REFERENCE: B-6051/U-6143

PROJECT: 48708

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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LINE	STATION	PLAN
-L-	24+15 - 69+50	4 - 7
-YI-	10+00 - 15+70	4, 8
-Y2-	10+00 - 17+70	4, 9
-Y3-	10+00 - 19+43	6 - 7
-MUP-	10+00 - 12+72	5
-DRI-	10+00 - 11+90	6
-DR2-	10+00 - 12+60	6
-DR3-	10+00 - 12+00	7
-DR5-	10+00 - 11+45	4

CROSS SECTIONS

LINE	STATION	SHEET
-L-	24+50 - 69+00	10 - 32
-YI-	11+00 - 14+00	33 - 35
-Y2-	12+50 - 16+50	36 - 38
-Y3-	12+00 - 15+50	39 - 42
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APPENDICES

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *GASTON & MECKLENBURG*

PROJECT DESCRIPTION *BRIDGE NO. 91 OVER CATAWBA RIVER ON US 29/US 74 AND INTERSECTION IMPROVEMENTS ON US 29/US 74 (WILKINSON BLVD) AND NC 7 (CATAWBA ST)*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6051/U-6143	1	

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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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CATLIN PERSONNEL

INVESTIGATED BY *RK&K*

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Gregory Goins 05/23/2023
A40B119A1F2B43C... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	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	< 4	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	N/A
	DENSE	30 TO 50	
	VERY DENSE	> 50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	< 2	< 0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	> 30	> 4

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	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:
- [X] CME-45C
- [ ] CME-55
- [X] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D-50
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16" STEEL TEETH
- [X] TRICONE 2 15/16" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B ____ [ ] -H ____
- [X] -N Q2

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:

BOREHOLE ELEVATIONS DETERMINED FROM PROVIDED .TIN FILE AND SURVEY GRADE GPS.
TIN FILE: B-6051_Merged_tin.tin

ABBREVIATIONS:
F.I.A.D. - FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

TIP PROJECT: B-6051 / U-6143

CONTRACT NO: C204773

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6051 / U-6143	3	

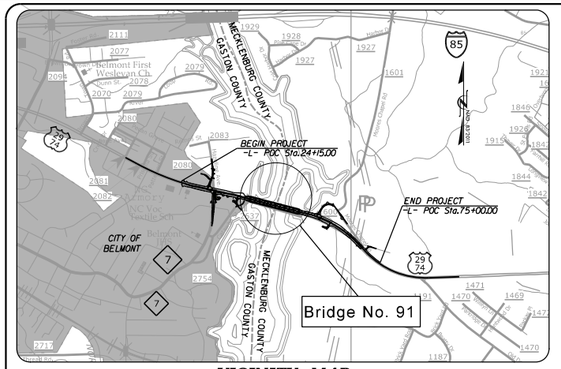
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48708.1.1		P.E.
48326.1.1		P.E.
48708.2.1		R / W & UTILITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

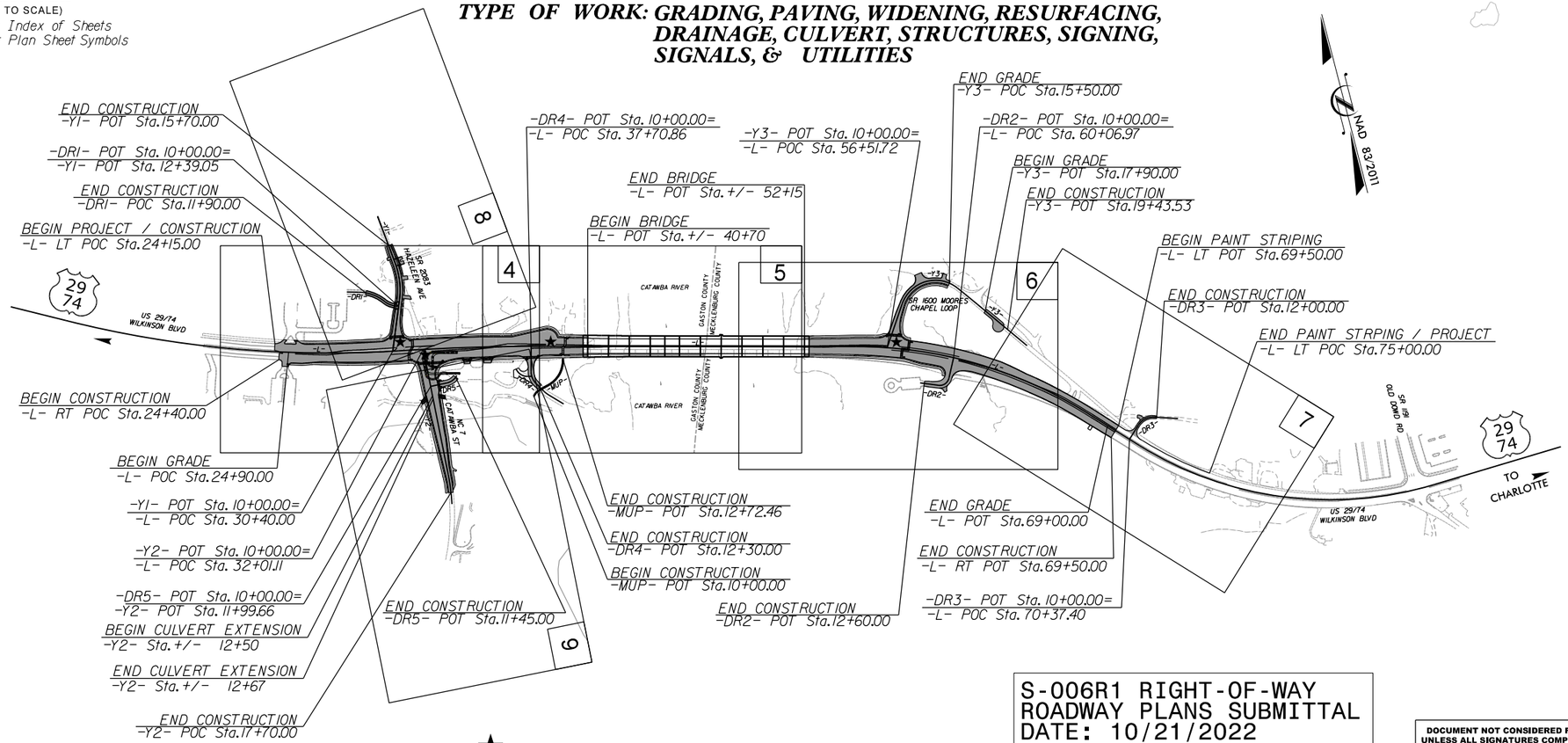
GASTON / MECKLENBURG COUNTIES

LOCATION: *BRIDGE NO. 91 OVER CATAWBA RIVER ON US 29 / US 74 AND INTERSECTION IMPROVEMENTS ON US 29 / US 74 (WILKINSON BLVD) AND NC 7 (CATAWBA ST)*

TYPE OF WORK: *GRADING, PAVING, WIDENING, RESURFACING, DRAINAGE, CULVERT, STRUCTURES, SIGNING, SIGNALS, & UTILITIES*



VICINITY MAP
(NOT TO SCALE)
See Sheet 1A For Index of Sheets
See Sheet 1B For Plan Sheet Symbols



NOTES:
1. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO THE TURNAROUNDS. ★

S-006R1 RIGHT-OF-WAY ROADWAY PLANS SUBMITTAL DATE: 10/21/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 0 50 100
PROFILE (HORIZONTAL): 50 0 50 100
PROFILE (VERTICAL): 10 0 0 10 20

DESIGN DATA

ADT 2024 = 25,476
ADT 2044 = 30,690
DHV = 11%
DIR = 80%
T = 6%*
V = 50 MPH
(* TTST = 2% / DUAL 4%)
FUNC CLASS = MAJOR ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-6051 / U-6143 = 0.746 mi
LENGTH STRUCTURE TIP PROJECT B-6051 / U-6143 = 0.217 mi
TOTAL LENGTH TIP PROJECT B-6051 / U-6143 = 0.963 mi

PLANS PREPARED BY:
RK&K
8601 SIX FORKS ROAD, FORUM 1, SUITE 700
RALEIGH, NORTH CAROLINA 27615
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2022

LETTING DATE:
JULY 17, 2023

Scott D. Blevins, P.E.
PROJECT ENGINEER

Carter Mull, P.E.
PROJECT DESIGN ENGINEER

David Stutts, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

3/14/2023
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March 14, 2023

WBS Number: 48708.1.1
TIP Number: B-6051 / U-6143
County: Gaston & Mecklenburg
Description: Bridge No. 91 on US 29/US 74 Over Catawba River & Intersection Improvements at US 29/US 74 & NC 7

Subject: Roadway Subsurface Inventory Report

PROJECT DESCRIPTION

The project site consists of improvements to US 29/US 74, including grading, paving, widening, structures, and resurfacing, drainage, culvert, signing, signals, and utilities. The proposed project is approximately 0.75 miles in length. It begins approximately 0.1 miles west of the intersection of Hazeline Ave and US 29/US 74, and it ends at the intersection of Moores Chapel Loop and US 29/US 74.

The geotechnical investigation for -L- Sta. 25+40 to 69+00, was performed during August to December 2022. During this time, a total of 69 Standard Penetration Test (SPT) borings were performed. The SPT borings were advanced with an ATV-mounted CME 550X, ATV-mounted Diedrich D-50, and barge-mounted CME 45B drill rig equipped with an automatic hammer. Representative soil samples were collected from the split spoon for field visual classification and laboratory testing.

The following alignments were investigated for this report. Selected cross sections of these alignments are included in this report.

Line	Stations (±)
-L-	24+15 – 69+50
-Y1-	10+00 – 15+70
-Y2-	10+00 – 17+70
-Y3-	10+00 – 19+43
-MUP-	10+00 – 12+72
-DR2-	10+00 – 12+60
-DR3-	10+00 – 12+00
-DR5-	10+00 – 11+45

BRIDGES

In addition to roadway improvements, Bridge No. 91 over Catawba River will be replaced. Details for this bridge are addressed in a separate report.

PHYSIOGRAPHY AND GEOLOGY

The proposed project is located in the Piedmont Physiographic Province. The terrain within and around the project is rolling hills. The land surrounding the proposed roadway is typically residential, commercial, or forested. Topographic relief along the length of the project alignment ranges in elevation from 561.3 feet to 646.2 feet.

The proposed project is underlain by the Neoproterozoic to Paleozoic-age foliated to massive Metamorphosed Quartz Diorite rock. The metadiorite is locally fractured. Local surficial soils in the project area are typically classified as alluvial and residual.

GROUNDWATER PROPERTIES

Some borings were backfilled immediately upon their completion because of safety concerns related to leaving the borings open overnight. Groundwater was encountered in seven of the completed borings as summarized in the table below. The actual level of the hydrostatic water table and the amount and level of perched water should be anticipated to fluctuate throughout the year, depending upon variations in precipitation, surface run-off, infiltration, site topography, and drainage.

Boring No.	Existing Ground Surface ELEV	0-hr Groundwater Depth (ft)	0-hr Groundwater ELEV	24-hr Groundwater Depth (ft)	24-hr Groundwater ELEV
L 62+00	581.7	N/A	N/A	11.5	570.2
L 64+00	593.4	N/A	N/A	6.0	587.4
Y2 12+42 LT	572.9	N/A	N/A	7.8	565.0
Y2 12+42 RT HA	568.8	2.5	566.3	2.1	566.7
Y3 12+00	577.5	17.5	560.0	FIAD	N/A
Y3 13+20	569.4	N/A	N/A	3.3	566.1
Y3 14+75	578.6	N/A	N/A	3.1	575.5

SOIL PROPERTIES

The boring logs on the cross sections provide details related to the subsurface conditions encountered during the investigation. The stratification lines shown on the boring logs represent approximate transitions between material types. Strata changes could occur gradually or abruptly. Also, the borings depict conditions at particular locations and at the particular times indicated. Soils encountered during the geotechnical investigation are separated into three categories based on origin. The origins consist of roadway embankment, alluvial soils, and residual soils.

Roadway Embankment Material: Roadway embankment material was encountered in the following borings:

Boring ID
L 25+40
L 29+40
L 31+15
L 33+70
L 38+20
L 58+00
Y1 12+20
Y1 14+05
Y2 12+42 RT
Y2 14+00
Y3 12+00
Y3 14+75
DR5 11+00

The roadway embankment soils typically consisted of medium stiff to very stiff SILT and CLAY with varying percentages of sand (AASHTO: A-5, A-7-5, A-7-6). The roadway embankment soils also consisted of loose to medium dense SAND with varying percentages of silt and clay (AASHTO: A-2-4 and A-2-6). The thickness of the encountered roadway embankment was 2.0 to 15.0 feet. The SPT N-values ranged from 5 to 34-bpf. According to the lab test results, the natural moisture content ranged from 10.2 to 28.4-percent, the liquid limit ranged from 42 to 65, and the plasticity index ranged from 16 to 36.

Alluvial Soils: Alluvial soil was encountered in the following borings:

Boring ID
L 53+00
L 54+00
L 55+00
L 56+00
L 60+00
L 62+00
L 64+00
Y2 12+42 RT
Y2 12+42 RT HA
Y3 12+00
Y3 13+20
MUP 11+75

The alluvial soils typically consisted of very soft to very stiff CLAY with varying percentages of sand (AASHTO: A-6, A-7-5, A-7-6) and MUCK. The thickness of the encountered alluvial soil was 5 to 17 feet. The SPT N-values ranged from 0 to 23-bpf. According to the lab test results, the natural moisture content ranged from 17.9 to 50.8-percent, the liquid limit ranged from 40 to 61, and the plasticity index ranged from 13 to 29.

Residual Soils: Residual soils were encountered in most borings drilled outside the limits of existing road and below the existing pavement and roadway embankment material. The residual soils typically consisted of soft to hard SILT and CLAY with varying percentages of sand (AASHTO: A-4, A-5, A-6, A-7-5, A-7-6). The residual soils also consisted of medium dense to very dense SAND with varying percentages of silt and clay (AASHTO: A-2-4 and A-2-6). The SPT N-values ranged from 11 to 89-bpf. According to the lab test results, the natural moisture content ranged from 15.2 to 39.1-percent, the liquid limit ranged from 45 to 75, and the plasticity index ranged from 8 to 41.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Alluvial Soils: Alluvial soils were encountered at the following location:

Line	Stations (±)	Offset
-L-	53+00 – 64+00	LT
-Y2-	12+42	RT/LT
-Y3-	12+00 – 13+20	CL/RT
-MUP-	11+75	CL

Highly Plastic Soils: Soils with plasticity indices (PI) greater than 20 within proposed cut sections and within 3-ft of subgrade were encountered at the following locations:

Line	Stations (±)	Offset
-L-	25+40	RT
-L-	27+40	LT
-L-	29+40	RT
-L-	31+15	RT
-L-	36+20	LT
-L-	37+70	LT
-L-	68+00	LT
-L-	69+00	RT
-Y1-	11+54	LT
-Y2-	12+42	RT
-Y2-	16+00	LT
-Y3-	14+75	LT
-MUP-	11+75	CL

GROUNDWATER

Groundwater was encountered within **six (6) feet** of proposed subgrade at the following locations:

Line	Stations (±)	Offset
-Y3-	14+75	LT

Ponds: Ponds were not observed during the subsurface investigation within the footprint of the project.

Water Wells: Water wells and monitoring wells were not observed during the subsurface investigation.

Water wells may be encountered during construction due to the presence of dwellings and businesses near the proposed right of way.

Prepared by,

DocuSigned by:
Gregory Goins
A40B419A1E2B43C...

