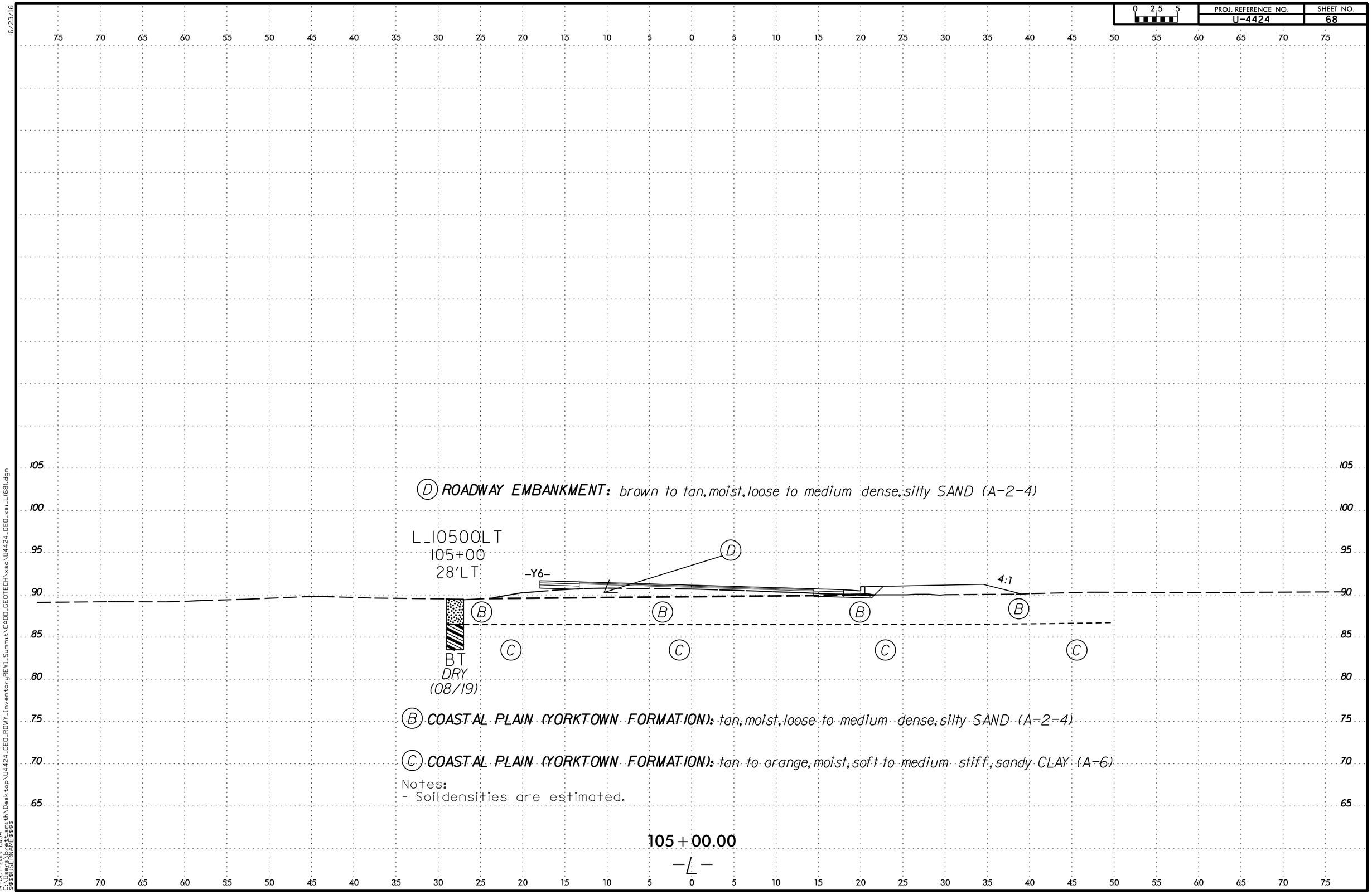
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	68



(D) **ROADWAY EMBANKMENT:** *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, moist, loose to medium dense, silty SAND (A-2-4)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, moist, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

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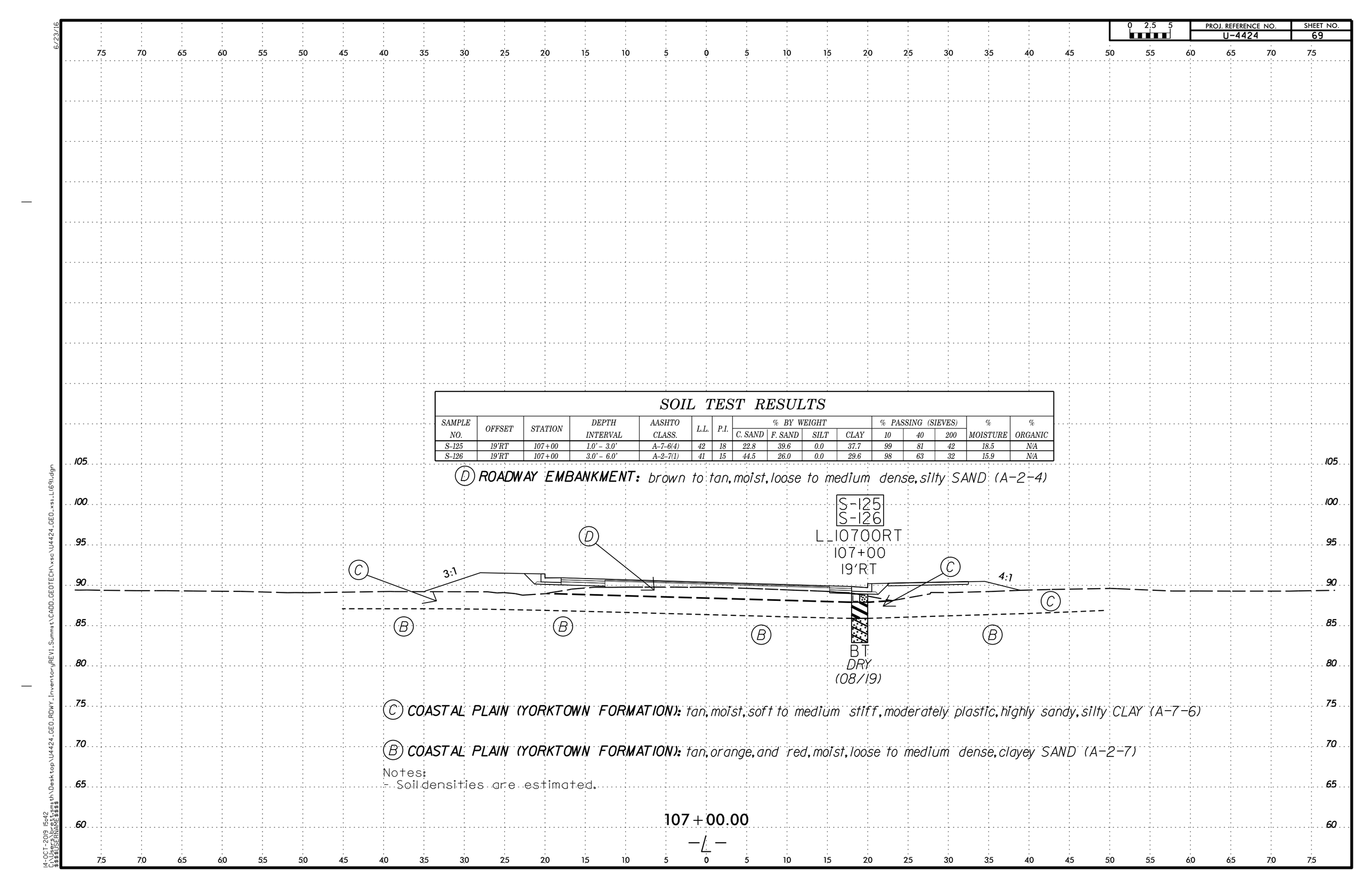
SOIL TEST RESULTS

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-125	19'RT	107+00	1.0' - 3.0'	A-7-6(4)	42	18	22.8	39.6	0.0	37.7	99	81	42	18.5	N/A
S-126	19'RT	107+00	3.0' - 6.0'	A-2-7(1)	41	15	44.5	26.0	0.0	29.6	98	63	32	15.9	N/A



(D) **ROADWAY EMBANKMENT:** brown to tan, moist, loose to medium dense, silty SAND (A-2-4)

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, moist, soft to medium stiff, moderately plastic, highly sandy, silty CLAY (A-7-6)

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, orange, and red, moist, loose to medium dense, clayey SAND (A-2-7)

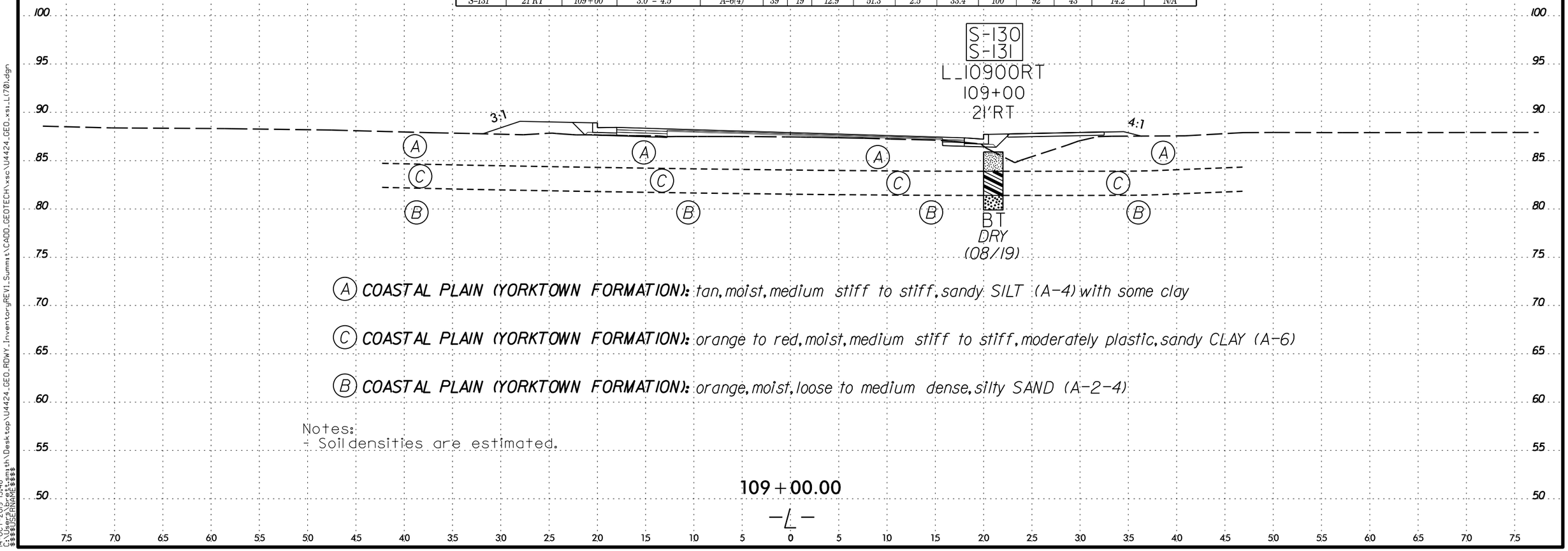
Notes:
- Soil densities are estimated.

107+00.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	70

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-130	21'RT	109+00	0.0' - 2.0'	A-4(0)	26	7	12.3	54.5	5.5	27.7	98	92	38	9.7	N/A
S-131	21'RT	109+00	3.0' - 4.5'	A-6(4)	39	19	12.9	51.3	2.5	33.4	100	92	43	14.2	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, moist, medium stiff to stiff, sandy SILT (A-4) with some clay*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange to red, moist, medium stiff to stiff, moderately plastic, sandy CLAY (A-6)*

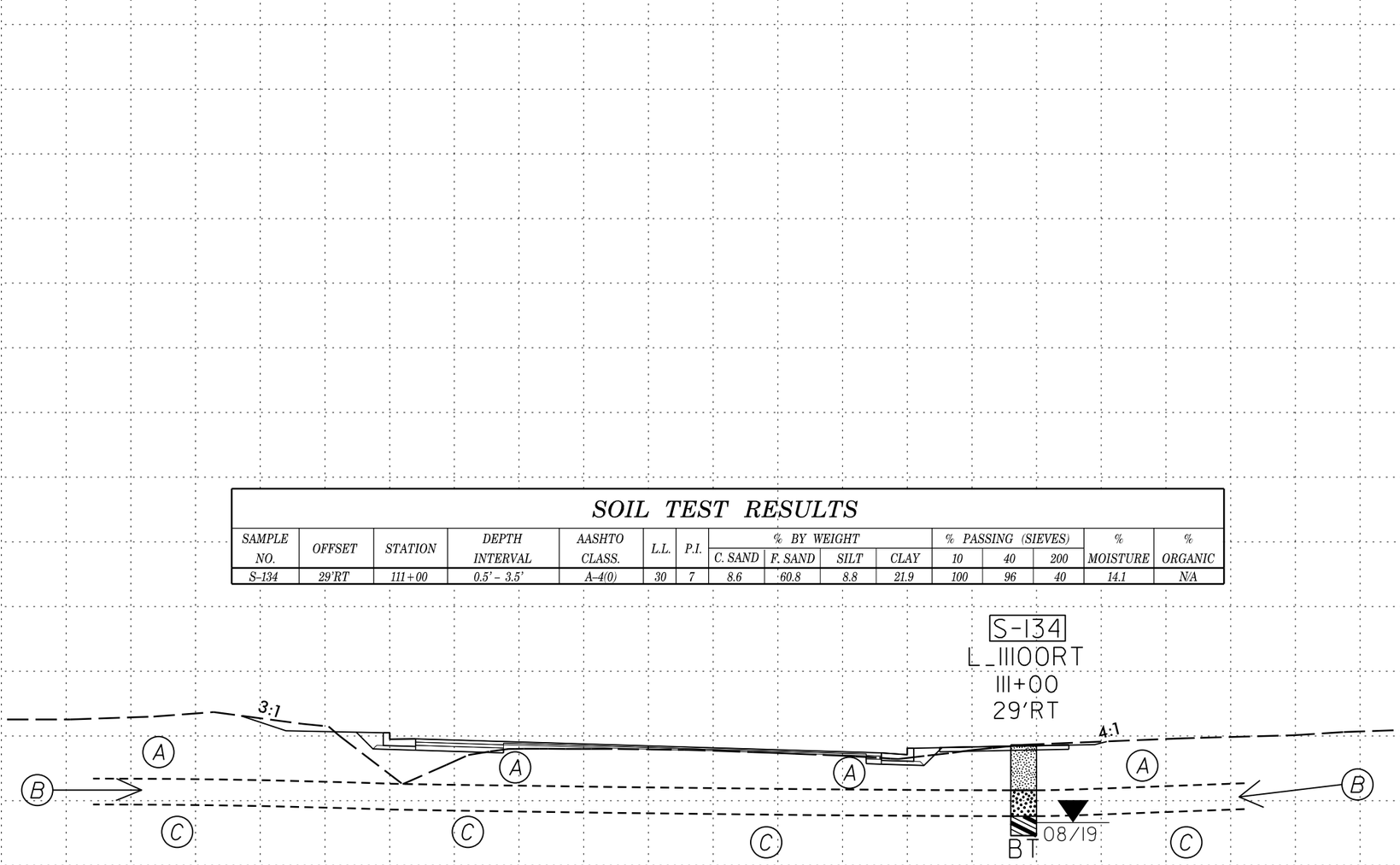
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange, moist, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

109+00.00
-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		
S-134	29'RT	111+00	0.5' - 3.5'	A-4(0)	30	7	8.6	60.8	8.8	21.9	100	96	40	14.1	N/A



(A) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown, tan, and orange, moist, soft to stiff, sandy SILT (A-4) with some clay*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to gray, moist, loose to medium dense, silty SAND (A-2-4)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *gray to tan, wet to saturated, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

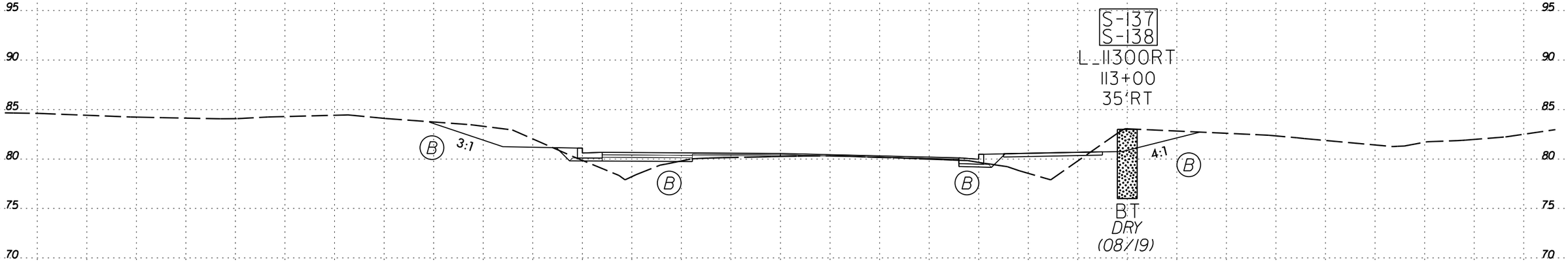
111+00.00
-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	72

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-137	35'RT	113+00	2.0' - 5.5'	A-2-4(0)	20	0	7.0	66.6	6.7	19.6	100	98	33	14.2	N/A
S-138	35'RT	113+00	5.5' - 7.0'	A-2-4(0)	24	2	8.9	68.0	3.2	19.8	100	97	27	15.9	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, orange, and red, moist, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

113+00.00

-L-

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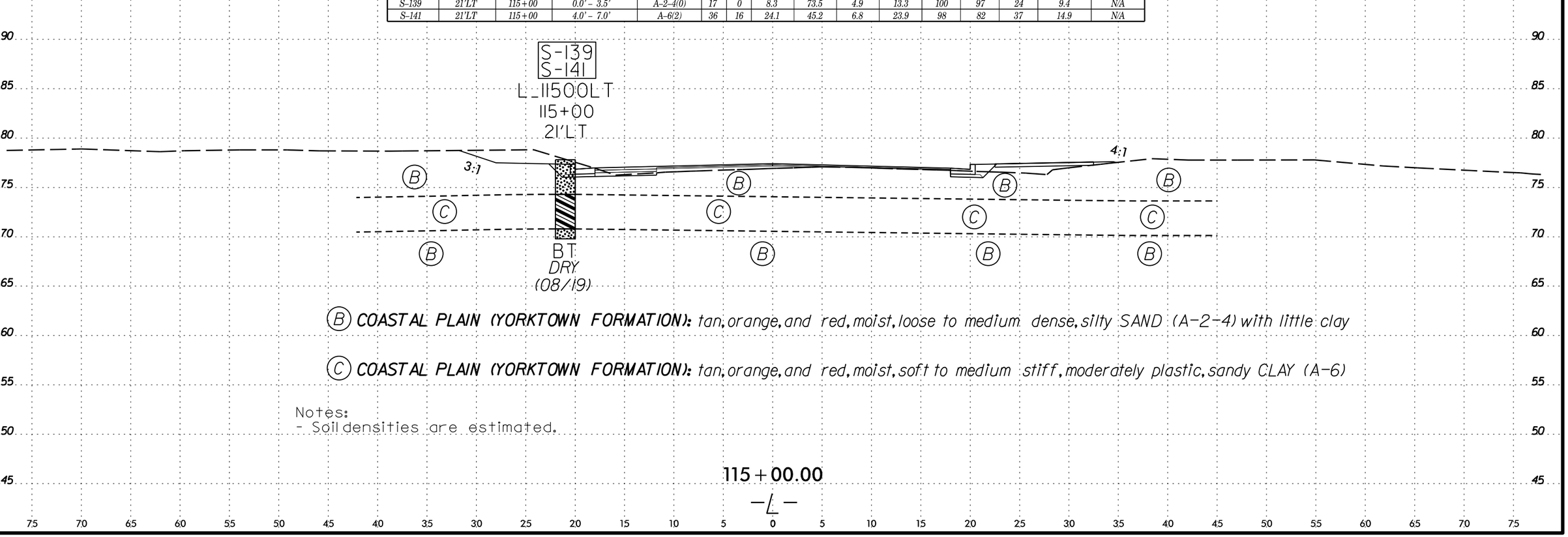
$$$$USERNAME$$$$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	73

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-139	21'LT	115+00	0.0' - 3.5'	A-2-4(0)	17	0	8.3	73.5	4.9	13.3	100	97	24	9.4	N/A
S-141	21'LT	115+00	4.0' - 7.0'	A-6(2)	36	16	24.1	45.2	6.8	23.9	98	82	37	14.9	N/A



(B) COASTAL PLAIN (YORKTOWN FORMATION): tan, orange, and red, moist, loose to medium dense, silty SAND (A-2-4) with little clay

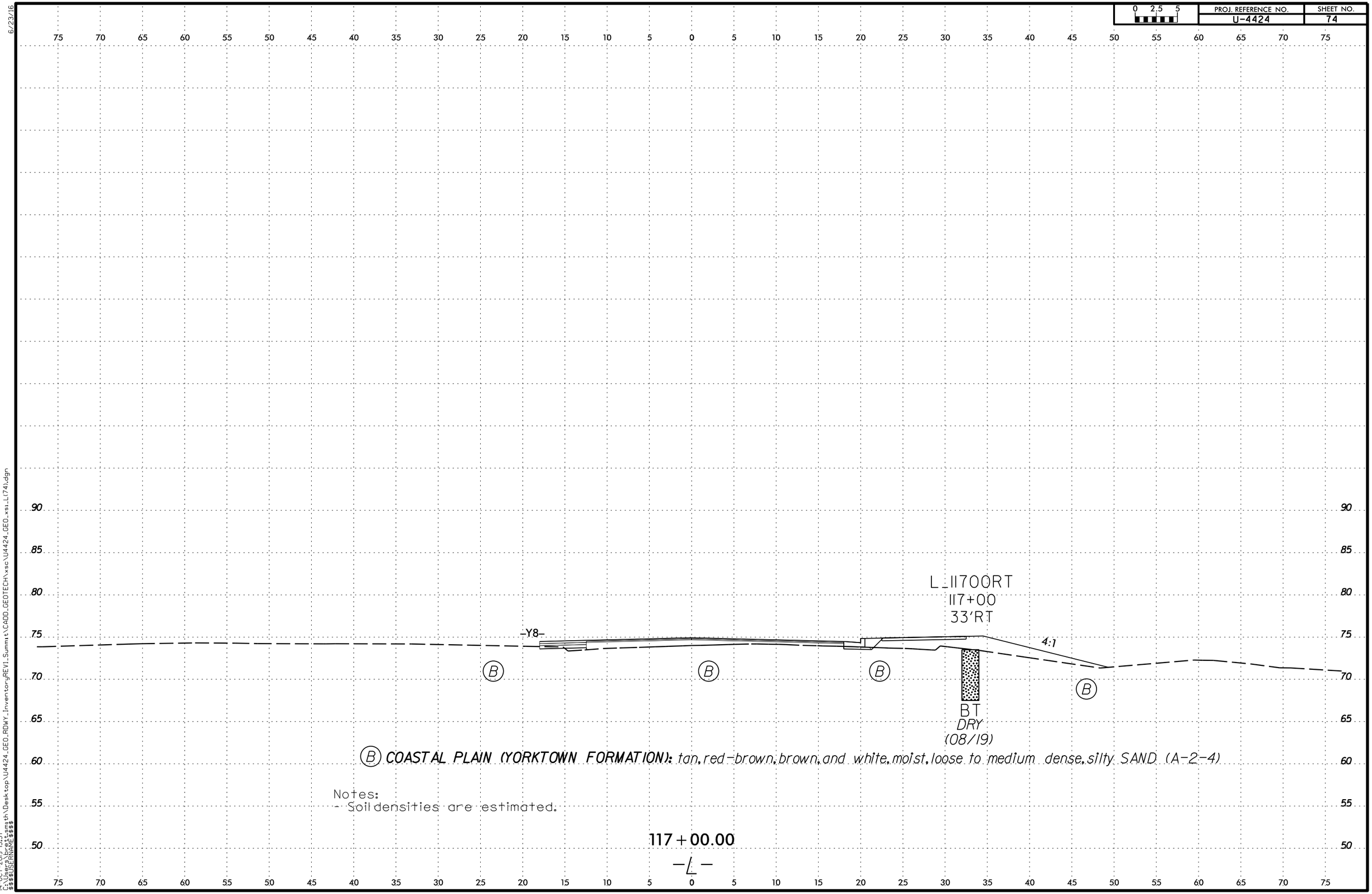
(C) COASTAL PLAIN (YORKTOWN FORMATION): tan, orange, and red, moist, soft to medium stiff, moderately plastic, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

