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SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6010	1	54

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:
- 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.
 - 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.

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY ALAMANCE
PROJECT DESCRIPTION US 70 (SOUTH CHURCH STREET)
FROM WEST OF SR 1311 (UNIVERSITY DRIVE) TO
SR 1309 (WESTBROOK AVENUE) IN BURLINGTON
INVENTORY

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APPENDICES

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REFERENCE: U-6010

PROJECT: 47145

PERSONNEL

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STUDNICKY, R. T.

MOODY, J. R.

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DRAWN BY BUNCH, C. M., TALAVERA, K. E.

CHECKED BY NASH, A. A.

SUBMITTED BY RIGGS, Jr., A. F.

DATE FEBRUARY 2020

Terracon
Consulting Engineers and Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F-0869
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:
Abner F. Riggs, Jr. 3/12/2022
52280738044182 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (ASTM 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										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRERD ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED 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 (ROQ) - 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 (SCREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																													
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																													
MINERALOGICAL COMPOSITION										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-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																													
COMPRESSION										NON-CRYSTALLINE ROCK (NCR)										FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.										COASTAL PLAIN SEDIMENTARY ROCK (CPS)										COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																			
PERCENTAGE OF MATERIAL										WEATHERING										FRESH										ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.																													
GROUND WATER										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.																			
MISCELLANEOUS SYMBOLS										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																			
RECOMMENDATION SYMBOLS										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																			
ABBREVIATIONS										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.									
SOIL MOISTURE - CORRELATION OF TERMS										UNDERCUT										HARD										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																													
TEXTURE OR GRAIN SIZE										SHALLOW UNDERCUT										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.																													
CONSISTENCY OR DENSENESS										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE										MEDIUM HARD										CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																													
UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL										SOFT										CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																													
PRIMARY SOIL TYPE										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
COMPACTNESS OR CONSISTENCY										INFERRED SOIL BOUNDARY										SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										INFERRED ROCK LINE										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)										ALLUVIAL SOIL BOUNDARY										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
GENERAL CLASS.										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										VERY HARD										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																													
GROUP CLASS.										SOIL SYMBOL										HARD										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																													
SYMBOL										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										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.																													
% PASSING #10 #40 #200										INFERRED ROCK LINE										MEDIUM HARD										CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																													
MATERIAL PASSING #40 LL PI										ALLUVIAL SOIL BOUNDARY										SOFT										CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																													
GROUP INDEX										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
USUAL TYPES OF MAJOR MATERIALS										SOIL SYMBOL										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
GEN. RATING AS SUBGRADE										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
EXCELLENT TO GOOD										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
FAIR TO POOR										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
FAIR TO POOR										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
POOR										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
UNSATURABLE										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																													

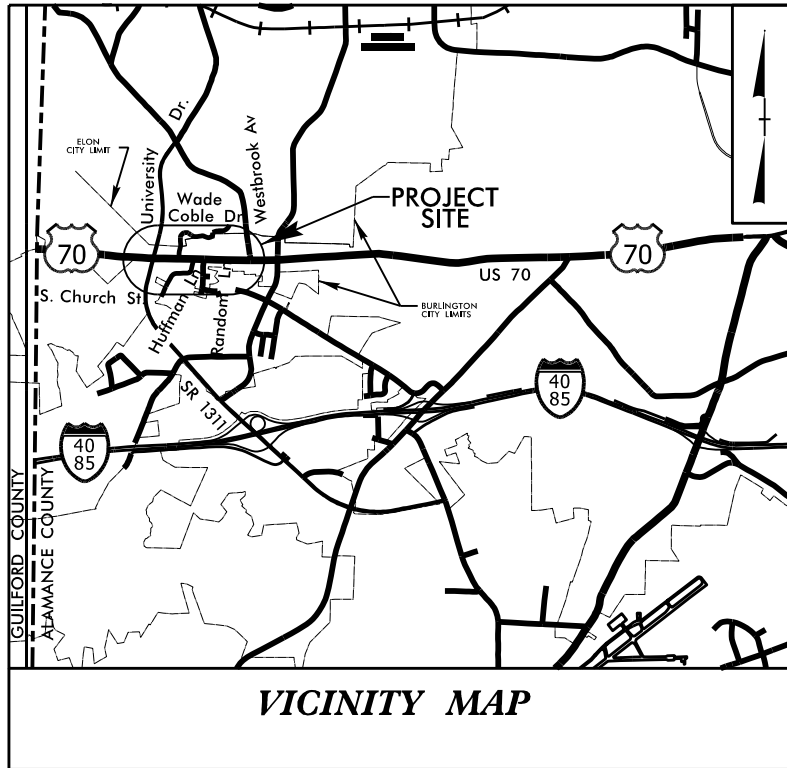
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6010	3	54
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47145.1.1		PE	
47145.2.1		ROWUTIL	
47145.3.1		CONST	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ALAMANCE COUNTY

LOCATION: US 70 (S. CHURCH ST.) FROM WEST OF UNIVERSITY DR. (SR 1311) TO WESTBROOK AVE. (SR 1309) IN BURLINGTON

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS
CULVERT EXTENSIONS AND PAVEMENT MARKING**

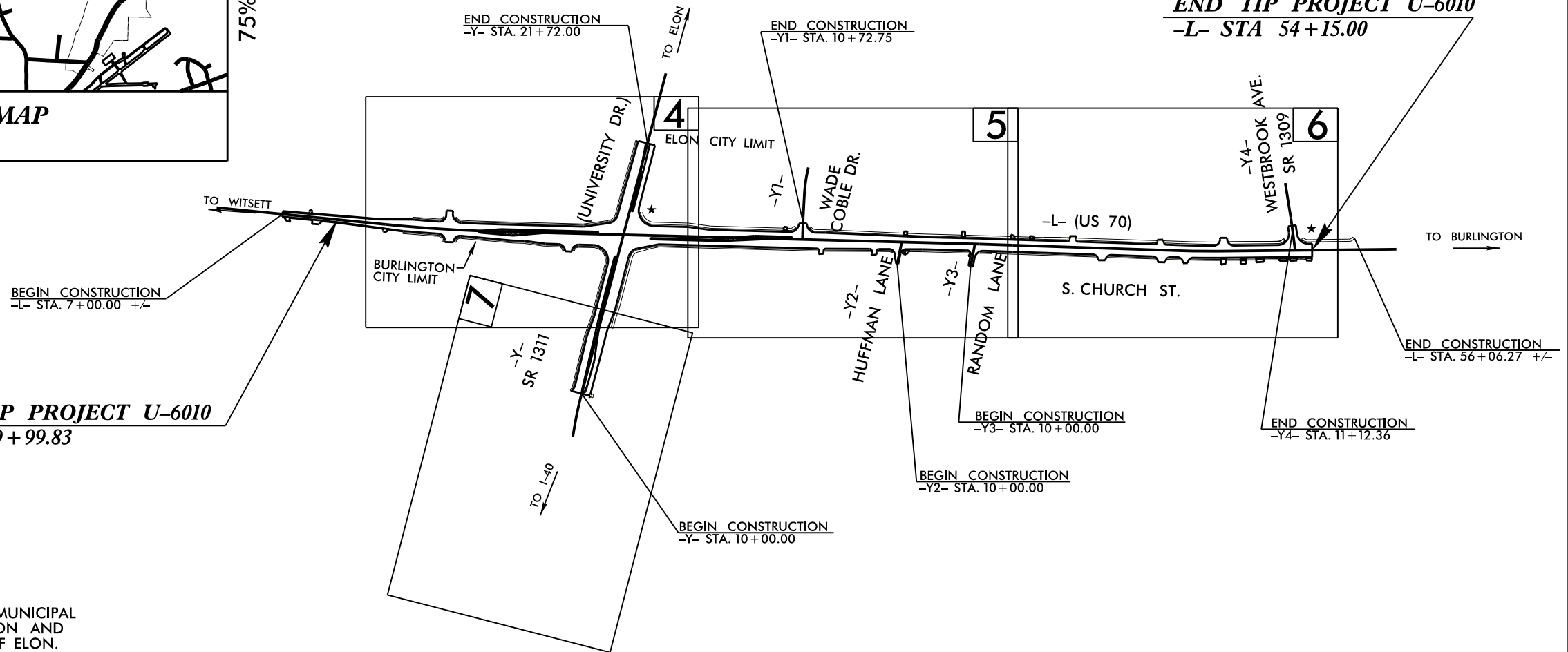


VICINITY MAP

75% ROW PLANS - 5/31/2019

BEGIN TIP PROJECT U-6010
-L- STA 9+99.83

END TIP PROJECT U-6010
-L- STA 54+15.00



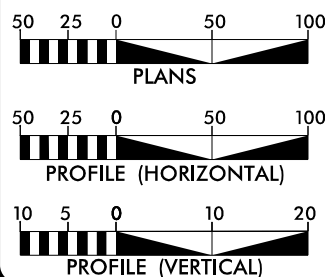
★ DENOTES SIGNAL

THIS PROJECT IS LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF BURLINGTON AND IS NOT LOCATED WITHIN THE TOWN OF ELON.

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2020 = 12,500
ADT 2040 = 14,400
K = 13 %
D = 50 %
T = 3 % *
V = 50 MPH
* TTST = 2 DUAL 1
FUNC CLASS =
URBAN ARTERIAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-6010 = 0.836 MILES
TOTAL LENGTH OF TIP PROJECT U-6010 = 0.836 MILES

Prepared in the Office of:



2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 31, 2019

LETTING DATE:
OCTOBER 20, 2020

DAVID L. WILVER PE
PROJECT ENGINEER

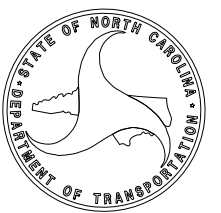
DAVID GARRETT
PROJECT DESIGN ENGINEER

NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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CONTRACT: 47145 TIP PROJECT: U-6010

CONTRACT: 47145



PROJECT REFERENCE NO.	SHEET NO.
U-6010	3A

Date: February 11, 2020

WBS Number: 47145.1.1
 TIP Number: U-6010
 County: Alamance
 Description: US 70 (S. Church St.) from West of University Dr. (SR 1311) to Westbrook Ave. (SR 1309) in Burlington

Subject: Roadway Geotechnical Report - Inventory

Project Description

The project is located along US 70 (Church Street) and University Drive in Burlington, North Carolina. The project has a total length of approximately 0.836 miles and will consist of widening the existing roadway. The new section will consist of wider four-lanes with and without sidewalks down both sides separated periodically by a concrete median and will include four and six lane sections for center left turn lanes. Additionally, the existing RCBC structure at approximately station 19+40 -L- will be extended at both ends and the existing 72-inch RCP at approximately station 19+84-L- will be replaced with a precast box culvert structure at the crossing of Michaels Branch. The existing RCBC structure at station 14+36 -Y- will be extended on the downstream side. The project will also include the construction of a retaining wall between stations 17+50 to 18+50-L- having a maximum height of about 5 feet. The project corridor is in an urban setting with both residential and commercial development. The project will require minimal cuts of less than 6 feet and maximum fill placement of about 12 feet at the culverts.