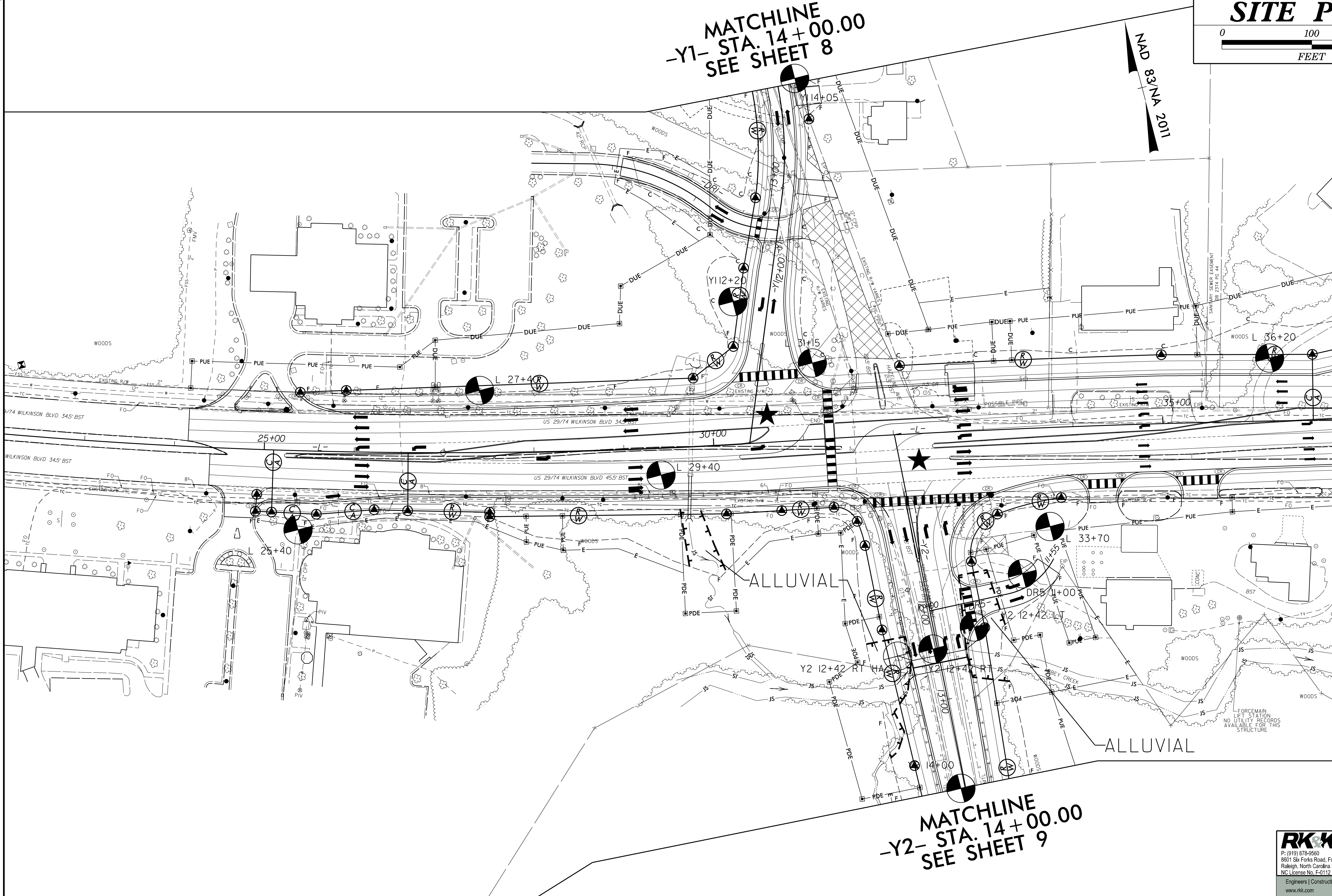
Greg Goins, P.E.
Project Delivery Leader, Geotechnical
Registered, North Carolina 041709

DocuSigned by:
James W. Mize
E11D362115544D2...

James Mize
Associate Geologist, Geotechnical
Registered, North Carolina 2688

PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	4

SITE PLAN



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PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	5

SITE PLAN

0 100 200
FEET

NAD 83/NA 2011

MATCHLINE –L– STA. 37+00.00 SEE SHEET 4

MATCHLINE –L– STA. 50+50.00 SEE SHEET 6

ALLUVIAL

ALLUVIAL

EBI-A

EBI-B

EBI-C

EBI-D

L 37+70

L 38+20

MUP 11+75

US 29/74 WILKINSON BLVD BST VARIES

1A-MASH TL-3

EXISTING R/W

CATAWBA RIVER

GASTON COUNTY
MECKLENBURG COUNTY

WOODS

45+00

50+00

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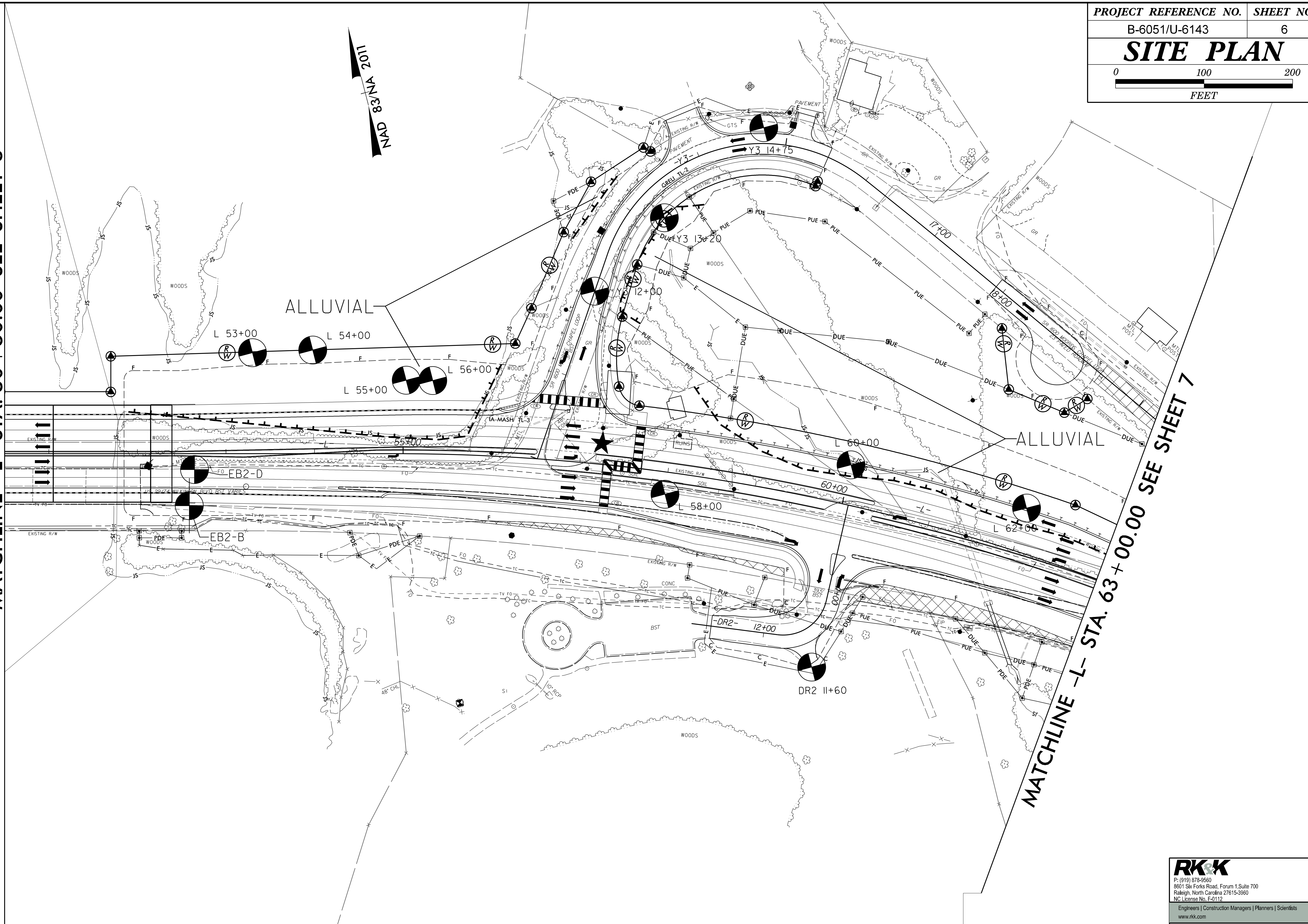
PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	6

SITE PLAN

0 100 200
FEET



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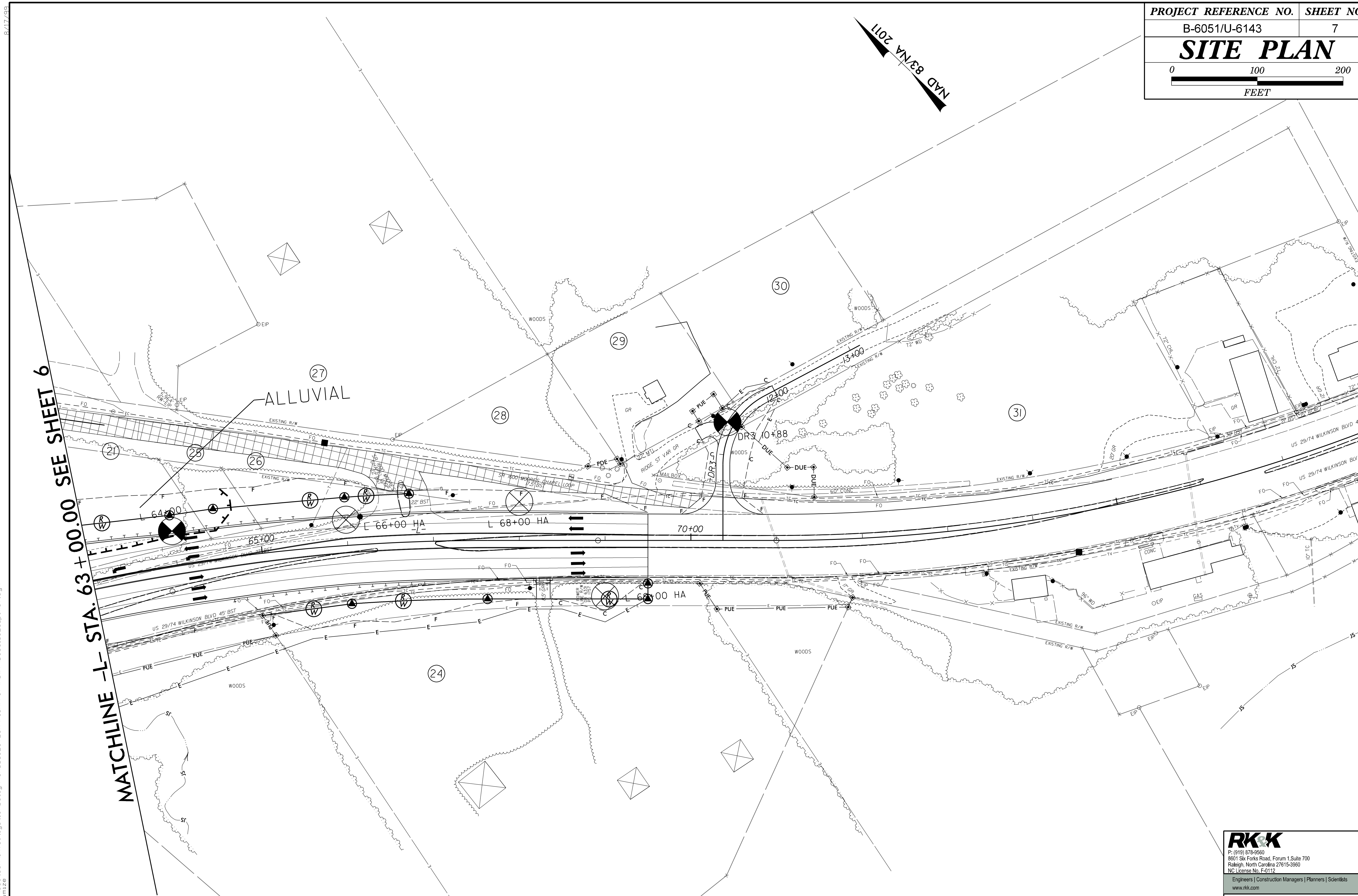
PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	7

SITE PLAN



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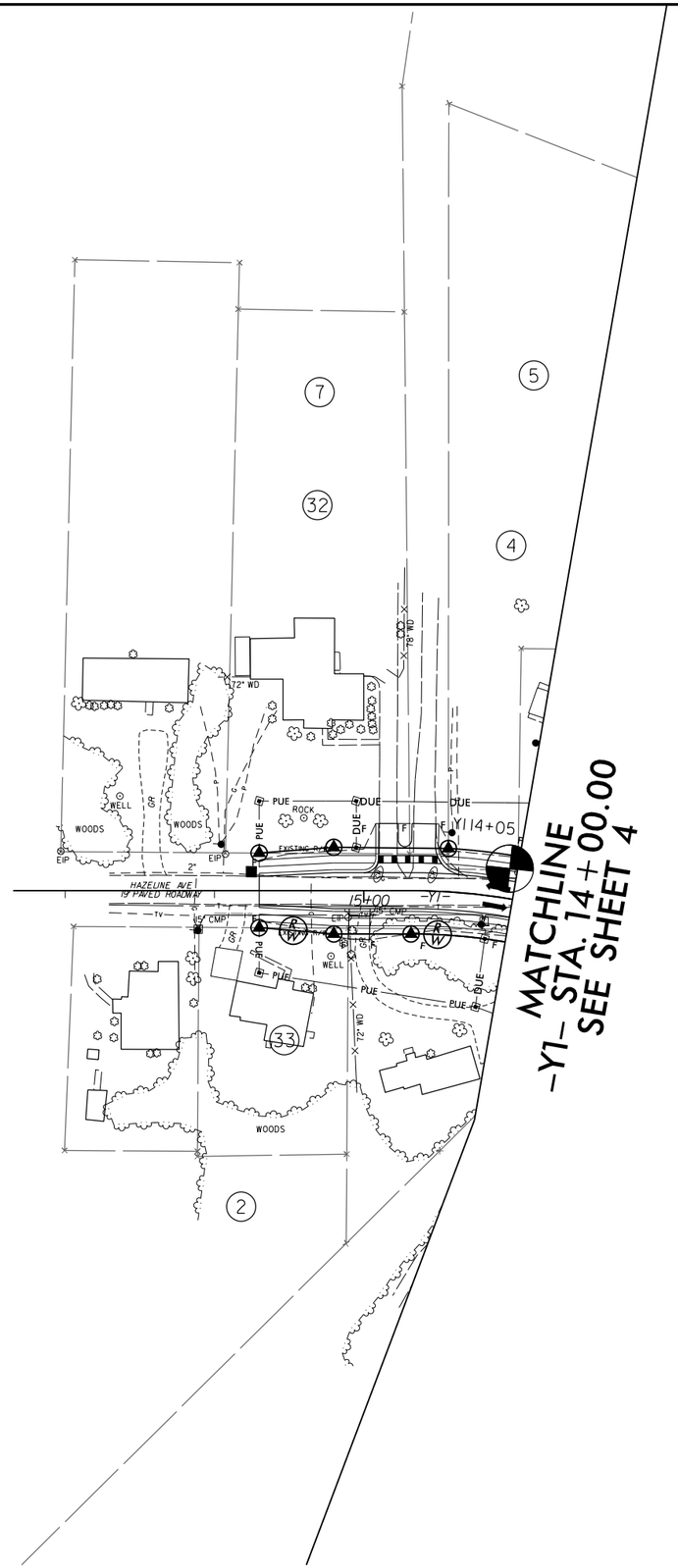
PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	8

SITE PLAN

0 100 200

FEET

NAD 83/NA 2011



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PROJECT REFERENCE NO.	SHEET NO.
B-6051/U-6143	9

SITE PLAN

0 100 200
FEET

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6/23/16

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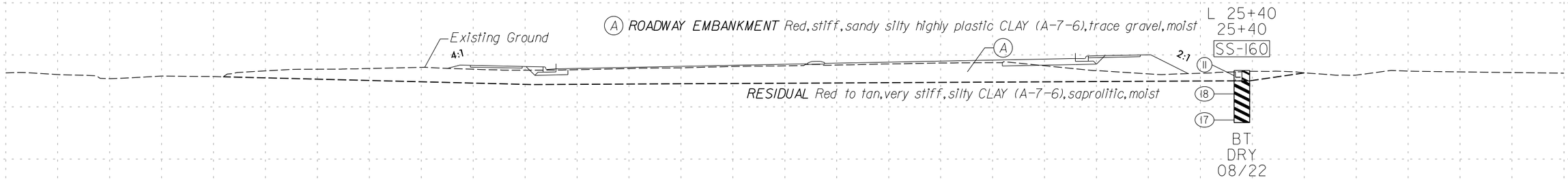
	B-6051/U-6143	10