115+00.00
—L—

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	74



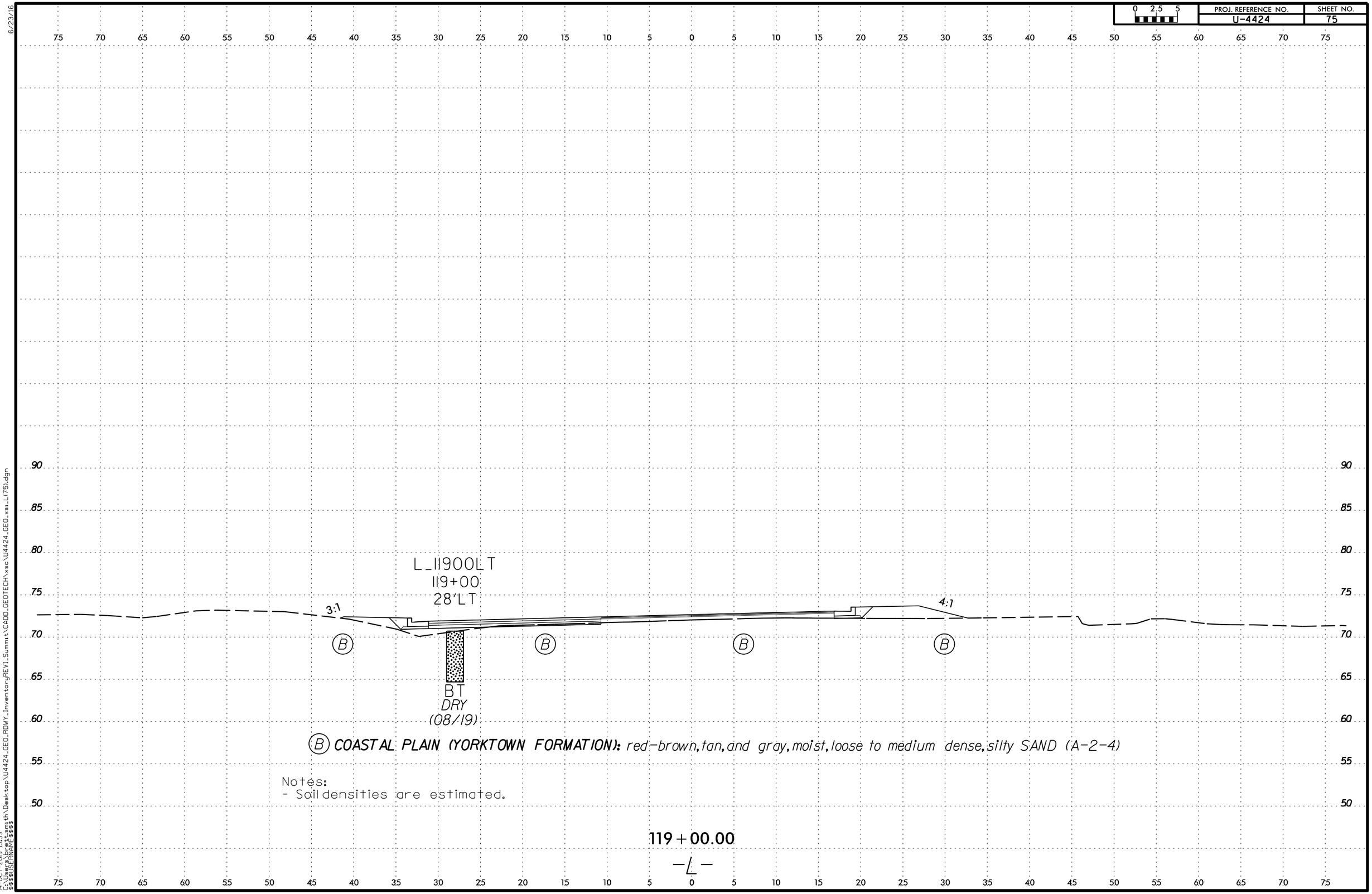
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, red-brown, brown, and white, moist, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

117+00.00
-L-

14-OCT-2019 15:57
C:\Users\dsmith\Desktop\U4424_GEO_RDWY_InventoryREV1_Summit\CADD_GEOTECH\xsc\U4424_GEO_xsi_L741.dgn
$$$$USERNAME$$$$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	75



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *red-brown, tan, and gray, moist, loose to medium dense, silty SAND (A-2-4)*

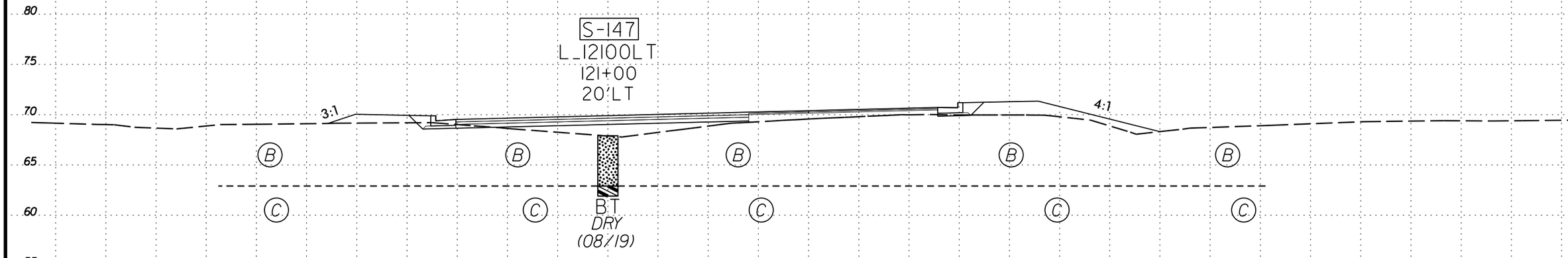
Notes:
- Soil densities are estimated.

119+00.00
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	76

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-147	20'LT	121+00	2.0' - 4.5'	A-2-4(0)	21	0	18.2	68.1	4.2	9.4	100	90	19	17.0	N/A



(B) COASTAL PLAIN (YORKTOWN FORMATION): red-brown, moist to wet, loose to medium dense, silty SAND (A-2-4)

(C) COASTAL PLAIN (YORKTOWN FORMATION): red-brown and gray, wet, medium stiff to stiff, sandy CLAY (A-6)

Notes:
- Soil densities are estimated.

121+00.00
-L-

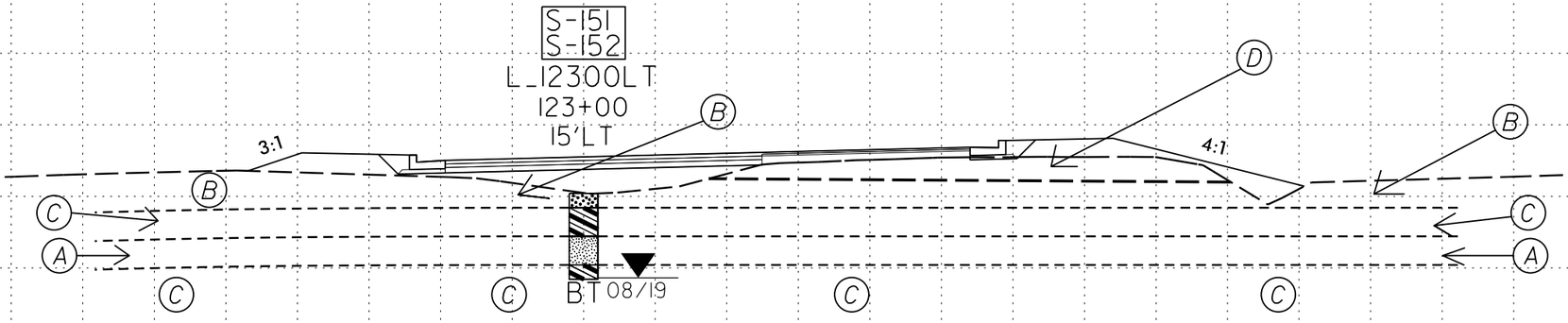
0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	77

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-151	15'LT	123+00	1.0' - 3.0'	A-6(7)	35	17	5.8	44.0	18.1	32.1	100	97	59	21.1	N/A
S-152	15'LT	123+00	3.0' - 5.0'	A-4(1)	25	6	10.0	47.4	18.8	23.9	99	94	50	18.4	N/A

(D) **ROADWAY EMBANKMENT:** tan to brown, moist, loose to medium dense, silty SAND (A-2-4) with little clay



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, moist, loose to medium dense, silty SAND (A-2-4)

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to gray, wet, medium stiff to stiff, moderately plastic, sandy CLAY (A-6)

(A) **COASTAL PLAIN (YORKTOWN FORMATION):** gray and red-brown, wet, medium stiff to stiff, sandy SILT (A-4) with some clay

Notes:
- Soil densities are estimated.

123+00.00
-L-

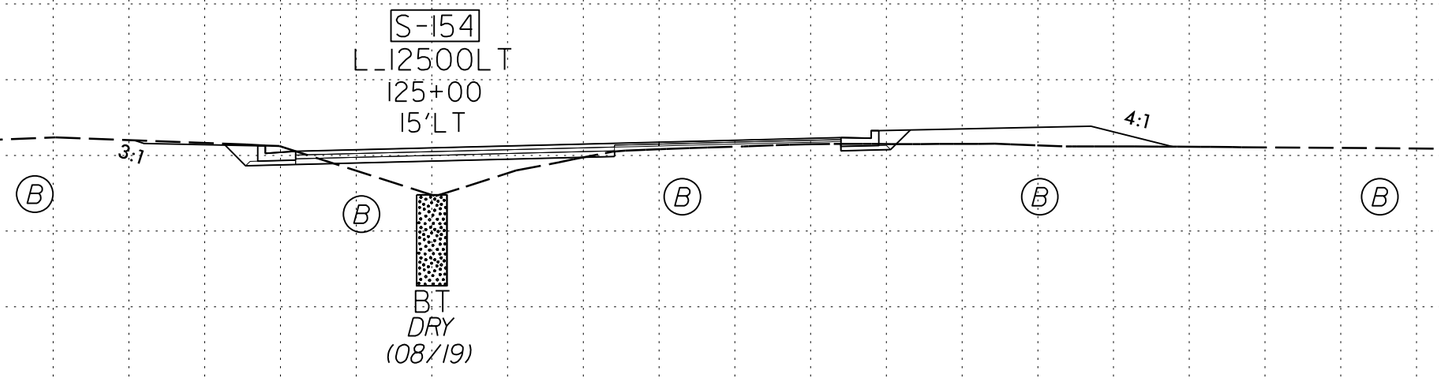
14-OCT-2019 16:12
C:\Users\jsmith\Desktop\U4424_GEO_RDWY_InventoryREV1_Summit\CADD_GEOTECH\xsc\U4424_GEO_xsLL(77).dgn
$$$$USERNAME$$$$

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	78

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-154	15'LT	125+00	0.0' - 3.5'	A-2-4(0)	22	0	10.7	64.9	12.7	11.6	99	95	30	6.6	N/A



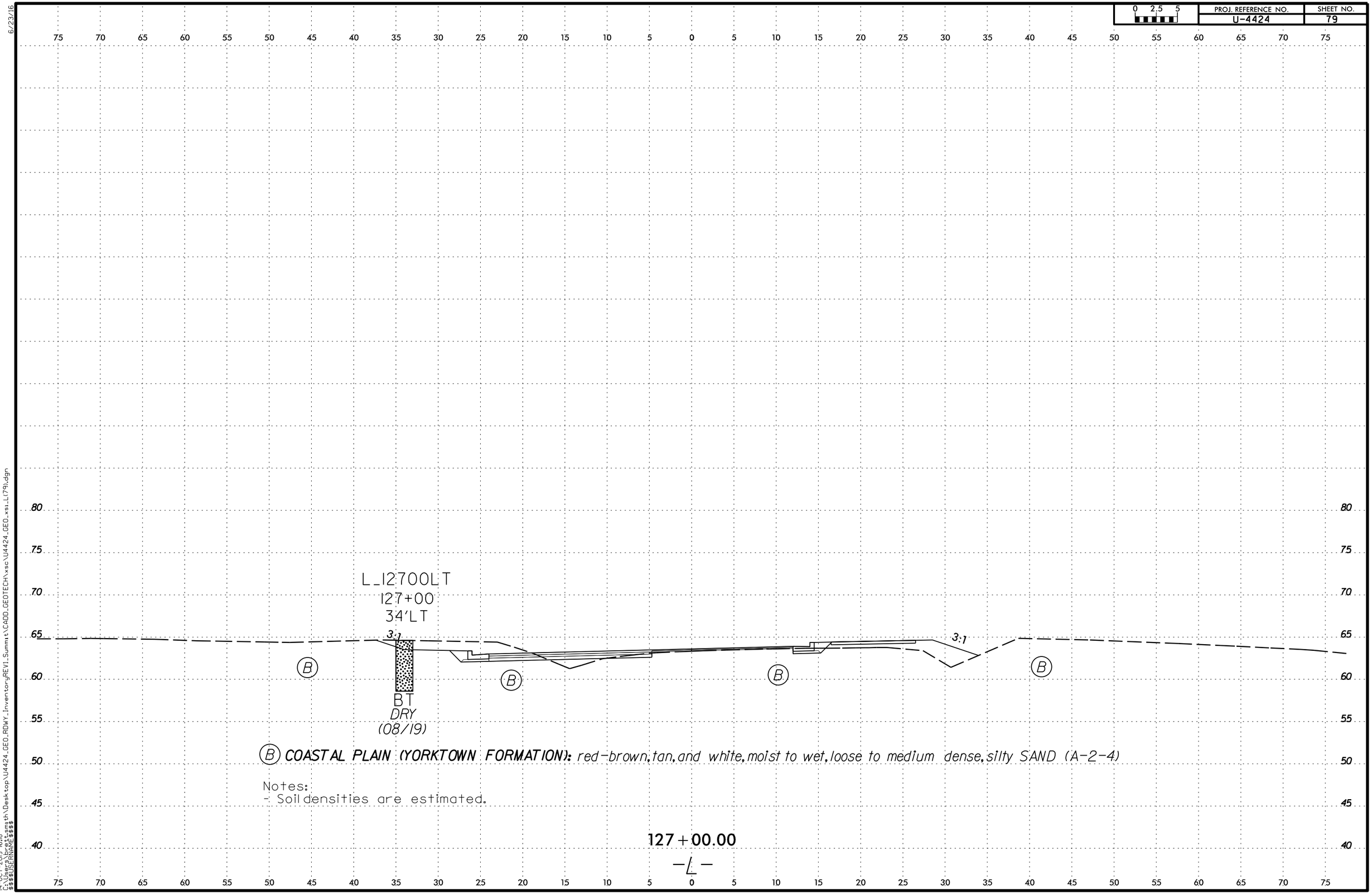
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** red-brown and tan, moist, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

125+00.00
—L—

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	79



14-OCT-2019 16:18
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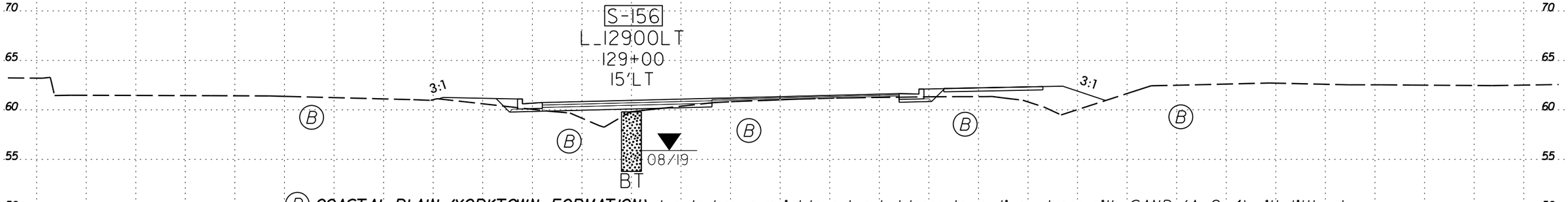
$$$$USERNAME$$$$

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	80

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-156	15'LT	129+00	0.0' - 2.0'	A-2-4(0)	19	1	13.5	57.0	9.6	19.9	99	93	35	12.0	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to brown, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay

Notes:
- Soil densities are estimated.

129+00.00
-L-

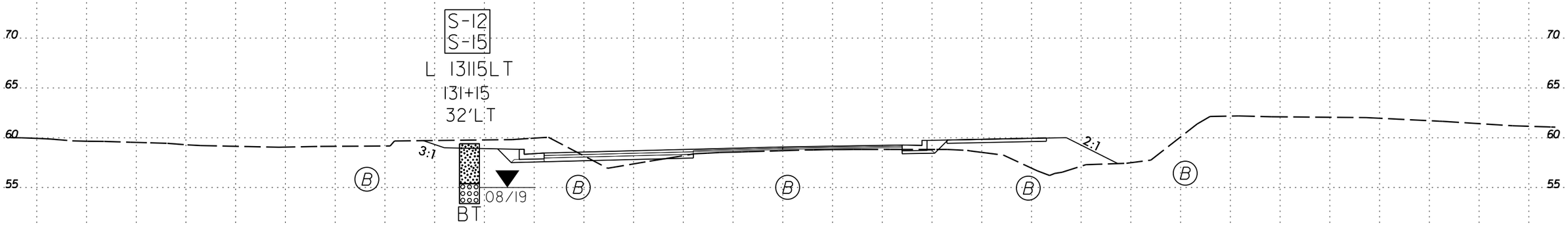
14-OCT-2019 16:20
C:\Users\dsmith\Desktop\U4424_GEO_RDWY_InventoryREV1_Summit\CADD_GEOTECH\xsc\U4424_GEO_xsi_L(80).dgn
$$$$USERNAME$$$$

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-4424	81

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-12	32'LT	131+15	1.0' - 2.5'	A-2-4(0)	17	0	3.2	69.3	7.7	19.8	100	99	34	16.3	N/A
S-15	32'LT	131+15	4.5' - 6.0'	A-1-b(0)	18	0	47.2	38.4	5.2	9.3	67	46	11	15.8	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown, tan, orange, white, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4) with little clay, and fine to coarse SAND (A-1-b)

Notes:
- Soil densities are estimated.

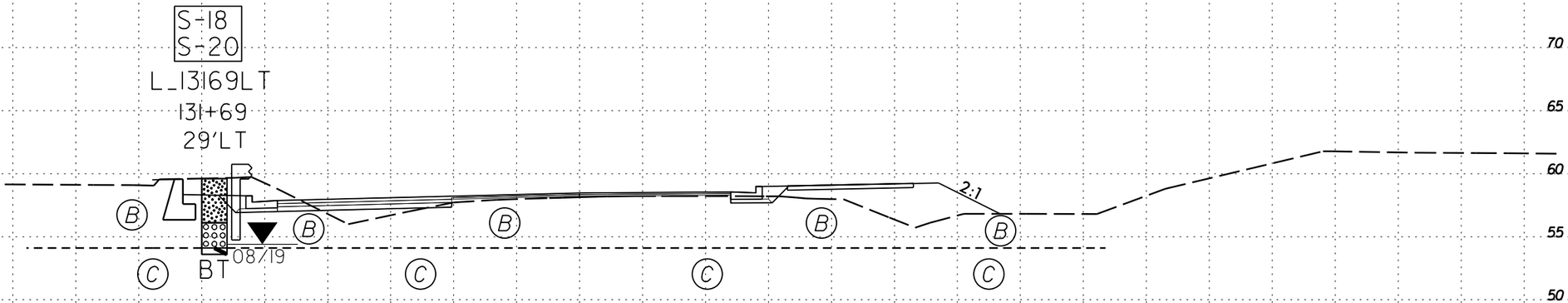
131+00.00

—L—

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	82

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-18	29'LT	131+69	3.5' – 4.5'	A-1-b(0)	18	0	69.8	20.5	2.5	7.2	85	39	9	12.2	N/A
S-20	29'LT	131+69	5.5' – 6.0'	A-7-6(16)	42	21	1.8	18.5	42.0	37.7	97	97	78	43.6	N/A



(B) COASTAL PLAIN (YORKTOWN FORMATION): brown, tan, orange, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4), and fine to coarse SAND (A-1-b)

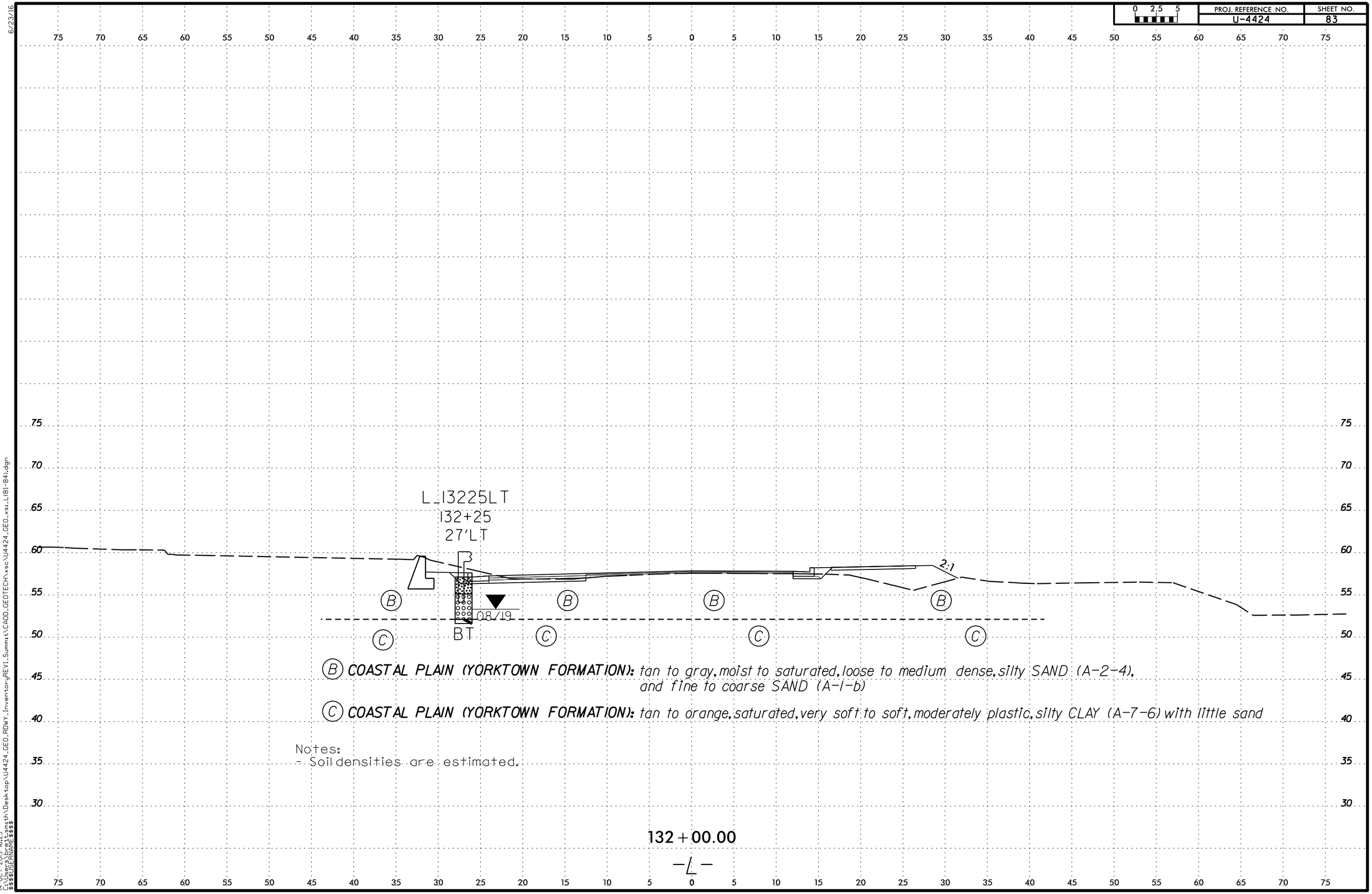
(C) COASTAL PLAIN (YORKTOWN FORMATION): tan to gray, saturated, very soft to soft, moderately plastic, silty CLAY (A-7-6) with little sand

Notes:
- Soil densities are estimated.