The geotechnical subsurface investigation was performed in October of 2019. The site was investigated with a total of twenty-three (23) standard penetration test (SPT) borings and eight (8) hand auger borings. The hand auger borings were performed due to limited access beneath overhead utilities or rig access limitations. Additionally, seven (7) auger probes, performed during the pavement design investigation are included in this report. The hand auger borings were advanced to depths of 1 to 6 feet beneath the ground surface. Hand auger borings L_2750 and Y_2029 were terminated upon refusal at a depth of 1.0 foot on an obstruction or possible utility. Standard penetration test (SPT) borings were advanced using a CME 45B truck rig equipped with a recently calibrated automatic hammer. SPT Borings were advanced utilizing hollow stem auger drilling techniques to depths 8.6 to 15.0 feet. Representative soil samples were collected in the field for visual classification and selected samples were submitted for laboratory analysis by Terracon's soil testing laboratory. Laboratory testing was performed in accordance with the AASHTO Soil Classification System.

The following alignments were investigated by soil testing and visual reconnaissance:

<u>Alignment</u>	<u>Stations(±)</u>
-L-	10+00 to 54+15
-Y-	10+00 to 21+72

Physiography and Geology

The site is located within the Piedmont Physiographic Province of North Carolina, east of Greensboro, North Carolina. Topography in the area is rolling to moderately steep. The Piedmont Province is characterized by gently to steeply sloping topography with well-rounded hills and along rolling ridges with a northeast-southwest trend dissected by a moderate to well developed (mature) dendritic-type drainage system consisting of drainage swales, hollows, tributaries, streams and rivers. The existing elevations along the investigated corridor range from approximately 603 feet to 674 feet. In general, the site rises in elevation to the east and drains centrally to Micheals Branch which flows south.

Geologically, the site is located within the Carolina Slate Belt. Based on the North Carolina Geologic Map 1985, the underlying rock formation at this site consist of metamorphosed felsic and mafic metavolcanics rocks with igneous, intrusive, metamorphosed gabbro and diorite rocks of Permian Age. These igneous rocks have a medium to coarse grained rock structure. These rocks typically weather in an irregular pattern with deep residual soils overlying saprolite to bedrock. The typical residual profile consists of finer grain clays and silts near the ground surface which gradually transition to coarser and denser material with depth and contain some mica.

Soil Properties

Soils encountered during this investigation are separated into four categories based on their origin. Soils encountered consist of roadway embankment fill, artificial fill, alluvial and residual.

Roadway embankment soils were encountered at the following approximate locations:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	9+60 to 11+75
-L-	17+90 to 21+70
-L-	26+95 to 31+45
-L-	32+65 to 35+25
-L-	35+75 to 37+50
-L-	39+50 to 42+55
-L-	46+10 to 51+75
-Y-	10+00 to 15+70

Roadway embankment soils were encountered along the existing roadway shoulders to depths of about 1 to 11 feet. The roadway embankment soils consist of slightly to highly plastic, soft to very stiff, dry to moist, silty clay and sandy clay (A-7-6, A-6). The roadway embankment soils appear to be reworked near-by residual soils. These clay soils exhibited plastic indices of 13 to 26 percent and are slightly to highly plastic.



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Artificial fill soils were encountered at the following approximate locations:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	20+70 to 22+20 RT
-L-	34+25 to 34+75 RT
-Y-	14+60 to 16+60 LT

Artificial fill material was encountered within isolated areas along entrances to commercial structures. These areas are listed in "Areas of Special Geotechnical Interest." The artificial fill soil extends to depths of about 1.5 to greater than 6 feet beneath the ground surface and are underlain by residual soils. The artificial fill soil consists of moderately to highly plastic, medium stiff, dry to moist, silty clay and sandy clay (A-7-6, A-6).

Alluvial soils were encountered at the following approximate locations:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	19+20 to 19+99
-Y-	14+10 to 14+70

Alluvial deposits are present adjacent to Micheals Branch at the proposed culvert crossings of Church Street -L- and University Drive -Y-, beneath the roadway embankment and at the surface on both sides of the adjacent roadway embankment. The alluvial soils along the -L- alignment consist of soft, moist to wet, silty clays (A-7-6) and very loose, wet to saturated, clayey fine to coarse sands (A-2-6).

Residual soils are present at the surface along the majority of the project and beneath the roadway embankment soils, asphalt pavement sections, artificial fill and alluvium in the remaining portions of the project. The residual soils are deeply weathered and extend to greater than the roadway boring termination depths of about 15 feet at most locations. The residual soils can be generalized as about 1 to 15 feet of moderate to highly plastic, medium stiff to hard, dry to wet, silty clay and sandy clay (A-7-6, A-7-5, A-6) with trace to some mica and trace to some rock fragments, at the surface, underlain by slightly to non-plastic sandy silts, clayey silts and silty sands. These clays exhibit slightly to highly plastic indices of 11 to 55 percent. The highly plastic residual soils are indicated on the attached cross section graphics. The slightly plastic silts and clayey silts consist of medium stiff to hard, dry to wet, fine to coarse sandy silts (A-4) and clayey silts (A-5). The sands consist of loose to very dense, moist silty coarse to fine sands with rock fragments (A-2-4).

Rock Properties

Weathered rock was encountered during the roadway investigation. The depth to weathered rock varied from about 7 to 14 feet and originates from the underlying metavolcanic and metamorphosed diorite crystalline rock.

Crystalline rock (metavolcanics and metamorphosed diorite) was encountered during the roadway investigation. Crystalline rock is present at depths of 8.5 to 14.1 feet beneath the ground surface. No outcrops of crystalline rock were observed during drilling operations.

Groundwater

24-hr groundwater levels were encountered as high as 4.3 to 7.0 feet of the ground surface. Other areas were dry to depths greater than 10.7 feet after 24-hours from completion of drilling. The depth of groundwater, beneath the ground surface, will fluctuate with seasonal precipitation and may occur at higher levels at other times of the year above less permeable clayey soils.

Areas of Special Geotechnical Interest

- 1) Plastic Soils – High plasticity soils with a Plasticity Index of 26 or greater occur throughout a majority of project and may impact grading at the following locations:

<u>Alignment</u>	<u>Stations(±)</u>
-L-	17+25 to 19+25
-L-	28+25 to 31+25
-L-	32+75 to 35+25
-L-	39+25 to 42+25
-L-	47+75 to 54+15
-Y-	10+00 to 15+25

A discussion of these plastic soils is located above in the section titled "Soil Properties".

- 2) Alluvial Soils- Relatively recent flood plain deposits typically consisting of very soft clay and very loose sands which have the potential to cause embankment stability/settlement problems occur through the following sections:

<u>Alignment</u>	<u>Stations (±)</u>
-L-	19+20 to 19+99
-Y-	14+10 to 14+70

- 3) Artificial Fill- Artificial fill was encountered at the following locations:

<u>Alignment</u>	<u>Station (±)</u>
-L-	20+70 to 22+20 RT
-L-	34+25 to 34+75 RT
-Y-	14+60 to 16+60 LT

A discussion of these artificial soils is located above in the section titled "Soil Properties".

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4) Groundwater- The following locations were found to exhibit a high-water table, seasonal high groundwater or the potential for groundwater related construction problems:

<u>Alignment</u>	<u>Station (±)</u>
-L-	19+20 to 19+99
-Y-	14+10 to 14+70

Closing

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service. Please contact us at your convenience.

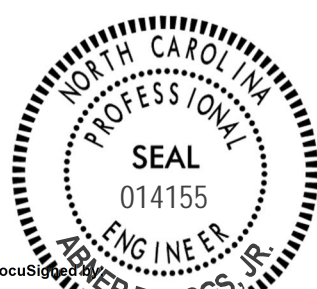
BULK SAMPLES

<u>Sample No.</u>	<u>Location</u>	<u>Depth (ft.)</u>	<u>Test</u>
CBR-1	25+50 -L- 75' LT	1.0 – 3.0	Proctor and CBR
CBR-2	52+33 -L- 49' LT	1.0 – 3.0	Proctor and CBR
CBR-3	38+50 -L- 42' RT	1.0 – 3.0	Proctor and CBR

UNDISTURBED SAMPLES

No “Shelby” tube samples were taken.

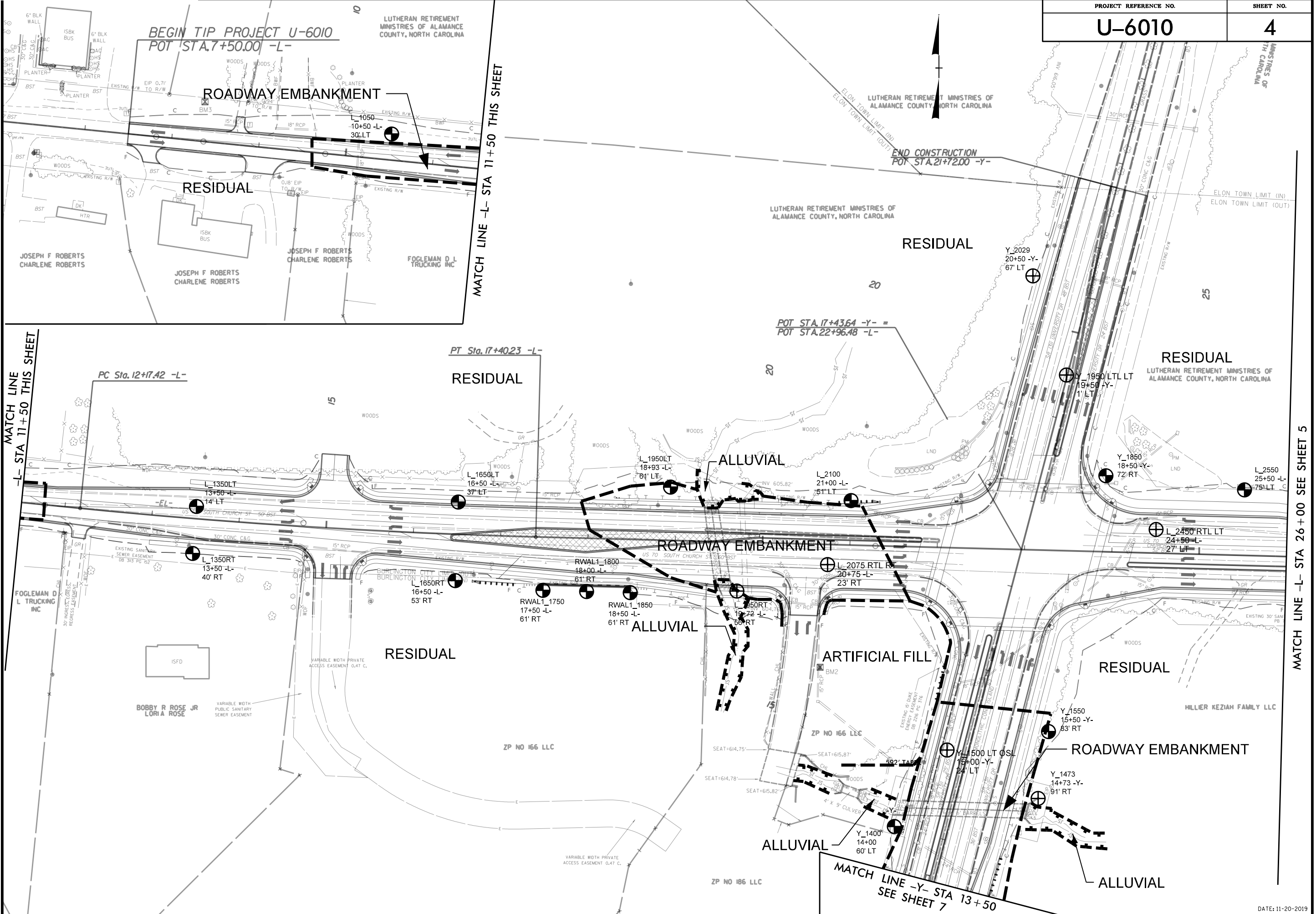
Sincerely,
Terracon Consultants, Inc.