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

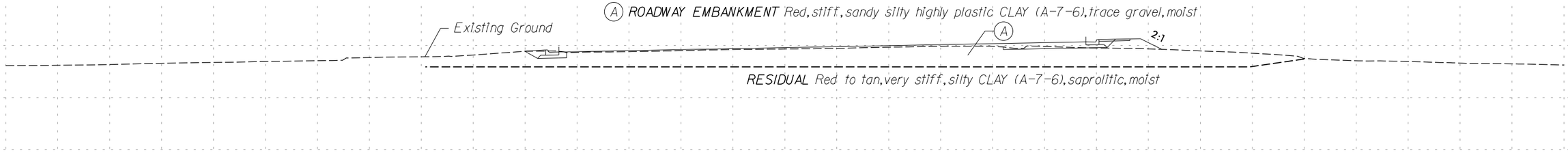
640 630 620 610 600 590

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-160	25+40	88 RT	0.0-1.5	A-7-6	65	36	15	14	10	61	97	90	71	24	-



25+50.00



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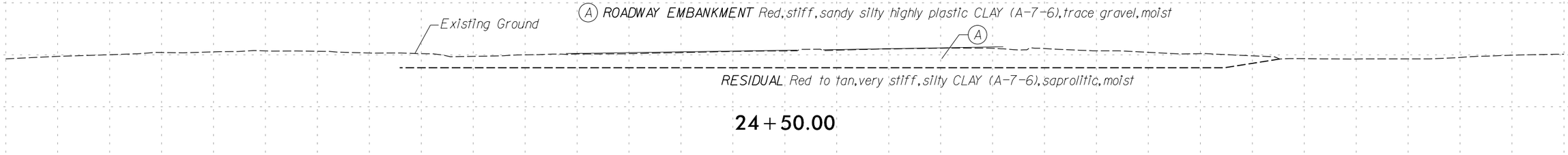

24+50.00

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	11

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

630 620 610 600 590

Existing Ground

3:1 3:1 4:1 2:1

RESIDUAL Red, stiff to very stiff, silty moderately plastic CLAY (A-7-5), trace mica, little rock fragments, moist

RESIDUAL Brown, stiff, fine to coarse sandy SILT (A-4), moist

27+00.00

620 610 600 590

Existing Ground

4:1

(A) *ROADWAY EMBANKMENT* Red, stiff, sandy silty highly plastic CLAY (A-7-6), trace gravel, moist

2:1

RESIDUAL Red to tan, very stiff, silty CLAY (A-7-6), saprolitic, moist

26+50.00

620 610 600 590

Existing Ground

4:1

(A) *ROADWAY EMBANKMENT* Red, stiff, sandy silty highly plastic CLAY (A-7-6), trace gravel, moist

2:1

RESIDUAL Red to tan, very stiff, silty CLAY (A-7-6), saprolitic, moist

26+00.00

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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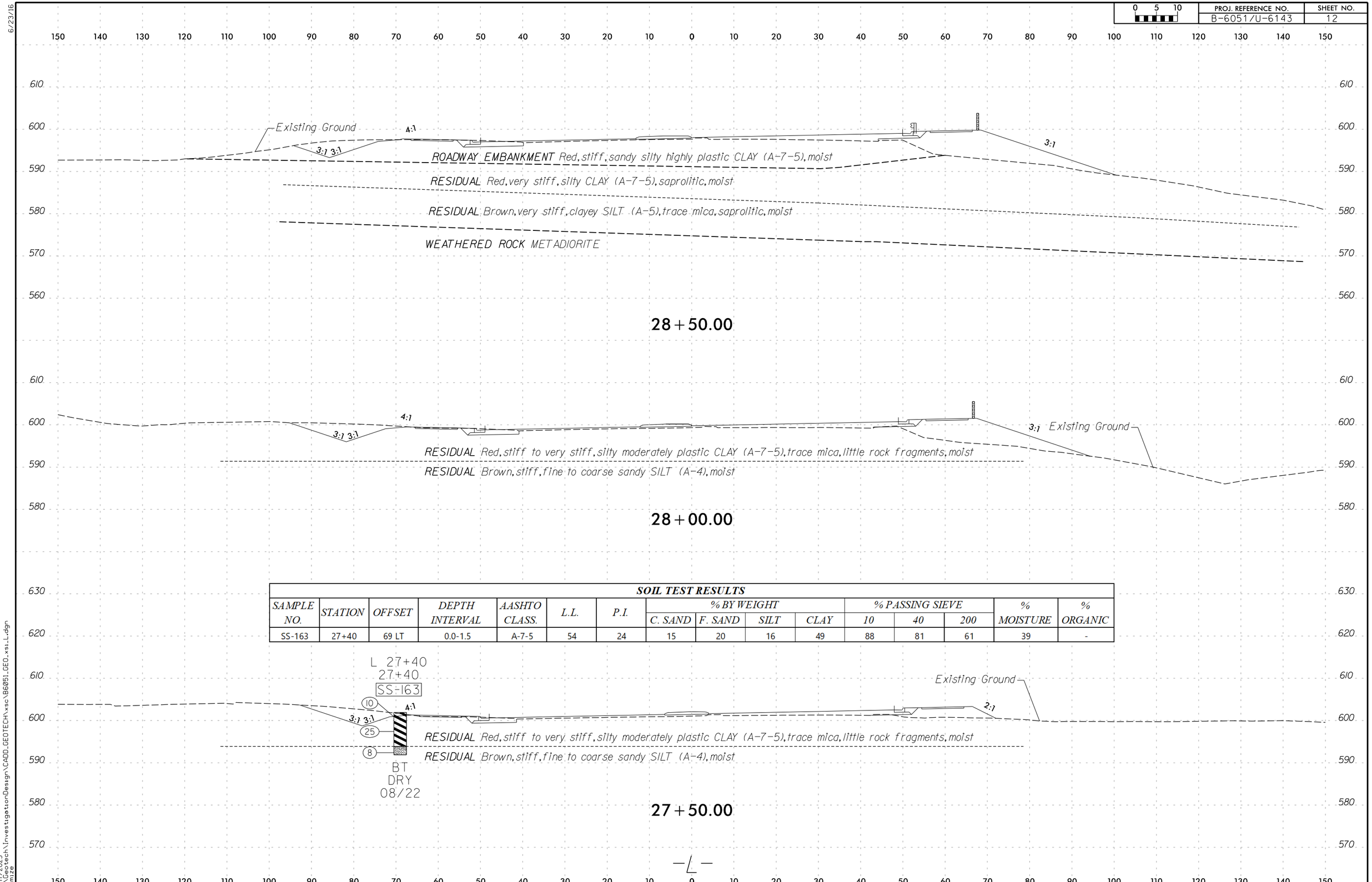

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-163	27+40	69 LT	0.0-1.5	A-7-5	54	24	15	20	16	49	88	81	61	39	-

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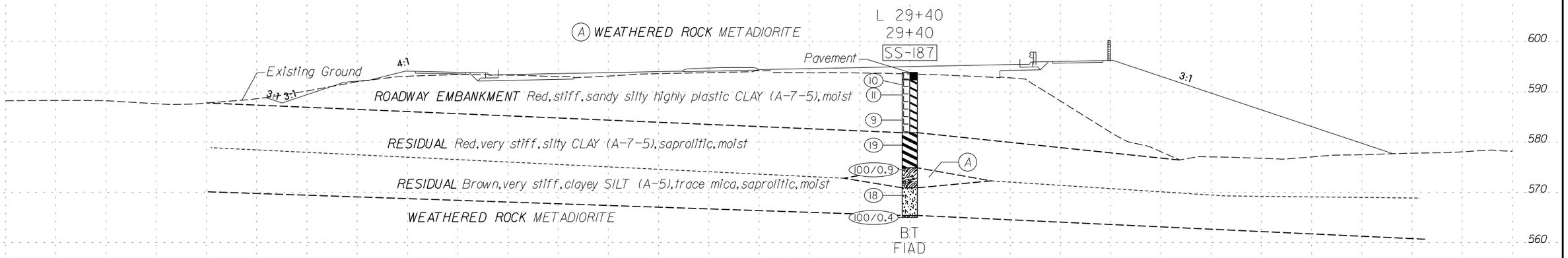
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	13

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-187	29+40	30 RT	1.5-3.0	A-7-5	59	29	12	12	18	58	100	94	79	21	-



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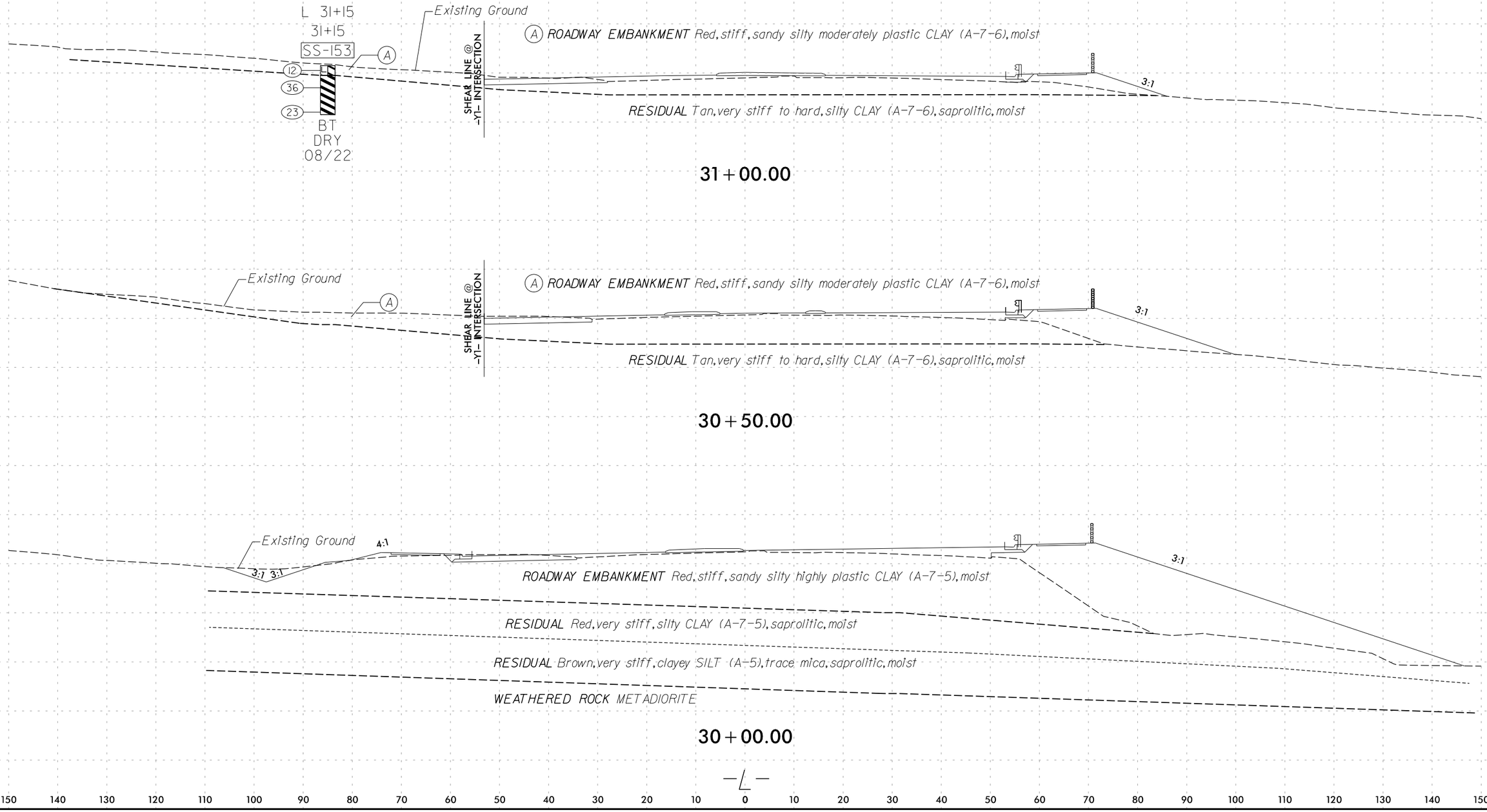
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	14

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-153	31+15	85 LT	0.0-1.5	A-7-6	53	24	14	11	20	55	100	91	77	17	-



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6/23/16

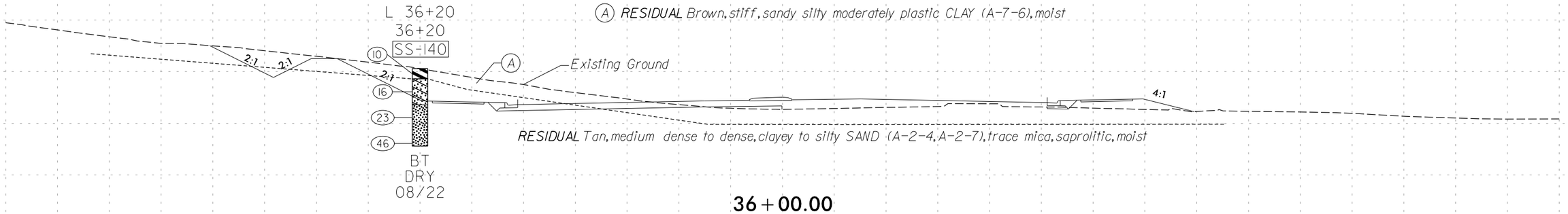
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	15

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

620 610 600 590 580 570

SOIL TEST RESULTS

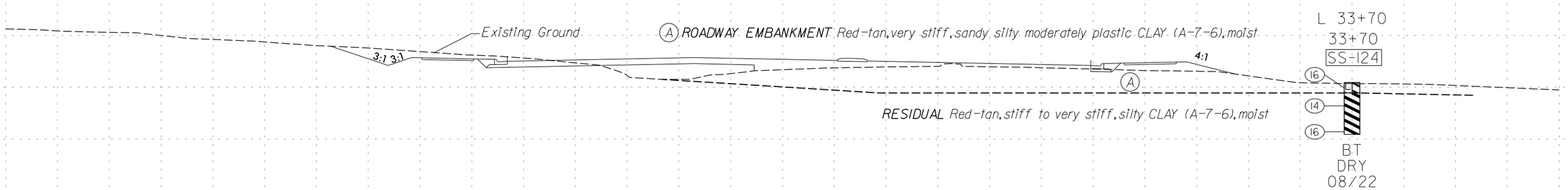
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-140	36+20	70 LT	0.0-1.5	A-7-6	52	25	16	18	24	42	100	90	71	28	-



36+00.00

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-124	33+70	110 RT	0.0-1.5	A-7-6	42	16	14	24	29	33	97	88	66	10	-



33+50.00

610 600 590 580 570 560 550

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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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	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

620 610 600 590 580 570 560

(A) *RESIDUAL* Brown, stiff, sandy silty highly plastic CLAY (A-7-5), moist

(B) *RESIDUAL* Tan-white, stiff, sandy SILT (A-4), moist

2:1 2:1 2:1 A B Existing Ground 4:1

RESIDUAL Tan-white, dense to very dense, clayey SAND (A-2-6), trace rock fragments, saprolitic, moist

37 + 00.00

(A) *RESIDUAL* Brown, stiff, sandy silty moderately plastic CLAY (A-7-6), moist

2:1 2:1 2:1 A Existing Ground 4:1

RESIDUAL Tan, medium dense to dense, clayey to silty SAND (A-2-4, A-2-7), trace mica, saprolitic, moist

36 + 50.00

—L—

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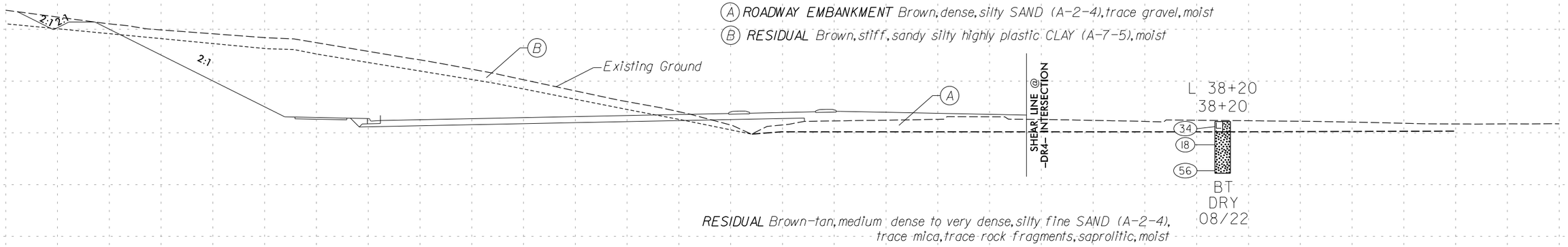
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	17