131+50.00

—L—

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	83



(B) COASTAL PLAIN (YORKTOWN FORMATION): *tan to gray, moist to saturated, loose to medium dense, silty SAND (A-2-4), and fine to coarse SAND (A-1-b)*

(C) COASTAL PLAIN (YORKTOWN FORMATION): *tan to orange, saturated, very soft to soft, moderately plastic, silty CLAY (A-7-6) with little sand*

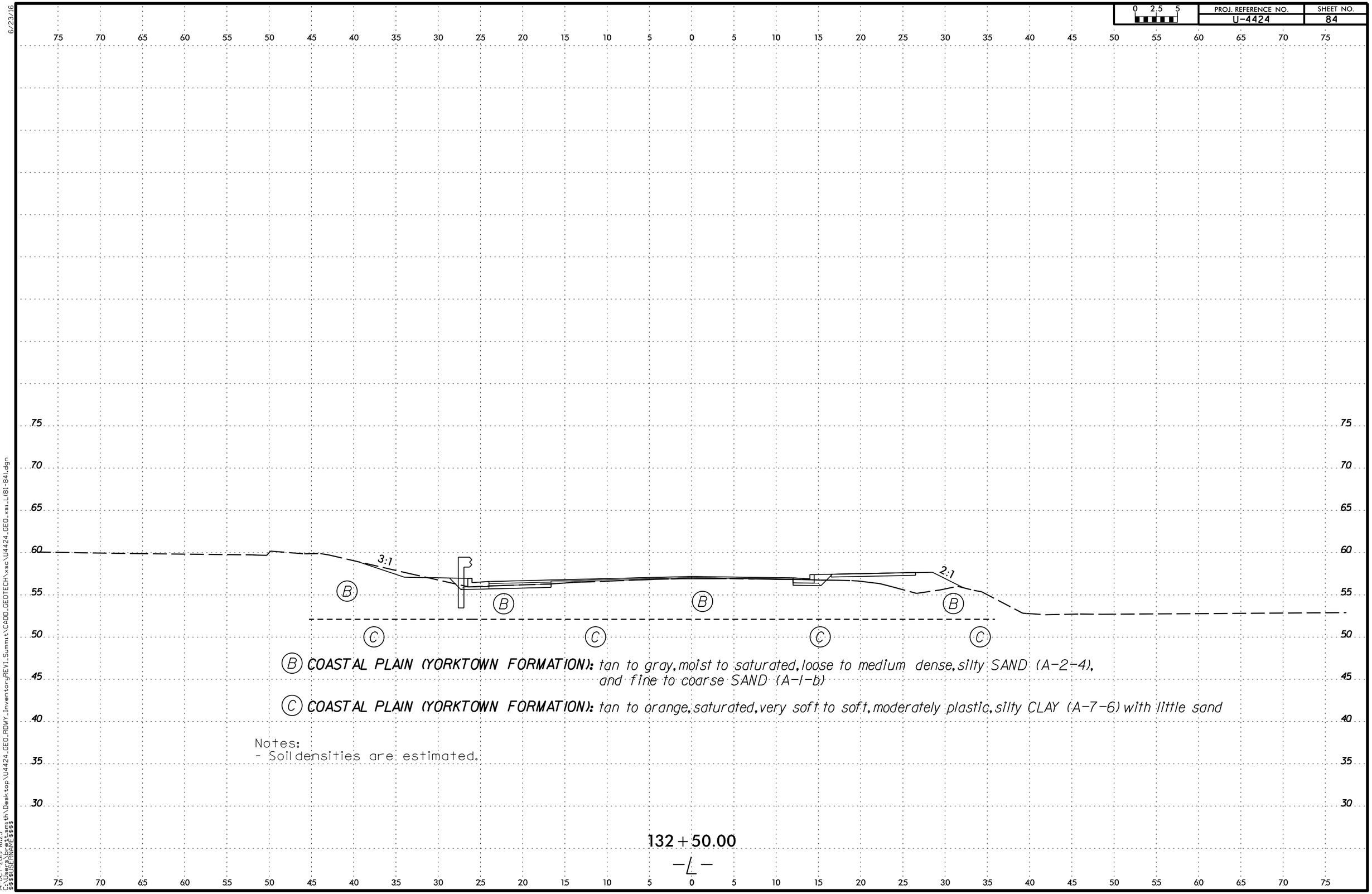
Notes:
- Soil densities are estimated.

132+00.00

-L-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	84



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to gray, moist to saturated, loose to medium dense, silty SAND (A-2-4), and fine to coarse SAND (A-1-b)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan to orange, saturated, very soft to soft, moderately plastic, silty CLAY (A-7-6) with little sand*

Notes:
- Soil densities are estimated.

132 + 50.00
-L-

14-OCT-2019 16:25
C:\Users\dsmith\Desktop\U4424_GEO_RDWY_InventoryREV1_Summit\CADD_GEOTECH\xsc\U4424_GEO_xsL(81-84).dgn
$$$$USERNAME$$$$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	85

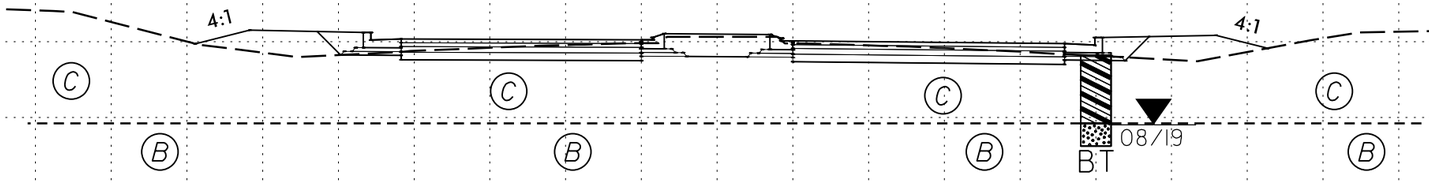
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

125 120 115 110 105 100 95 90 85

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-23	25'RT	11+50	0.0' - 3.0'	A-6(1)	34	13	3.2	63.4	6.8	26.5	100	99	37	21.6	N/A

S-23
Y2 1150RT
11+50
25'RT



(C) **COASTAL PLAIN (YORKTOWN FORMATION):** tan to red, moist to wet, soft to medium stiff, slightly plastic, sandy CLAY (A-6)

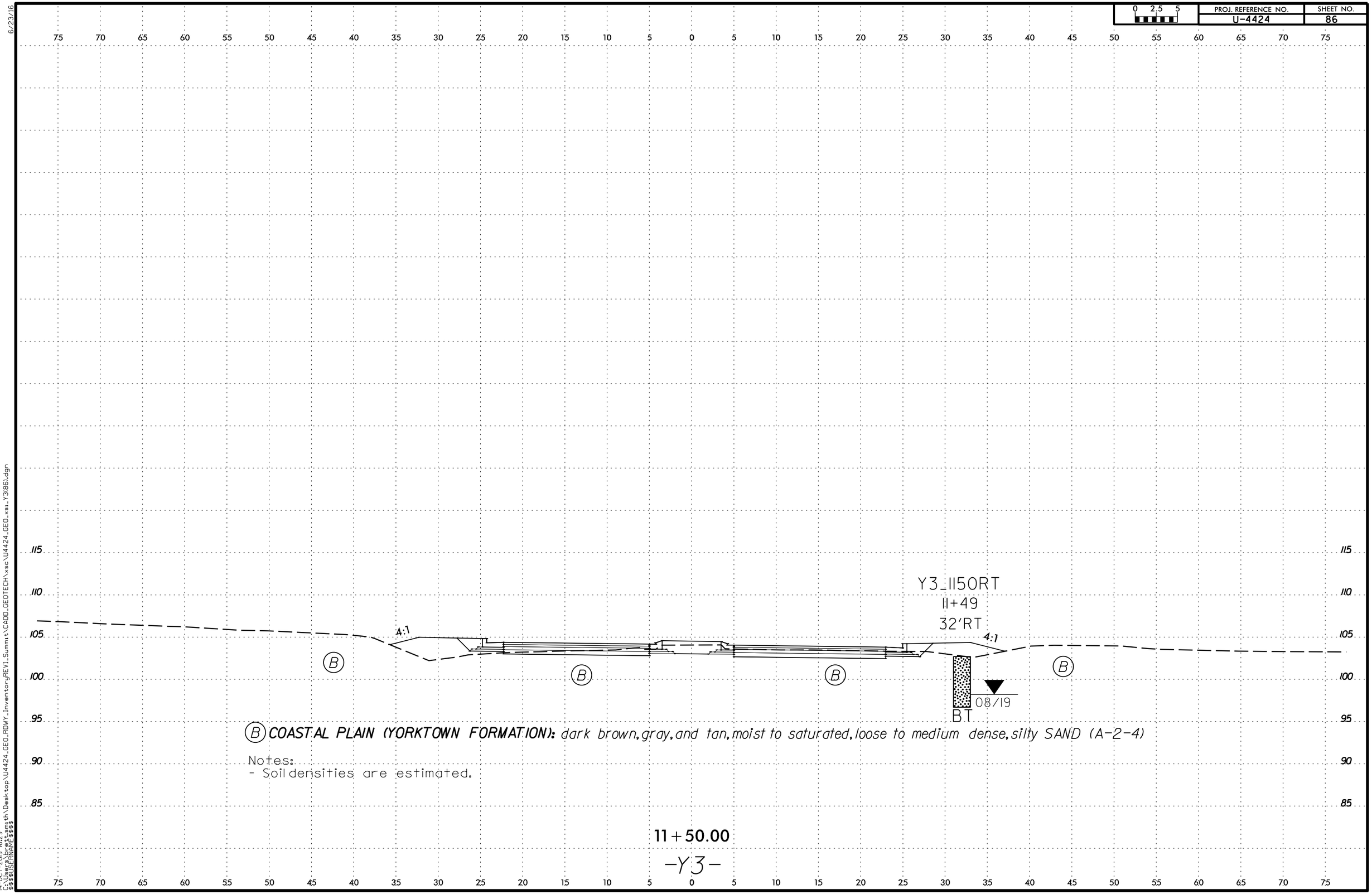
(B) **COASTAL PLAIN (YORKTOWN FORMATION):** orange, white, and tan, wet to saturated, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

11+50.00
-Y2-

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	86



(B) *COASTAL PLAIN (YORKTOWN FORMATION):* dark brown, gray, and tan, moist to saturated, loose to medium dense, silty SAND (A-2-4)

Notes:
- Soil densities are estimated.

11+50.00

-Y3-

14-OCT-2019 16:29
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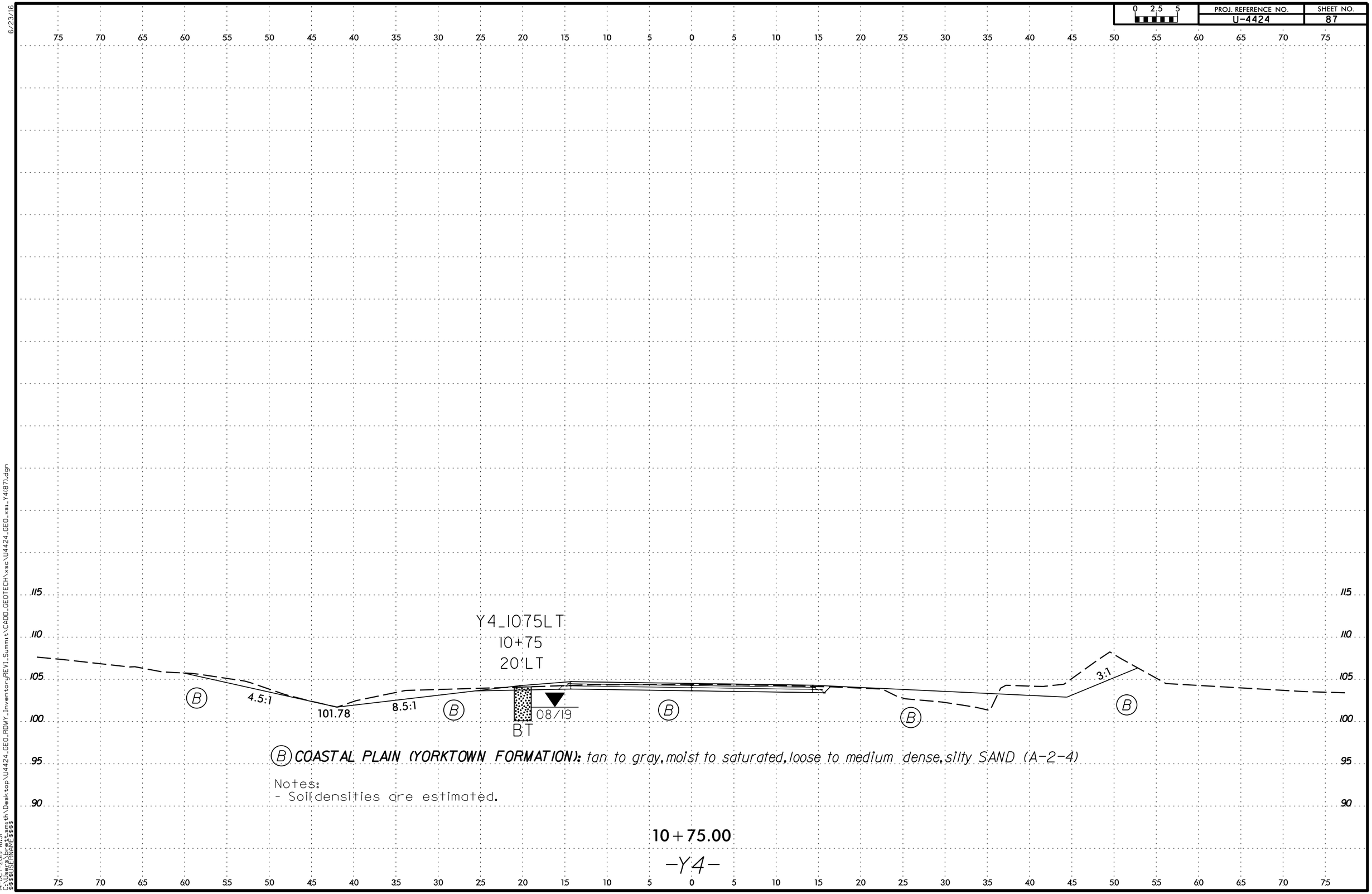
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	87



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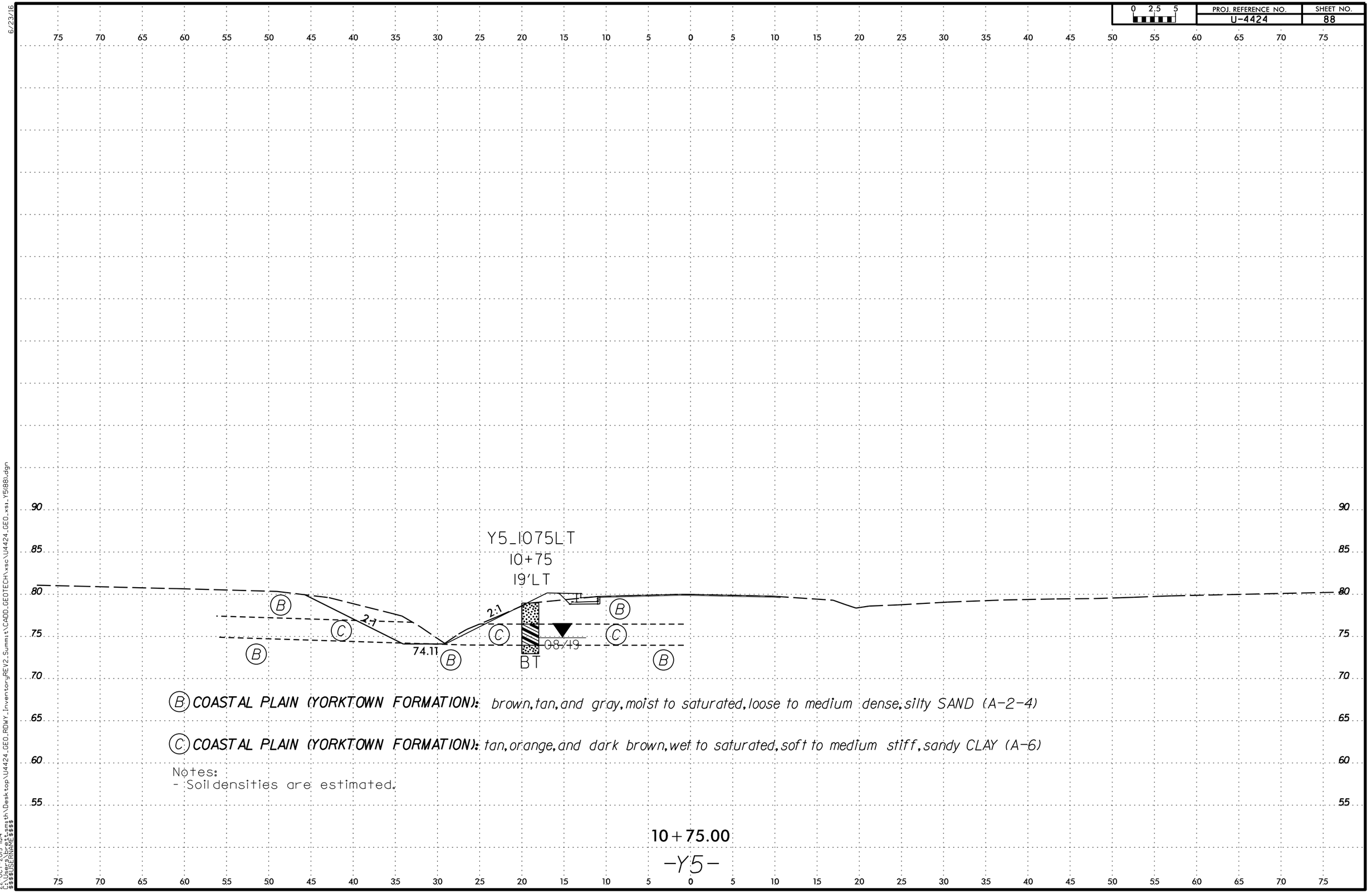
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	88



(B) COASTAL PLAIN (YORKTOWN FORMATION): *brown, tan, and gray, moist to saturated, loose to medium dense, silty SAND (A-2-4)*

(C) COASTAL PLAIN (YORKTOWN FORMATION): *tan, orange, and dark brown, wet to saturated, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

10+75.00

-Y5-

22-OCT-2019 11:44
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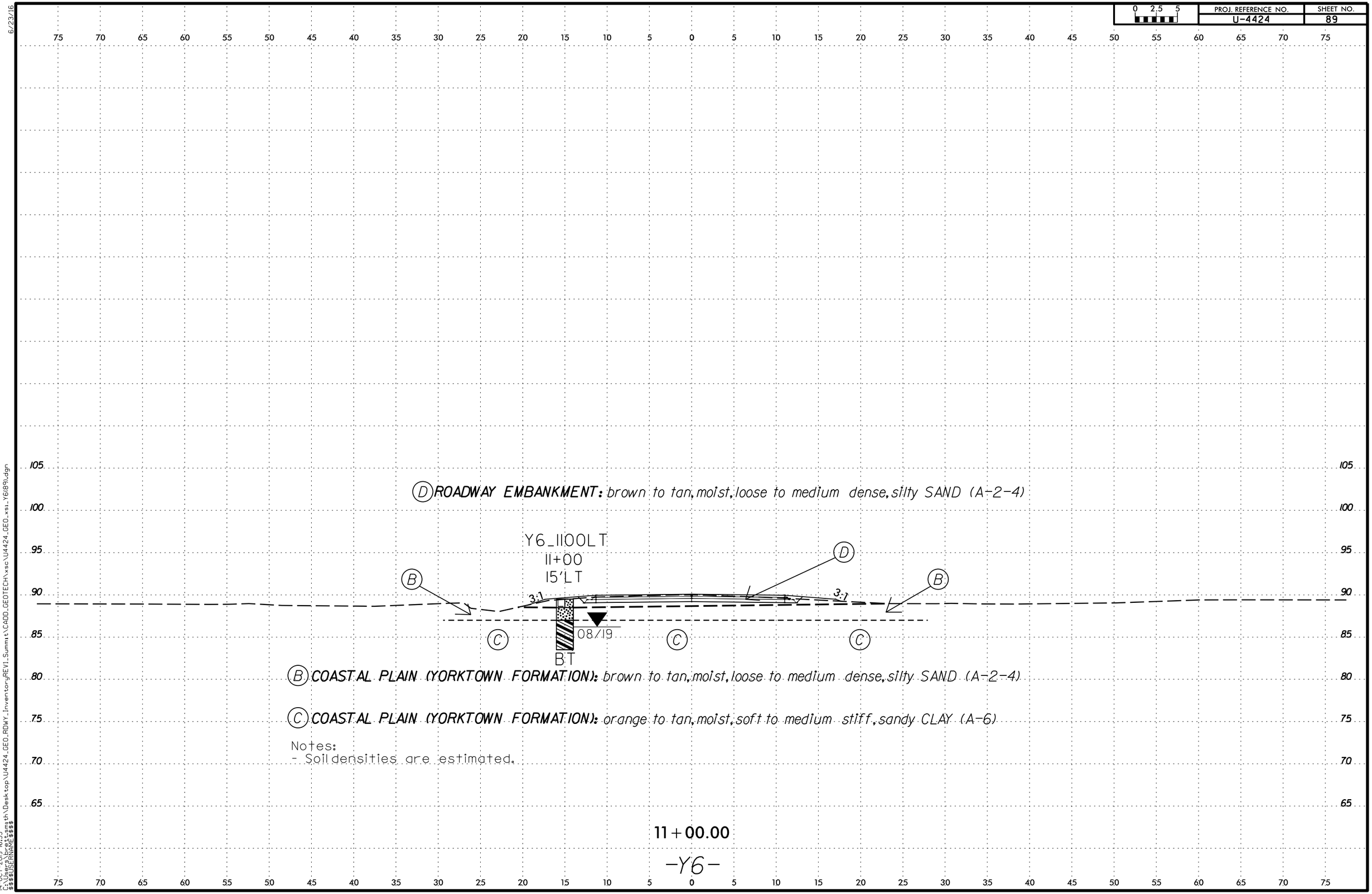
6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	89



(D) **ROADWAY EMBANKMENT:** *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *brown to tan, moist, loose to medium dense, silty SAND (A-2-4)*

(C) **COASTAL PLAIN (YORKTOWN FORMATION):** *orange to tan, moist, soft to medium stiff, sandy CLAY (A-6)*

Notes:
- Soil densities are estimated.

11+00.00

-Y6-

14-OCT-2019 16:35
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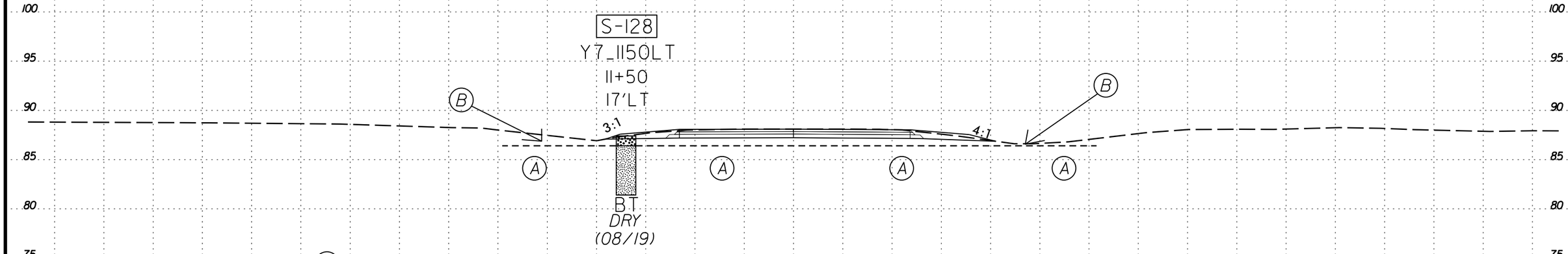
$$$$USERNAME$$$$

6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	90

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-128	17'LT	11+50	1.0' - 2.5'	A-4(1)	30	10	8.6	54.1	6.2	31.1	98	94	42	17.6	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** brown to tan, moist, loose to medium dense, silty SAND (A-2-4)

(A) **COASTAL PLAIN (YORKTOWN FORMATION):** tan, orange, and red, moist, soft to medium stiff, sandy SILT (A-4) with some clay

Notes:
- Soil densities are estimated.