DocuSigned by:
Abner F. Riggs, Jr.
5228073BBA4F482...
3/2/2022

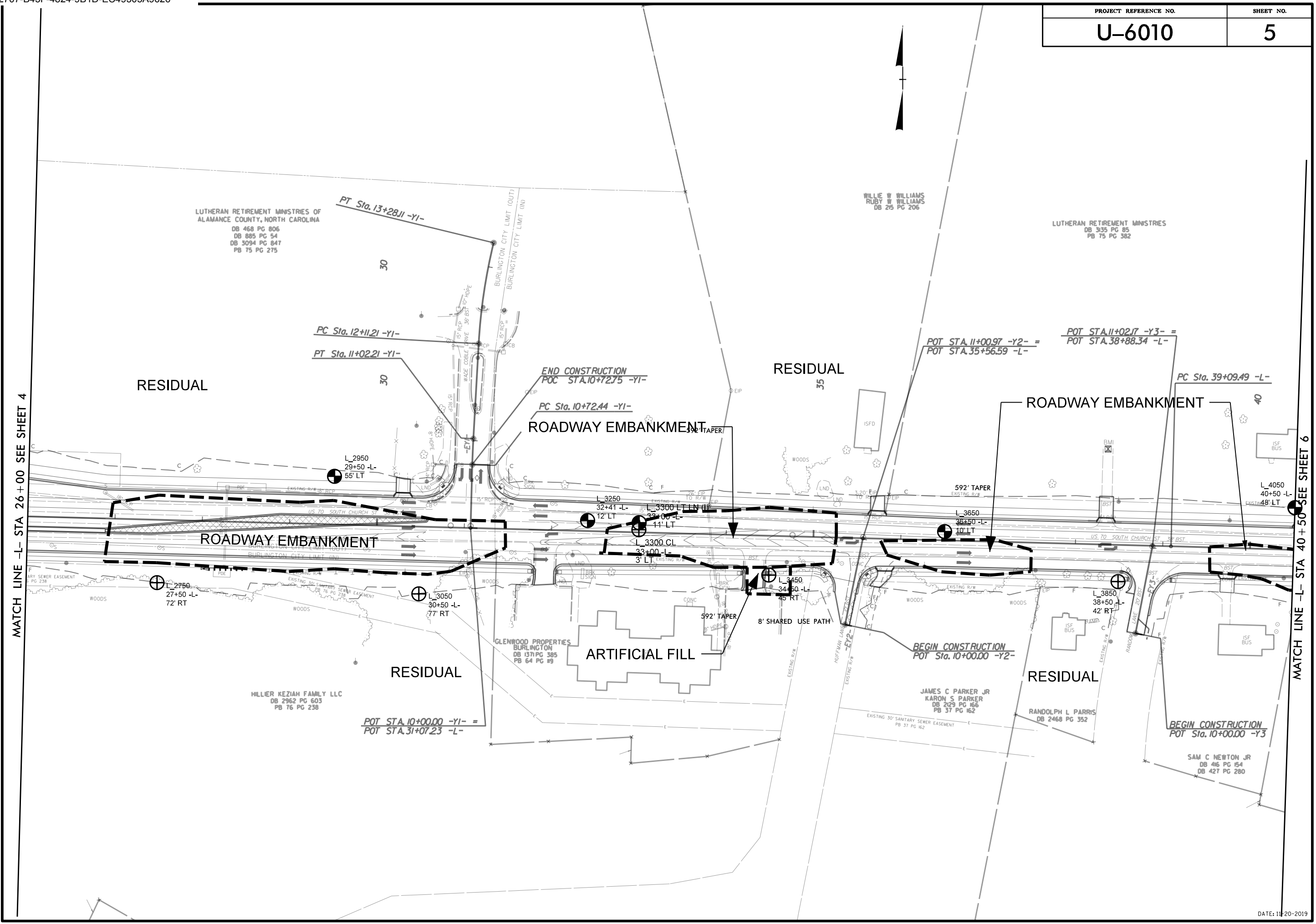
Abner F. Riggs, Jr., P.E.
Senior Geotechnical Engineer
N.C. Registration No. 14155

Andrew A. Nash, P.E.
Geotechnical Department Manager
N.C Registration No. 31022



MATCH LINE -L- STA 26+00 SEE SHEET 5

PROJECT REFERENCE NO.	SHEET NO.
U-6010	5

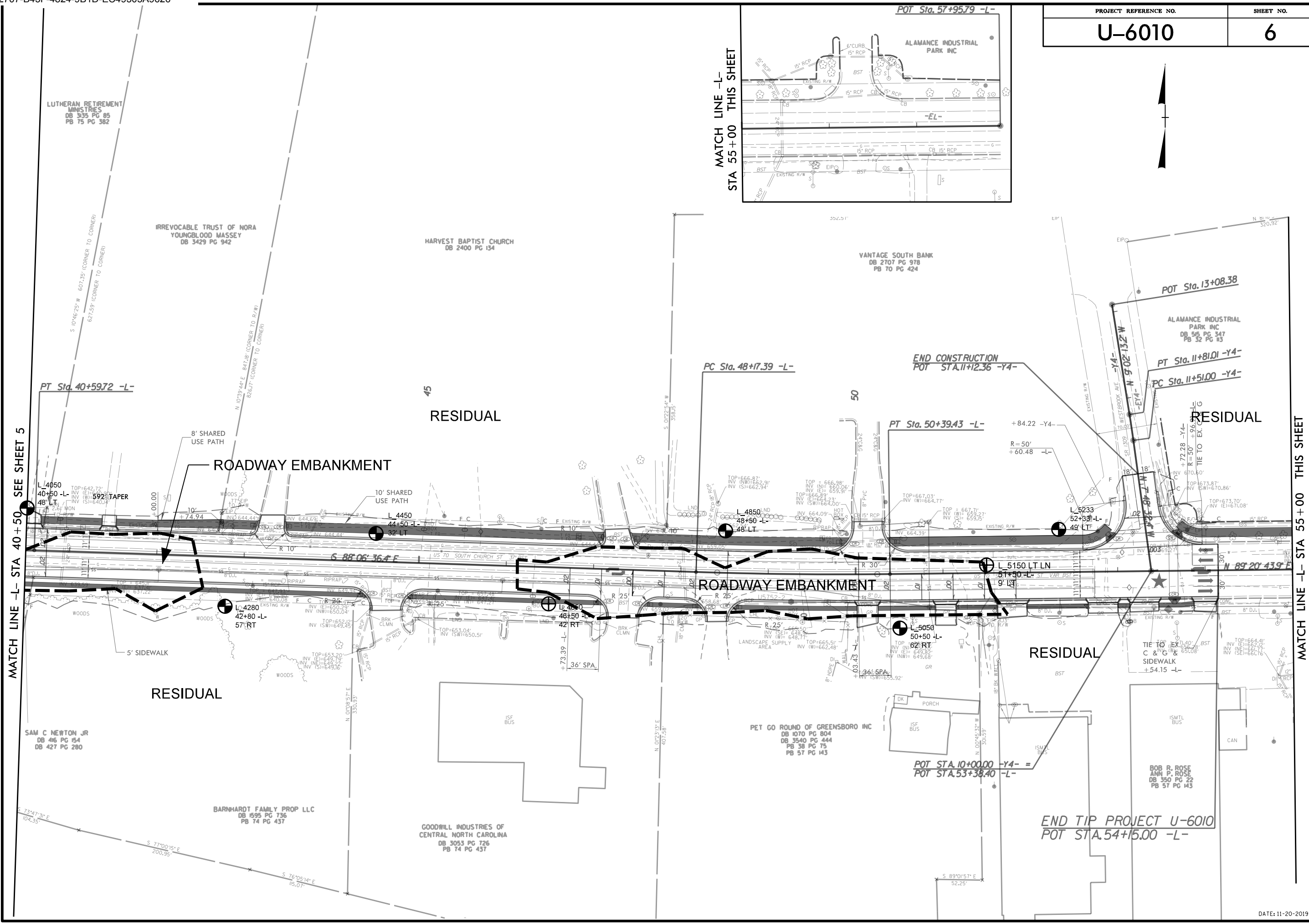
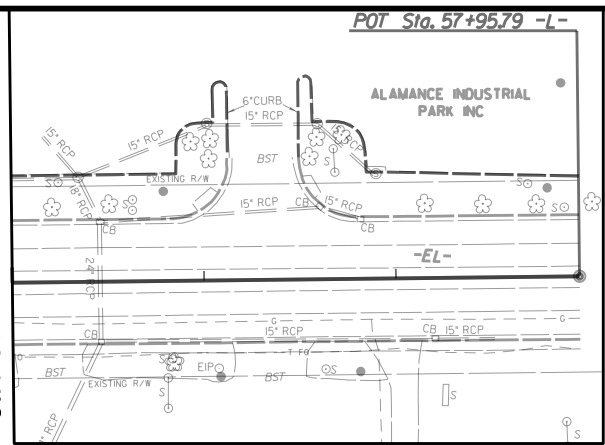


MATCH LINE -L- STA 26+00 SEE SHEET 4

MATCH LINE -L- STA 40+50 SEE SHEET 6



MATCH LINE -L- STA 55+00 THIS SHEET



MATCH LINE -L- STA 40+50 SEE SHEET 5

MATCH LINE -L- STA 55+00 THIS SHEET

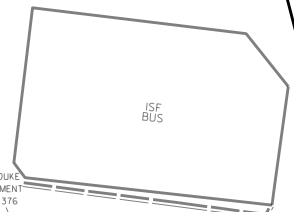
PROJECT REFERENCE NO.	SHEET NO.
U-6010	7