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

620 610 600 590 580 570 560



(A) *ROADWAY EMBANKMENT* Brown, dense, silty SAND (A-2-4), trace gravel, moist

(B) *RESIDUAL* Brown, stiff, sandy silty highly plastic CLAY (A-7-5), moist

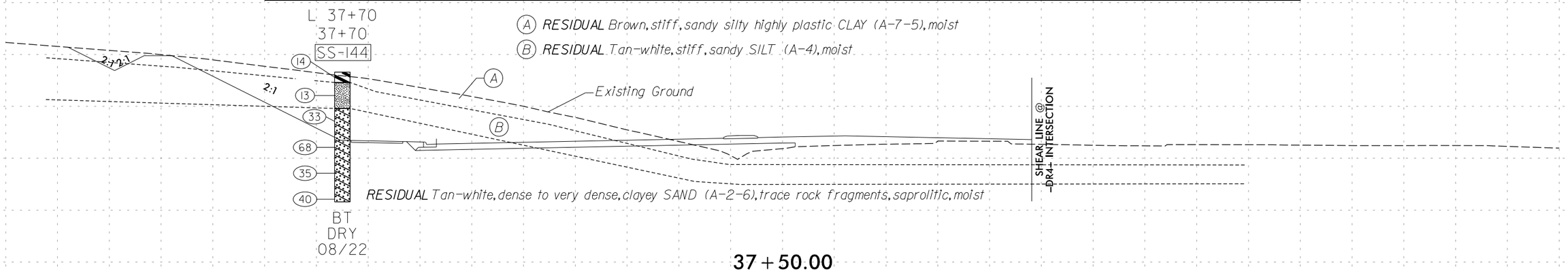
RESIDUAL Brown-tan, medium dense to very dense, silty fine SAND (A-2-4), trace mica, trace rock fragments, saprolitic, moist

38+00.00

630 620 610 600 590 580 570 560

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-144	37+70	85 LT	0.0-1.5	A-7-5	75	41	6	10	18	66	100	98	86	20	-



(A) *RESIDUAL* Brown, stiff, sandy silty highly plastic CLAY (A-7-5), moist

(B) *RESIDUAL* Tan-white, stiff, sandy SILT (A-4), moist

RESIDUAL Tan-white, dense to very dense, clayey SAND (A-2-6), trace rock fragments, saprolitic, moist

37+50.00

630 620 610 600 590 580 570 560

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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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	18

Ⓐ *ARTIFICIAL FILL* Brown, soft to stiff, fine to coarse sandy silty CLAY (A-7-5), trace to little gravel, trace mica, moist to wet

Ⓑ *ROADWAY EMBANKMENT* Brown, soft to medium stiff, fine to coarse sandy and silty CLAY (A-6, A-7-5), trace gravel, moist to saturated

Ⓒ *ALLUVIAL* Gray, soft to medium stiff, fine to coarse sandy SILT (A-4), little mica, trace root fragments, trace gravel, wet

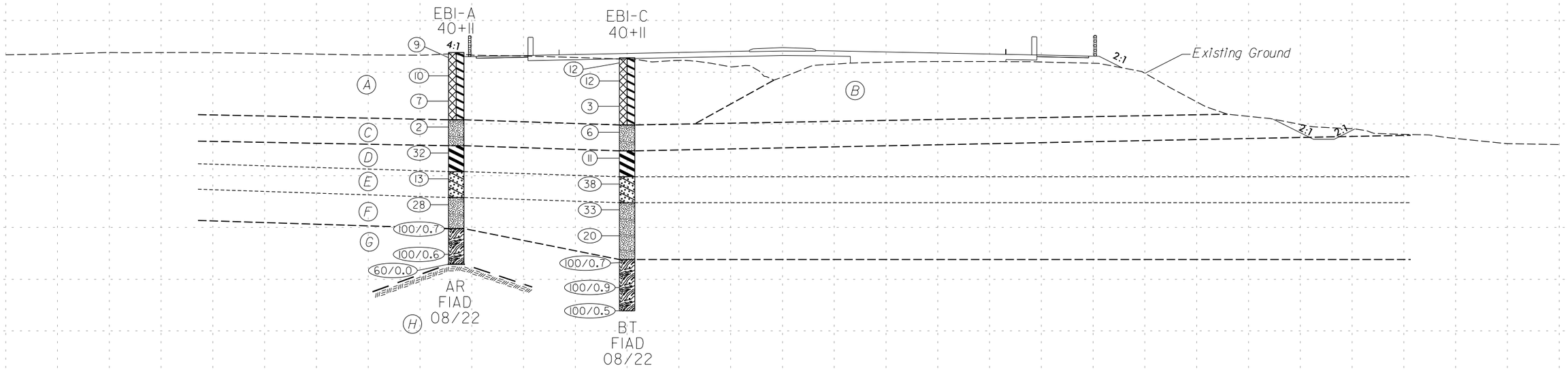
Ⓓ *RESIDUAL* Brown, stiff to hard, fine to coarse sandy silty CLAY (A-7-5), saprolitic, wet

Ⓔ *RESIDUAL* Gray, medium dense to dense, clayey fine to coarse SAND (A-2-6), trace rock fragments, saprolitic, wet

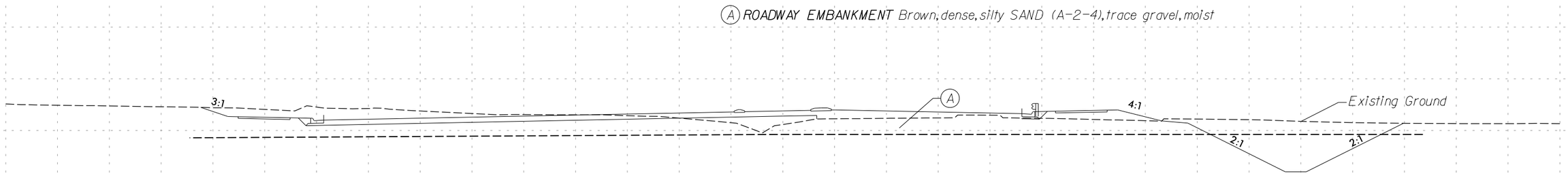
Ⓕ *RESIDUAL* Brown to gray, very stiff to hard, fine to coarse sandy SILT (A-4), saprolitic, wet

Ⓖ *WEATHERED ROCK* METADIORITE

Ⓗ *CRYSTALLINE ROCK* METADIORITE



40+00.00



38+50.00

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	19

(A) *ROADWAY EMBANKMENT* Gray to brown, medium dense, clayey silty fine to coarse SAND (A-2-4, A-2-6), little gravel, saprolitic, moist to saturated

(B) *ROADWAY EMBANKMENT* Brown, soft to medium stiff, fine to coarse sandy and silty CLAY (A-6, A-7-5), trace gravel, moist to saturated

(C) *ALLUVIAL* Dark gray, soft to very stiff, fine to coarse sandy and silty CLAY (A-6, A-7-5), saturated

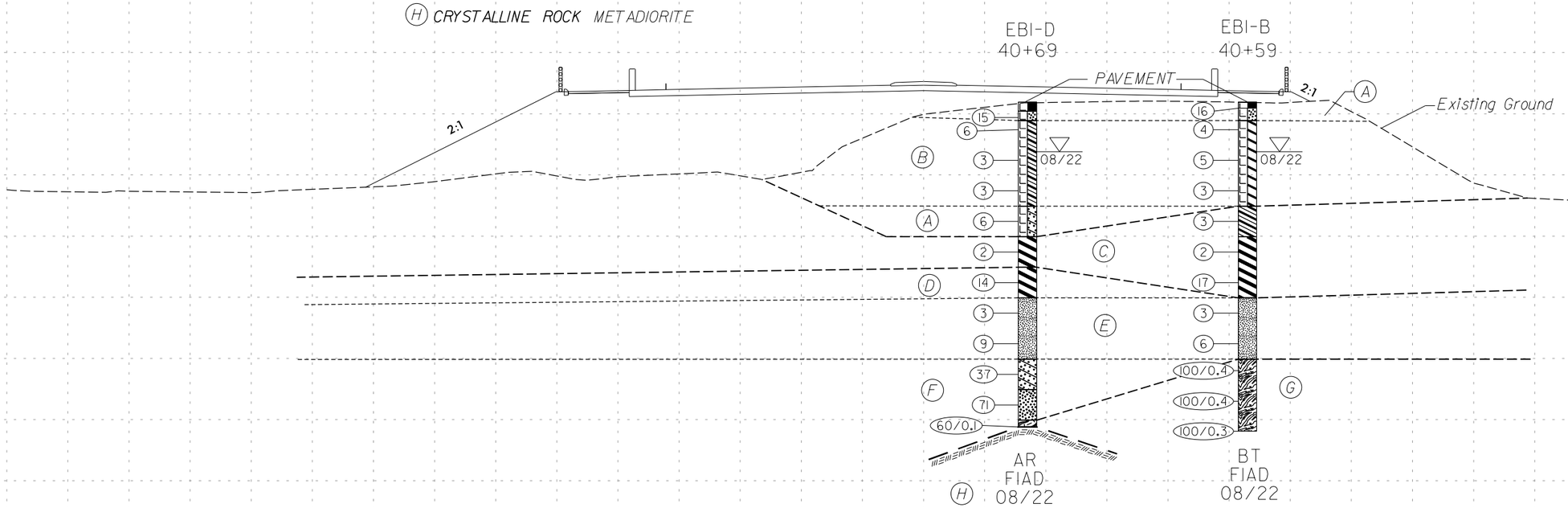
(D) *RESIDUAL* Brown, stiff, silty CLAY (A-7-5), trace rock fragments, saturated

(E) *RESIDUAL* Brown, soft to stiff, fine sandy SILT (A-4), saturated

(F) *RESIDUAL* Brown, dense to very dense, silty and clayey, fine to coarse SAND (A-2-4, A-2-6), trace rock fragments, saprolitic, saturated

(G) *WEATHERED ROCK* METADIORITE

(H) *CRYSTALLINE ROCK* METADIORITE



40+50.00

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	20

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

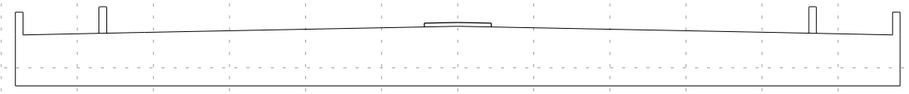
630
620
610
600
590
580
570
560
550
540
530
520

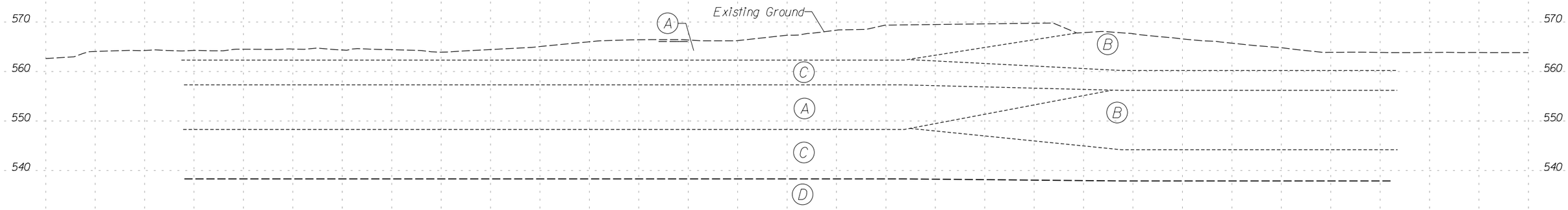
(A) **ALLUVIAL** *Gray, silty CLAY (A-7-5, A-7-6), trace organics, trace mica, trace organics, mottled, saturated*

(B) **ALLUVIAL** *Dark brown to brown, soft to very stiff, fine sandy clayey SILT (A-5), trace clams, saturated*

(C) **ALLUVIAL** *Gray to tan to brown, very loose to medium dense, clayey to silty to fine to coarse SAND (A-1-b, A-2-4, A-2-6), trace mica, trace organics, saturated*

(D) **RESIDUAL** *Brown, dense, silty fine to coarse SAND (A-2-4), trace mica, saprolitic, saturated*





41+00.00

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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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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	21

(A) ROADWAY EMBANKMENT Brown, medium dense, clayey silty fine to coarse SAND (A-2-4), trace gravel, saturated

(B) ROADWAY EMBANKMENT Brown to gray to gray-brown to red-brown, soft to stiff, fine sandy clayey SILT (A-5), trace gravel, trace mica, saturated

(C) ROADWAY EMBANKMENT Brown, medium stiff, silty CLAY (A-7-5), saturated

(D) ALLUVIAL Gray to brown, very soft to medium stiff, fine to coarse sandy silty CLAY (A-7-5), saturated

(E) ALLUVIAL Brown to dark orange-brown, very loose to medium dense, silty and clayey, fine to coarse SAND (A-2-4, A-2-6), saturated

(F) ALLUVIAL Brown, dense, fine to coarse sandy GRAVEL (A-1-b), saturated

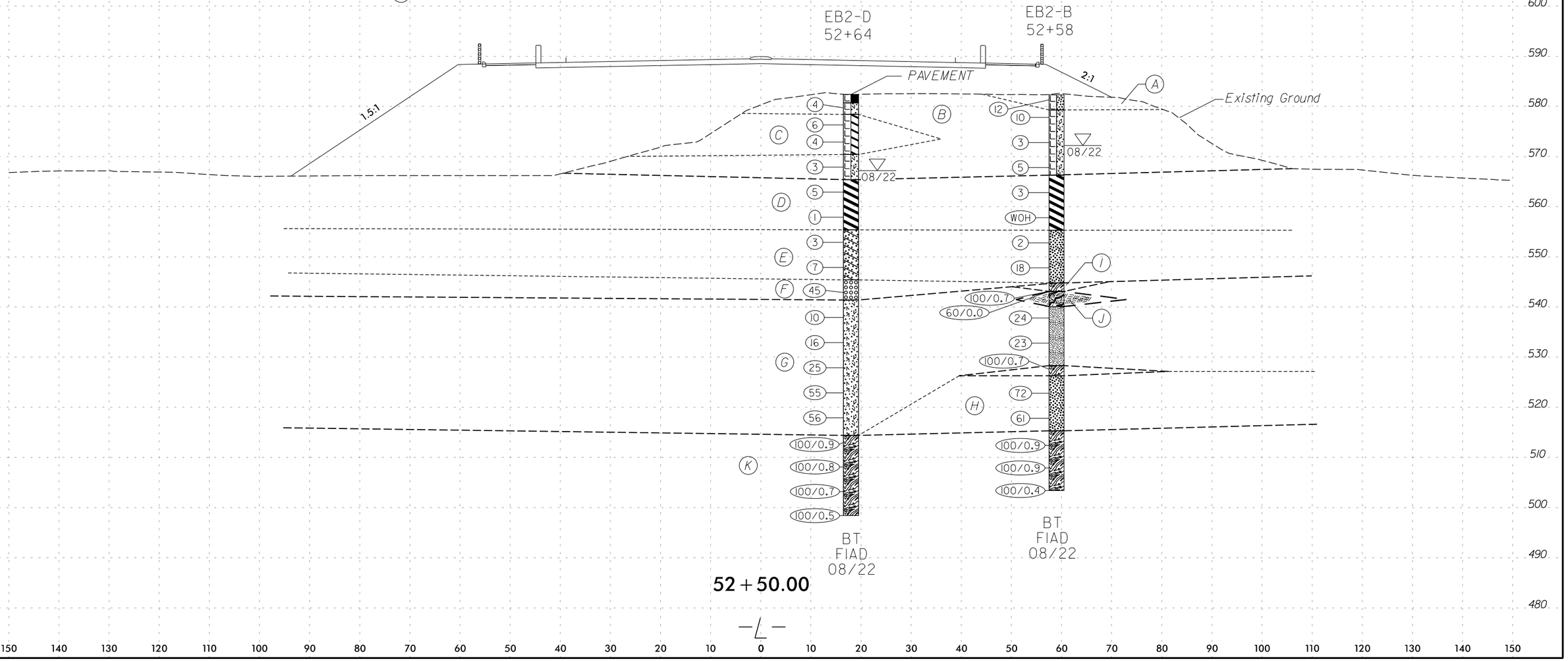
(G) RESIDUAL Gray, stiff to hard, fine to coarse sandy and clayey SILT (A-4, A-5), saprolitic, saturated