11+50.00

-Y7-

14-OCT-2019 16:36
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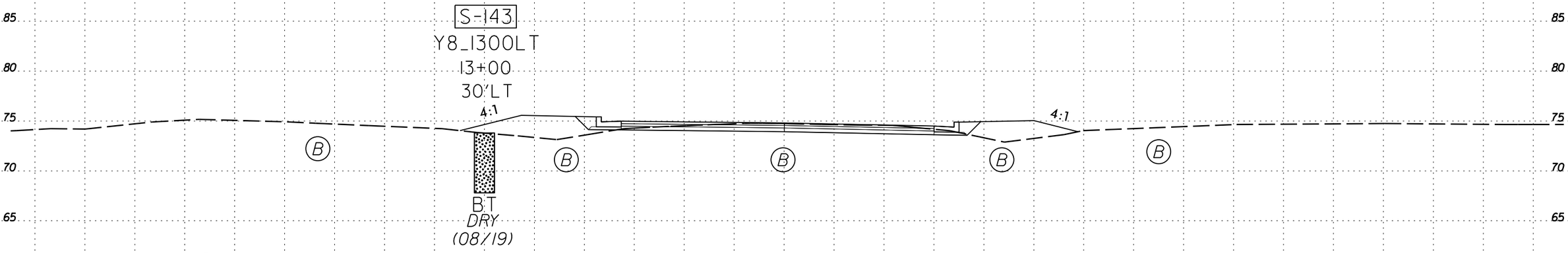
$$$$USERNAME$$$$

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-4424	91

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-143	30'LT	13+00	0.0' - 3.0'	A-2-4(0)	18	0	15.8	72.7	0.3	11.3	100	95	15	9.1	N/A



(B) **COASTAL PLAIN (YORKTOWN FORMATION):** *tan, orange, and gray, moist, loose to medium dense, silty SAND (A-2-4)*

Notes:
- Soil densities are estimated.

13+00.00

-Y8-

PROJECT REFERENCE NO.	SHEET NO.
U–4424	92

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
CALIFORNIA BEARING RATIO (CBR) RESULTS

REFERENCE: U–4424

PROJECT: 39062

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339 and C-487
504 Meadowlands Drive
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. U-4424

REPORT ON SAMPLES OF Improvements to NC 111 (W Wilston Street)

Project	39062.1.2	**County**	Edgecombe	**Owner**	Geotech
Date: Sampled	August, 2019	**Received**	8/16/19	**Reported**	
Sampled from	Roadway Investigation		**By**	Geotech	
Submitted by	B.Smith			2008	**Standard Specifications**

9/20/19

TEST RESULTS

Proj. Sample No.		S-161	S-162				
Boring No.		L_1500RT	L_2900LT				
Retained #4 Sieve	%	0	0				
Passing #10 Sieve	%	100	100				
Passing #40 Sieve	%	99	98				
Passing #200 Sieve	%	41	39				

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	5.3	7.4				
Fine Sand Ret - #270	%	61.2	63.9				
Silt 0.05 - 0.005 mm	%	16.7	12.3				
Clay < 0.005 mm	%	16.7	16.4				
Passing #40 Sieve	%	99.0	97.9				
Passing #200 Sieve	%	41.2	39.4				

L. L.		16	17				
P. I.		1	1				
AASHTO Classification		A-4	A-4				
Group Index		0	0				
pH		N/A	N/A				
Station		15+00	29+00				
OFFSET		46'RT	25'LT				
ALIGNMENT		N/A	N/A				
Depth (Ft)		1.0	1.0				
	to	3.0	3.0				
Natural Moisture %		N/A	N/A				

Aaron Hackett
Soils Engineer

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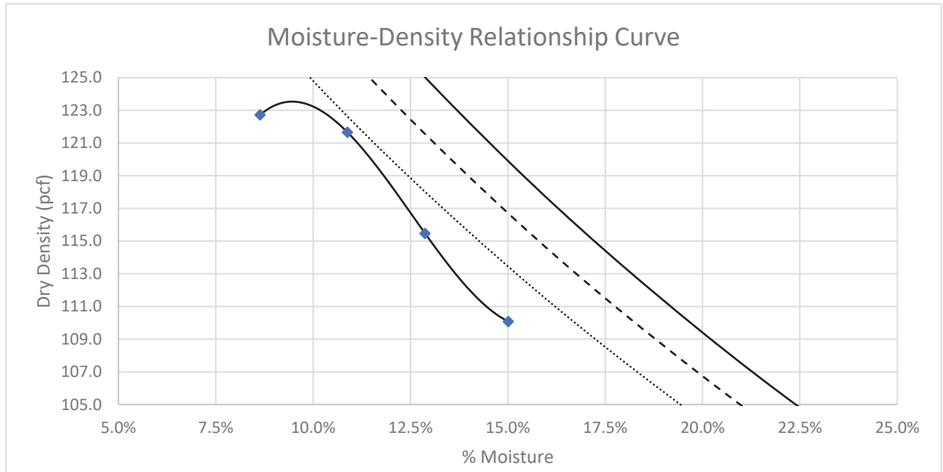
Standard Moisture-Density Relationship Report

ASTM D698

Project Number	**18-0173.I59**	Date	**9/12/2019**
Project Name	**U-4424 Roadway**	Sample Number	**S-161**
Client	**NCDOT**		
Sample Description	**A-4**	Maximum Dry Density	**123.5 pcf**
Sample Location	**15+00, 46'RT**	Optimum Moisture	**9.5%**



Natural Moisture:	**N/A**	Rammer Type:	**Manual**
Specific Gravity:	**2.60 (Assumed)**	Preparation Method:	**Dry**
Liquid Limit:	**16**	Method:	**A**
Plasticity Index:	**1**	Oversize Correction:	**Not Required**
% Fines:	**41.2%**		
% Sand:	**58.8%**		
% Gravel:	**0.0%**		

Aaron Hackett, EI
Lab Manager

Jeff Elliott, PE
CMT & SI Department Manager

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DESIGN AND ENGINEERING SERVICES

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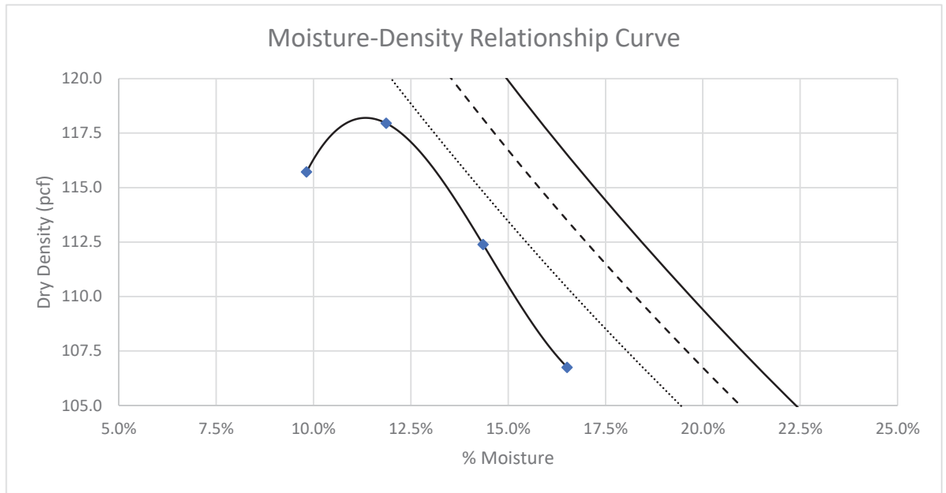
Standard Moisture-Density Relationship Report

ASTM D698

Project Number	**18-0173.I59**	Date	**9/12/2019**
Project Name	**U-4424 Roadway**	Sample Number	**S-162**
Client	**NCDOT**		
Sample Description	**A-4**	Maximum Dry Density	**118.2 pcf**
Sample Location	**29+00, 25'LT**	Optimum Moisture	**11.3%**



Natural Moisture:	**N/A**	Rammer Type:	**Manual**
Specific Gravity:	**2.60 (Assumed)**	Preparation Method:	**Dry**
Liquid Limit:	**17**	Method:	**A**
Plasticity Index:	**1**	Oversize Correction:	**Not Required**
% Fines:	**39.4%**		
% Sand:	**60.6%**		
% Gravel:	**0.0%**		

Aaron Hackett, EI
Lab Manager

Jeff Elliott, PE
CMT & SI Department Manager

SUMMIT
DESIGN AND ENGINEERING SERVICES

Report on California Bearing Ratio (ASTM D 1883/AASHTO T 193)

Date	**9/17/2019**	Project Name	**U-4424 Roadway**
Sample No.	**S-161 Test #1**	Project No.	**18-0173.I59**
Sample Location	**15+00, 46'RT 1'-3'**	Client	**NCDOT**

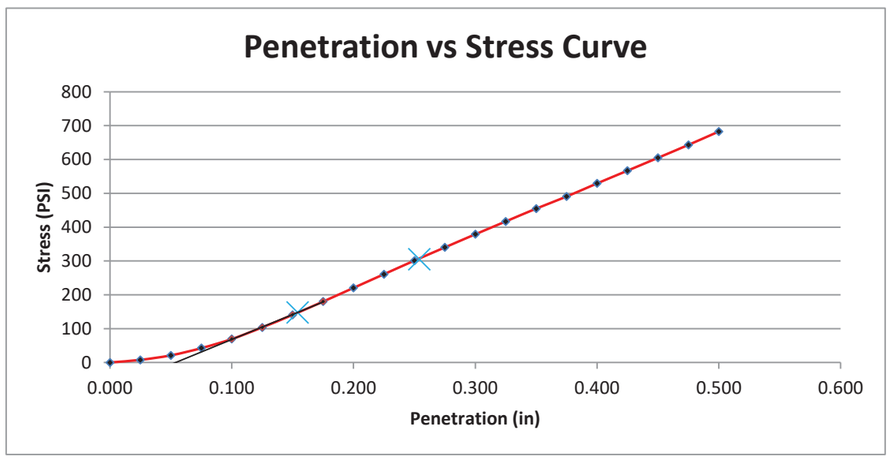
Proctor and Classification Data		**CBR Preparation Data**	
Classification	**A-4**	Rammer Used	**5.5 lbs**
Group Index	**0**	Compaction Method	**3 Layers, 56 Blows**
Max. Dry Density	**123.5**	Surcharge Amount	**10 lbs**
Optimum Moisture	**9.5%**	Soaked/Unsoaked	**Soaked**

CBR Results

Compaction Moisture Content	**9.9%**	Dry unit weight (lbs/cu.ft)	**120.5**
Moisture Content of Top 1" After Soaking	**10.8%**	Percent of Max. Dry Density	**97.5%**
Swell	**0.0%**		

CBR Values

Penetration (in)	**0.154**	**0.254**
Stress (psi)	**148.00**	**305.00**
CBR	**14.8**	**20.3**



Remarks: Zero-point correction applied. All material passed the 3/4" sieve.

Aaron Hackett
Lab Manager

Jeff Elliott, P.E.
CMT & SI Dept. Manager

SUMMIT DESIGN AND ENGINEERING SERVICES

Report on California Bearing Ratio (ASTM D 1883/AASHTO T 193)

Date	9/17/2019	Project Name	U-4424 Roadway
Sample No.	S-161 Test #2	Project No.	18-0173.I59
Sample Location	15+00, 46'RT 1'-3'	Client	NCDOT

Proctor and Classification Data

Classification	A-4
Group Index	0
Max. Dry Density	123.5
Optimum Moisture	9.5%

CBR Preparation Data

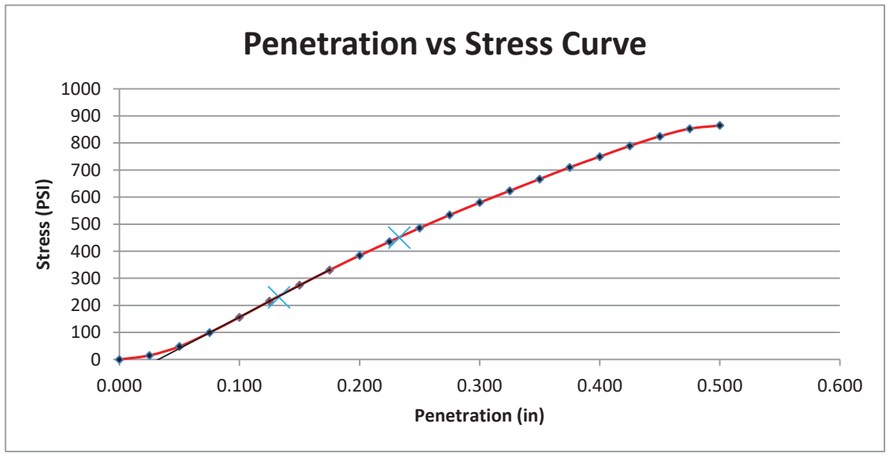
Rammer Used	5.5 lbs
Compaction Method	3 Layers, 56 Blows
Surcharge Amount	10 lbs
Soaked/Unsoaked	Soaked

CBR Results

Compaction Moisture Content	9.9%
Moisture Content of Top 1" After Soaking	11.5%
Swell	0.0%
Dry unit weight (lbs/cu.ft)	121.9
Percent of Max. Dry Density	98.7%

CBR Values

Penetration (in)	0.133	0.233
Stress (psi)	230.00	450.00
CBR	23.0	30.0



Remarks: Zero-point correction applied. All material passed the 3/4" sieve.

Aaron Hackett
Lab Manager

Jeff Elliott, P.E.
CMT & SI Dept. Manager

SUMMIT DESIGN AND ENGINEERING SERVICES

Report on California Bearing Ratio (ASTM D 1883/AASHTO T 193)

Date	9/17/2019	Project Name	U-4424 Roadway
Sample No.	S-162 Test #1	Project No.	18-0173.I59
Sample Location	29+00, 25'LT 1'-3'	Client	NCDOT

Proctor and Classification Data

Classification	A-4
Group Index	0
Max. Dry Density	118.2
Optimum Moisture	11.3%

CBR Preparation Data

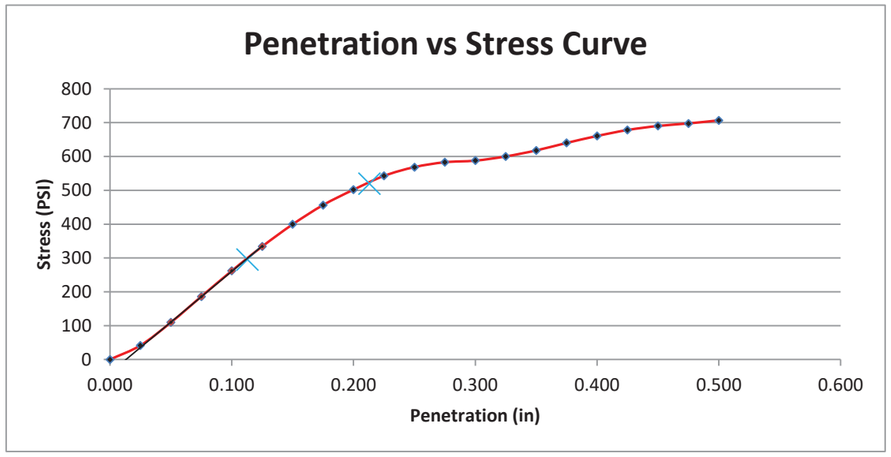
Rammer Used	5.5 lbs
Compaction Method	3 Layers, 56 Blows
Surcharge Amount	10 lbs
Soaked/Unsoaked	Soaked

CBR Results

Compaction Moisture Content	11.4%
Moisture Content of Top 1" After Soaking	14.5%
Swell	0.1%
Dry unit weight (lbs/cu.ft)	115.8
Percent of Max. Dry Density	98.0%

CBR Values

Penetration (in)	0.113	0.213
Stress (psi)	295.00	520.00
CBR	29.5	34.7



Remarks: Zero-point correction applied. All material passed the 3/4" sieve.

Aaron Hackett
Lab Manager

Jeff Elliott, P.E.
CMT & SI Dept. Manager

SUMMIT
DESIGN AND ENGINEERING SERVICES

Report on California Bearing Ratio (ASTM D 1883/AASHTO T 193)

Date	9/17/2019	Project Name	U-4424 Roadway
Sample No.	S-162 Test #2	Project No.	18-0173.I59
Sample Location	29+00, 25'LT 1'-3'	Client	NCDOT

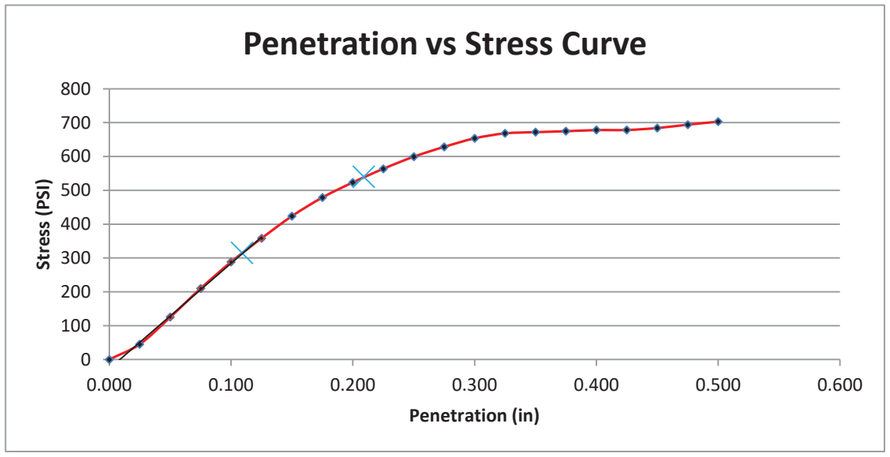
Proctor and Classification Data		CBR Preparation Data	
Classification	A-4	Rammer Used	5.5 lbs
Group Index	0	Compaction Method	3 Layers, 56 Blows
Max. Dry Density	118.2	Surcharge Amount	10 lbs
Optimum Moisture	11.3%	Soaked/Unsoaked	Soaked

CBR Results

Compaction Moisture Content	11.1%
Moisture Content of Top 1" After Soaking	14.4%
Swell	0.0%

Dry unit weight (lbs/cu.ft)	115.3
Percent of Max. Dry Density	97.5%

CBR Values		
Penetration (in)	0.109	0.209
Stress (psi)	315.00	540.00
CBR	31.5	36.0



Remarks:

Zero-point correction applied. All material passed the 3/4" sieve.

Aaron Hackett
Lab Manager

Jeff Elliott, P.E.
CMT & SI Dept. Manager

PROJECT REFERENCE NO.	SHEET NO.
U–4424	97

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
SHELBY TUBE RESULTS

REFERENCE: U–4424

PROJECT: 39062

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339 and C-487
504 Meadowlands Drive
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

UNIT WEIGHT

Client	Summit Design & Eng. Services
Client Reference	U-4424
Project No.	R-2019-278-001

Alignment:	-L-	-L-
Station & Offset:	62+95, 71'RT	64+42, 82'RT
Depth (ft):	6.0-8.0	4.0-6.0
Sample No.:	ST-1	ST-2

UNIT WEIGHT		
Wt. Mold & WS.(gms.)	13989.30	1118.89
Wt. Of Mold(gms.)	281.10	0.00
Wt. Of WS.(gms.)	13708.20	1118.89
Length 1 (in.)	12.125	5.781
Length 2 (in.)	12.125	5.647
Length 3 (in.)	12.125	5.579
Top Diameter (in.)	6.000	2.831
Middle Diameter (in.)	6.000	2.828
Bottom Diameter (in.)	6.000	2.814
Sample Volume (cc)	5617.92	582.01
Moisture Content(%)	0.00	0.00
Unit Wet Wt.(gms/cc)	**2.44**	**1.92**
Unit Wet Wt.(pcf.)	**152.3**	**120.0**

Tested By *PW* Date *9/26/19* Checked By GEM Date 10/14/19

DCN: CT-S37A DATE:8-03-99 REVISION: Original

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001 UNIT WET DENSITY.xls]Sheet1

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MOISTURE CONTENT

ASTM D 2216-10

Client:	Summit Design & Eng. Services
Client Reference:	U-4424
Project No.:	R-2019-278-001

Alignment:	-L-	-L-
Station & Offset:	62+95, 71'RT	64+42, 82'RT
Depth (ft):	6.0-8.0	4.0-6.0
Sample No.:	ST-1	ST-2
Tare Number	914	SS-1
Wt. of Tare & Wet Sample (g)	283.85	333.26
Wt. of Tare & Dry Sample (g)	234.33	261.76
Weight of Tare (g)	102.21	100.19
Weight of Water (g)	49.52	71.50
Weight of Dry Sample (g)	132.12	161.57
Water Content (%)	**37.5**	**44.3**

Notes :

Tested By *MY* *Date* *9/26/19* *Checked By* *GEM* *Date* *10/8/19*

DCN: CT-S1 DATE: 3/18/13 REVISION: 4

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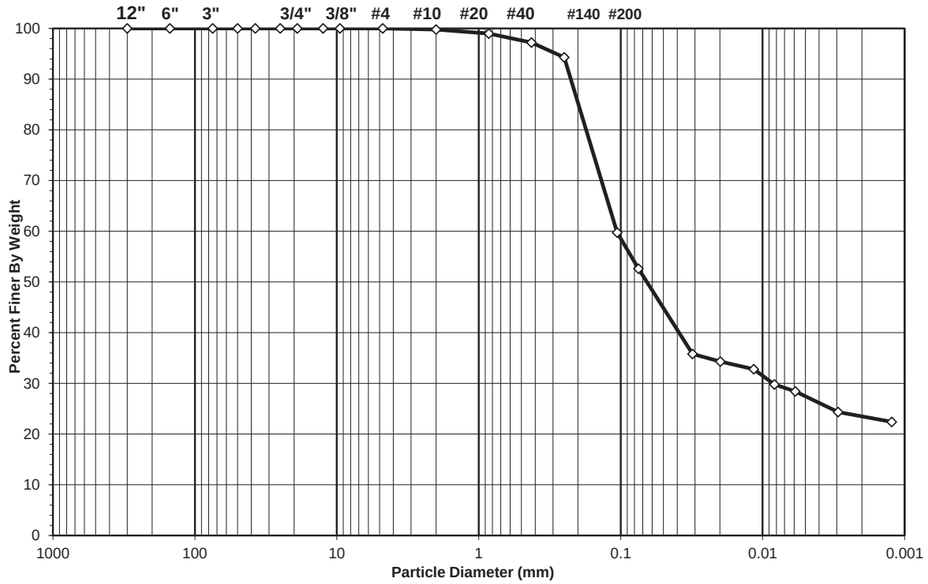
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001	Soil Color:	Gray Orange

	SIEVE ANALYSIS			*HYDROMETER*
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer	USCS	(%)	AASHTO	(%)	ASTM	(%)
100	100.00	*Gravel*	0.00	*Gravel*	0.22	*Gravel*	0.00
2	99.78	*Sand*	47.36	*Coarse Sand*	2.57	*Sand*	47.36
0.075	52.64	*Silt&Clay*	52.64	*Fine Sand*	44.57	*Silt*	25.15
0.05	44.88			*Silt & Clay*	52.64	*Clay*	27.48
0.005	27.48						
0.002	23.50						

AASHTO (GI): ***A - 6 (7)***

USCS Symbol: ***CL, TESTED***

D50 = 0.07

USCS Classification:
SANDY LEAN CLAY

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001	Soil Color:	Gray Orange

Minus #10 for Hygroscopic Moisture Content		Hydrometer Specimen Data	
Tare No.	17	Air Dried - #10 Hydrometer Material (g)	66.78
Wgt.Tare + Wet Soil (g)	54.44	Corrected Dry Wt. of - #10 Material (g)	65.91
Wgt.Tare + Dry Soil (g)	53.93		
Weight of Tare (g)	15.43	Weight of - #200 Material (g)	34.77
Weight of Water (g)	0.51	Weight of - #10 ; + #200 Material (g)	31.14
Weight of Dry Soil (g)	38.50		
Moisture Content (%)	**1.3**	**J-FACTOR (%FINER THAN #10)**	**0.9978**
	Soil Specimen Data		
Tare No.	NE-04		
Wgt.Tare + Air Dry Soil (g)	779.97		
Weight of Tare (g)	229.49		
Air Dried Wgt. Total Sample (g)	550.48	Dry Weight of Material Retained on #10 (g)	1.18
Total Dry Sample Weight (g)	543.30	Corrected Dry Sample Wt - #10 (g)	542.12