BEGIN CONSTRUCTION
PT Sta. 10+00.00 -Y-

ZP NO 186 LLC
DB 3243 PG 538
PB 75 PG 109

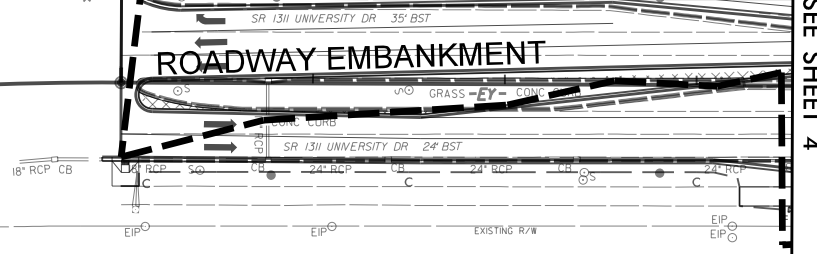
RESIDUAL



-Y- PC Sta. 8+00.00



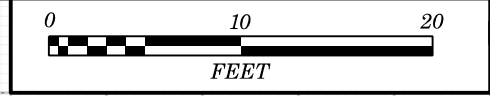
ROADWAY EMBANKMENT



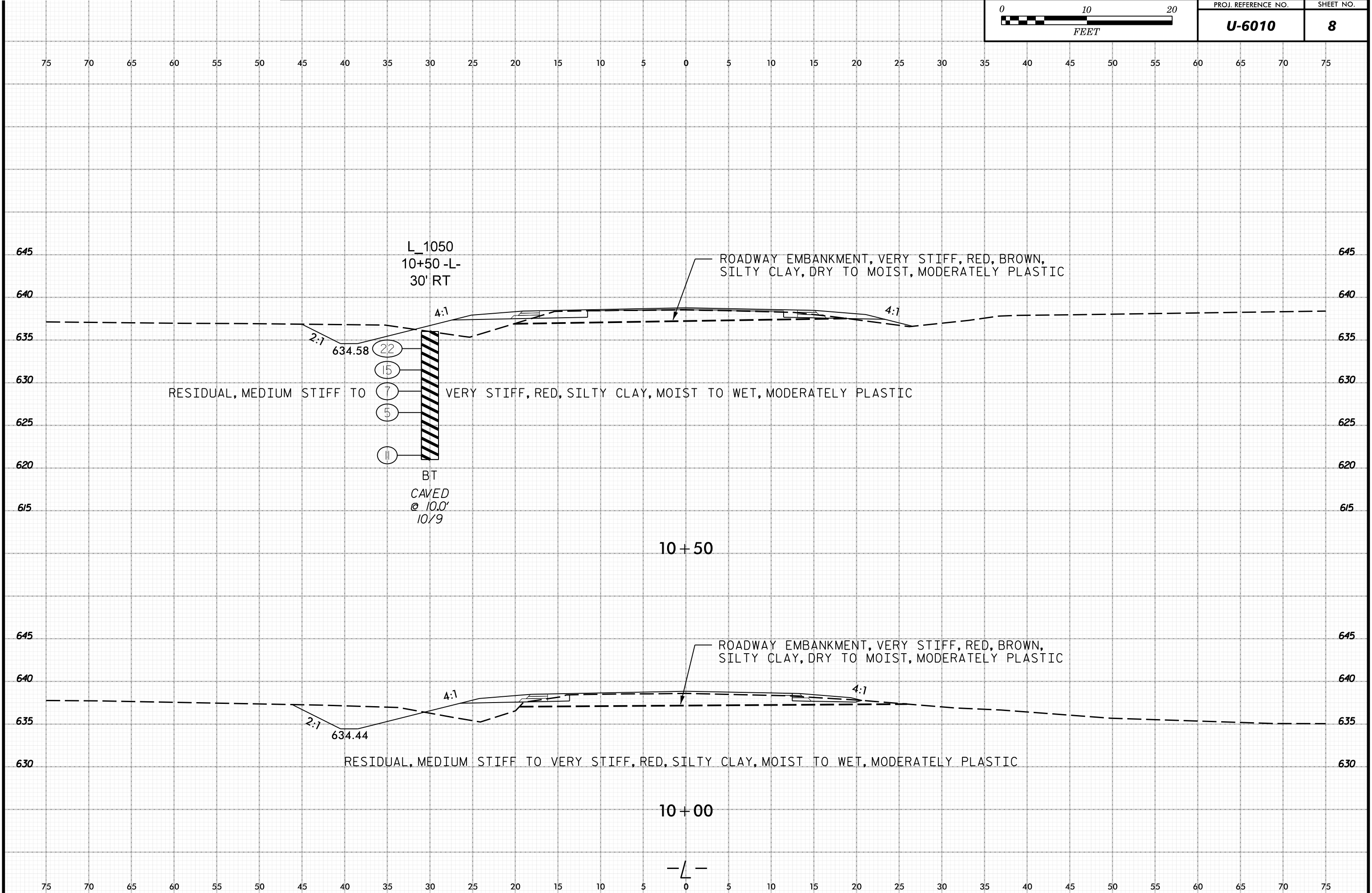
RESIDUAL

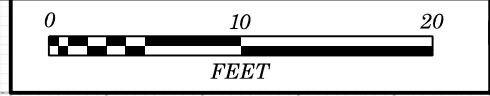
HILLIER KEZIAH FAMILY LLC
DB 2962 PG 603
PB 76 PG 238

MATCH LINE -Y- STA 13+50
SEE SHEET 4



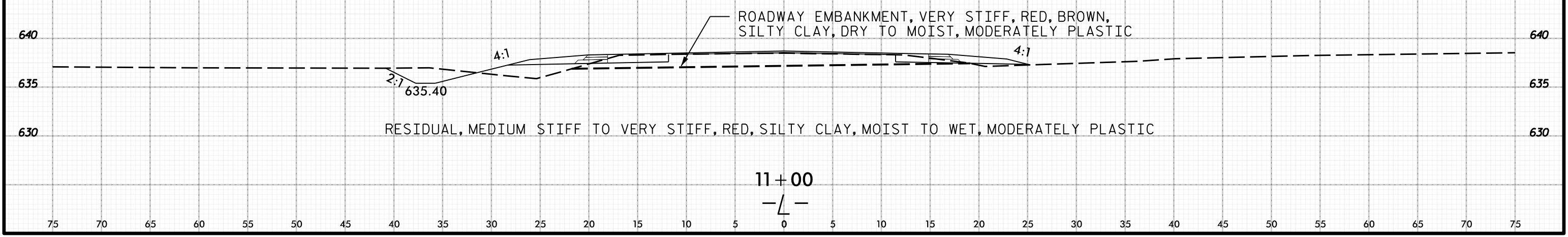
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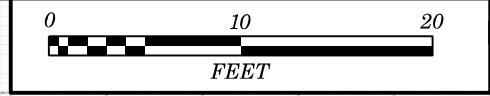




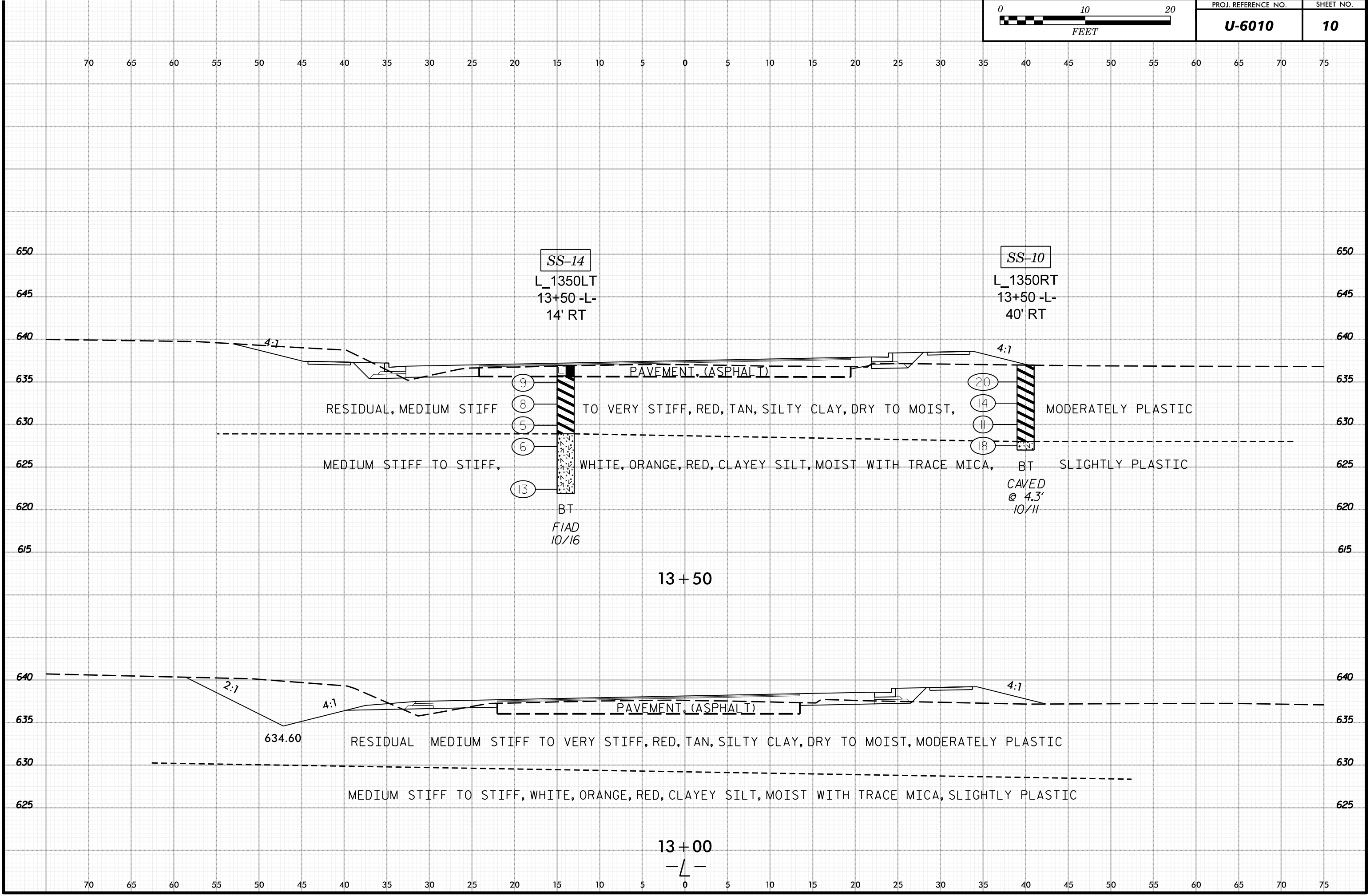
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U-6010	9

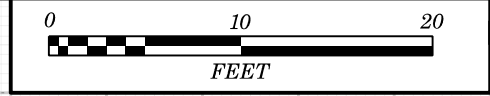
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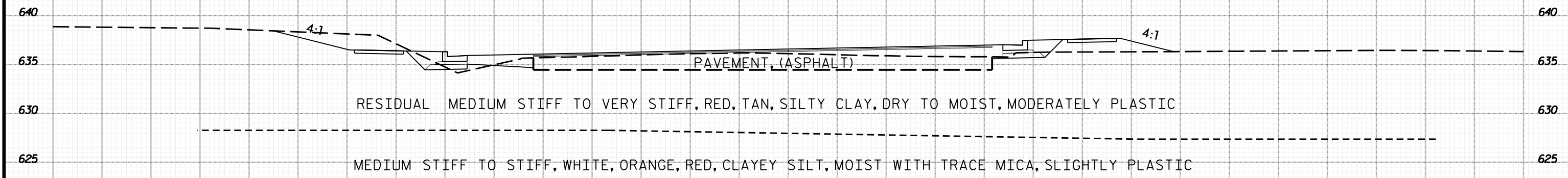
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U-6010	10



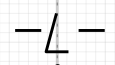


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U-6010	11

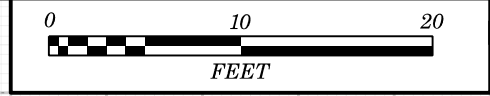
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14+00