(H) RESIDUAL Gray, very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated

(I) WEATHERED ROCK ALLUVIAL BOULDERS

(J) CRYSTALLINE ROCK ALLUVIAL BOULDERS

(K) WEATHERED ROCK METADIORITE



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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	22

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

600 590 580 570 560 550 540 530

L 54+00
53+98

1.5:1

2:1

Existing Ground

ROADWAY EMBANKMENT

SURFACE WATER

WOH — ALLUVIAL Dark gray, very soft, clayey MUCK, trace sand, saturated

12 — ALLUVIAL Brown to gray, stiff, fine sandy silty CLAY (A-7-5), saturated

11

41

55 — RESIDUAL Brown, dense to very dense, clayey fine to coarse SAND (A-2-6), trace to little rock fragments, saprolitic, saturated

100/0.9

100/0.3 — WEATHERED ROCK METADIORITE

BT
FIAD

54+00.00

590 580 570 560 550 540 530 520

L 53+00
53+30

1.5:1

2:1

Existing Ground

ROADWAY EMBANKMENT

SURFACE WATER

2 — ALLUVIAL Gray to brown, very soft to stiff, silty CLAY (A-7-5), saturated

7

10

7 — RESIDUAL Brown to gray, medium stiff, clayey SILT (A-5), trace mica, trace rock fragments, saturated

38 — RESIDUAL Brown to gray, dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated

49

100/0.7

60/0.0 — WEATHERED ROCK METADIORITE

AR
FIAD

53+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

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	23

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

600 590 580 570 560 550 540 530

1.5:1

L 56+00
55+32

SURFACE WATER

Existing Ground

ROADWAY EMBANKMENT

4:1

WOH
WOH
ALLUVIAL Dark gray, very soft, silty CLAY (A-7-6), little organic matter, saturated

36
RESIDUAL Brown, dense, clayey silty SAND (A-2-4), trace rock fragments, saprolitic, saturated

100/0.9
100/0.6
WEATHERED ROCK METADIORITE

BT
FIAD

55+50.00

590 580 570 560 550 540 530 520

1.5:1

L 55+00
55+03

SURFACE WATER

Existing Ground

ROADWAY EMBANKMENT

3:1

WOH
6
4
29
40
61
ALLUVIAL Gray to brown, very soft to medium stiff, fine sandy to silty CLAY (A-6, A-7-6), little organic matter, saturated

RESIDUAL Brown, medium dense to very dense, silty fine to coarse SAND (A-2-4), trace mica, saprolitic, saturated

100/0.5
60/0.1
WEATHERED ROCK METADIORITE

CRYSTALLINE ROCK METADIORITE

AR
FIAD

55+00.00

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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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	24

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

620 610 600 590 580 570 560 550 540 530 520

Ⓐ **ALLUVIAL** *Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated*

Ⓑ **WEATHERED ROCK** *METADIORITE*

2:1

Existing Ground

ROADWAY EMBANKMENT

4:1

Ⓐ

RESIDUAL *Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated*

Ⓑ

RESIDUAL *Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated*

Ⓑ

58+50.00

Ⓐ **ROADWAY EMBANKMENT** *Gray, medium dense, sandy GRAVEL (A-1-a), moist*

Ⓑ **ROADWAY EMBANKMENT** *Brown, stiff, clayey SILT (A-5), trace mica, moist*

L 58+00
58+00

Pavement

Ⓐ

2:1

Existing Ground

Ⓑ

18
9
14
23
8

4:1

RESIDUAL *Brown, medium stiff to very stiff, clayey SILT (A-5), saprolitic, moist*

BT
FIAD

58+00.00

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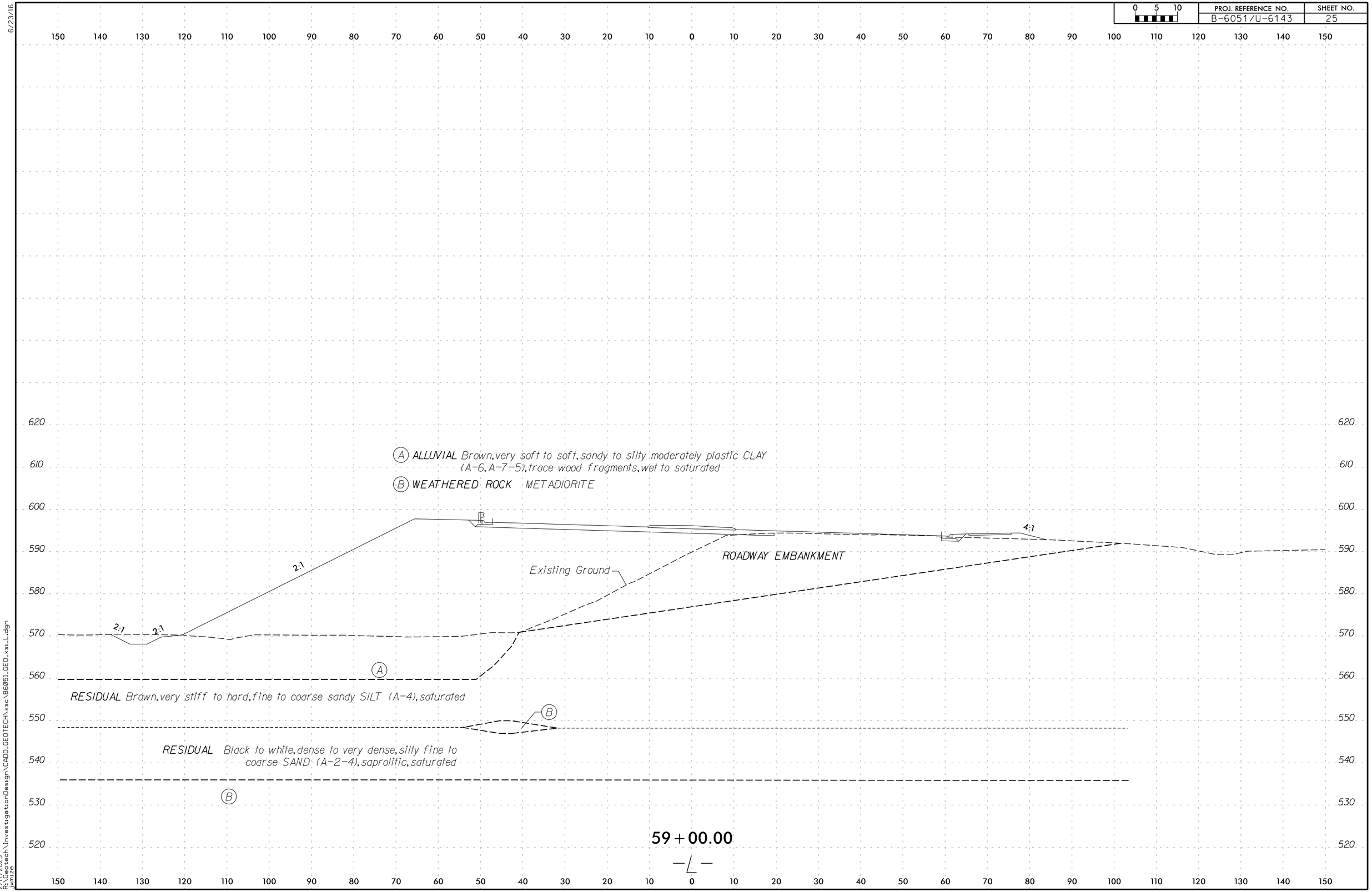
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	25



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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	26

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

620 610 600 590 580 570 560 550 540 530 520

(A) *ALLUVIAL* Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated

(B) *WEATHERED ROCK* METADIORITE

2:1 2:1 2:1 4:1

ROADWAY EMBANKMENT

Existing Ground

(A)

RESIDUAL Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated

(B)

RESIDUAL Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated

(B)

59 + 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

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	27

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

640 630 620 610 600 590 580 570 560 550 540 530 520 510

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-80	60+00	45 LT	0.0-1.5	A-7-5	56	17	5	18	41	36	100	98	83	42	-

(A) ALLUVIAL Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated

(B) WEATHERED ROCK METADIORITE

2:1 2:1 2:1

ROADWAY EMBANKMENT

Existing Ground

SHEAR LINE @ -DR2- INTERSECTION

L 60+00
60+00
SS-80

3 4 2 24 33 100/0.8 52 48 100/0.7 100/0.8

BT
FIAD

RESIDUAL Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated

RESIDUAL Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated

60+00.00

—L—

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	28

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

630 620 610 600 590 580 570 560 550 540 530 520

(A) **ALLUVIAL** *Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated*

(B) **WEATHERED ROCK** *METADIORITE*

2:1 2:1 2:1

Existing Ground

ROADWAY EMBANKMENT

SHEAR LINE @ -DR2- INTERSECTION

(A)

RESIDUAL *Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated*

(B)

RESIDUAL *Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated*

(B)

60+50.00

—L—

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	29

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

630 620 610 600 590 580 570 560 550 540 530 520

Ⓐ **ALLUVIAL** *Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated*

Ⓑ **WEATHERED ROCK** *METADIORITE*

2:1 2:1 2:1 4:1

Existing Ground

ROADWAY EMBANKMENT

Ⓐ

RESIDUAL *Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated*

Ⓑ

RESIDUAL *Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated*

Ⓑ

61+00.00

—L—

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	30

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

640
630
620
610
600
590
580
570
560
550
540
530

(A) *ALLUVIAL* Brown, very soft to soft, sandy to silty moderately plastic CLAY (A-6, A-7-5), trace wood fragments, wet to saturated

(B) *WEATHERED ROCK* METADIORITE

2:1
2:1
2:1
4:1

Existing Ground

ROADWAY EMBANKMENT

(A)

RESIDUAL Brown, very stiff to hard, fine to coarse sandy SILT (A-4), saturated

(B)

RESIDUAL Black to white, dense to very dense, silty fine to coarse SAND (A-2-4), saprolitic, saturated

(B)

61+50.00

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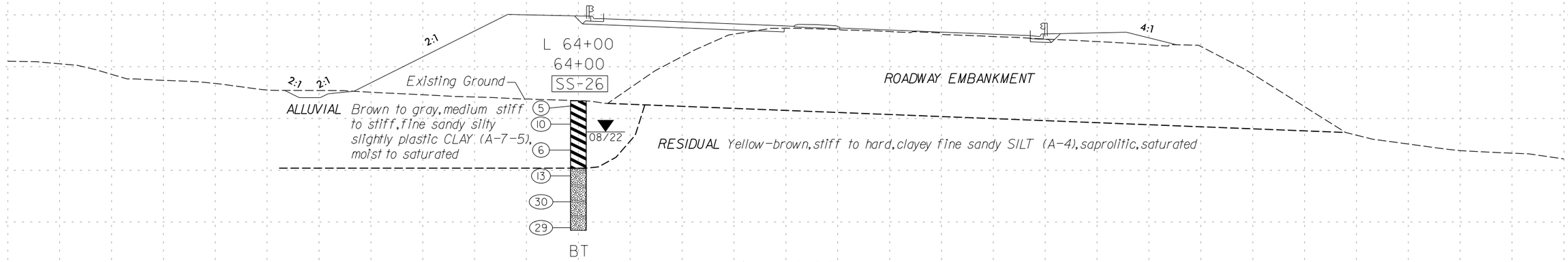
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	31

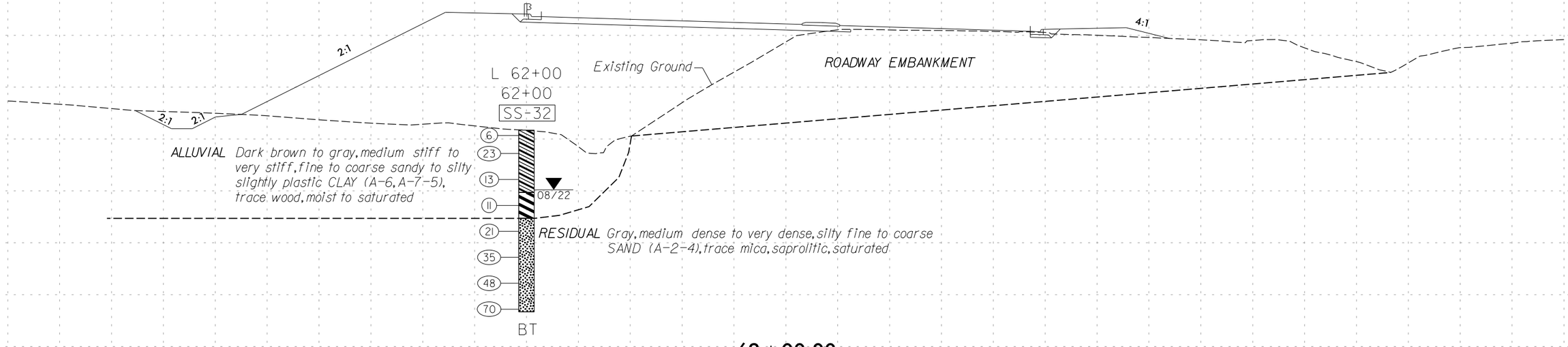
SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-26	64+00	40 LT	0.0-1.5	A-7-5	47	14	9	19	37	35	98	92	77	18	-



SOIL TEST RESULTS

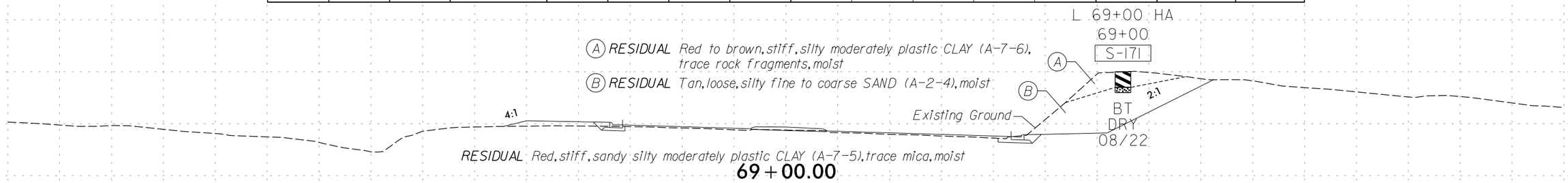
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-32	62+00	50 LT	0.0-1.5	A-6	40	13	19	23	21	37	100	91	62	23	-



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	32

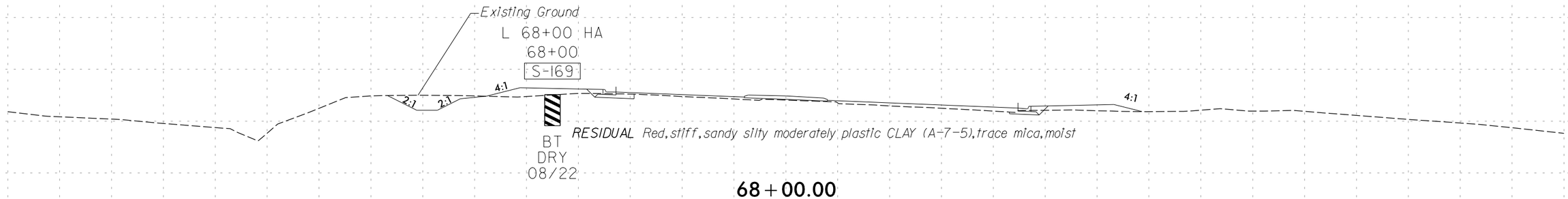
SOIL TEST RESULTS

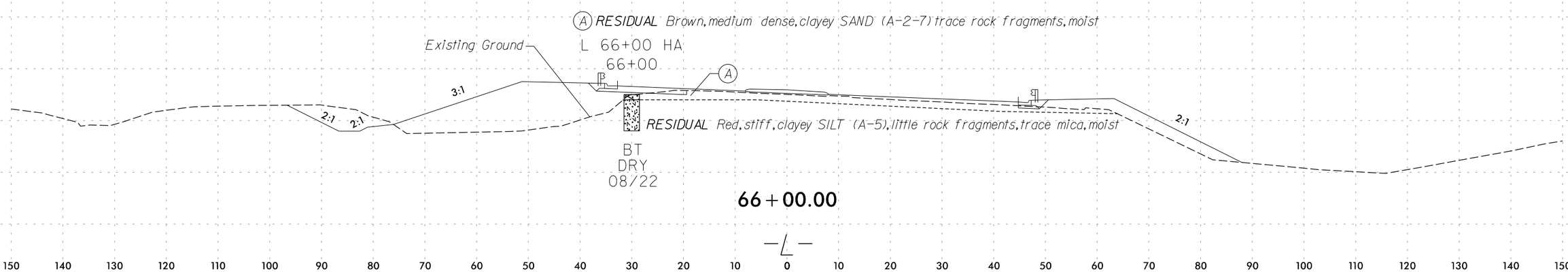
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-171	69+00	65 RT	0.5-1.0	A-7-6	51	25	29	18	15	38	100	81	57	22	-



SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-169	68+00	45 LT	0.0-0.5	A-7-5	50	20	12	22	26	40	100	93	71	19	-

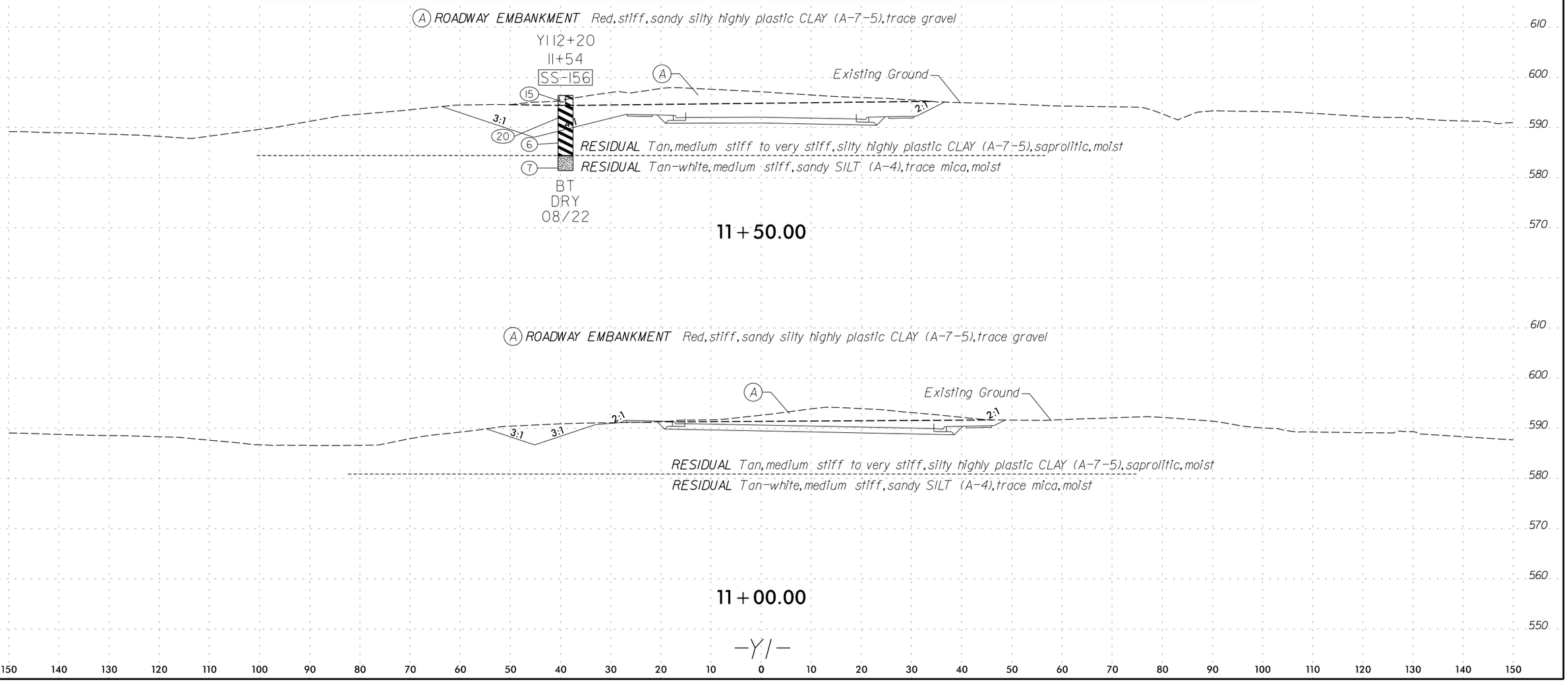




0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	33

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-156	11+54	39 LT	0.0-1.5	A-7-5	60	29	12	13	23	52	99	92	78	24	-



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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	34

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

630 620 610 600 590 580

(A) *ROADWAY EMBANKMENT* Brown to red, medium stiff to stiff, sandy silty moderately plastic CLAY (A-7-6), trace mica, moist

Existing Ground

3:1 3:1 2:1 (A)

RESIDUAL Tan-red, stiff, sandy CLAY (A-6), moist

13+00.00

620 610 600 590 580

(A) *ROADWAY EMBANKMENT* Red, stiff, sandy silty highly plastic CLAY (A-7-5), trace gravel

(A) Existing Ground

2:1 2:1

RESIDUAL Tan, medium stiff to very stiff, silty highly plastic CLAY (A-7-5), saprolitic, moist

RESIDUAL Tan-white, medium stiff, sandy SILT (A-4), trace mica, moist

12+50.00

620 610 600 590 580 570

(A) *ROADWAY EMBANKMENT* Red, stiff, sandy silty highly plastic CLAY (A-7-5), trace gravel

(A) Existing Ground

2:1 2:1

RESIDUAL Tan, medium stiff to very stiff, silty highly plastic CLAY (A-7-5), saprolitic, moist

RESIDUAL Tan-white, medium stiff, sandy SILT (A-4), trace mica, moist

12+00.00

-Y1-

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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0 5 10

PROJ. REFERENCE NO.	SHEET NO.
B-6051/U-6143	35

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

640 630 620 610 600 590 580 570

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-150	14+05	20 RT	0.0-1.5	A-7-6	46	17	16	18	23	43	100	91	69	25	-

Y1 14+05
14+05
SS-150

Existing Ground

3:1 3:1 2:1

ROADWAY EMBANKMENT Brown to red, medium stiff to stiff, sandy silty moderately plastic CLAY (A-7-6), trace mica, moist (6) (13)

RESIDUAL Tan-red, stiff, sandy CLAY (A-6), moist (11)

BT
DRY
08/22

14+00.00

Existing Ground

3:1 3:1 2:1

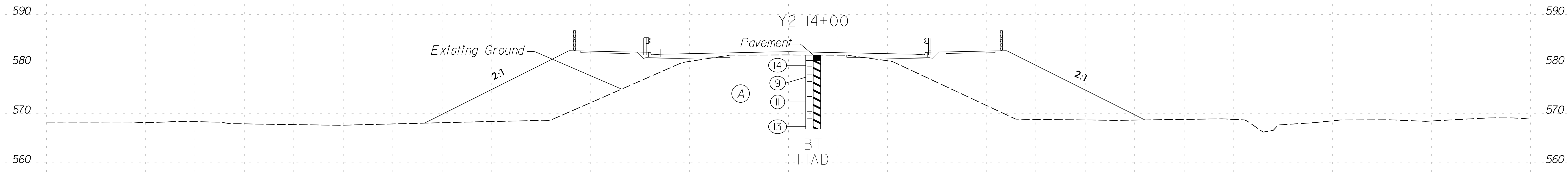
ROADWAY EMBANKMENT Brown to red, medium stiff to stiff, sandy silty moderately plastic CLAY (A-7-6), trace mica, moist

RESIDUAL Tan-red, stiff, sandy CLAY (A-6), moist

13+50.00

-Y1-

Ⓐ **ROADWAY EMBANKMENT** *Red, stiff, silty CLAY (A-7-5), trace quartz fragments, moist to wet*



14+00.00

SOIL TEST RESULTS															
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-184	12+42	45 RT	0.5-1.0	A-7-5	61	21	4	13	43	40	100	98	89	51	-

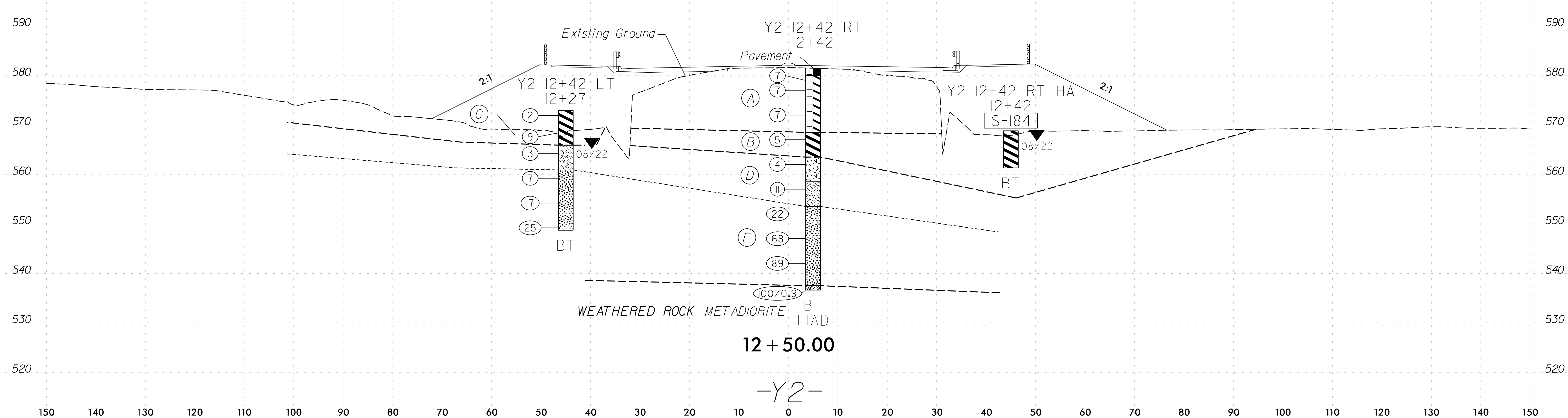
Ⓐ **ROADWAY EMBANKMENT** *Red-brown, medium stiff, sandy silty moderately plastic CLAY (A-7-5), moist*

Ⓑ **ALLUVIAL** *Gray-green to red-brown, soft to stiff, sandy silty moderately plastic CLAY (A-7-5), trace mica, trace root fragments, moist to saturated*

Ⓒ **RESIDUAL** *Brown to red, soft to stiff, silty CLAY (A-7-5), moist*

Ⓓ **RESIDUAL** *Red to brown, soft to stiff, fine to coarse sandy to clayey SILT (A-4, A-5), trace mica, saprolitic, moist to wet*

Ⓔ **RESIDUAL** *Tan-white to brown, loose to very dense, silty fine to coarse SAND (A-2-4, A-2-5), trace mica, saprolitic, wet*



12+50.00

-Y2-

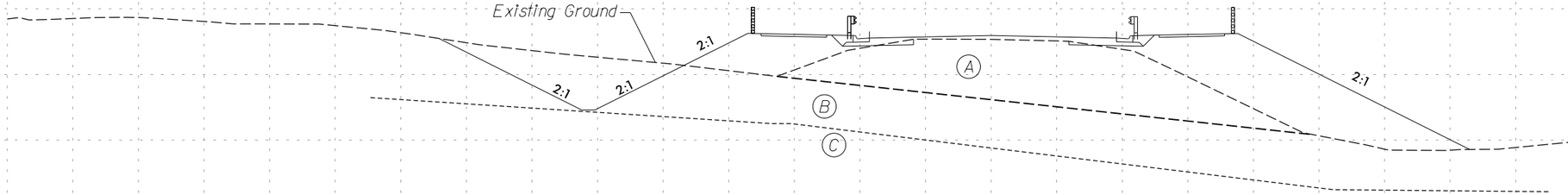
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	37

(A) *ROADWAY EMBANKMENT* Red, medium stiff, sandy silty moderately plastic CLAY (A-7-5), saprolitic, moist

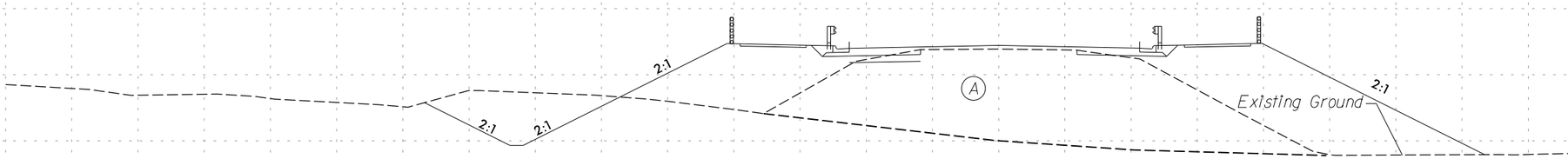
(B) *RESIDUAL* Red, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-5), saprolitic, moist

(C) *RESIDUAL* Brown, stiff, sandy SILT (A-4), saprolitic, moist



15+50.00

(A) *ROADWAY EMBANKMENT* Red, stiff, silty moderately plastic CLAY (A-7-5), trace quartz fragments, moist to wet



RESIDUAL Red to brown, soft to stiff, fine to coarse sandy to clayey SILT (A-4, A-5), trace mica, saprolitic, moist to wet

15+00.00

-Y2-

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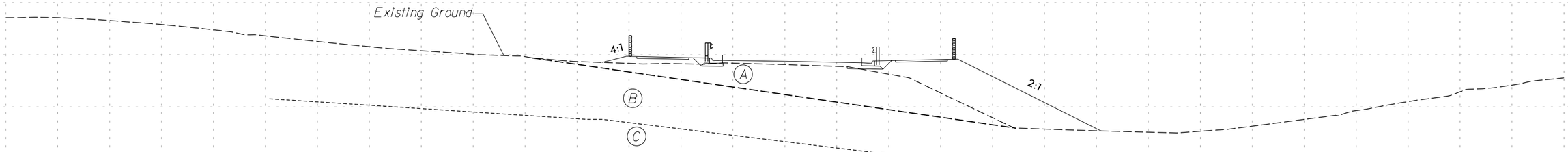
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	38

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

630 620 610 600 590 580 570 560

(A) *ROADWAY EMBANKMENT* Red, medium stiff, sandy silty moderately plastic CLAY (A-7-5), saprolitic, moist
(B) *RESIDUAL* Red, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-5), saprolitic, moist
(C) *RESIDUAL* Brown, stiff, sandy SILT (A-4), saprolitic, moist



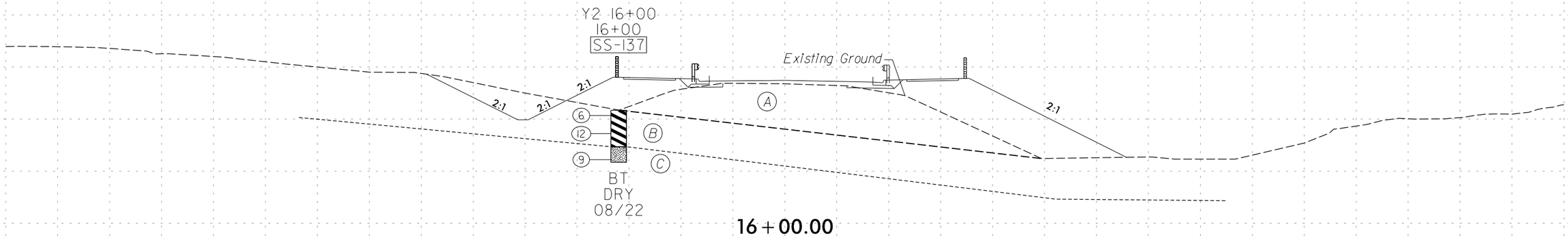
16 + 50.00

640 630 620 610 600 590 580 570 560 550

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-137	16+00	32 LT	0.0-1.5	A-7-5	71	35	13	17	16	54	100	94	74	33	-

(A) *ROADWAY EMBANKMENT* Red, medium stiff, sandy silty moderately plastic CLAY (A-7-5), saprolitic, moist
(B) *RESIDUAL* Red, medium stiff to stiff, sandy silty highly plastic CLAY (A-7-5), saprolitic, moist
(C) *RESIDUAL* Brown, stiff, sandy SILT (A-4), saprolitic, moist



16 + 00.00

-Y2-

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PROJ. REFERENCE NO.	SHEET NO.
B-6051/U-6143	39