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	1.18	0.22	0.22	99.78	**99.78**
#20	0.85	0.52	0.79	0.79	99.21	**99.00**
#40	0.425	1.18	1.79	2.58	97.42	**97.21**
#60	0.250	1.92	2.91	5.49	94.51	**94.30**
#140	0.106	22.83	34.64	40.13	59.87	**59.74**
#200	0.075	4.69	7.12	47.25	52.75	**52.64**
Pan	-	34.77	52.75	100.00	-	**-**

Tested By RFF Date 10/14/19 Checked By MPS Date 10/17/19

HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001	Soil Color:	Gray Orange

Elapsed Time (min)	R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA
2	30.0	22.5	6.11	23.9	35.9	0.01305	0.0311	**35.8**
5	29.0	22.5	6.11	22.9	34.4	0.01305	0.0198	**34.3**
15	28.0	22.5	6.11	21.9	32.9	0.01305	0.0115	**32.8**
30	26.0	22.5	6.11	19.9	29.9	0.01305	0.0083	**29.8**
60	25.0	22.7	6.04	19.0	28.5	0.01302	0.0059	**28.4**
250	22.0	23.5	5.76	16.2	24.4	0.01290	0.0029	**24.3**
1440	21.0	22.7	6.04	15.0	22.5	0.01302	0.0012	**22.4**

Soil Specimen Data		Other Corrections		
Wgt. of Dry Material (g)	65.91	Hygroscopic Moisture Factor	0.987	
Weight of Deflocculant (g)	5.0			
		a - Factor	0.99	
		Percent Finer than # 10	99.78	
		Specific Gravity	2.70	Assumed

Atterberg Limits Test Results:

LL = 35

PL = 15

PI = 20

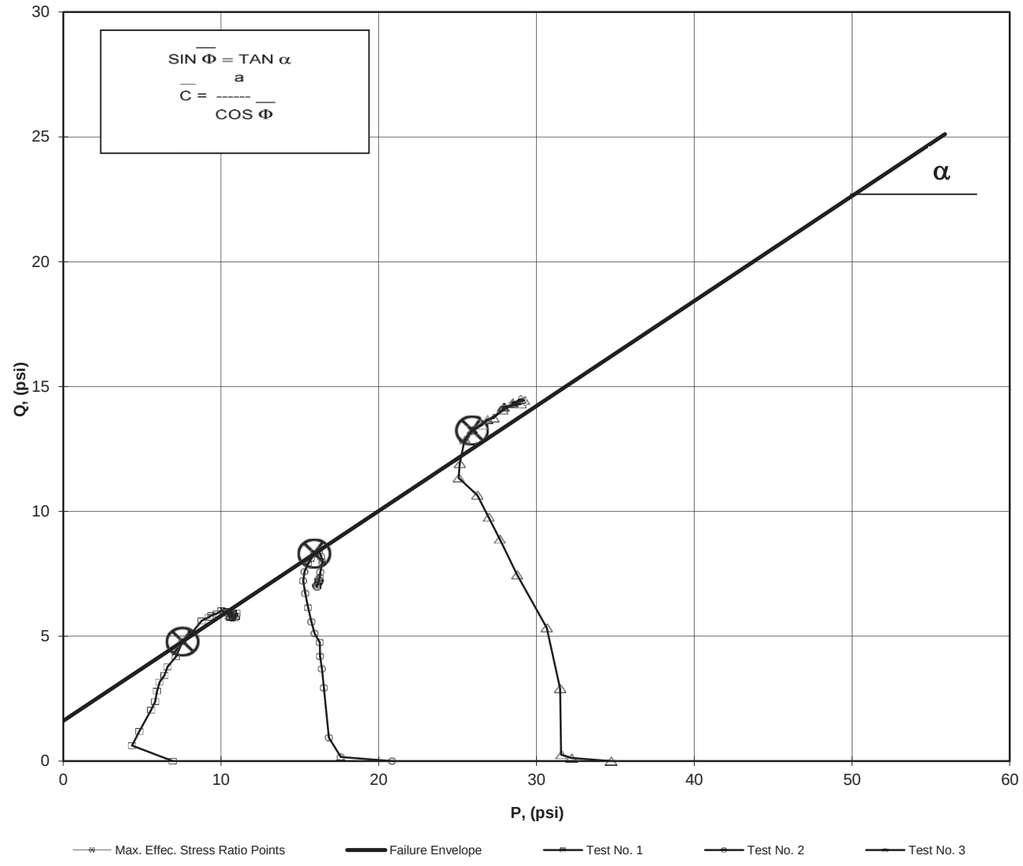
Tested By RFF Date 10/9/19 Checked By MPS Date 10/17/19

CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE READINGS

ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Consolidated Undrained Triaxial Test with Pore Pressure



a =	**1.61**	**$\overline{C}$ =**	**1.78**
α =	**22.8**	**$\overline{\Phi}$ =**	**24.86**

Tested By: MY Date: 10/7/19 Approved By: MPS Date: 10/14/19

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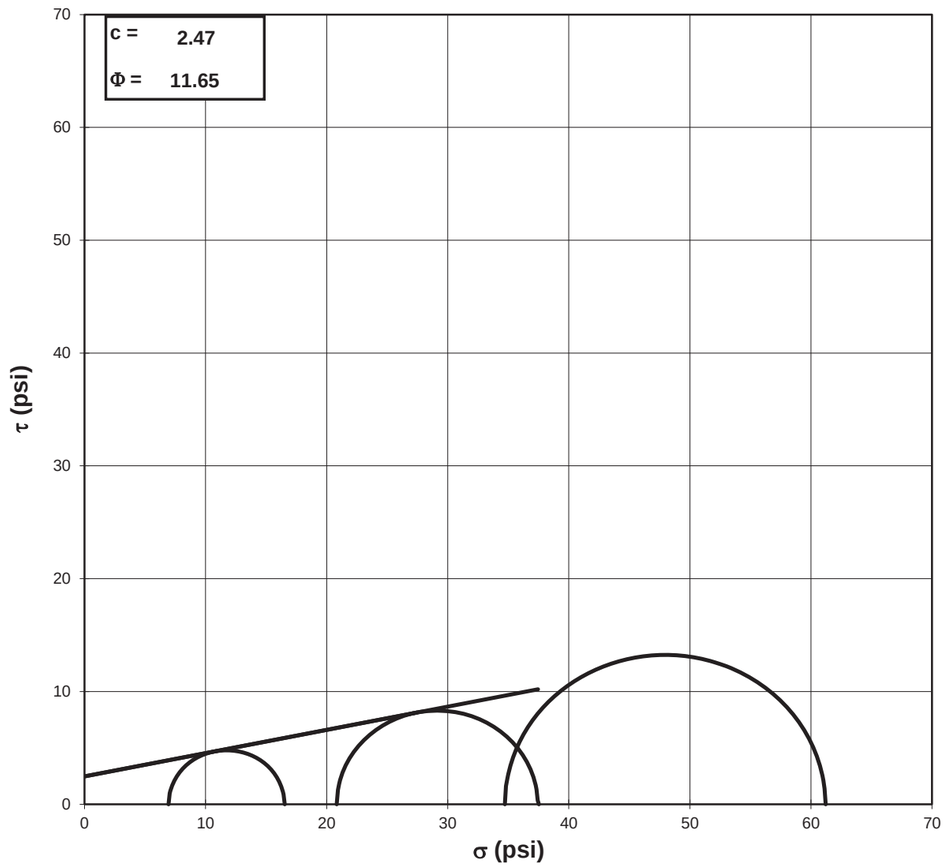
MOHR TOTAL STRENGTH ENVELOPE

ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		
Visual Description:	Gray Orange Clay (UNDISTURBED)		



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: MY *Date:* 10/7/19 *Approved By:* MPS *Date:* 10/14/19

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

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CONSOLIDATED UNDRAINED TRIAXIAL TEST WITH PORE PRESSURE READINGS

ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		
Visual Description:	Gray Orange Clay (UNDISTURBED)		

Stage No.	0
Test No.	1

PRESSURES (psi)

Cell Pressure (psi)	56.94
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	6.9
Pore Pressure Response (%)	97

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	7.56
Q	=	4.79

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	5.781	Diameter 1:	2.831
Length 2:	5.647	Diameter 2:	2.828
Length 3:	5.679	Diameter 3:	2.814
Avg. Length:	5.702	*Avg. Diam.:*	2.824

VOLUME CHANGE

Initial Burette Reading (ml)	24.0
Final Burette Reading (ml)	13.1
Final Change (ml)	10.9

Initial Dial Reading (mil)	541
Dial Reading After Saturation (mil)	542
Dial Reading After Consolidation (mil)	551

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
9.4	0.000	50.0
17.1	0.001	53.2
24.2	0.003	53.3
34.7	0.009	53.4
38.8	0.014	53.5
44.1	0.020	53.8
48.6	0.029	54.0
52.0	0.037	54.0
56.3	0.048	54.1
61.5	0.068	54.0
69.4	0.097	54.2
74.0	0.131	53.9
80.7	0.165	53.8
83.0	0.205	53.5
84.4	0.234	53.4
85.8	0.274	53.1
88.2	0.328	52.9
88.2	0.385	52.7
89.3	0.428	52.6
89.5	0.485	52.2
88.1	0.527	52.2
88.1	0.570	52.1
91.3	0.613	52.1
91.1	0.641	52.1
91.1	0.670	52.0
90.4	0.698	52.0
91.8	0.727	52.0
93.8	0.770	51.9
92.0	0.812	51.8
93.3	0.841	51.8
92.9	0.869	51.7

Tested By: MY Date: 10/7/19 Input Checked By: GEM Date: 10/14/19

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

Sigmatriax.xls

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Visual Description: Gray Orange Clay (UNDISTURBED)

Effective Confining Pressure (psi)	6.9	*Stage No.*	0
		Test No	1

INITIAL DIMENSIONS

Initial Sample Length (in)	5.70
Initial Sample Diameter (in)	2.82
Initial Sample Area (in^2)	6.27
Initial Sample Volume (in^3)	35.73

VOLUME CHANGE

Volume After Consolidation (in^3)	35.04
Length After Consolidation (in)	5.69
Area After Consolidation (in^2)	6.156

Strain (%)	Deviator Stress PSI	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principal Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.03	1.24	3.20	4.98	3.7	1.331	2.66	4.36	0.62
0.05	2.39	3.31	6.02	3.6	1.659	1.43	4.82	1.19
0.15	4.09	3.41	7.62	3.5	2.159	0.86	5.57	2.04
0.25	4.76	3.50	8.20	3.4	2.382	0.76	5.82	2.38
0.35	5.61	3.80	8.75	3.1	2.790	0.70	5.94	2.81
0.50	6.33	4.00	9.27	2.9	3.157	0.65	6.10	3.17
0.65	6.87	3.96	9.84	3.0	3.306	0.60	6.41	3.43
0.85	7.55	4.10	10.38	2.8	3.660	0.56	6.61	3.77
1.20	8.36	3.98	11.32	3.0	3.820	0.49	7.14	4.18
1.70	9.58	4.17	12.35	2.8	4.457	0.45	7.56	4.79
2.30	10.24	3.92	13.26	3.0	4.395	0.40	8.14	5.12
2.90	11.24	3.79	14.39	3.2	4.569	0.35	8.77	5.62
3.61	11.52	3.46	15.01	3.5	4.309	0.31	9.24	5.76
4.11	11.67	3.38	15.24	3.6	4.277	0.30	9.40	5.84
4.81	11.80	3.13	15.61	3.8	4.098	0.27	9.71	5.90
5.76	12.06	2.93	16.07	4.0	4.008	0.25	10.04	6.03
6.76	11.93	2.68	16.20	4.3	3.799	0.23	10.23	5.97
7.51	12.00	2.56	16.38	4.4	3.737	0.22	10.38	6.00
8.51	11.90	2.23	16.61	4.7	3.524	0.19	10.66	5.95
9.26	11.59	2.23	16.30	4.7	3.464	0.20	10.50	5.80
10.02	11.49	2.11	16.32	4.8	3.379	0.19	10.58	5.75
10.77	11.87	2.15	16.66	4.8	3.478	0.19	10.73	5.93
11.27	11.77	2.08	16.63	4.9	3.423	0.18	10.74	5.89
11.77	11.70	2.03	16.61	4.9	3.385	0.18	10.76	5.85
12.27	11.54	2.01	16.46	4.9	3.343	0.18	10.69	5.77
12.77	11.67	1.97	16.64	5.0	3.348	0.17	10.80	5.83
13.52	11.85	1.87	16.91	5.1	3.338	0.16	10.99	5.92
14.27	11.50	1.82	16.61	5.1	3.247	0.16	10.86	5.75
14.77	11.61	1.80	16.75	5.1	3.259	0.16	10.94	5.80
15.27	11.49	1.71	16.72	5.2	3.195	0.15	10.98	5.74

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Visual Description: Gray Orange Clay (UNDISTURBED)

Stage No.	0
Test No.	2

PRESSURES (psi)

Cell Pressure (psi)	70.83
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	20.8
Pore Pressure Response (%)	99

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	15.92
Q	=	8.30

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.207	Diameter 1:	2.774
Length 2:	6.216	Diameter 2:	2.804
Length 3:	6.213	Diameter 3:	2.827
Avg. Length	6.212	*Avg. Diam.:*	2.802

VOLUME CHANGE

Initial Burette Reading (ml)	48.0
Final Burette Reading (ml)	13.6
Final Change (ml)	34.4
Initial Dial Reading (mil)	324
Dial Reading After Saturation (mil)	232
Dial Reading After Consolidation (mil)	424

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
12.4	0.000	50.0
14.4	0.001	53.4
24.1	0.003	54.9
48.8	0.009	57.2
58.4	0.015	58.1
64.6	0.021	58.7
71.6	0.030	59.3
76.2	0.040	60.0
82.1	0.053	60.7
89.6	0.075	61.5
97.3	0.106	62.2
104.0	0.143	62.8
109.4	0.180	63.1
114.1	0.222	63.2
117.2	0.254	63.2
120.6	0.297	63.2
123.2	0.356	63.0
121.4	0.418	62.7
119.5	0.464	62.4
115.1	0.527	62.1
113.1	0.573	61.9
112.8	0.621	61.9
113.0	0.666	61.8
113.6	0.697	61.8
113.3	0.729	61.8
113.0	0.760	61.8
112.5	0.790	61.8
112.5	0.837	61.7
114.3	0.883	61.8
115.3	0.914	61.8
115.4	0.946	61.8

Tested By: MY Date: 10/7/19 Input Checked By: GEM Date: 10/14/19

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Visual Description: Gray Orange Clay (UNDISTURBED)

Effective Confining Pressure (psi)	20.8	*Stage No.*	0
		Test No	2

INITIAL DIMENSIONS

Initial Sample Length (in)	6.21
Initial Sample Diameter (in)	2.80
Initial Sample Area (in^2)	6.16
Initial Sample Volume (in^3)	38.30

VOLUME CHANGE

Volume After Consolidation (in^3)	37.90
Length After Consolidation (in)	6.11
Area After Consolidation (in^2)	6.201

Strain (%)	Deviator Stress PSI	ΔU	$\overline{\sigma}_1$	$\overline{\sigma}_3$	Effective Principal Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.32	3.40	17.75	17.4	1.019	10.63	17.59	0.16
0.05	1.88	4.93	17.78	15.9	1.118	2.65	16.84	0.94
0.15	5.86	7.24	19.46	13.6	1.431	1.25	16.53	2.93
0.25	7.40	8.14	20.09	12.7	1.583	1.11	16.39	3.70
0.35	8.39	8.74	20.47	12.1	1.694	1.05	16.28	4.19
0.49	9.50	9.32	21.00	11.5	1.825	0.99	16.26	4.75
0.66	10.22	10.01	21.04	10.8	1.945	0.99	15.93	5.11
0.86	11.15	10.67	21.31	10.2	2.097	0.97	15.73	5.57
1.22	12.30	11.46	21.67	9.4	2.313	0.94	15.52	6.15
1.73	13.45	12.22	22.06	8.6	2.562	0.92	15.33	6.72
2.34	14.43	12.83	22.42	8.0	2.804	0.90	15.21	7.21
2.94	15.19	13.13	22.89	7.7	2.972	0.87	15.29	7.59
3.63	15.80	13.22	23.42	7.6	3.075	0.84	15.52	7.90
4.15	16.21	13.23	23.80	7.6	3.134	0.82	15.70	8.10
4.85	16.61	13.21	24.22	7.6	3.181	0.80	15.92	8.30
5.83	16.82	13.02	24.63	7.8	3.154	0.78	16.22	8.41
6.84	16.38	12.67	24.54	8.2	3.006	0.78	16.35	8.19
7.60	15.96	12.38	24.41	8.5	2.888	0.78	16.43	7.98
8.62	15.13	12.11	23.85	8.7	2.735	0.81	16.29	7.57
9.38	14.71	11.92	23.62	8.9	2.651	0.82	16.27	7.36
10.15	14.55	11.92	23.46	8.9	2.633	0.83	16.18	7.27
10.89	14.45	11.84	23.44	9.0	2.608	0.83	16.21	7.23
11.40	14.45	11.83	23.45	9.0	2.606	0.83	16.22	7.23
11.92	14.34	11.81	23.36	9.0	2.589	0.83	16.19	7.17
12.43	14.21	11.78	23.26	9.0	2.570	0.84	16.15	7.10
12.93	14.06	11.78	23.10	9.0	2.553	0.85	16.08	7.03
13.69	13.93	11.72	23.04	9.1	2.528	0.85	16.08	6.96
14.45	14.06	11.80	23.09	9.0	2.557	0.85	16.06	7.03
14.96	14.12	11.79	23.16	9.0	2.562	0.84	16.10	7.06
15.48	14.05	11.82	23.06	9.0	2.559	0.85	16.03	7.02

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WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Visual Description: Gray Orange Clay (UNDISTURBED)

Stage No.	0
Test No.	3

PRESSURES (psi)

Cell Pressure (psi)	84.72
Back Pressure (psi)	50.0
Eff. Conf. Pressure (psi)	34.7
Pore Pressure Response (%)	96

MAXIMUM OBLIQUITY POINTS

$\overline{P}$	=	25.89
Q	=	13.24

INITIAL SAMPLE DIMENSIONS (in)

Length 1:	6.566	Diameter 1:	2.813
Length 2:	6.581	Diameter 2:	2.803
Length 3:	6.543	Diameter 3:	2.781
Avg. Length:	6.563	*Avg. Diam.:*	2.799

VOLUME CHANGE

Initial Burette Reading (ml)	72.0
Final Burette Reading (ml)	26.9
Final Change (ml)	45.1

Initial Dial Reading (mil)	616
Dial Reading After Saturation (mil)	625
Dial Reading After Consolidation (mil)	757

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
16.4	0.000	50.0
17.9	0.001	52.6
19.5	0.003	53.4
50.3	0.009	56.1
78.8	0.015	59.4
91.7	0.022	59.5
103.8	0.032	63.4
112.2	0.042	62.1
121.0	0.055	65.9
131.8	0.078	67.5
142.8	0.111	69.1
151.9	0.150	71.0
159.6	0.190	71.5
173.6	0.289	72.1
175.9	0.309	72.1
179.6	0.345	72.1
183.7	0.395	71.6
187.9	0.444	71.5
189.1	0.461	71.2
196.1	0.560	70.9
200.2	0.643	71.0
200.6	0.659	71.0
201.3	0.676	71.0
205.6	0.758	70.0
206.3	0.775	70.5
208.0	0.808	70.6
207.1	0.841	59.8
212.1	0.890	70.0
214.4	0.939	70.2
212.8	0.973	56.9
216.4	1.006	64.7

Tested By: MY Date: 10/7/2019 Input Checked By: GEM Date: ########

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		

Visual Description: Gray Orange Clay (UNDISTURBED)

Effective Confining Pressure (psi)	34.7	*Stage No.*	0
		Test No	3

INITIAL DIMENSIONS

Initial Sample Length (in)	6.56
Initial Sample Diameter (in)	2.80
Initial Sample Area (in^2)	6.15
Initial Sample Volume (in^3)	40.39

VOLUME CHANGE

Volume After Consolidation (in^3)	37.47
Length After Consolidation (in)	6.42
Area After Consolidation (in^2)	5.834

Strain (%)	Deviator Stress PSI	ΔU	$\overline{\sigma_1}$	$\overline{\sigma_3}$	Effective Principal Stress Ratio	$\overline{A}$	$\overline{P}$	Q
0.02	0.25	2.64	32.33	32.1	1.008	10.82	32.21	0.13
0.04	0.52	3.42	31.82	31.3	1.017	6.81	31.56	0.26
0.14	5.79	6.12	34.39	28.6	1.202	1.10	31.50	2.90
0.24	10.66	9.40	35.98	25.3	1.421	0.92	30.65	5.33
0.34	12.86	9.51	38.07	25.2	1.510	0.77	31.64	6.43
0.49	14.91	13.40	36.23	21.3	1.699	0.94	28.77	7.46
0.65	16.31	12.12	38.91	22.6	1.722	0.77	30.75	8.16
0.85	17.78	15.93	36.57	18.8	1.946	0.93	27.68	8.89
1.22	19.53	17.52	36.73	17.2	2.136	0.93	26.97	9.77
1.73	21.29	19.11	36.90	15.6	2.364	0.94	26.25	10.65
2.34	22.67	20.99	36.40	13.7	2.651	0.96	25.07	11.34
2.96	23.82	21.50	37.04	13.2	2.802	0.94	25.13	11.91
4.50	25.73	22.14	38.32	12.6	3.045	0.90	25.45	12.87
4.81	26.03	22.06	38.69	12.7	3.055	0.88	25.68	13.01
5.37	26.47	22.06	39.13	12.7	3.092	0.87	25.89	13.24
6.15	26.91	21.63	40.00	13.1	3.056	0.84	26.55	13.46
6.92	27.36	21.53	40.55	13.2	3.075	0.82	26.87	13.68
7.17	27.47	21.18	41.01	13.5	3.029	0.80	27.27	13.73
8.72	28.12	20.94	41.90	13.8	3.041	0.78	27.84	14.06
10.01	28.36	21.00	42.08	13.7	3.067	0.77	27.90	14.18
10.26	28.33	21.03	42.02	13.7	3.070	0.77	27.85	14.16
10.52	28.36	21.02	42.06	13.7	3.070	0.77	27.88	14.18
11.80	28.60	20.04	43.28	14.7	2.948	0.73	28.98	14.30
12.06	28.63	20.53	42.81	14.2	3.017	0.75	28.50	14.31
12.57	28.72	20.60	42.84	14.1	3.033	0.75	28.48	14.36
13.09	28.41	9.79	53.34	24.9	2.140	0.36	39.14	14.21
13.86	28.89	19.96	43.65	14.8	2.958	0.72	29.21	14.45
14.63	28.98	20.23	43.47	14.5	3.000	0.73	28.98	14.49
15.15	28.56	6.90	56.38	27.8	2.026	0.25	42.10	14.28
15.66	28.91	14.72	48.90	20.0	2.446	0.53	34.45	14.45