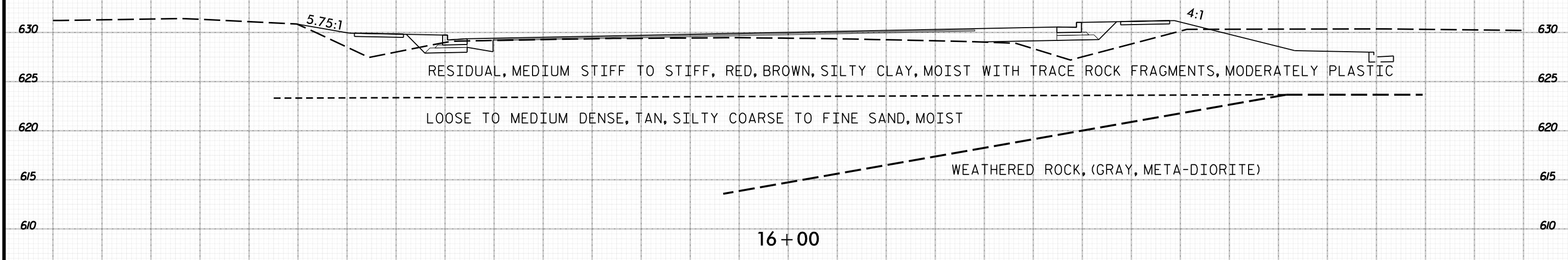
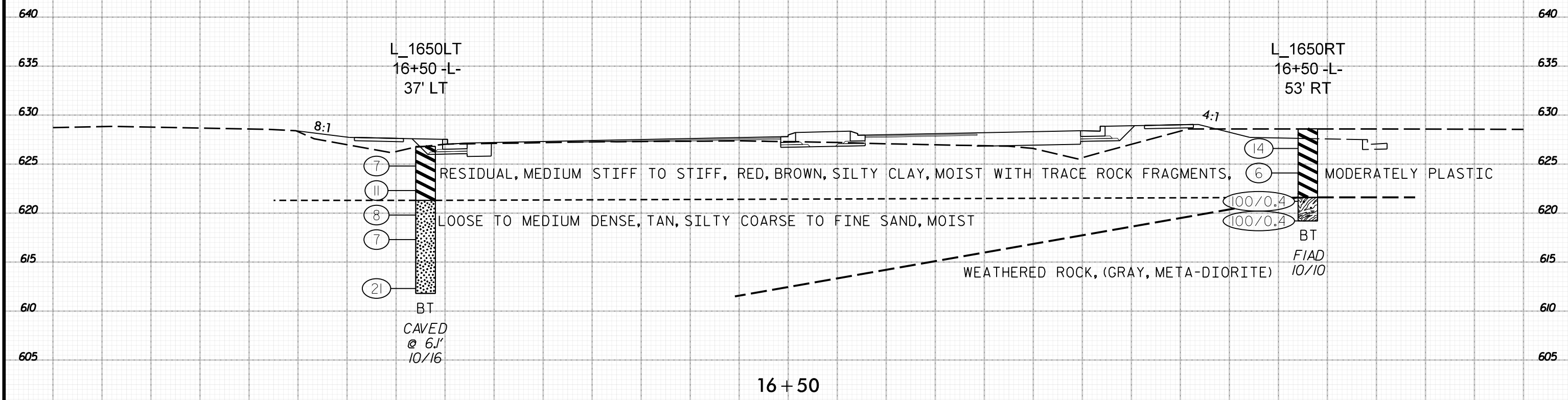


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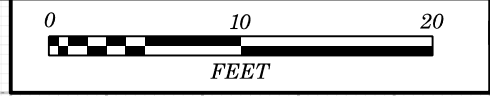


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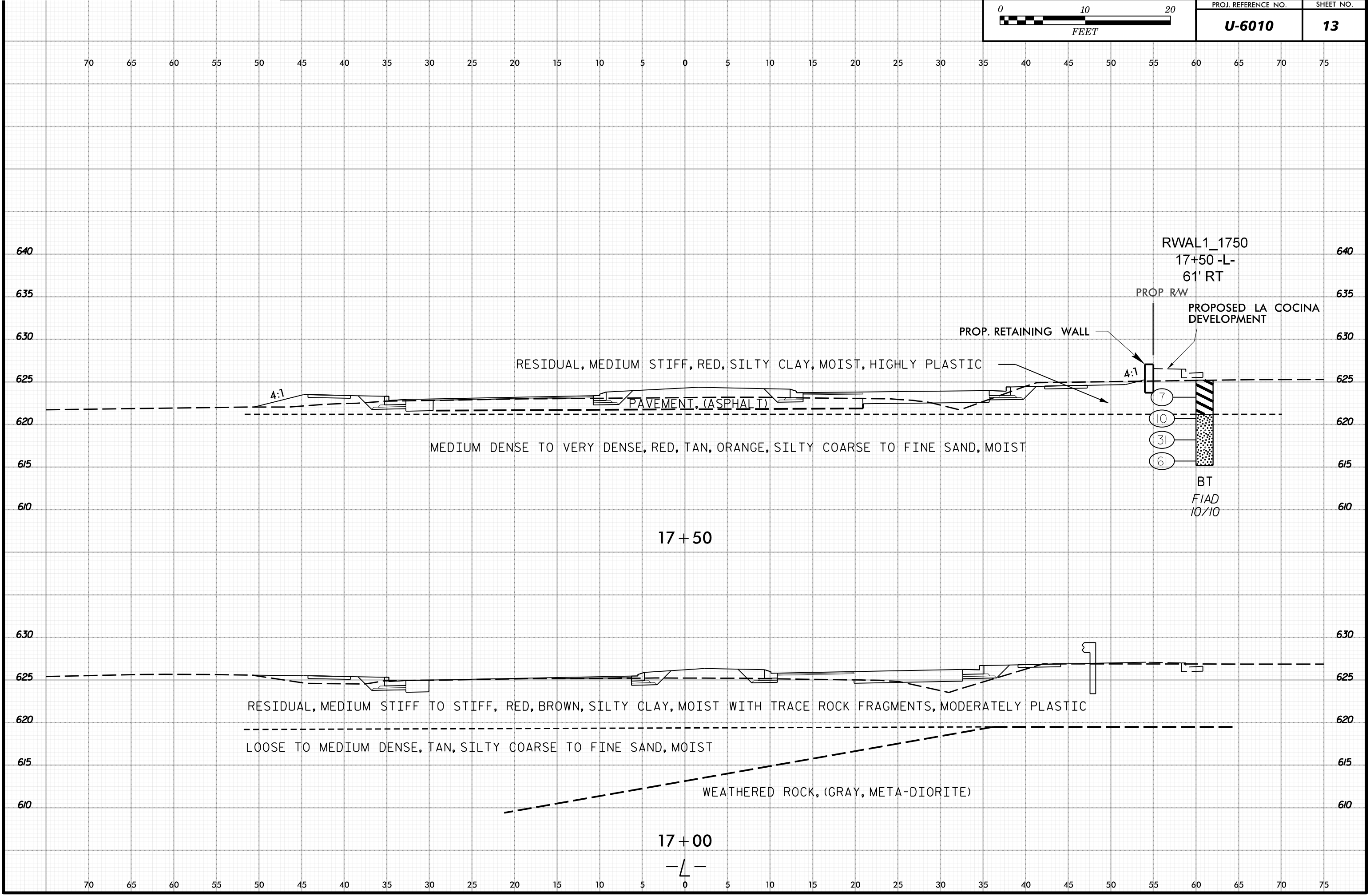
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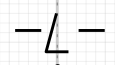


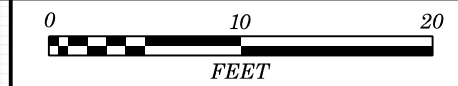
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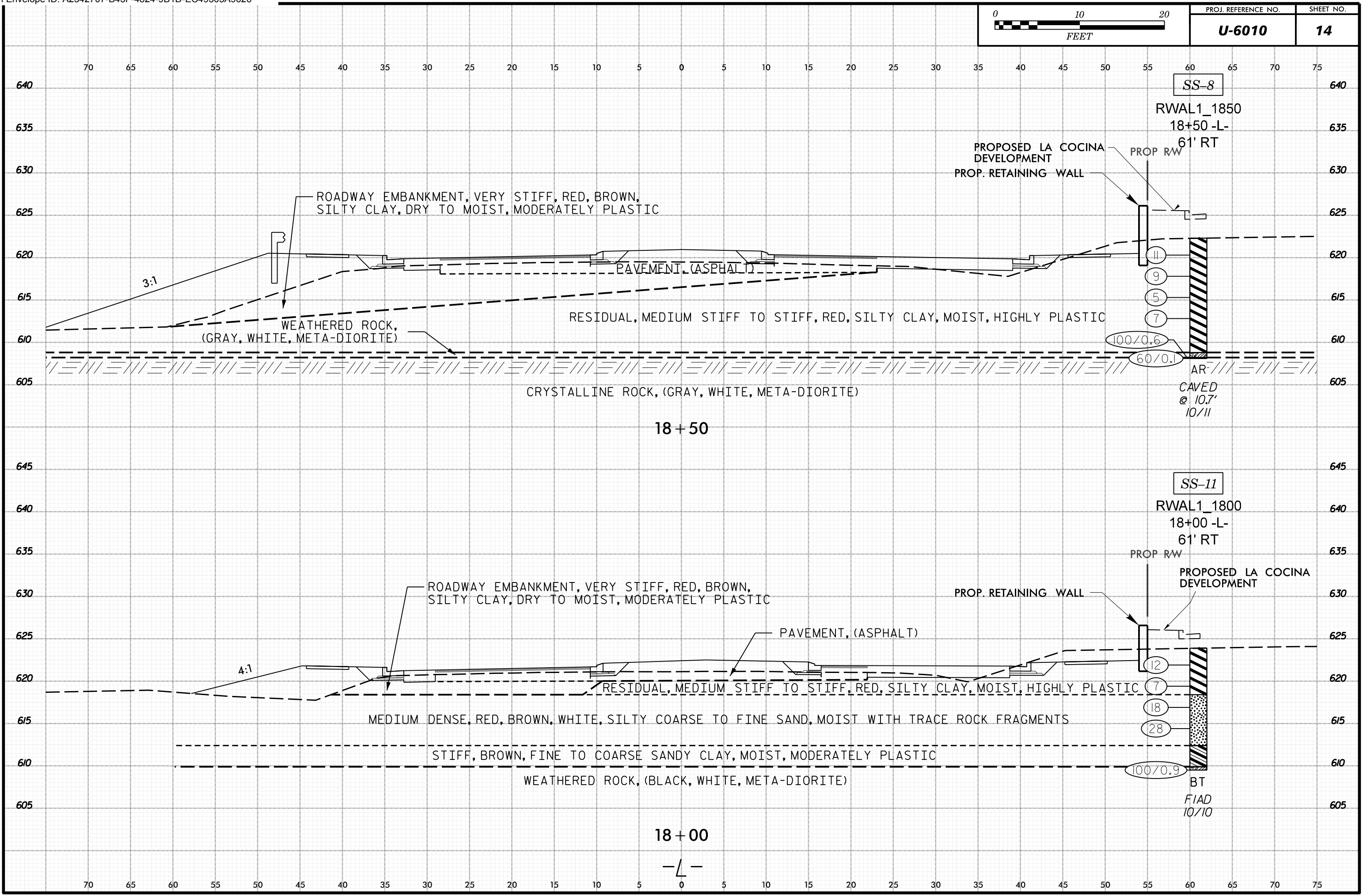
17+50