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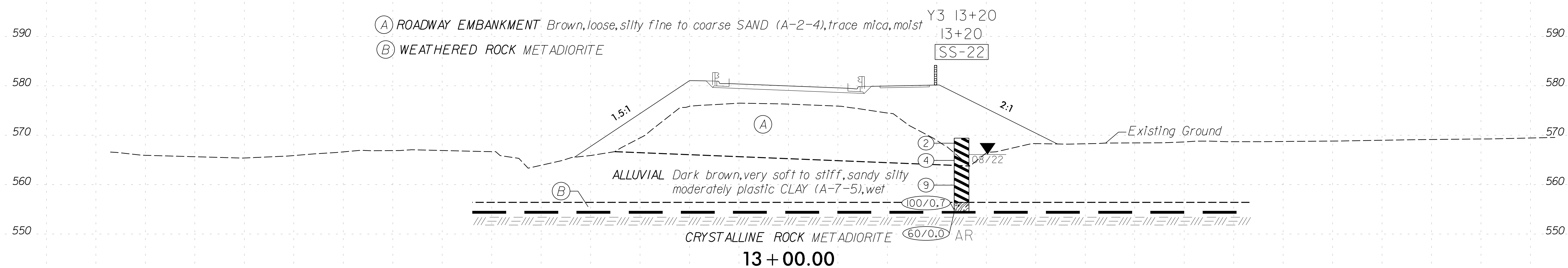
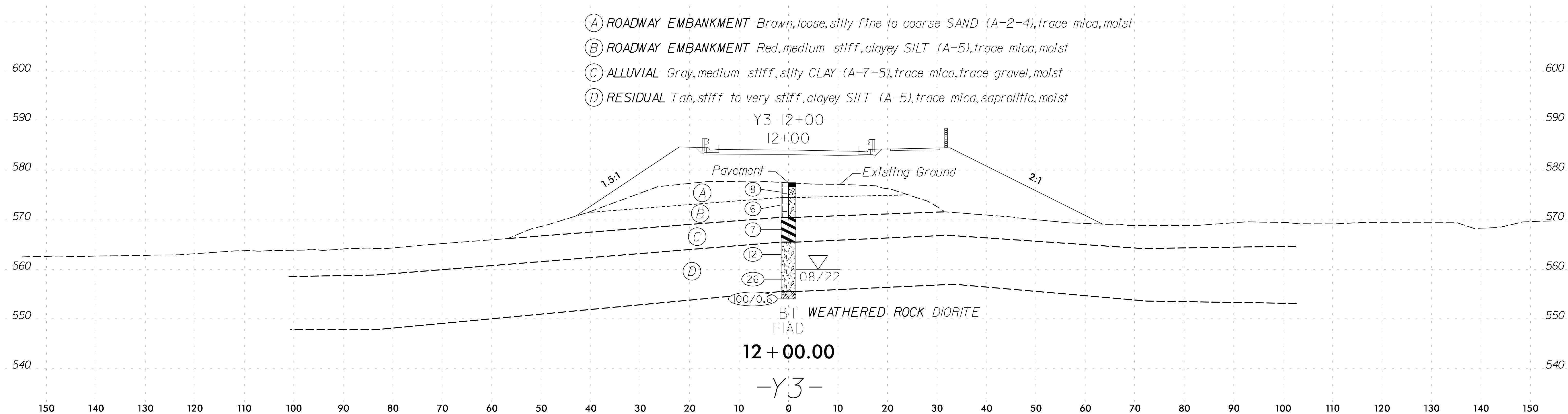
SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-22	13+20	35 RT	0.0-1.5	A-7-5	57	17	5	19	40	36	100	97	84	32	-





6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	40

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

610
600
590
580
570
560
550

(A) *ROADWAY EMBANKMENT* Red-brown, medium stiff to very stiff, silty moderately plastic CLAY (A-7-6), moist

SHEAR LINE @ DRIVE INTERSECTION

3:1

Existing Ground

RESIDUAL Red-brown, stiff, fine sandy silty CLAY (A-7-6), saprolitic, saturated

14+00.00

(A) *ROADWAY EMBANKMENT* Brown, loose, silty fine to coarse SAND (A-2-4), trace mica, moist

(B) *WEATHERED ROCK* METADIORITE

2:1

3:1

Existing Ground

ALLUVIAL Dark brown, very soft to stiff, sandy silty moderately plastic CLAY (A-7-5), wet

CRYSTALLINE ROCK METADIORITE

13+50.00

-Y3-

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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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	41

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

610 600 590 580 570 560 550

(A) ROADWAY EMBANKMENT Red-brown, medium stiff to very stiff, silty moderately plastic CLAY (A-7-6), moist

4:1 4:1 Existing Ground

RESIDUAL Red-brown, stiff, fine sandy silty CLAY (A-7-6), saprolitic, saturated

15+00.00

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-19	14+75	18 LT	0.0-1.5	A-7-6	54	25	11	14	22	53	100	94	79	28	-

(A) ROADWAY EMBANKMENT Red-brown, medium stiff to very stiff, silty moderately plastic CLAY (A-7-6), moist

Y3 14+75
14+75
SS-19

4:1 4:1 Existing Ground

7 20 15 08 22

BT RESIDUAL Red-brown, stiff, fine sandy silty CLAY (A-7-6), saprolitic, saturated

14+50.00

-Y3-

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	42

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

620
610
600
590
580
570
560

Ⓐ ROADWAY EMBANKMENT Red-brown, medium stiff to very stiff, silty moderately plastic CLAY (A-7-6), moist

Existing Ground

Ⓐ

4:1

RESIDUAL Red-brown, stiff, fine sandy silty CLAY (A-7-6), saprolitic, saturated

15+50.00

-Y3-

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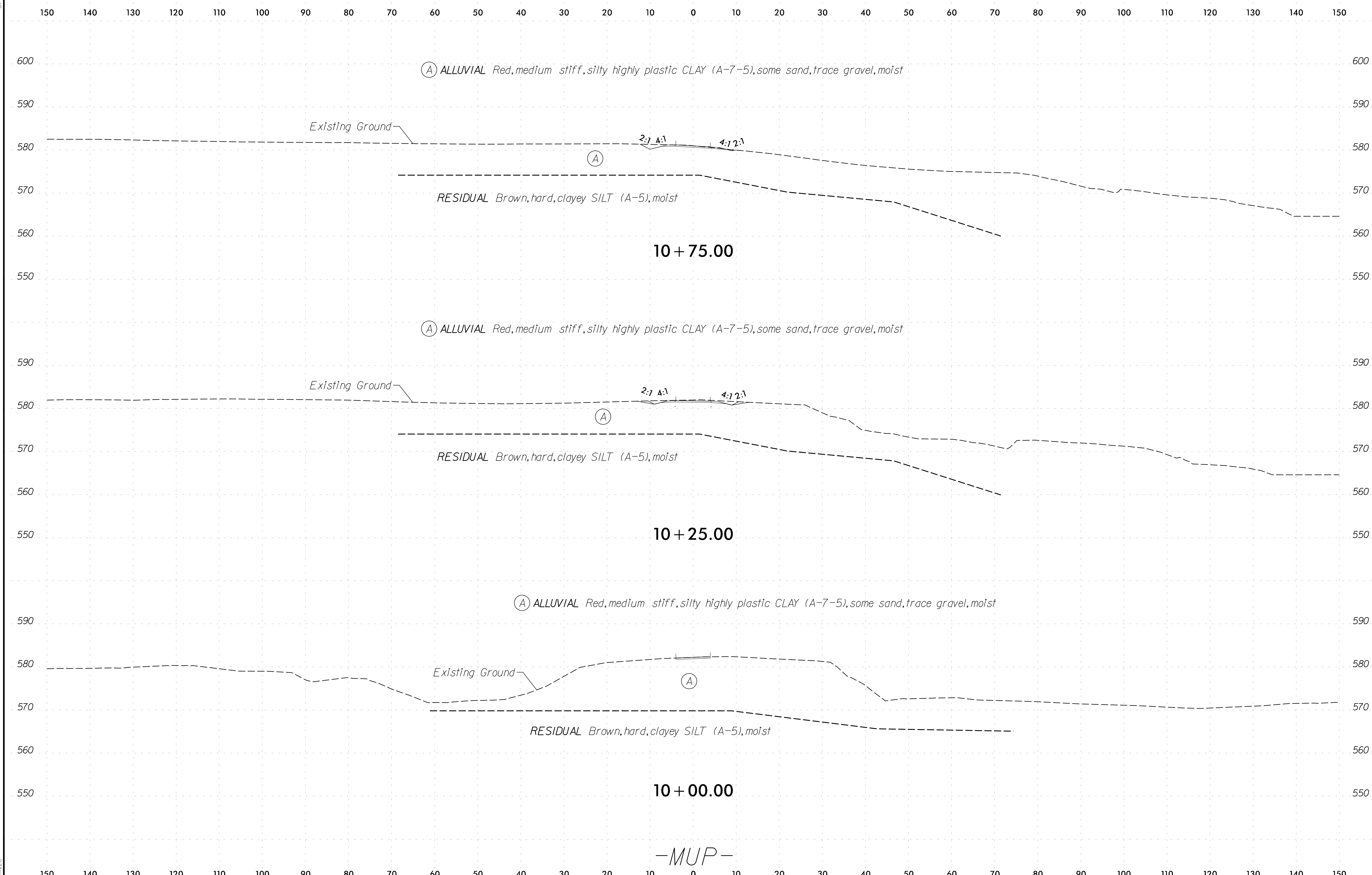
PROJ. REFERENCE NO.	SHEET NO.
B-6051/U-6143	43



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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	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

610 600 590 580 570 560 550

(A) *ALLUVIAL* Red, medium stiff, silty highly plastic CLAY (A-7-5), some sand, trace gravel, moist

Existing Ground

2:1 4:1 (A) 3:1

RESIDUAL Brown, hard, clayey SILT (A-5), moist

11+50.00

(A) *ALLUVIAL* Red, medium stiff, silty highly plastic CLAY (A-7-5), some sand, trace gravel, moist

Existing Ground

(A) 2:1 4:1 4:1 2:1

RESIDUAL Brown, hard, clayey SILT (A-5), moist

11+25.00

(A) *ALLUVIAL* Red, medium stiff, silty highly plastic CLAY (A-7-5), some sand, trace gravel, moist

Existing Ground

(A) 2:1 4:1 4:1 2:1

RESIDUAL Brown, hard, clayey SILT (A-5), moist

11+00.00

-MUP-

2/17/2023
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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	45

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

600 590 580 570 560 550 620 610 600 590 580 570 560 550

(A) *ALLUVIAL* Red, medium stiff, silty highly plastic CLAY (A-7-5), some sand, trace gravel, moist

Existing Ground

2:1 3:1 3:1 3:1

(A)

RESIDUAL Brown, hard, clayey SILT (A-5), moist

12+00.00

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-98	11+75	0 CL	0.0-1.5	A-7-5	61	29	21	8	17	54	95	80	70	26	-

(A) *ALLUVIAL* Red, medium stiff, silty highly plastic CLAY (A-7-5), some sand, trace gravel, moist

MUP 11+75
11+75
SS-98

Existing Ground

3:1 3:1 3:1 3:1

5
7
34

(A)

RESIDUAL Brown, hard, clayey SILT (A-5), moist

BT
DRY
08/22

11+75.00

-MUP-

2/17/2023
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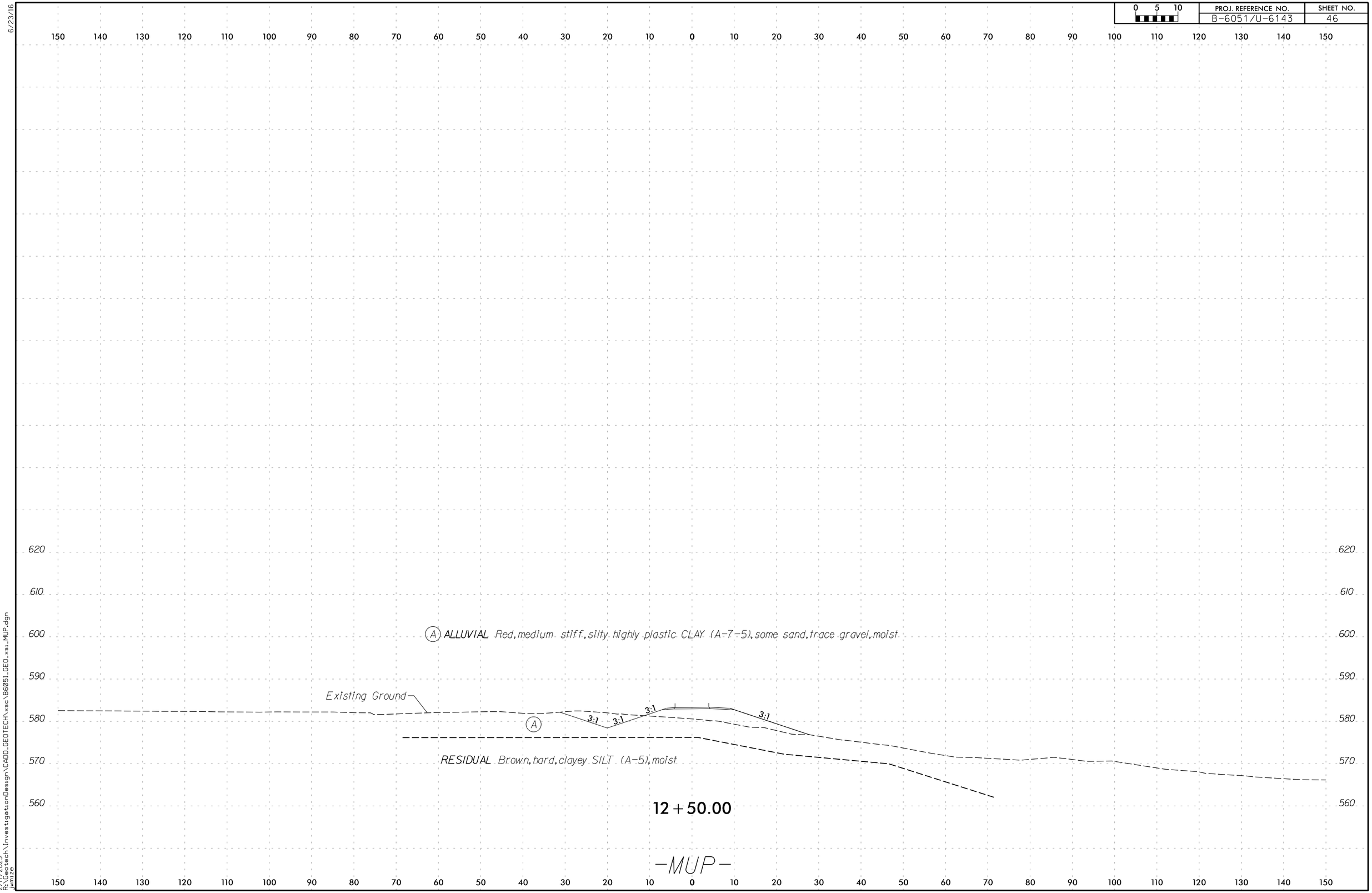
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	46



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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	47

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

620 610 600 590 580 570

(A) ROADWAY EMBANKMENT Red, stiff, sandy silty highly plastic CLAY (A-7-5), trace gravel

Existing Ground

4:1 4:1

(A)

RESIDUAL Tan, medium stiff to very stiff, silty highly plastic CLAY (A-7-5), saprolitic, moist

RESIDUAL Tan-white, medium stiff, sandy SILT (A-4), trace mica, moist

11+00.00

640 630 620 610 600 590 580 570 560 550

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-156	10+32	86 LT	0.0-1.5	A-7-5	60	29	12	13	23	52	99	92	78	24	-

(A) ROADWAY EMBANKMENT Red, stiff, sandy silty highly plastic CLAY (A-7-5), trace gravel

Y112+20
10+32
SS-156

15
20
6
7

BT
DRY
08/22

Existing Ground

3:1 3:1

(A)

RESIDUAL Tan, medium stiff to very stiff, silty highly plastic CLAY (A-7-5), saprolitic, moist