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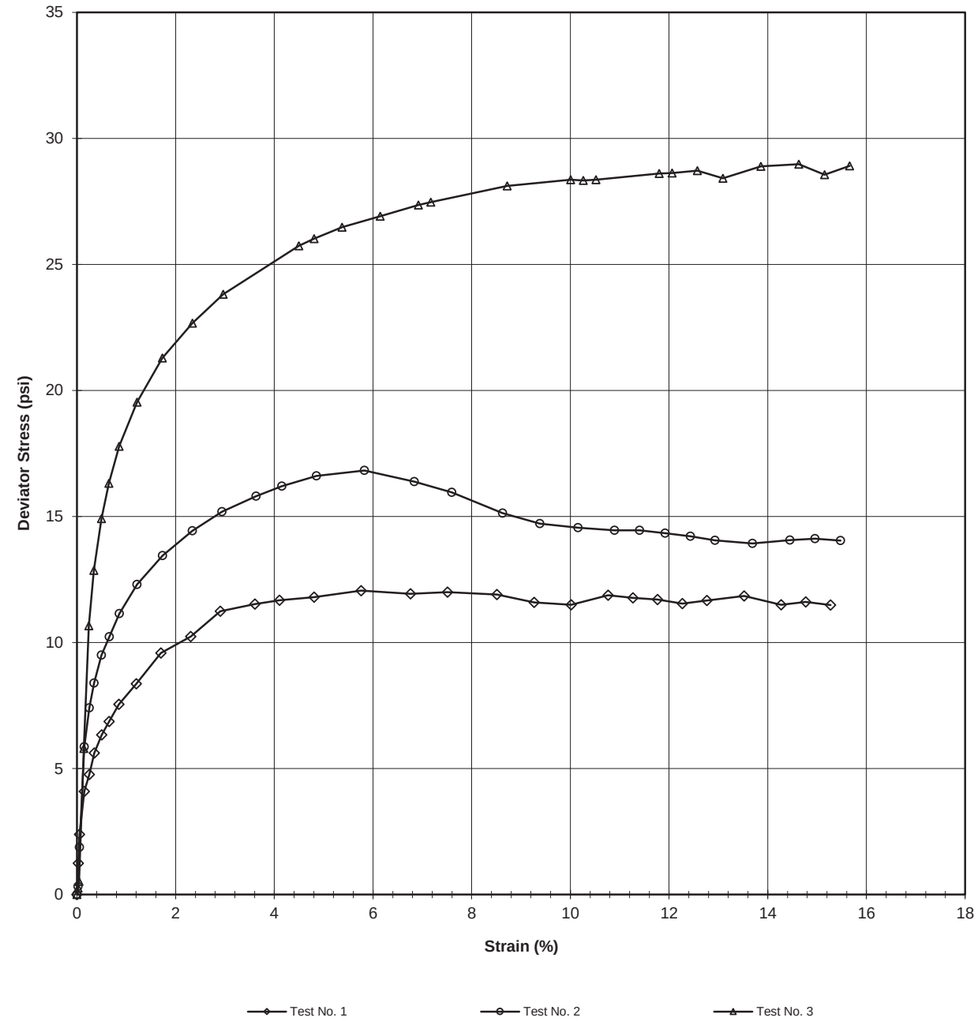
WITH PORE PRESSURE READINGS
ASTM D4767-11

Client:	Summit Design & Eng. Services	Location:	-L-, 62+95, 71'RT
Client Reference:	U-4424	Depth (ft):	6.0 - 8.0
Project No.:	R-2019-278-001	Sample No.:	ST-1
Lab ID:	R-2019-278-001-001		
Visual Description:	Gray Orange Clay (UNDISTURBED)		



Tested By: MY Date: 10/7/2019 Approved By: MPS Date: #######

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CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS

ASTM D4767-11

Client:	Summit Design & Eng. Services		
Client Reference:	U-4424		
Project No.:	R-2019-278-001		
Lab ID:	R-2019-278-001-001	Specific Gravity (assumed)	2.7

Visual Description: Gray Orange Clay (UNDISTURBED)

SAMPLE CONDITION SUMMARY

Location:	-L-, 62+95, 71'RT	-L-, 62+95, 71'RT	-L-, 62+95, 71'RT
Depth (ft):	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0
Sample No.:	ST-1	ST-1	ST-1
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.0009	0.0006	0.001
Back Pressure (psi)	50.0	50.0	50.0
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	37.5	29.7	24.2
Total Unit Weight (pcf)	119.3	120.1	123.6
Dry Unit Weight (pcf)	86.8	92.5	99.5
Moisture Content (%) (FINAL)	31.5	30.5	24.5
Initial State Void Ratio,e	0.942	0.821	0.694
Void Ratio at Shear, e	0.905	0.803	0.572



Tested By: MY Date: 10/7/19 Input Checked By: GEM Date: 10/14/19

DCN: CT-S28 DATE: 4/12/13 REVISION: 3

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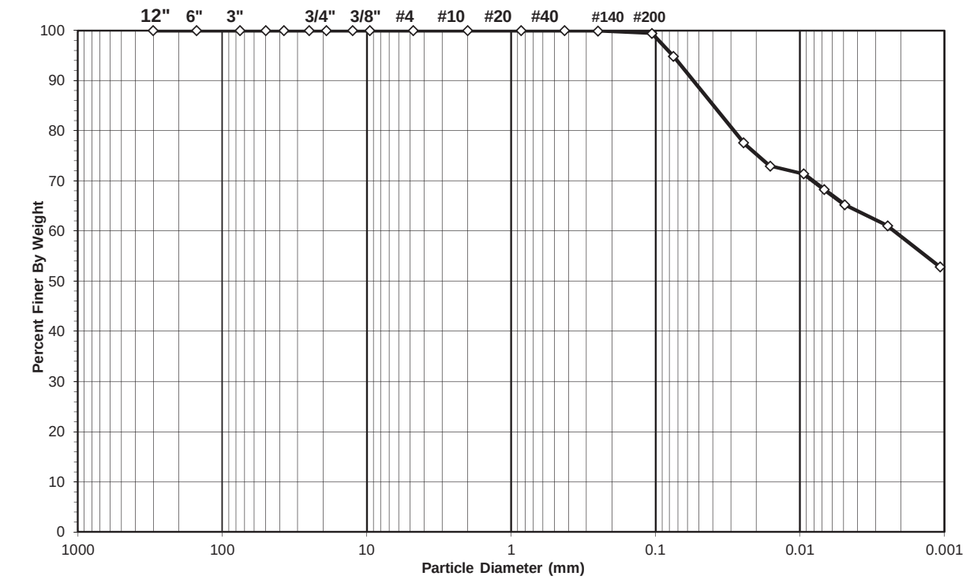
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 64+42, 82'RT
Client Reference:	U-4424	Depth (ft):	4.0 - 6.0
Project No.:	R-2019-278-001	Sample No.:	ST-2
Lab ID:	R-2019-278-001-002	Soil Color:	Orange Gray

	SIEVE ANALYSIS			HYDROMETER
USCS	cobbles	gravel	sand	silt and clay fraction
AASHTO	cobbles	gravel	sand	silt and clay fraction



Sieve Size (mm)	Percent Finer	USCS	(%)	AASHTO	(%)	ASTM	(%)
100	100.00	*Gravel*	0.00	*Gravel*	0.00	*Gravel*	0.00
2	100.00	*Sand*	5.20	*Coarse Sand*	0.06	*Sand*	5.20
0.075	94.80	*Silt&Clay*	94.80	*Fine Sand*	5.14	*Silt*	67.31
0.05	44.88			*Silt & Clay*	94.80	*Clay*	27.48
0.005	27.48						
0.002	23.50						

AASHTO (GI): ***A -7- 6 (60)***

USCS Symbol: ***CH, TESTED***

USCS Classification: ***FAT CLAY***

DCN: CT-S3Y/AASHTO DATE: 7/24/19 REVISION: 2

S:/Excel/Excel QA/Spreadsheets/SieveHyd10 AASHTO Class.xls

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 64+42, 82'RT
Client Reference:	U-4424	Depth (ft):	4.0 - 6.0
Project No.:	R-2019-278-001	Sample No.:	ST-2
Lab ID:	R-2019-278-001-002	Soil Color:	Orange Gray

Minus #10 for Hygroscopic Moisture Content		Hydrometer Specimen Data	
Tare No.	A	Air Dried - #10 Hydrometer Material (g)	66.08
Wgt.Tare + Wet Soil (g)	38.76	Corrected Dry Wt. of - #10 Material (g)	63.64
Wgt.Tare + Dry Soil (g)	37.89		
Weight of Tare (g)	15.18	Weight of - #200 Material (g)	60.33
Weight of Water (g)	0.87	Weight of - #10 ; + #200 Material (g)	3.31
Weight of Dry Soil (g)	22.71		
Moisture Content (%)	**3.8**	**J-FACTOR (%FINER THAN #10)**	**1.0000**
Soil Specimen Data			
Tare No.	918		
Wgt.Tare + Air Dry Soil (g)	583.51		
Weight of Tare (g)	222.39		
Air Dried Wgt. Total Sample (g)	361.12	Dry Weight of Material Retained on #10 (g)	0.00
Total Dry Sample Weight (g)	347.80	Corrected Dry Sample Wt - #10 (g)	347.80

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.00	0.00	0.00	100.00	**100.00**
#20	0.85	0.00	0.00	0.00	100.00	**100.00**
#40	0.425	0.04	0.06	0.06	99.94	**99.94**
#60	0.250	0.04	0.06	0.13	99.87	**99.87**
#140	0.106	0.28	0.44	0.57	99.43	**99.43**
#200	0.075	2.95	4.64	5.20	94.80	**94.80**
Pan	-	60.33	94.80	100.00	-	**-**

Tested By RFF Date 10/3/19 Checked By MPS Date 10/17/19

DCN: CT-S3Y/AASHTO DATE: 7/24/19 REVISION: 2

S:/Excel/Excel QA/Spreadsheets/SieveHyd10 AASHTO Class.xls

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HYDROMETER ANALYSIS

ASTM D 422-63 (2007), AASHTO T88

Client:	Summit Design & Eng. Services	Location:	-L-, 64+42, 82'RT
Client Reference:	U-4424	Depth (ft):	4.0 - 6.0
Project No.:	R-2019-278-001	Sample No.:	ST-2
Lab ID:	R-2019-278-001-002	Soil Color:	Orange Gray

Elapsed Time (min)	**R Measured**	**Temp. (°C)**	**Composite Correction**	**R Corrected**	**N (%)**	**K Factor**	**Diameter (mm)**	**N' (%)**
0	NA	NA	NA	NA	NA	NA	NA	NA
2	56.0	22.5	6.11	49.9	77.6	0.01305	0.0246	**77.6**
5	53.0	22.5	6.11	46.9	72.9	0.01305	0.0161	**72.9**
15	52.0	22.5	6.11	45.9	71.4	0.01305	0.0094	**71.4**
30	50.0	22.5	6.11	43.9	68.3	0.01305	0.0068	**68.3**
60	48.0	22.7	6.04	42.0	65.3	0.01302	0.0049	**65.3**
250	45.0	23.5	5.76	39.2	61.0	0.01290	0.0024	**61.0**
1440	40.0	22.7	6.04	34.0	52.8	0.01302	0.0011	**52.8**

Soil Specimen Data		**Other Corrections**		
Wgt. of Dry Material (g)	63.64	Hygroscopic Moisture Factor	0.963	
Weight of Deflocculant (g)	5.0			
		a - Factor	0.99	
		Percent Finer than # 10	100.00	
		Specific Gravity	2.70	Assumed

Atterberg Limits Test Results:

LL = 79

PL = 24

PI = 55

Tested By RFF Date 10/1/19 Checked By MPS Date 10/17/19

DCN: CT-S3Y/AASHTO DATE: 7/24/19 REVISION: 2

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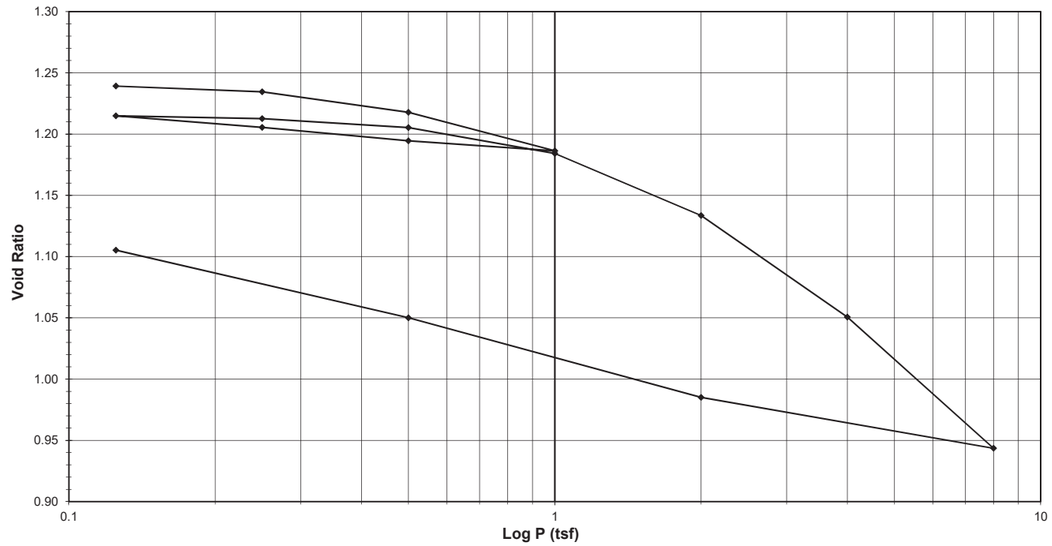
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Reference	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Tested By PW *Date* 9/26/2019 *Approved By* MPS *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 6

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Reference	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409

1 Division = 0.0001 (in.)

Sample Properties	**Initial**	**Final**
Water Content		
Tare Number	SS-1	SS-9
Wt. Tare & WS (g)	333.26	236.92
Wt. Tare & DS (g)	261.76	197.69
Wt. Water (g)	71.50	39.23
Wt. Tare (g)	100.19	101.53
Wt. DS (g)	161.57	96.16
Water Content (%)	44.25	40.80
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9394
Sample Volume (cc)	80.44	75.56
Wt. Wet Sample + Ring (g)	354.00	350.65
Wt. of Ring (g)	214.20	214.20
Wt. of Wet Sample (g)	139.80	136.45
Wet Density (pcf)	108.45	112.68
Wet Density (g/cc)	1.74	1.81
Water Content (%)	44.25	40.80
Wt. of Dry Sample (g)	96.91	96.91
Dry Density (pcf)	75.18	80.03
Dry Density (g/cc)	1.20	1.28
Void Ratio	1.2411	1.1052
Saturation (%)	96.28	99.67
Specific Gravity	2.70	*Assumed*

Test Data Summary

Applied Pressure (tsf)	**Final Dial Reading** (div)	**Machine Deflection** (div)	**Corrected Reading** (div)	**Height of Sample** (mm)	**Volume** (cc)	**Dry Density** (g/cc)	**Void Ratio**
Seating	0	0	0	25.400	80.440	1.20479	**1.24106**
0.125	23.4	14.9	8.5	25.378	80.371	1.20581	**1.23915**
0.25	49.7	20.3	29.4	25.325	80.203	1.20834	**1.23447**
0.5	138.3	34.6	103.8	25.136	79.605	1.21742	**1.21780**
1	299.3	55.1	244.3	24.780	78.475	1.23495	**1.18632**
0.5	253.0	45.5	207.4	24.873	78.771	1.23031	**1.19457**
0.25	191.2	32.3	158.9	24.996	79.161	1.22425	**1.20544**
0.125	139.9	22.8	117.1	25.102	79.498	1.21907	**1.21481**
0.25	152.5	25.6	126.9	25.078	79.419	1.22028	**1.21261**
0.5	199.4	39.8	159.6	24.995	79.156	1.22433	**1.20529**
1	309.7	55.8	253.9	24.755	78.398	1.23617	**1.18416**
2	556.5	76.6	479.9	24.181	76.579	1.26552	**1.13350**
4	957.7	108.1	849.5	23.242	73.606	1.31664	**1.05068**
8	1479.9	152.3	1327.7	22.028	69.760	1.38923	**0.94352**
2	1249.1	106.9	1142.1	22.499	71.253	1.36013	**0.98510**
0.5	919.8	67.1	852.7	23.234	73.581	1.31709	**1.04997**
0.125	644.2	37.9	606.3	23.860	75.563	1.28255	**1.10519**

Tested By PW *Date* 9/26/2019 *Input Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 6

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Reference	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Tested By PW *Date* 9/26/2019 *Input Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\(2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm)FINAL PLOT*

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ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Reference	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED
Consolidometer No. R409
1 Division = 0.0001 (in.)

Sample Properties	Initial	Final
Water Content		
Tare Number	SS-1	SS-9
Wt. Tare & WS (g)	333.26	236.92
Wt. Tare & DS (g)	261.76	197.69
Wt. Water (g)	71.50	39.23
Wt. Tare (g)	100.19	101.53
Wt. DS (g)	161.57	96.16
Water Content (%)	44.25	40.80
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.000	0.939
Sample Volume (cc)	80.44	75.56
Wt. Wet Sample + Ring (g)	354.00	350.65
Wt. of Ring (g)	214.20	214.20
Wt. of Wet Sample (g)	139.80	136.45
Wet Density (pcf)	108.45	112.68
Wet Density (g/cc)	1.74	1.81
Water Content (%)	44.25	40.80
Wt. of Dry Sample (g)	96.91	96.91
Dry Density (pcf)	75.18	80.03
Dry Density (g/cc)	1.20	1.28
Void Ratio	1.2411	1.1052
Saturation (%)	96.28	99.67
Specific Gravity	*2.7*	*Assumed*

C_v Test Data Summary

Load Increment (tsf)	Dial Reading @ t_{50} (div)	Machine Deflection (div)	Corrected Dial Reading @ t_{50} (div)	Sample Height @ t_{50} (cm)	Time t_{50} (min.)	C_v (cm²/sec)
0 - 0.125	16.1	14.9	1.2	2.540	**0.89**	**0.00595**
0.125 - 0.25	38.6	20.3	18.3	2.535	**0.95**	**0.00555**
0.25 - 0.5	100.3	34.6	65.7	2.523	**5.25**	**0.00100**
0.5 - 1.0	228.5	55.1	173.4	2.496	**7.00**	**0.00073**
1.0 - 0.5	NA	45.5	NA	NA	**NA**	**NA**
0.5 - 0.25	NA	32.3	NA	NA	**NA**	**NA**
0.25 - 0.125	NA	22.8	NA	NA	**NA**	**NA**
0.125 - 0.25	146.0	25.6	120.4	2.509	**1.60**	**0.00323**
0.25 - 0.5	178.6	39.8	138.7	2.505	**6.00**	**0.00086**
0.5 - 1.0	255.9	55.8	200.0	2.489	**5.60**	**0.00091**
1.0 - 2.0	446.2	76.6	369.6	2.446	**12.50**	**0.00039**
2.0 - 4.0	765.8	108.1	657.6	2.373	**12.00**	**0.00039**
4.0 - 8.0	1225.6	152.3	1073.3	2.267	**14.00**	**0.00030**
8.0 - 2.0	NA	106.9	NA	NA	**NA**	**NA**
2.0 - 0.5	NA	67.1	NA	NA	**NA**	**NA**
0.5 - 0.125	NA	37.9	NA	NA	**NA**	**NA**

Tested By PW *Date* 9/26/2019 *Input Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 6 *Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\(2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm)FINAL PLOT*

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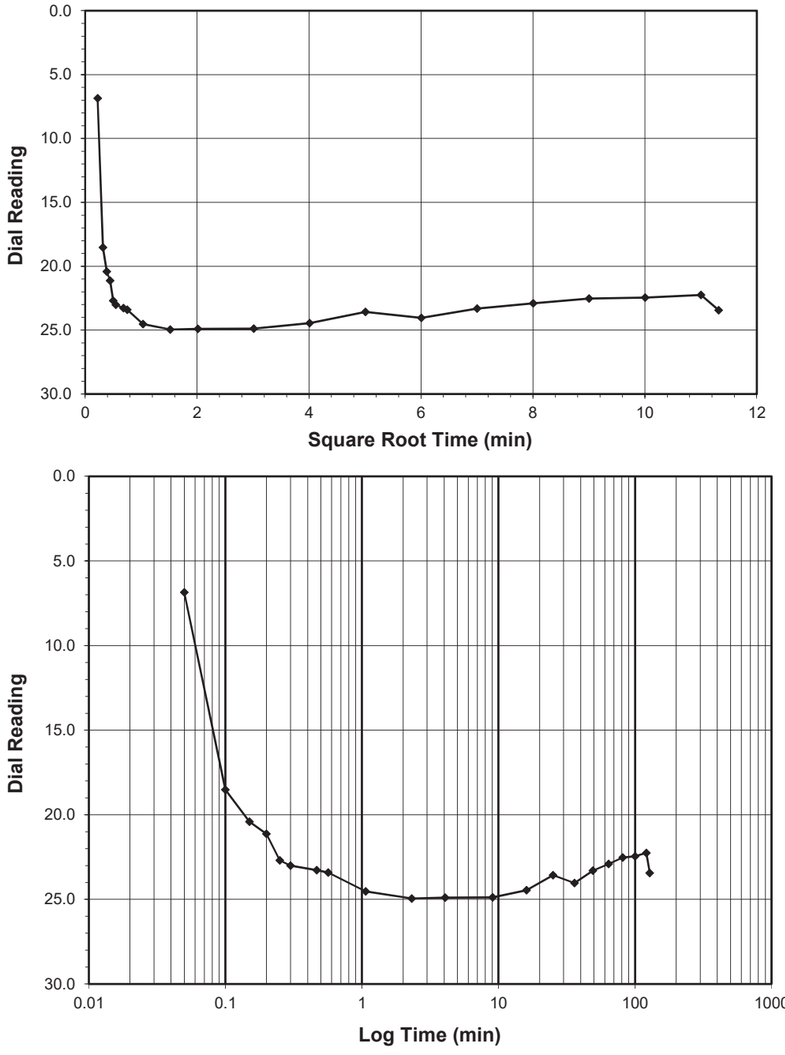
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.0-0.125**
Final Reading	**(div)**	**23.4**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/26/2019
Start Time		12:42:36

Elapsed Time (min)	Dial Reading (div)
Initial	**0.0**
0.05	6.9
0.10	18.5
0.15	20.4
0.20	21.1
0.25	22.7
0.30	23.0
0.47	23.3
0.57	23.4
1.07	24.5
2.32	24.9
4.07	24.9
9.07	24.9
16.07	24.5
25.07	23.6
36.07	24.0
49.07	23.3
64.07	22.9
81.07	22.5
100.07	22.5
121.07	22.3
128.13	23.4

Tested By PW *Date* 9/26/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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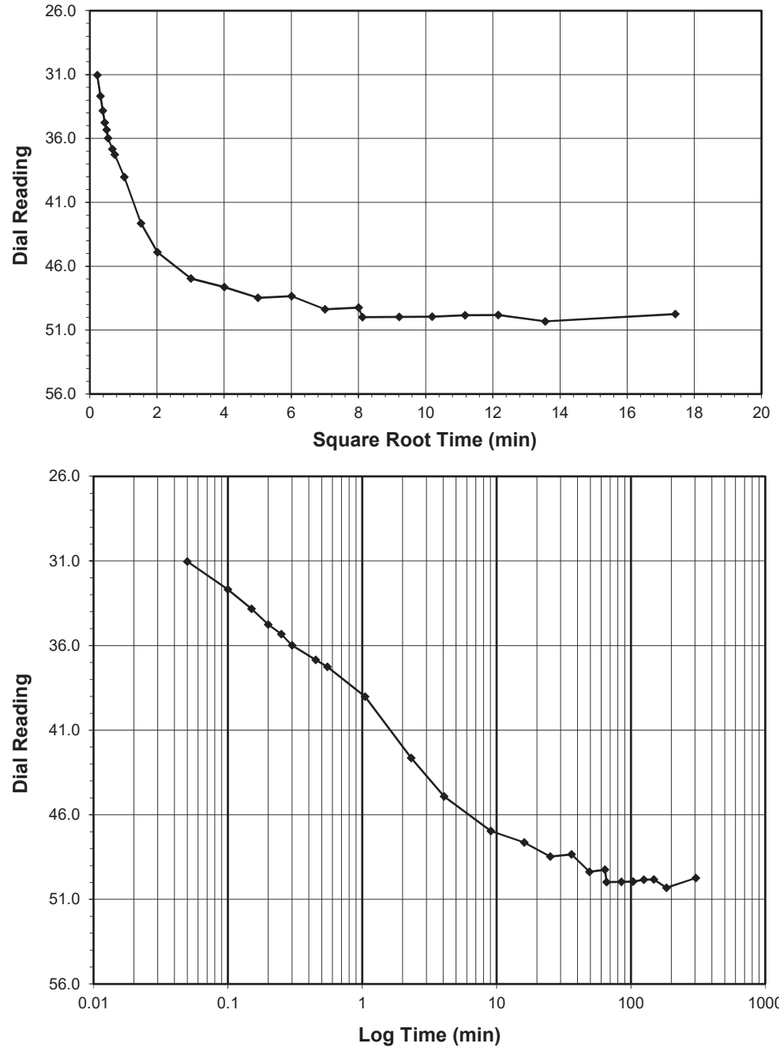
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.125-0.25**
Final Reading	**(div)**	**49.7**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/26/2019
Start Time		14:50:44