17+00



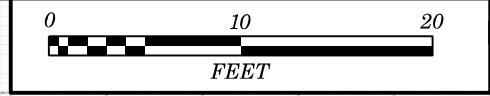


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U-6010	14

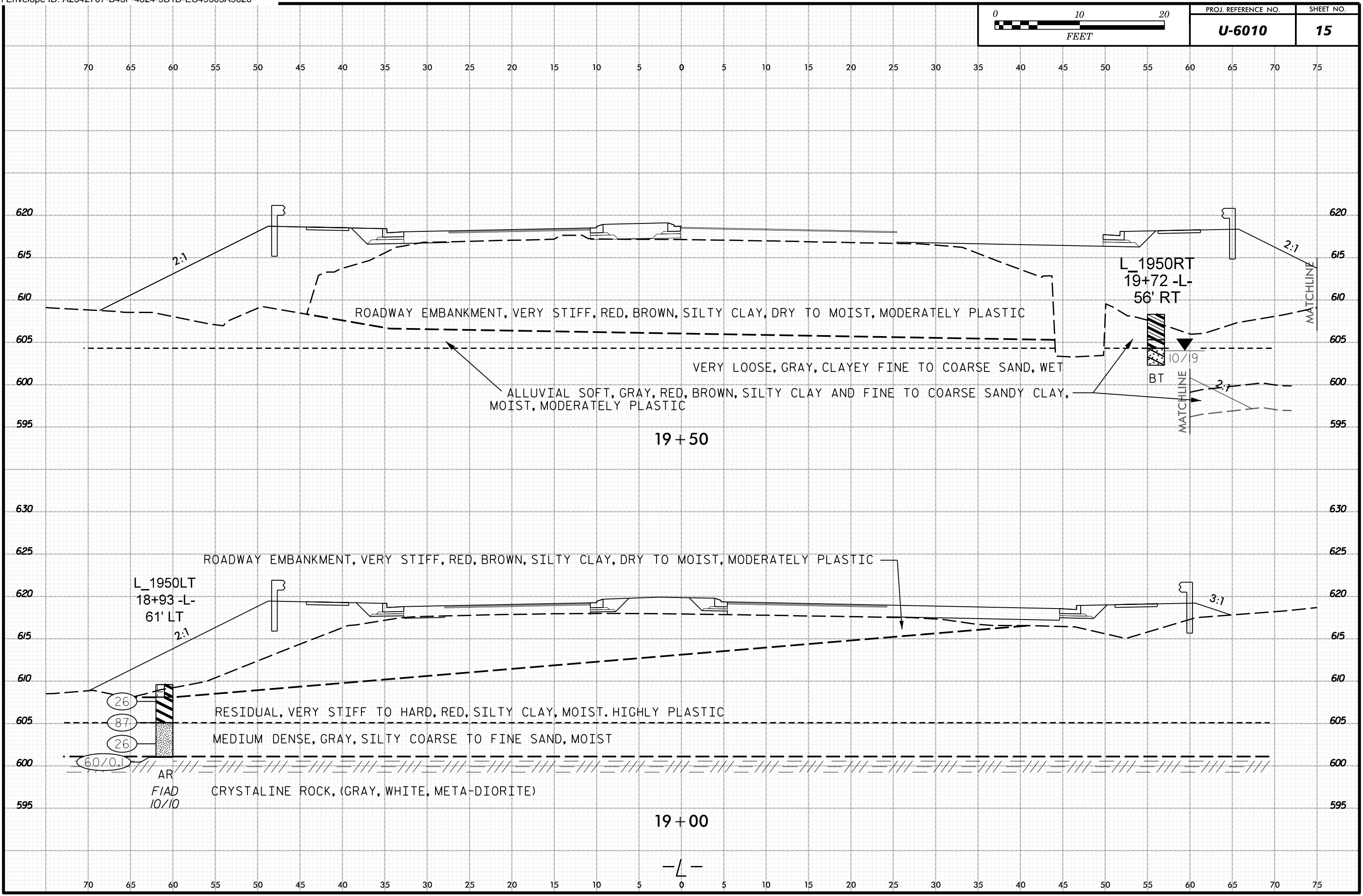


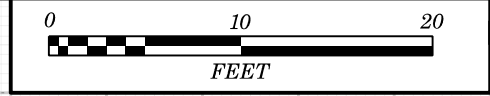
18+50

18+00



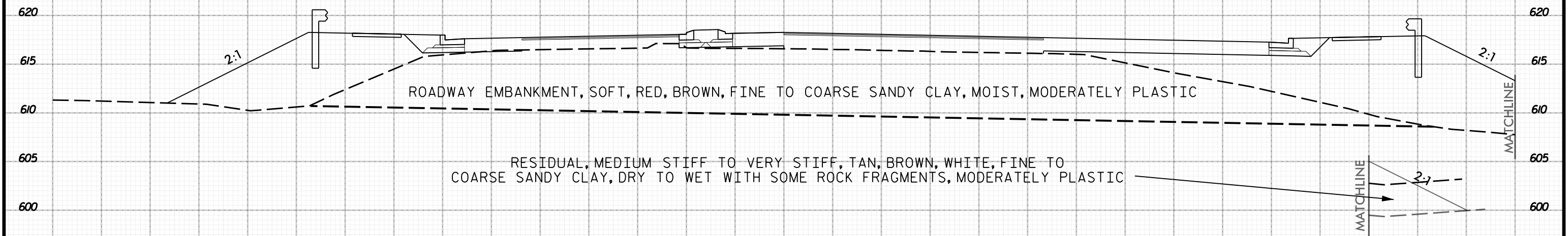
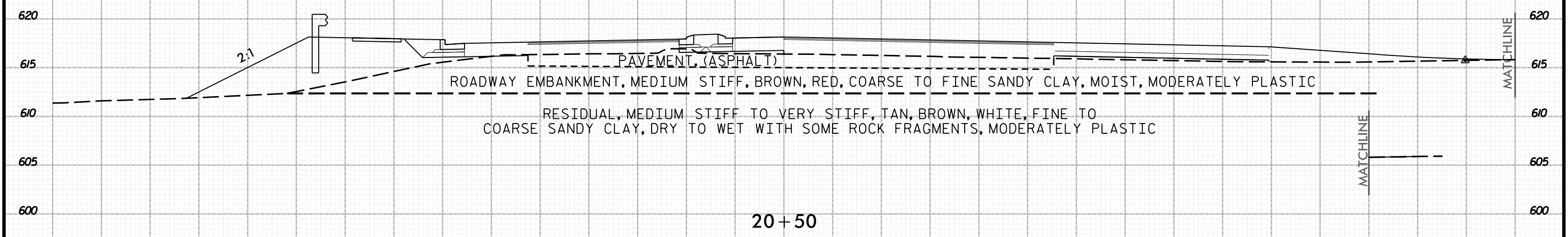
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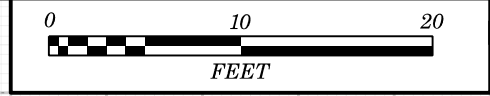


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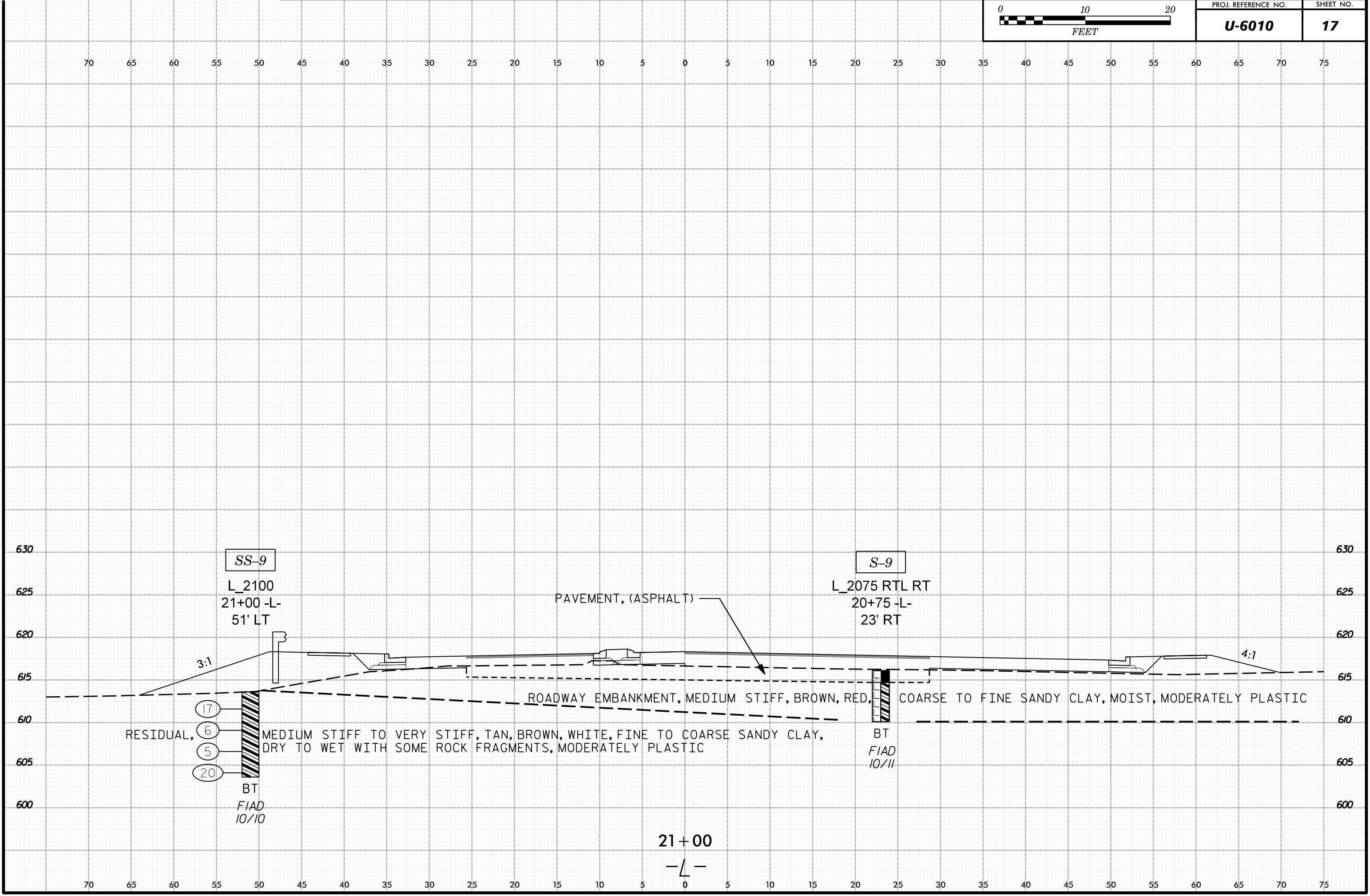
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70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



PROJ. REFERENCE NO.	SHEET NO.
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SS-9

L_2100
21+00 -L-
51' LT

PAVEMENT, (ASPHALT)

S-9

L_2075 RTL RT
20+75 -L-
23' RT

3:1

4:1

ROADWAY EMBANKMENT, MEDIUM STIFF, BROWN, RED,

COARSE TO FINE SANDY CLAY, MOIST, MODERATELY PLASTIC

RESIDUAL, MEDIUM STIFF TO VERY STIFF, TAN, BROWN, WHITE, FINE TO COARSE SANDY CLAY,
DRY TO WET WITH SOME ROCK FRAGMENTS, MODERATELY PLASTIC

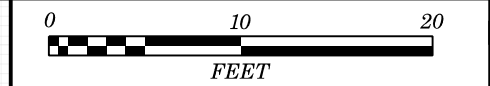
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- (6)
- (5)
- (20)