RESIDUAL Tan-white, medium stiff, sandy SILT (A-4), trace mica, moist

10+50.00

-DRI-

2/17/2023
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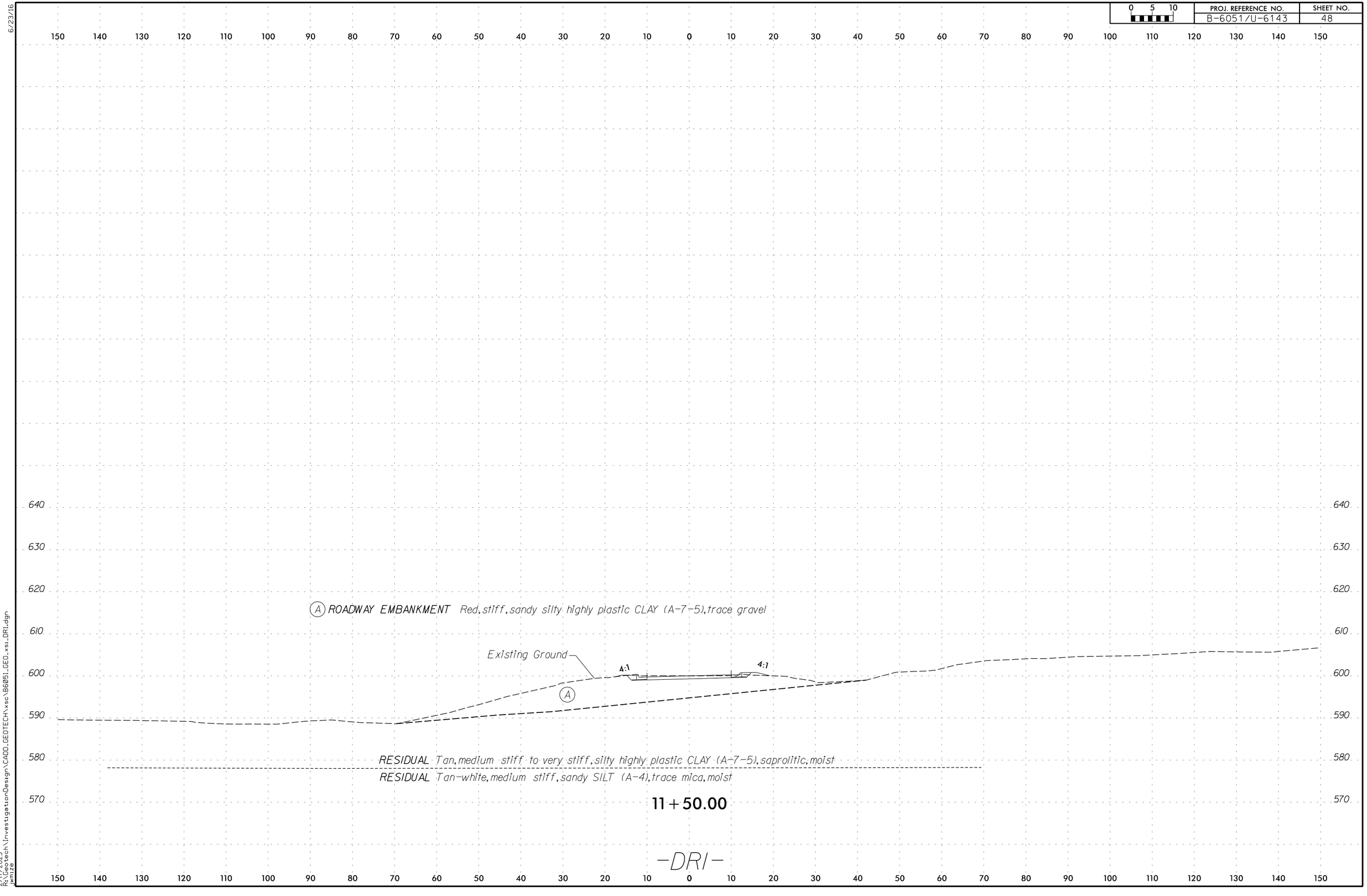
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	48



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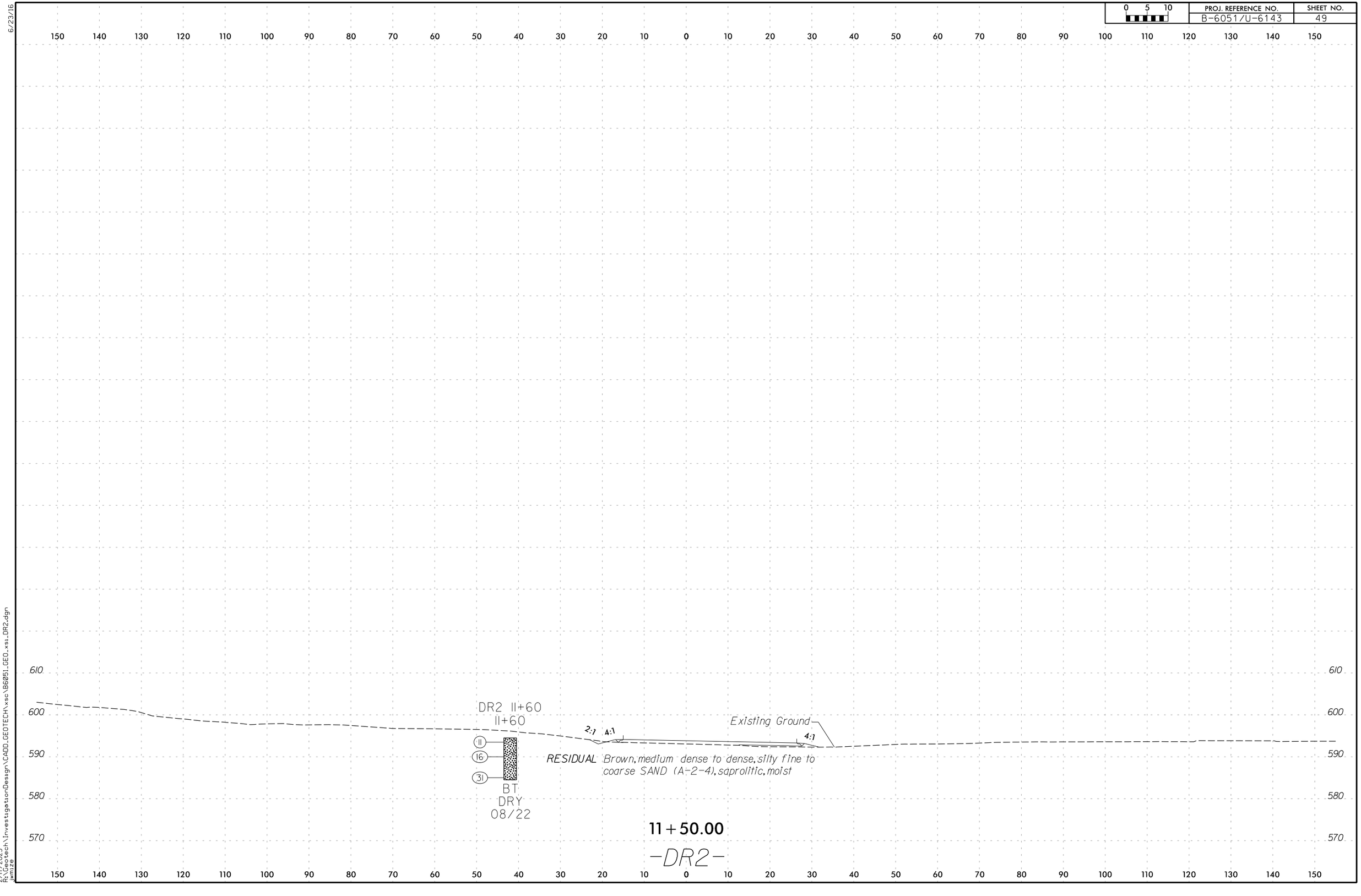
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	49



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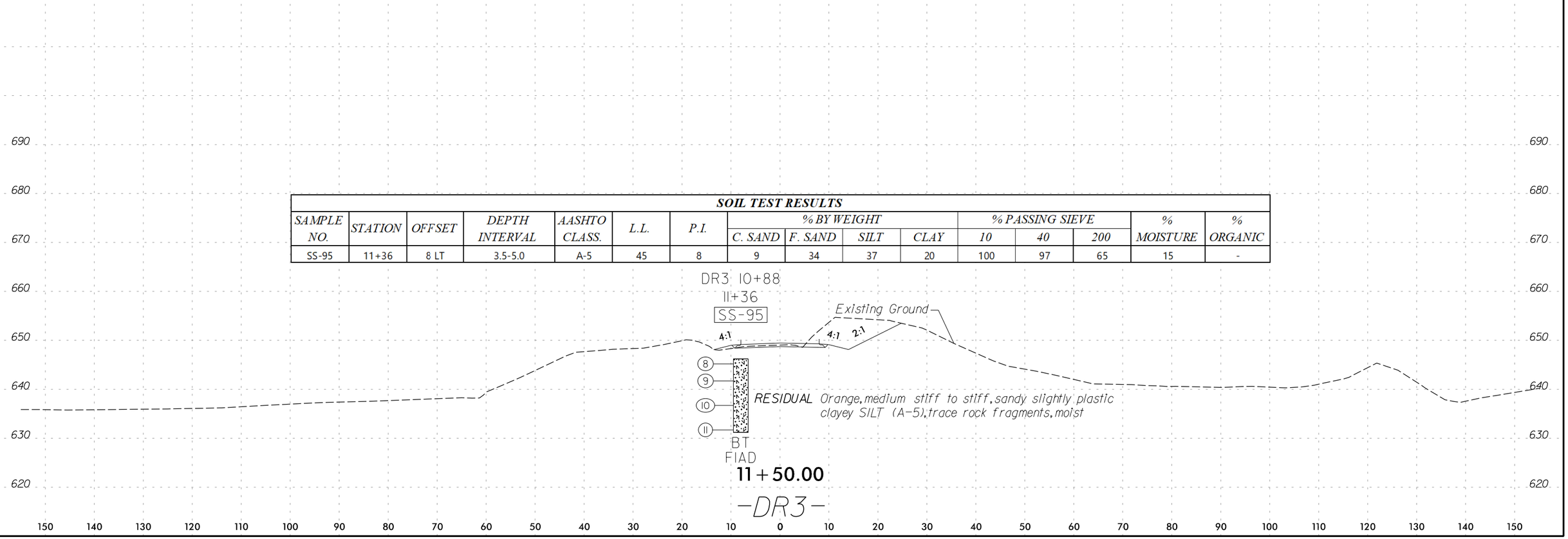
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-6051/U-6143	50

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

690 680 670 660 650 640 630 620

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-95	11+36	8 LT	3.5-5.0	A-5	45	8	9	34	37	20	100	97	65	15	-



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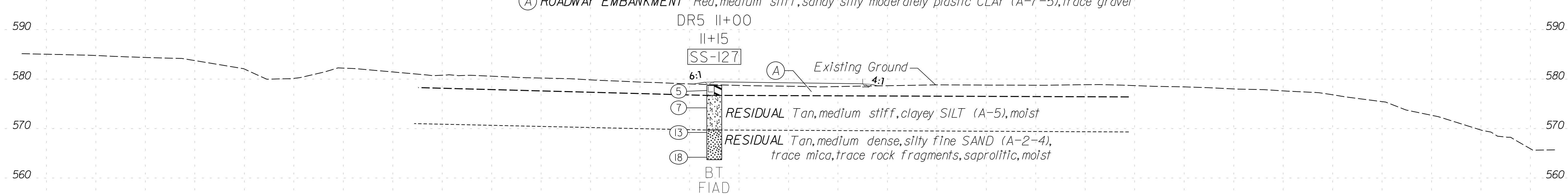
kmize

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVE			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-127	11+15	15 LT	0.0-1.5	A-7-5	53	17	16	20	31	33	99	91	68	19	-

(A) ROADWAY EMBANKMENT Red, medium stiff, sandy silty moderately plastic CLAY (A-7-5), trace gravel



11+25.00

-DR5-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-6051/U-6143	52	

REFERENCE: B-6051/U-6143

PROJECT: 48708

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

ROADWAY SUBSURFACE INVESTIGATION

APPENDIX A
LAB RESULTS

RK&K
P: (919) 878-9560
8601 Six Forks Road, Forum 1,Suite 700
Raleigh, North Carolina 27615-3960
NC License No. F-0112
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

SUMMARY OF LABORATOTY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	2205			Date Report	10/21/2022
State Project No.:	B-6051	County:	N/A	Date Tested	10/10 - 10/21/22
Federal ID No.:	N/A	TIP No.:	N/A		
Project Name:	Gaston County Bridge 0091				
Client Name:	RK&K	Client Address:	8601 Six Forks Road, Forum 1, Raleigh, NC 27615		

Boring No.	Sample No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Moist. %
								10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay				
Y3 14+75	SS-19	14+75	N/A	N/A	0.0-1.5	A-7-6	(21)	100	94	89	78.8	11	14	22	53	54	29	25	28.4
Y3 13+20	SS-22	13+20	N/A	N/A	0.0-1.5	A-7-5	(19)	100	97	95	84.0	5	19	40	36	57	40	17	31.7
L 64+00	SS-26	64+00	N/A	N/A	0.0-1.5	A-7-5	(12)	98	92	89	77.4	9	19	37	35	47	33	14	17.9
L 62+00	SS-32	62+00	N/A	N/A	0.0-1.5	A-6	(7)	100	91	81	62.0	19	23	21	37	40	27	13	22.5
L 60+00	SS-80	60+00	N/A	N/A	0.0-1.5	A-7-5	(18)	100	98	95	83.1	5	18	41	36	56	39	17	41.9
DR3 10+88	SS-95	10+88	N/A	N/A	3.5-5.0	A-5	(6)	100	97	91	64.9	9	34	37	20	45	37	8	15.2
MUP 11+75	SS-98	11+75	N/A	N/A	0.0-1.5	A-7-5	(21)	95	80	76	69.6	21	8	17	54	61	32	29	26.2
L 33+70	SS-124	33+70	N/A	N/A	0.0-1.5	A-7-6	(10)	97	88	83	66.1	14	24	29	33	42	26	16	10.2
DR5 11+00	SS-127	11+00	N/A	N/A	0.0-1.5	A-7-5	(13)	99	91	83	68.2	16	20	31	33	53	36	17	19.2
Y2 16+00	SS-137	16+00	N/A	N/A	0.0-1.5	A-7-5	(29)	100	94	87	73.9	13	17	16	54	71	36	35	33.1
L 36+20	SS-140	36+20	N/A	N/A	0.0-1.5	A-7-6	(18)	100	90	84	71.0	16	18	24	42	52	27	25	28.3
L 37+70	SS-144	37+70	N/A	N/A	0.0-1.5	A-7-5	(41)	100	98	94	85.8	6	10	18	66	75	34	41	19.9
Y1 14+00	SS-150	14+00	N/A	N/A	0.0-1.5	A-7-6	(12)	100	91	84	69.4	16	18	23	43	46	29	17	25.2
L 31+70	SS-153	31+70	N/A	N/A	0.0-1.5	A-7-6	(20)	100	91	86	77.2	14	11	20	55	53	29	24	16.7
Y1 12+20	SS-156	12+20	N/A	N/A	0.0-1.5	A-7-5	(25)	99	92	87	77.6	12	13	23	52	60	31	29	23.9
L 25+40	SS-160	25+40	N/A	N/A	0.0-1.5	A-7-6	(26)	97	90	83	70.9	15	14	10	61	65	29	36	24.2
L 27+40	SS-163	27+40	N/A	N/A	0.0-1.5	A-7-5	(13)	88	81	75	60.8	15	20	16	49	54	30	24	39.1

SUMMARY OF LABORATOTY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	2205			Date Report	10/21/2022
State Project No.:	B-6051	County:	N/A	Date Tested	10/10 - 10/21/22
Federal ID No.:	N/A	TIP No.:	N/A		
Project Name:	Gaston County Bridge 0091				
Client Name:	RK&K	Client Address:	8601 Six Forks Road, Forum 1, Raleigh, NC 27615		

Boring No.	Sample No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing Sieve #				Total Mortar Fraction (%)				LL	PL	PI	Moist. %
								10	40	60	200	Coarse Sand	Fine Sand	Silt	Clay				
L 68+00 HA	S-169	68+00	N/A	N/A	0.0-0.5	A-7-5	(15)	100	93	88	71.2	12	22	26	40	50	30	20	18.8
L 69+00 HA	S-171	69+00	N/A	N/A	0.5-1.0	A-7-6	(12)	100	81	71	56.8	29	18	15	38	51	26	25	22.0
Y2 12+42 TR HA	S-184	12+42	N/A	N/A	0.5-1.0	A-7-5	(24)	100	98	96	88.6	4	13	43	40	61	40	21	50.8
L 29+40	SS-187	29+40	N/A	N/A	1.5-3.0	A-7-5	(25)	100	94	88	78.6	12	12	18	58	59	30	29	21.4

References / Comments / Deviations: N.P.=Non-Plastic

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Mal Krajan, ET		104-01-0703	Jeremy Potter, P.E.	Project Manager
Technician Name:	Signature	Certification #	Technical Responsibility:	Position