Elapsed Time (min)	Dial Reading (div)
Initial	**23.4**
0.05	31.0
0.10	32.7
0.15	33.8
0.20	34.8
0.25	35.3
0.30	36.0
0.45	36.8
0.55	37.3
1.05	39.0
2.32	42.6
4.07	44.9
9.07	47.0
16.07	47.6
25.07	48.5
36.07	48.3
49.07	49.4
64.07	49.2
65.95	50.0
84.95	50.0
103.95	50.0
124.95	49.8
147.95	49.8
183.95	50.3
303.95	49.7

Tested By PW *Date* 9/26/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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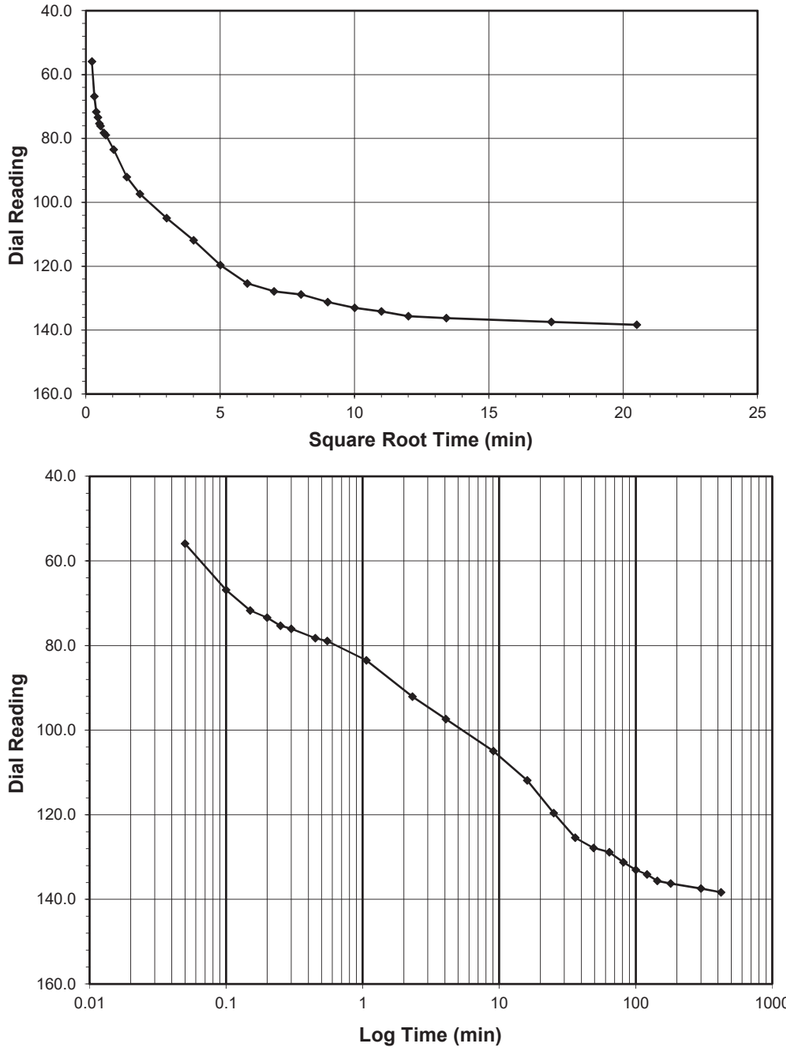
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.25-0.5**
Final Reading	**(div)**	**138.3**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/26/2019
Start Time		21:50:46

Elapsed Time (min)	Dial Reading (div)
Initial	**49.7**
0.05	55.9
0.10	66.9
0.15	71.7
0.20	73.4
0.25	75.3
0.30	76.1
0.45	78.3
0.55	78.9
1.07	83.5
2.32	92.1
4.07	97.4
9.07	104.9
16.07	111.9
25.07	119.6
36.07	125.4
49.07	127.8
64.07	128.9
81.07	131.2
100.07	133.0
121.07	134.1
144.07	135.6
180.07	136.3
300.07	137.4
420.40	138.3

Tested By PW *Date* 9/26/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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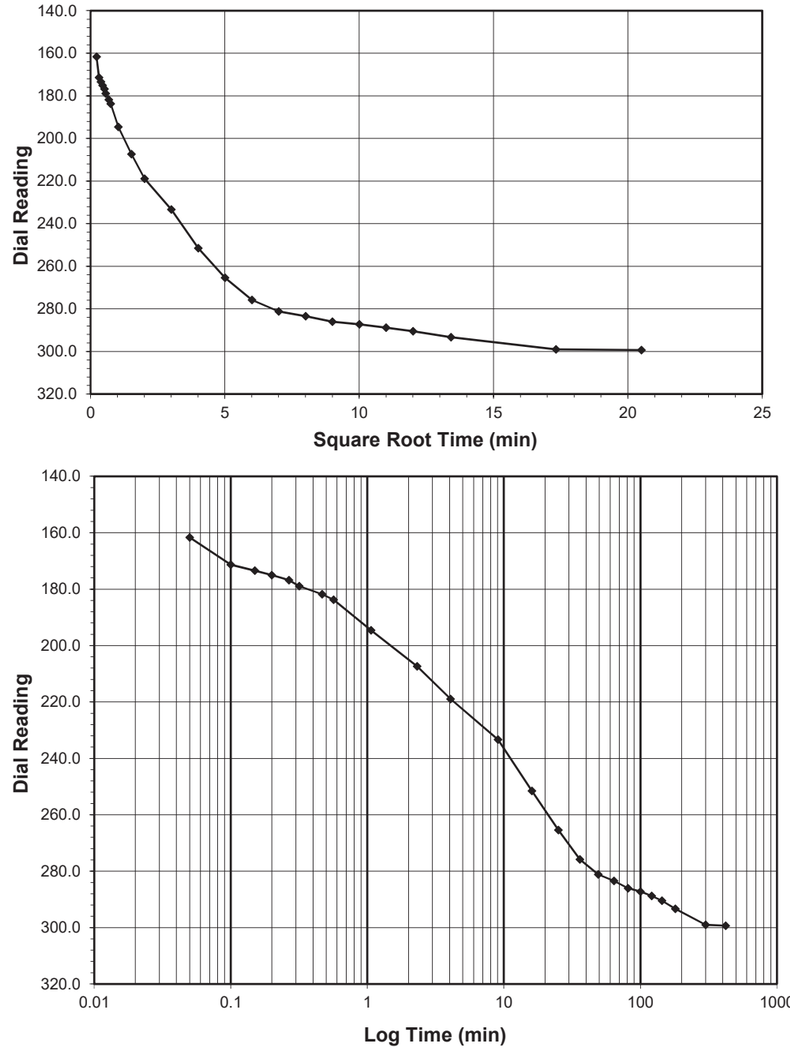
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.5-1.0**
Final Reading	**(div)**	**299.3**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/27/2019
Start Time		4:51:10

Elapsed Time (min)	Dial Reading (div)
Initial	**138.3**
0.05	161.7
0.10	171.3
0.15	173.4
0.20	175.0
0.27	176.8
0.32	178.9
0.47	181.8
0.57	183.8
1.07	194.6
2.32	207.4
4.07	219.0
9.07	233.3
16.07	251.5
25.07	265.4
36.07	275.8
49.07	281.2
64.07	283.5
81.07	286.1
100.08	287.3
121.08	288.8
144.08	290.5
180.08	293.4
300.08	299.0
420.47	299.3

Tested By PW *Date* 9/27/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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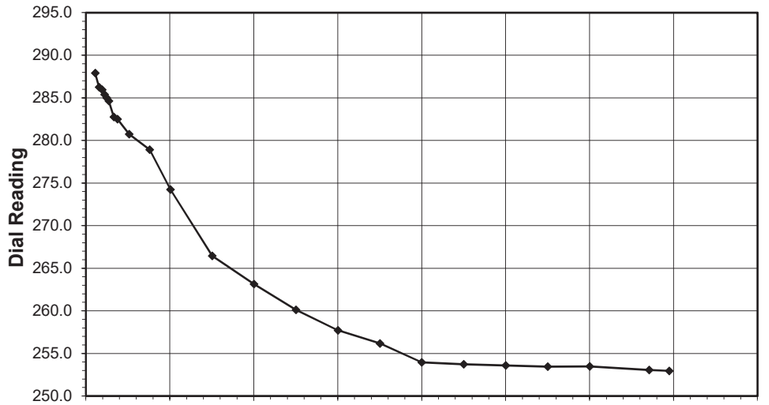
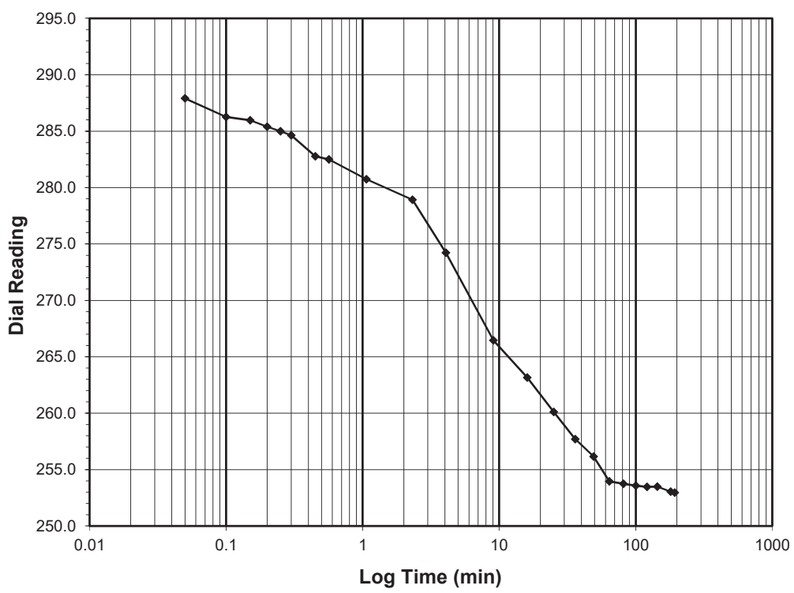
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**1.0-0.5**
Final Reading	**(div)**	**253.0**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/27/2019
Start Time		11:51:38

Elapsed Time (min)	Dial Reading (div)
Initial	**299.3**
0.05	287.9
0.10	286.3
0.15	286.0
0.20	285.4
0.25	285.0
0.30	284.6
0.45	282.8
0.57	282.5
1.07	280.7
2.32	278.9
4.07	274.2
9.07	266.5
16.07	263.2
25.07	260.1
36.07	257.7
49.07	256.2
64.07	254.0
81.07	253.7
100.07	253.6
121.07	253.5
144.07	253.5
180.07	253.0
193.07	253.0

Tested By PW *Date* 9/27/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 5

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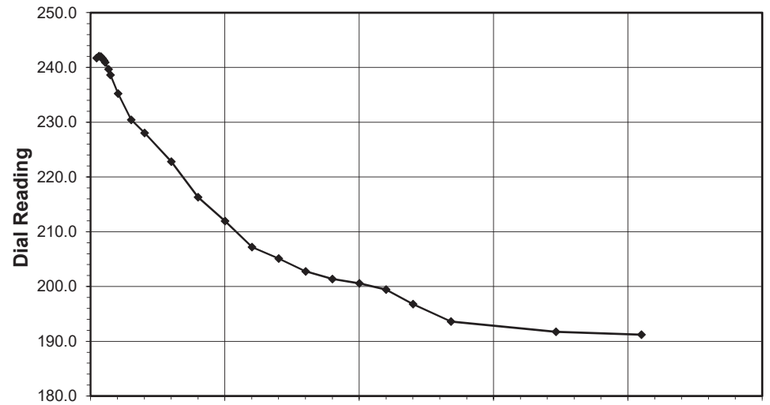
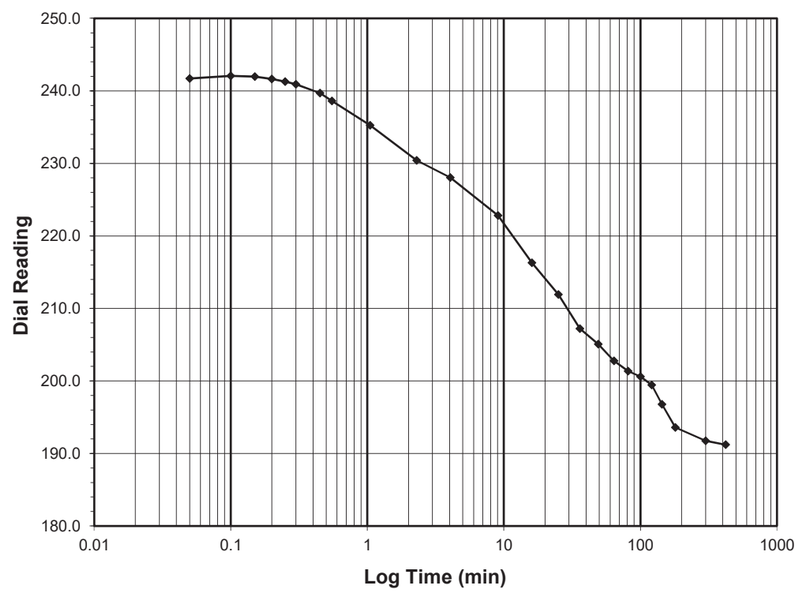
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**0.5-0.25**
Final Reading	**(div)**	**191.2**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/27/2019
Start Time		15:04:43

Elapsed Time (min)	Dial Reading (div)
Initial	**253.0**
0.05	241.7
0.10	242.1
0.15	242.0
0.20	241.6
0.25	241.3
0.30	240.9
0.45	239.7
0.55	238.6
1.05	235.2
2.30	230.4
4.05	228.0
9.05	222.8
16.05	216.3
25.07	211.9
36.07	207.2
49.07	205.1
64.07	202.8
81.07	201.4
100.07	200.6
121.07	199.4
144.07	196.8
180.07	193.6
300.07	191.7
420.45	191.2

Tested By PW *Date* 9/27/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 6

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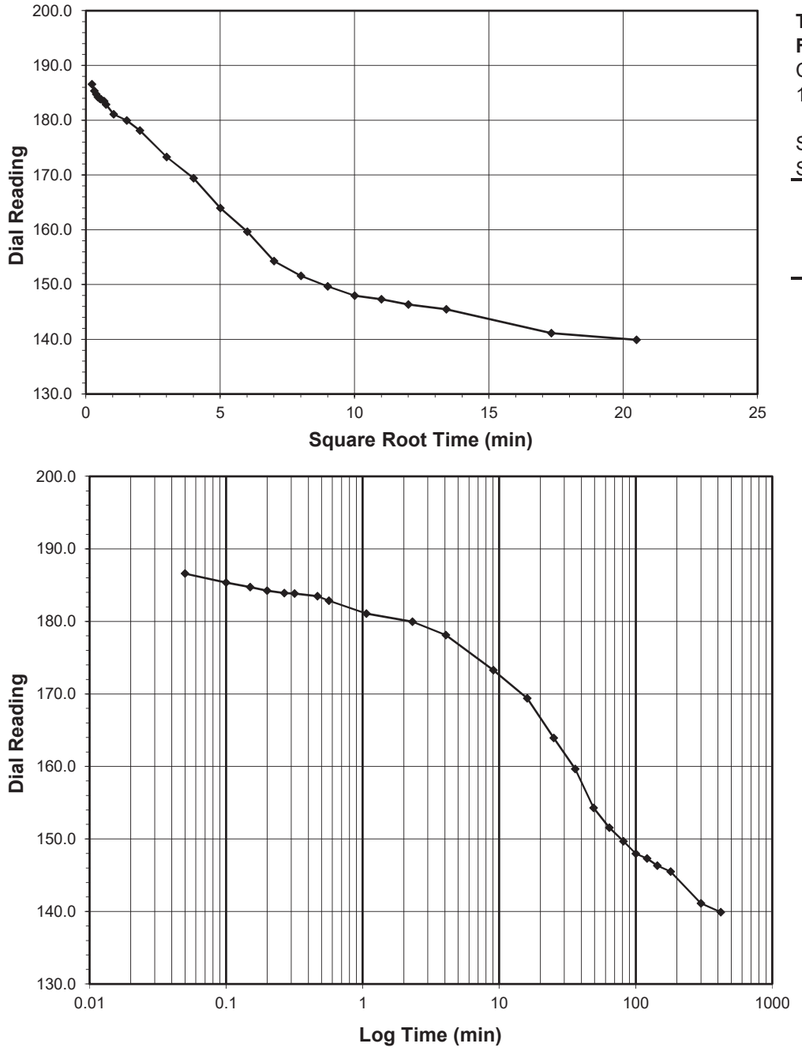
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.25-0.125**
Final Reading	**(div)**	**139.9**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/27/2019
Start Time		22:05:10

Elapsed Time (min)	Dial Reading (div)
Initial	**191.2**
0.05	186.6
0.10	185.3
0.15	184.7
0.20	184.2
0.27	183.9
0.32	183.8
0.47	183.5
0.57	182.9
1.07	181.1
2.32	179.9
4.07	178.1
9.07	173.3
16.07	169.4
25.07	163.9
36.07	159.7
49.07	154.3
64.07	151.6
81.07	149.7
100.07	148.0
121.07	147.3
144.07	146.3
180.07	145.5
300.07	141.1
420.08	139.9

Tested By PW *Date* 9/27/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 7

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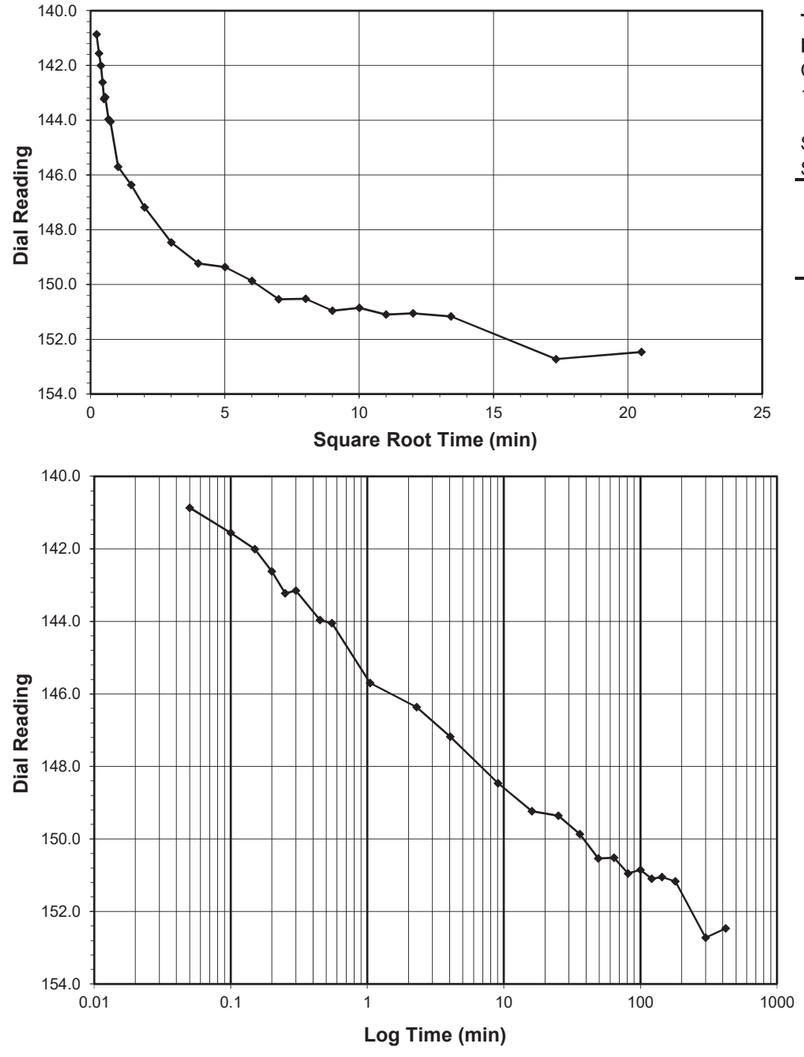
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.125-0.25**
Final Reading	**(div)**	**152.5**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/28/2019
Start Time		5:05:15

Elapsed Time (min)	Dial Reading (div)
Initial	**139.9**
0.05	140.9
0.10	141.6
0.15	142.0
0.20	142.6
0.25	143.2
0.30	143.2
0.45	144.0
0.55	144.0
1.05	145.7
2.30	146.4
4.05	147.2
9.05	148.5
16.07	149.2
25.07	149.4
36.07	149.9
49.07	150.5
64.07	150.5
81.07	151.0
100.07	150.9
121.07	151.1
144.07	151.1
180.07	151.2
300.07	152.7
420.48	152.5

Tested By PW *Date* 9/28/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 8

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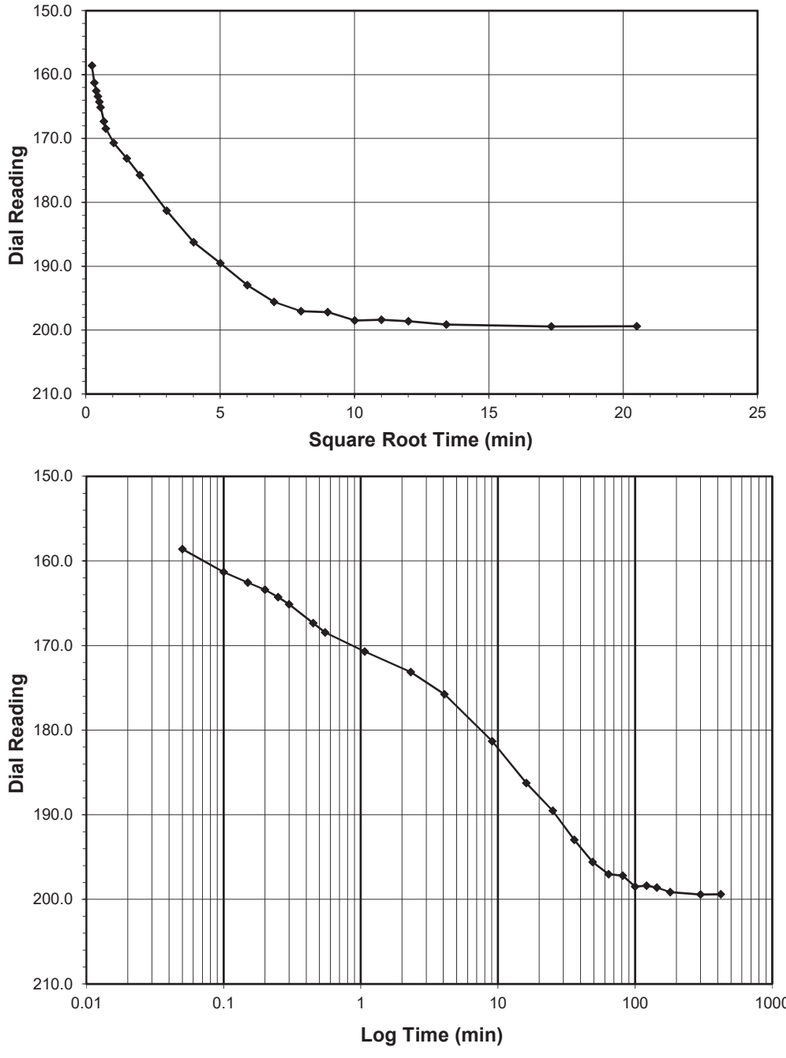
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.25-0.5**
Final Reading	**(div)**	**199.4**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/28/2019
Start Time		12:05:44

Elapsed Time (min)	Dial Reading (div)
Initial	**152.5**
0.05	158.6
0.10	161.3
0.15	162.5
0.20	163.4
0.25	164.3
0.30	165.1
0.45	167.4
0.55	168.5
1.07	170.7
2.32	173.1
4.07	175.7
9.07	181.3
16.07	186.2
25.07	189.5
36.07	193.0
49.07	195.6
64.07	197.0
81.07	197.2
100.07	198.5
121.07	198.4
144.07	198.6
180.07	199.1
300.07	199.4
420.40	199.4