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FIAD
10/11

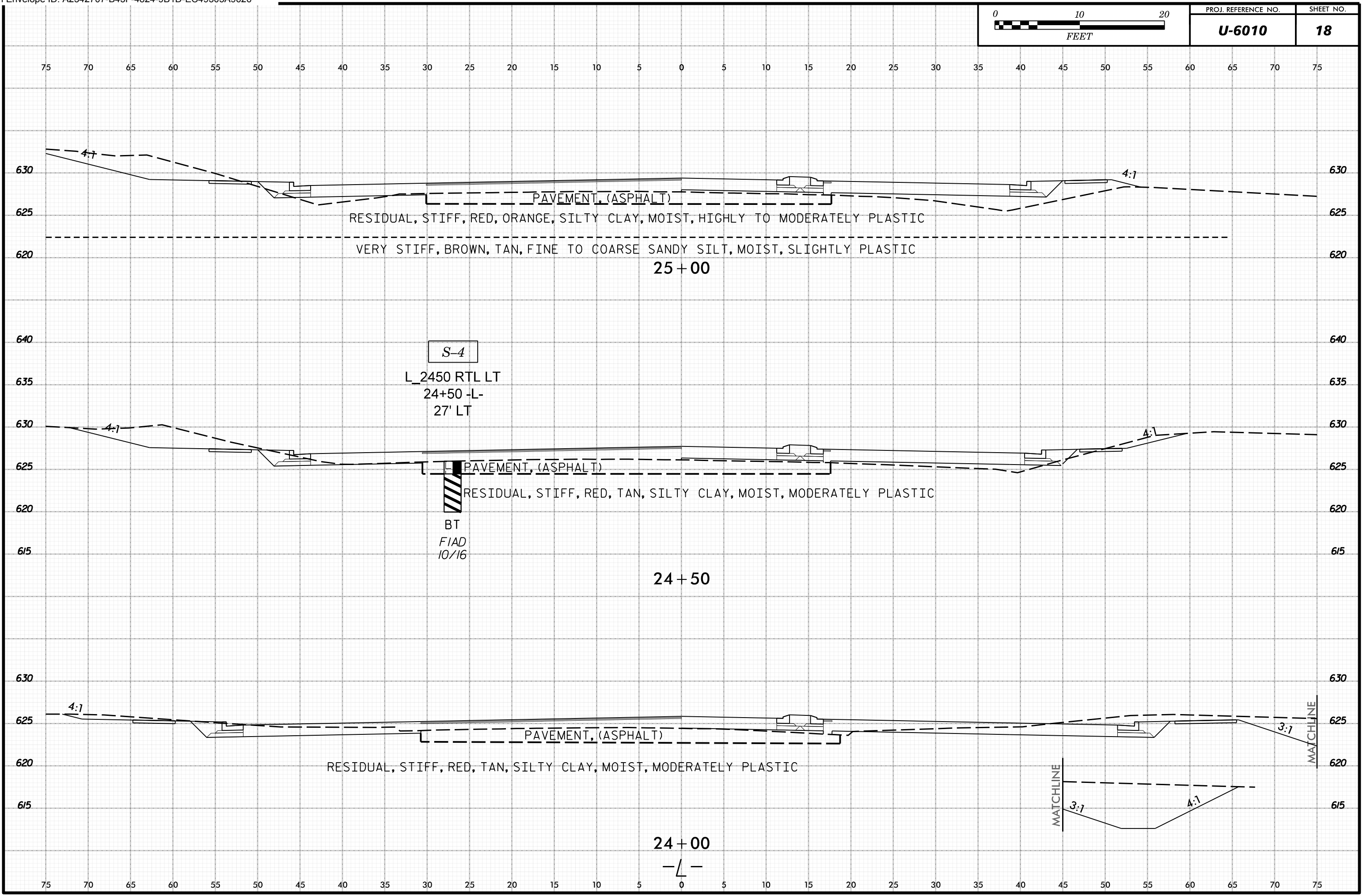
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FIAD
10/10

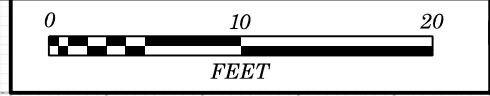
21+00

-L-



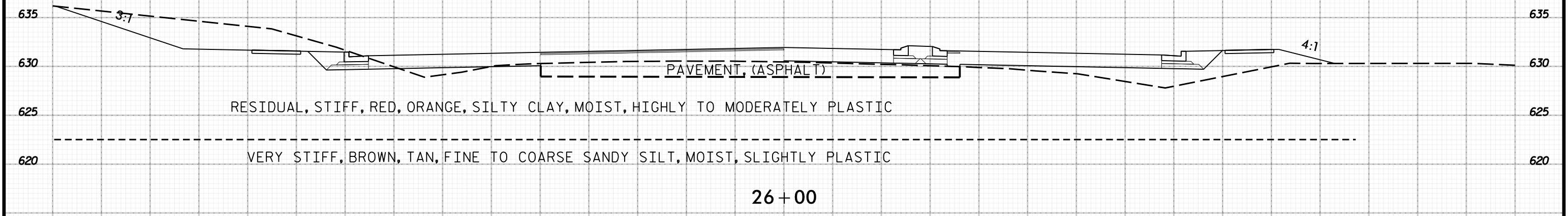
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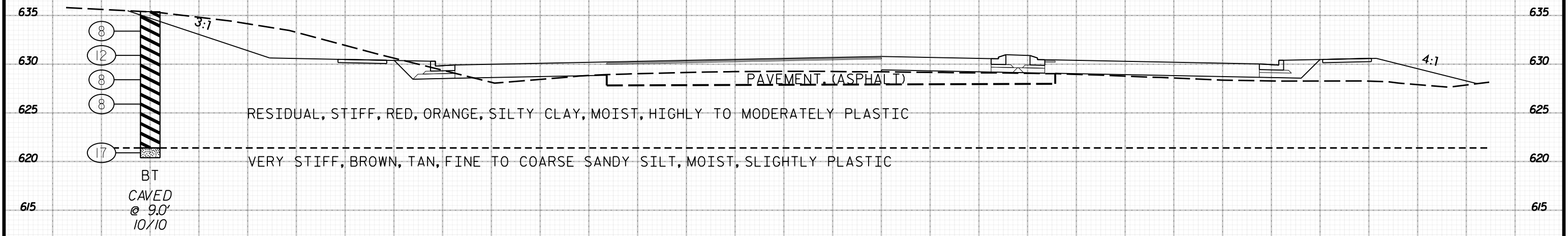
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U-6010	19