Tested By PW *Date* 9/28/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 9

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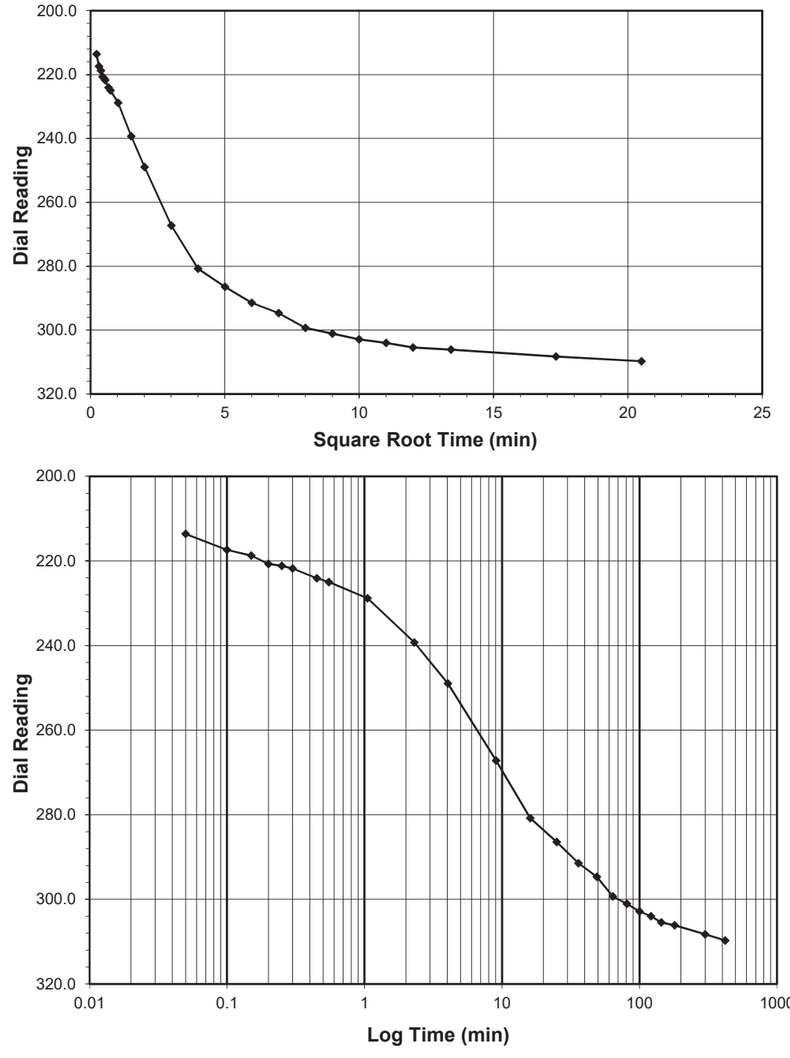
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.5-1.0**
Final Reading	**(div)**	**309.7**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/28/2019
Start Time		19:06:08

Elapsed Time (min)	Dial Reading (div)
Initial	**199.4**
0.05	213.6
0.10	217.4
0.15	218.8
0.20	220.7
0.25	221.1
0.30	221.8
0.45	224.1
0.55	225.0
1.05	228.8
2.30	239.3
4.05	249.0
9.05	267.2
16.05	280.8
25.05	286.4
36.05	291.4
49.05	294.7
64.05	299.3
81.05	301.1
100.05	302.9
121.05	304.0
144.05	305.4
180.05	306.1
300.07	308.3
420.42	309.7

Tested By PW *Date* 9/28/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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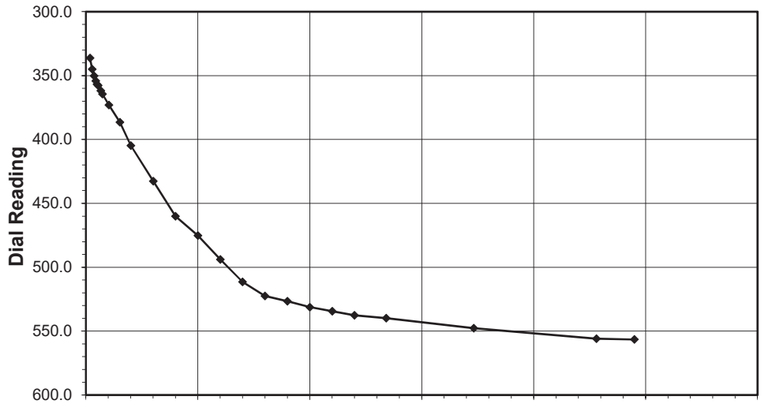
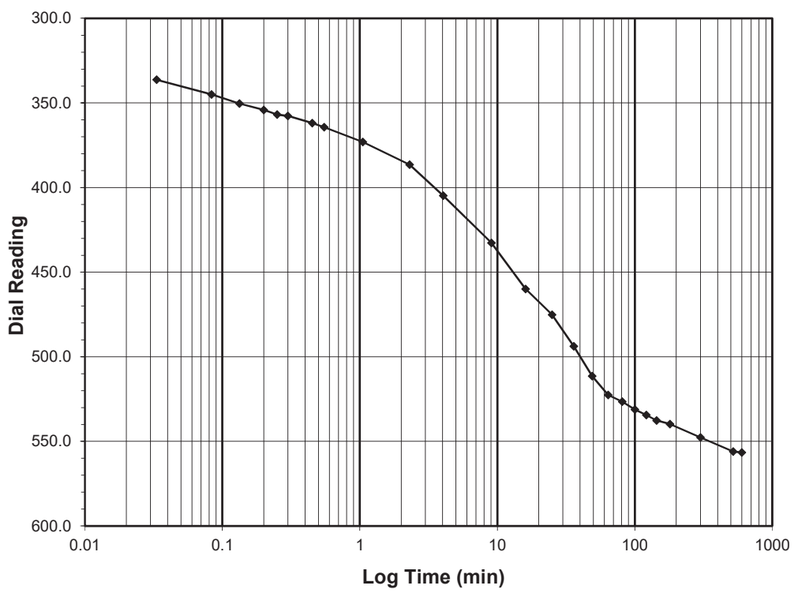
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**1.0-2.0**
Final Reading	**(div)**	**556.5**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/29/2019
Start Time		2:06:33

Elapsed Time (min)	Dial Reading (div)
Initial	**309.7**
0.03	336.3
0.08	345.0
0.13	350.3
0.20	354.2
0.25	356.8
0.30	357.7
0.45	361.9
0.55	364.4
1.05	373.1
2.30	386.4
4.05	404.8
9.05	432.7
16.05	460.0
25.05	475.1
36.05	493.8
49.05	511.4
64.05	522.5
81.07	526.5
100.07	531.2
121.07	534.5
144.07	537.7
180.07	539.8
300.07	547.7
520.07	556.0
600.33	556.5

Tested By PW *Date* 9/29/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 11

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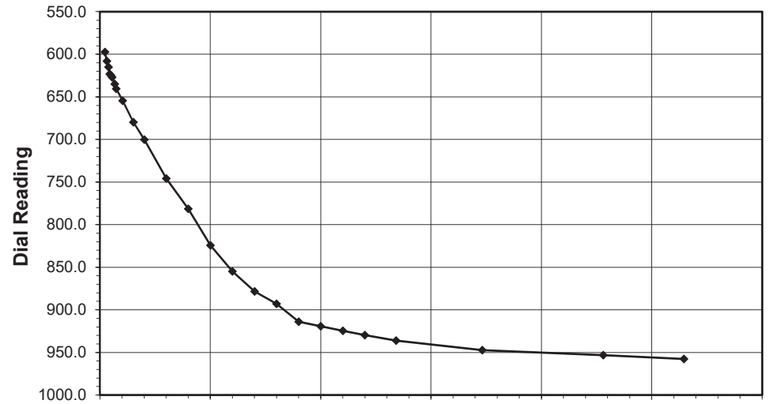
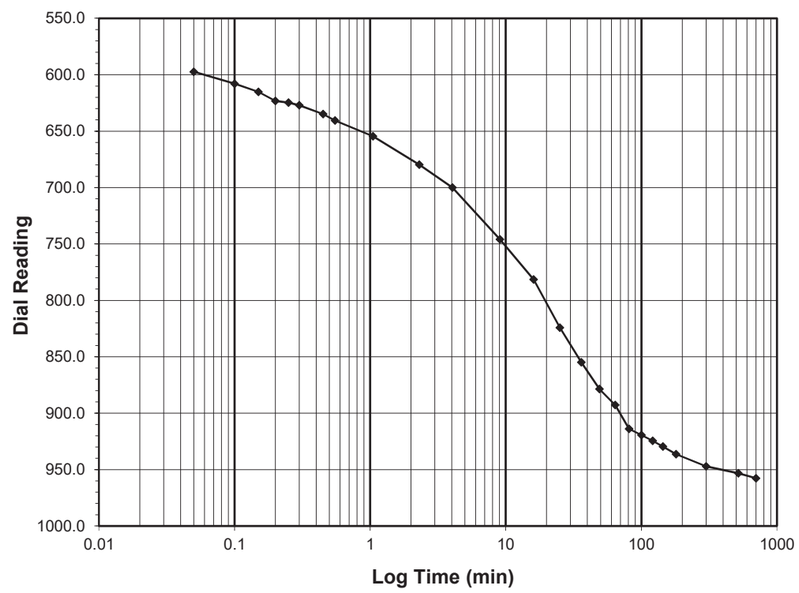
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED





Test Load	**(tsf)**	**2.0-4.0**
Final Reading	**(div)**	**957.7**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/29/2019
Start Time		12:06:54

Elapsed Time (min)	Dial Reading (div)
Initial	**556.5**
0.05	597.4
0.10	608.0
0.15	615.1
0.20	623.2
0.25	624.8
0.30	627.0
0.45	634.8
0.55	640.6
1.05	654.6
2.30	679.7
4.05	700.1
9.05	745.9
16.05	781.5
25.05	824.2
36.07	854.8
49.07	878.5
64.07	892.8
81.07	914.0
100.07	919.4
121.07	924.5
144.07	929.6
180.07	936.2
300.07	947.2
520.07	953.2
700.07	957.7

Tested By PW *Date* 9/29/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 12

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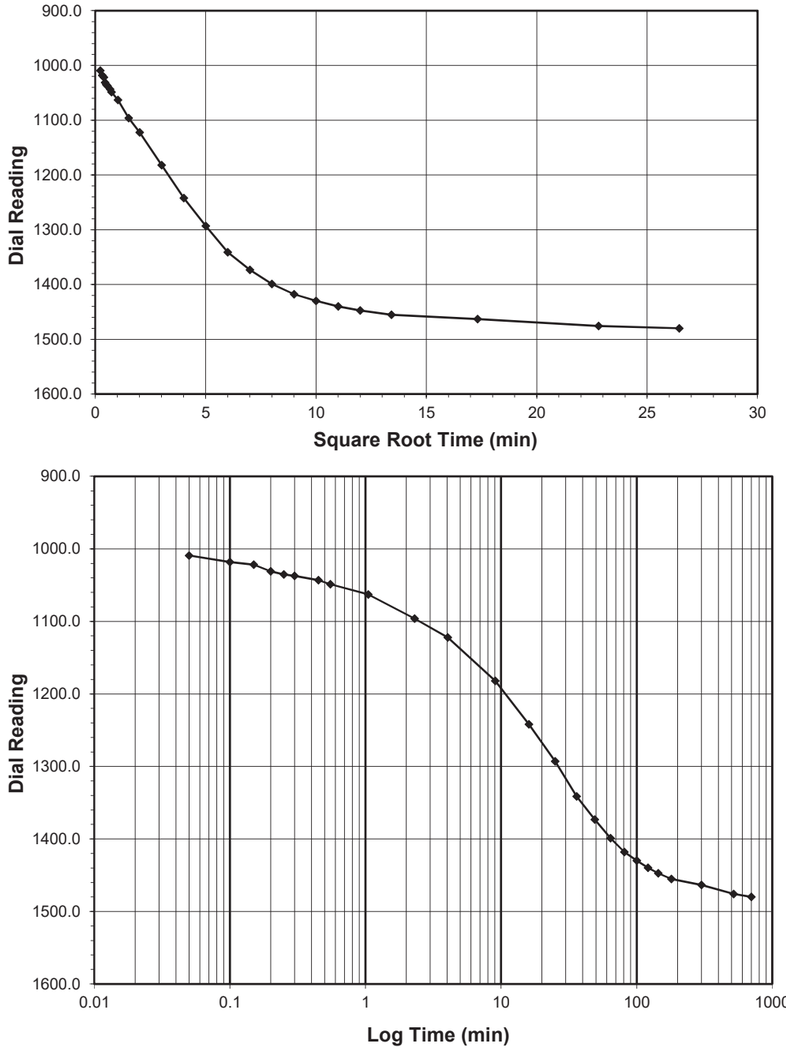
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**4.0-8.0**
Final Reading	**(div)**	**1479.9**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/30/2019
Start Time		0:07:05

Elapsed Time (min)	Dial Reading (div)
Initial	**957.7**
0.05	1009.2
0.10	1018.2
0.15	1021.7
0.20	1031.2
0.25	1035.2
0.30	1037.2
0.45	1043.2
0.55	1048.7
1.05	1063.0
2.30	1096.2
4.05	1122.2
9.05	1182.2
16.07	1242.0
25.07	1292.9
36.07	1341.3
49.07	1373.3
64.07	1398.9
81.07	1417.9
100.07	1430.0
121.07	1439.8
144.07	1447.4
180.07	1455.2
300.07	1463.3
520.07	1475.9
700.07	1479.9

Tested By PW *Date* 9/30/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 13

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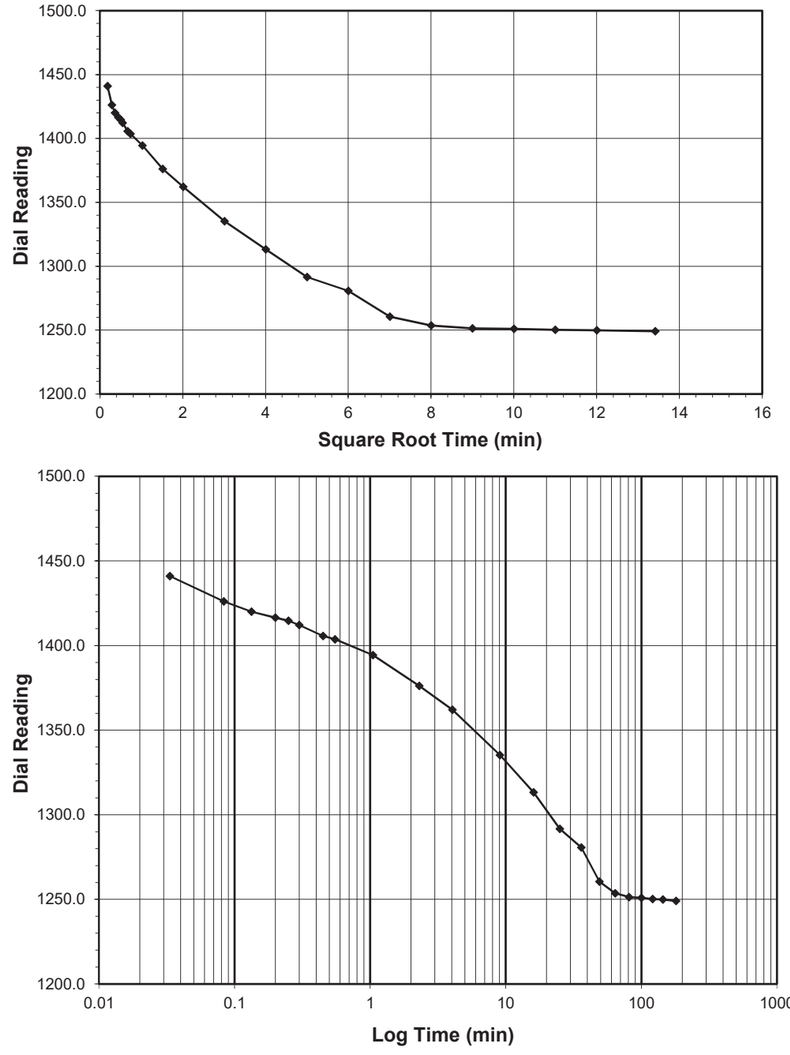
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**8.0-2.0**
Final Reading	**(div)**	**1249.1**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/30/2019
Start Time		12:07:16

Elapsed Time (min)	Dial Reading (div)
Initial	**1479.9**
0.03	1441.0
0.08	1426.1
0.13	1420.0
0.20	1416.5
0.25	1414.6
0.30	1412.1
0.45	1405.6
0.55	1403.7
1.05	1394.4
2.30	1376.2
4.05	1362.1
9.05	1335.2
16.05	1313.2
25.05	1291.6
36.05	1280.7
49.05	1260.5
64.05	1253.6
81.05	1251.3
100.07	1250.9
121.07	1250.2
144.07	1249.9
180.07	1249.1

Tested By PW *Date* 9/30/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 14

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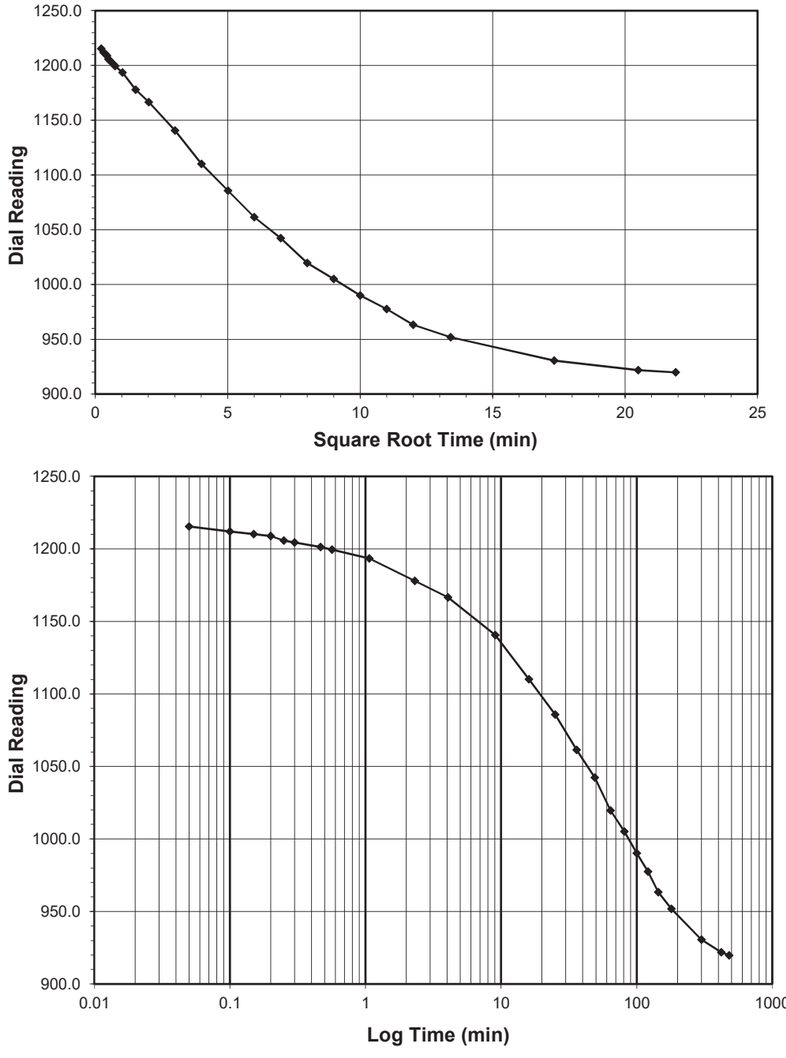
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**2.0-0.5**
Final Reading	**(div)**	**919.8**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/30/2019
Start Time		15:14:11

Elapsed Time (min)	Dial Reading (div)
Initial	**1249.1**
0.05	1215.4
0.10	1211.9
0.15	1210.2
0.20	1208.9
0.25	1205.7
0.30	1204.4
0.47	1201.3
0.57	1199.5
1.07	1193.5
2.32	1177.9
4.07	1166.5
9.07	1140.5
16.07	1110.1
25.07	1085.7
36.07	1061.5
49.07	1042.3
64.07	1019.7
81.07	1005.1
100.07	990.1
121.07	977.5
144.07	963.3
180.07	951.9
300.08	930.6
420.07	921.9
480.07	919.8

Tested By PW *Date* 9/30/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

Z:\2019 PROJECTS\SUMMIT D&E\2019-278 SUMMIT D&E - U-4424\[2019-278-001-002 GEOJAC-16TSF1 Cv.xlsm]STEP 15

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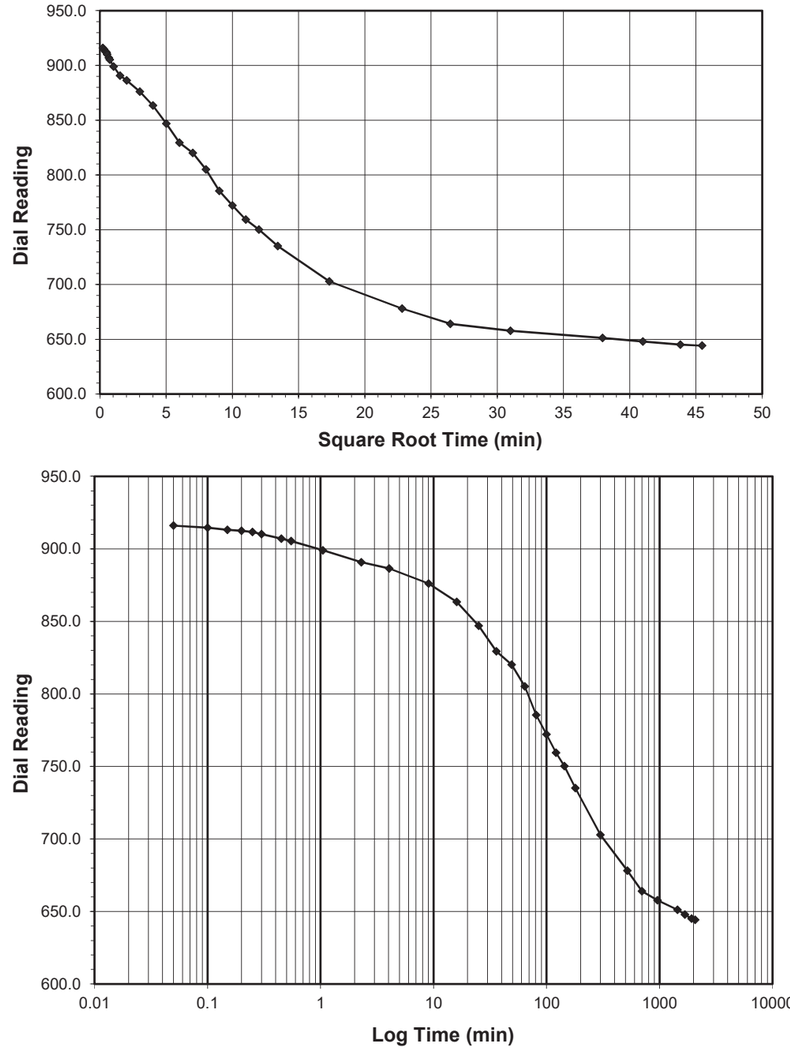
ONE DIMENSIONAL CONSOLIDATION

ASTM D 2435-11

Client	Summit Design & Eng. Services	Location	-L-, 64+42, 82'RT
Client Project	U-4424	Depth (ft)	4.0 - 6.0
Project No.	R-2019-278-001	Sample No.	ST-2
Lab ID	R-2019-278-001-002	Visual Description	Orange Gray Fat Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load	**(tsf)**	**0.5-0.125**
Final Reading	**(div)**	**644.2**
Consolidometer No.		**R409**
1 Division	(in)	0.0001
Start Date		9/30/2019
Start Time		22:14:15

Elapsed Time (min)	Dial Reading (div)
Initial	**919.8**
0.05	916.1
0.10	914.6
0.15	913.1
0.20	912.4
0.25	911.6
0.30	910.1
0.45	907.0
0.55	905.3
1.05	899.0
2.30	890.8
4.05	886.4
9.05	876.1
16.05	863.4
25.05	847.0
36.05	829.4
49.05	820.2
64.05	805.1
81.07	785.5
100.07	772.1
121.07	759.4
144.07	750.2
180.07	735.1
300.07	702.8
520.07	678.1
700.08	664.0
960.08	657.7
1440.08	651.2
1680.08	647.9
1920.08	645.1
2066.20	644.2

Tested By PW *Date* 9/30/2019 *Checked By* GEM *Date* 10/8/2019

DCN: CT-24E Date: 5/3/12 Revision: 3

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