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26 + 00

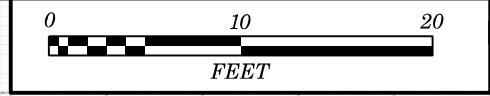
CBR-1
SS-6
 L_2550
 25+50 -L-
 75' LT



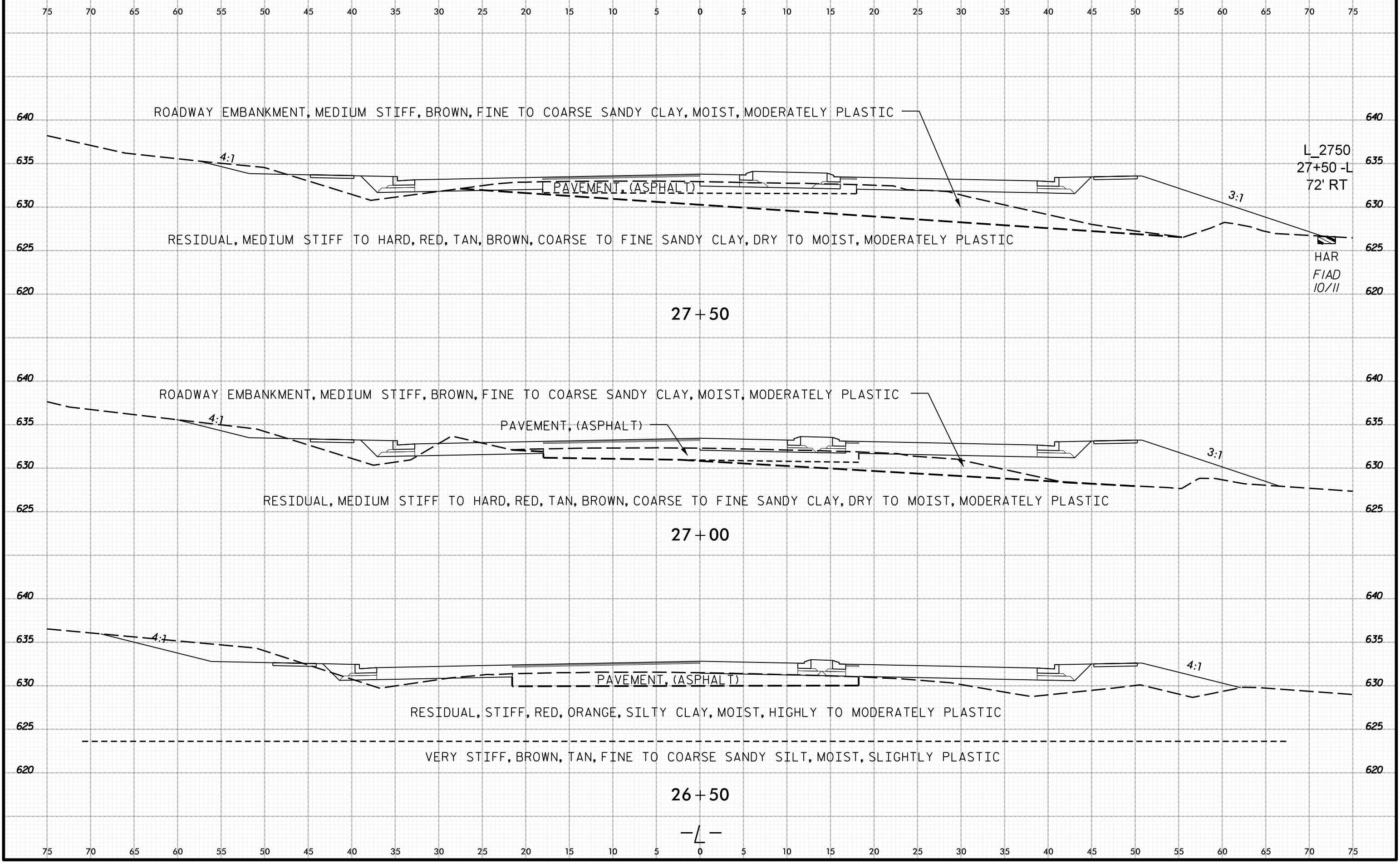
25 + 50

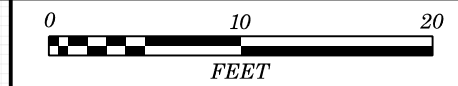
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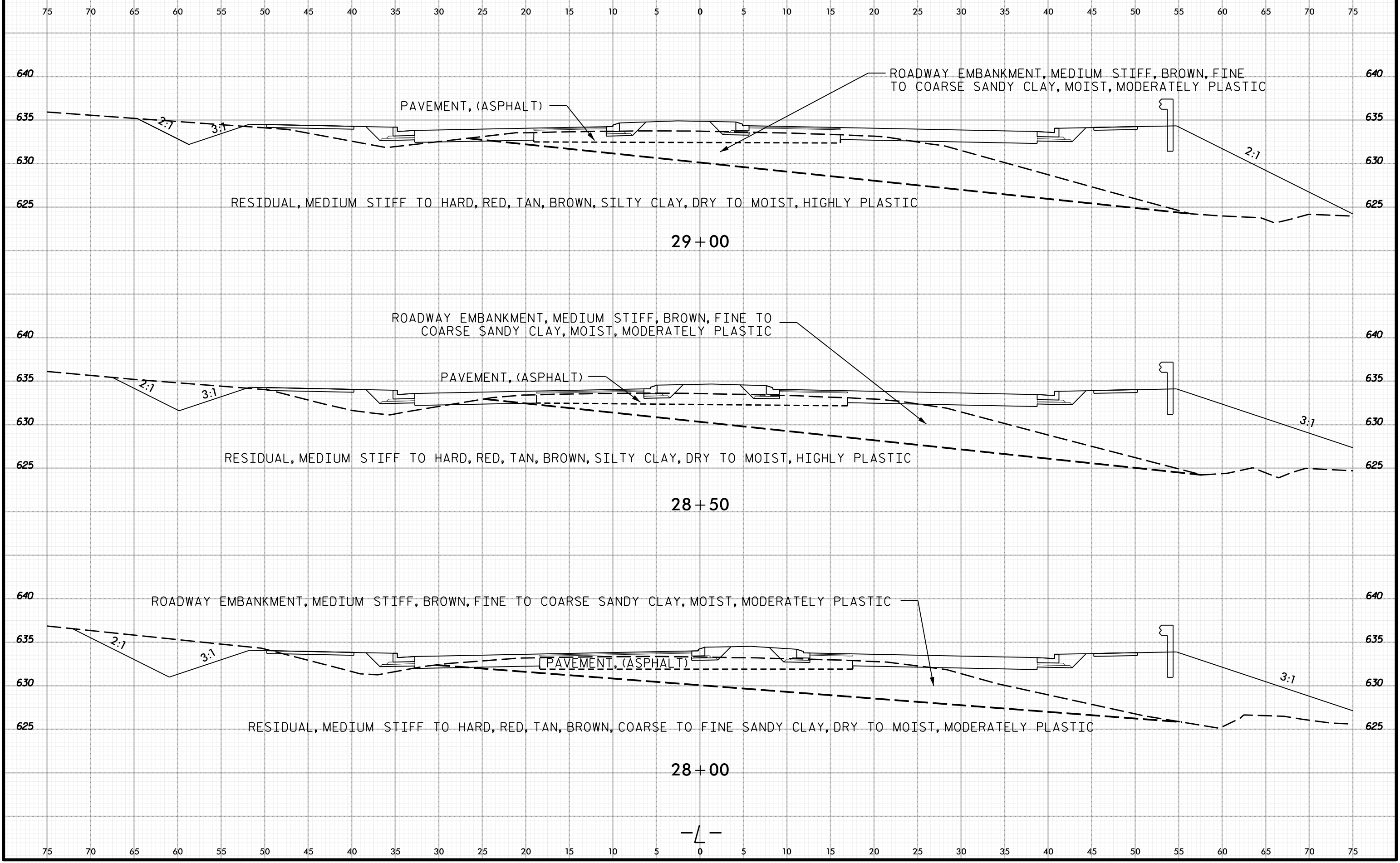


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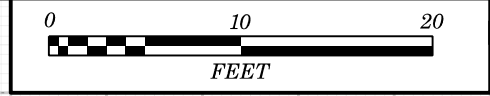




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U-6010	21

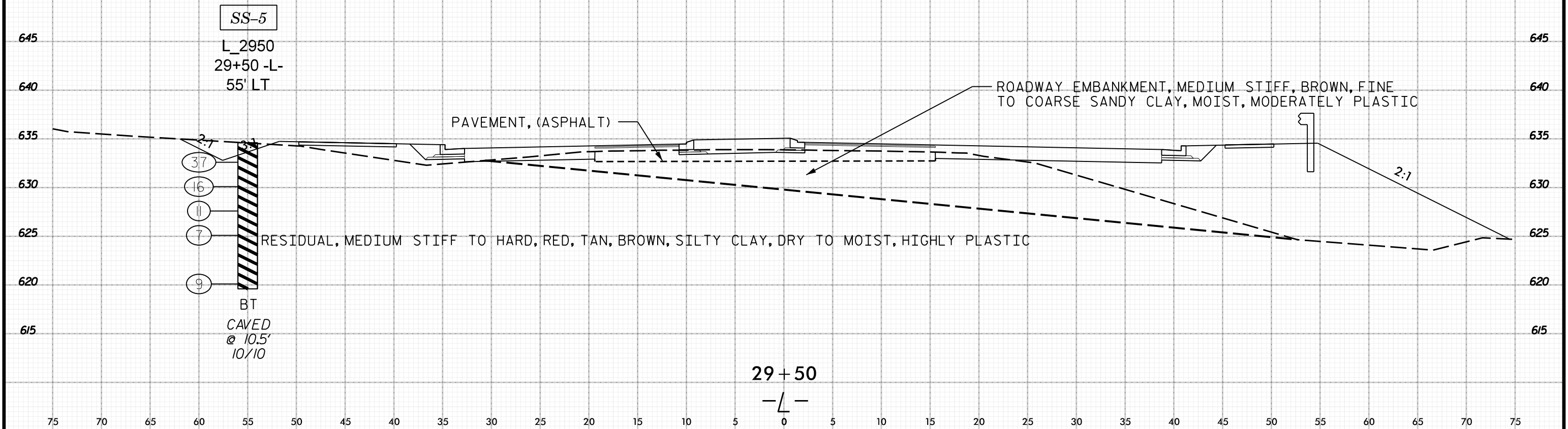
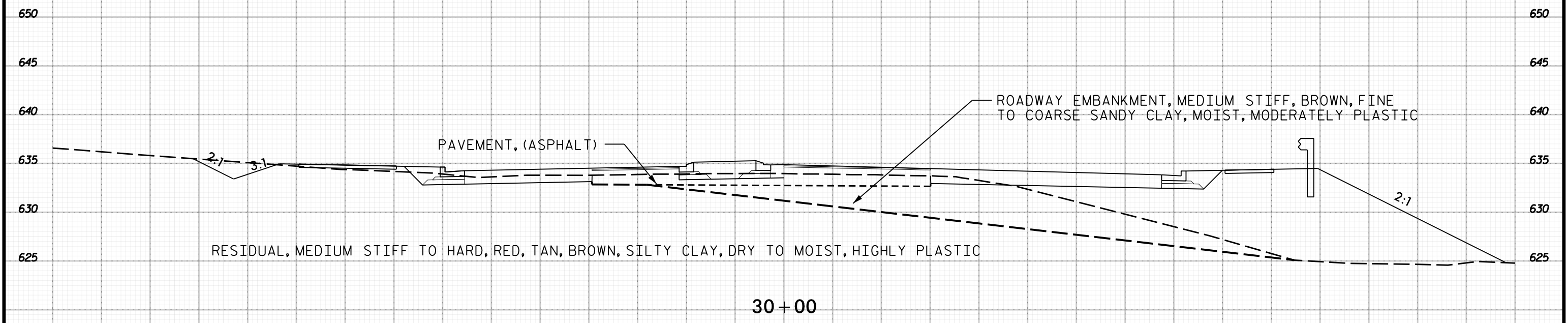


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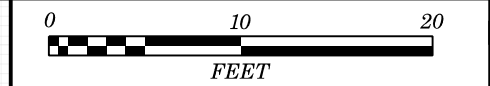


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U-6010	22

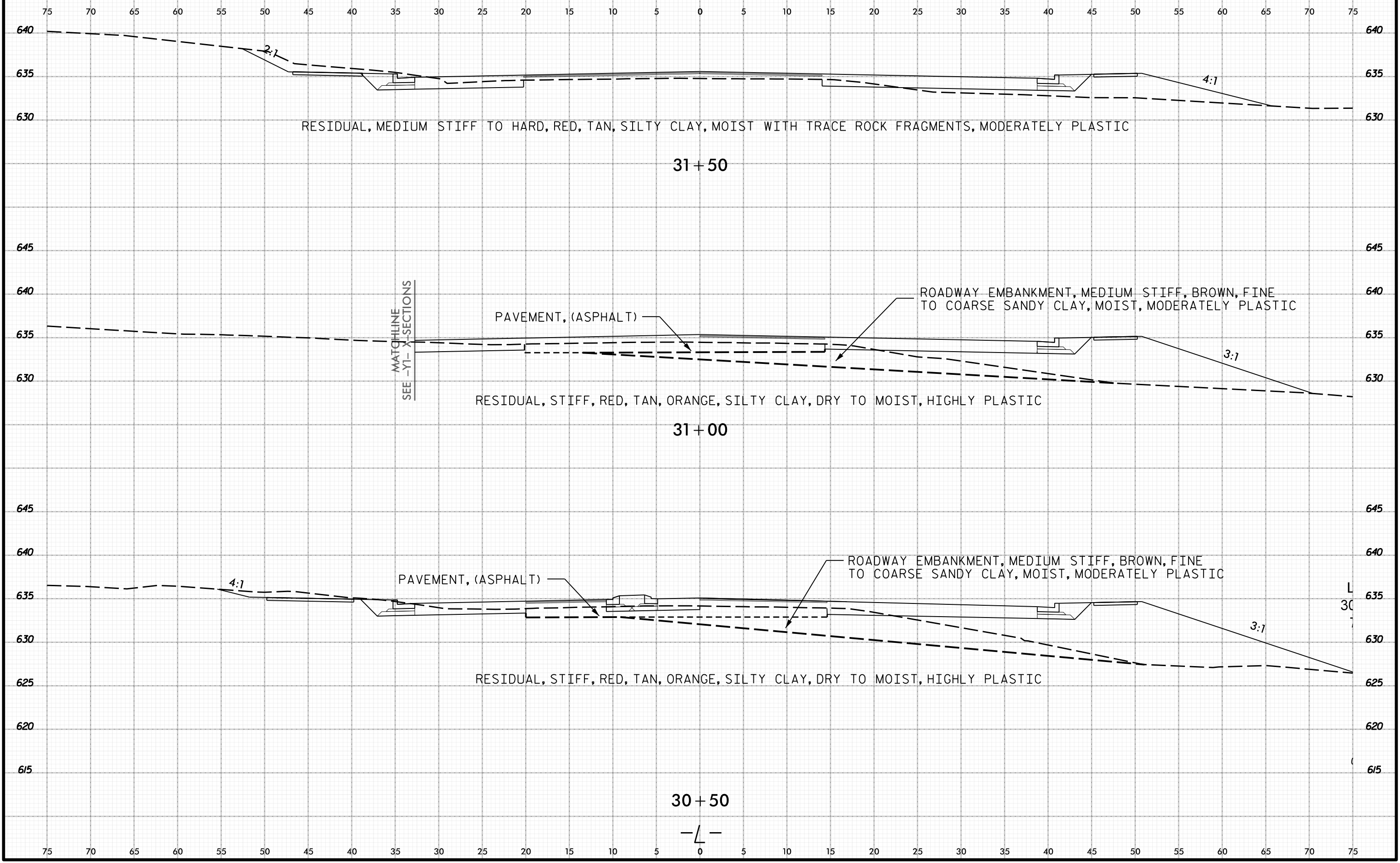
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

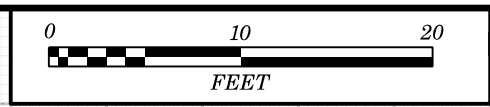


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



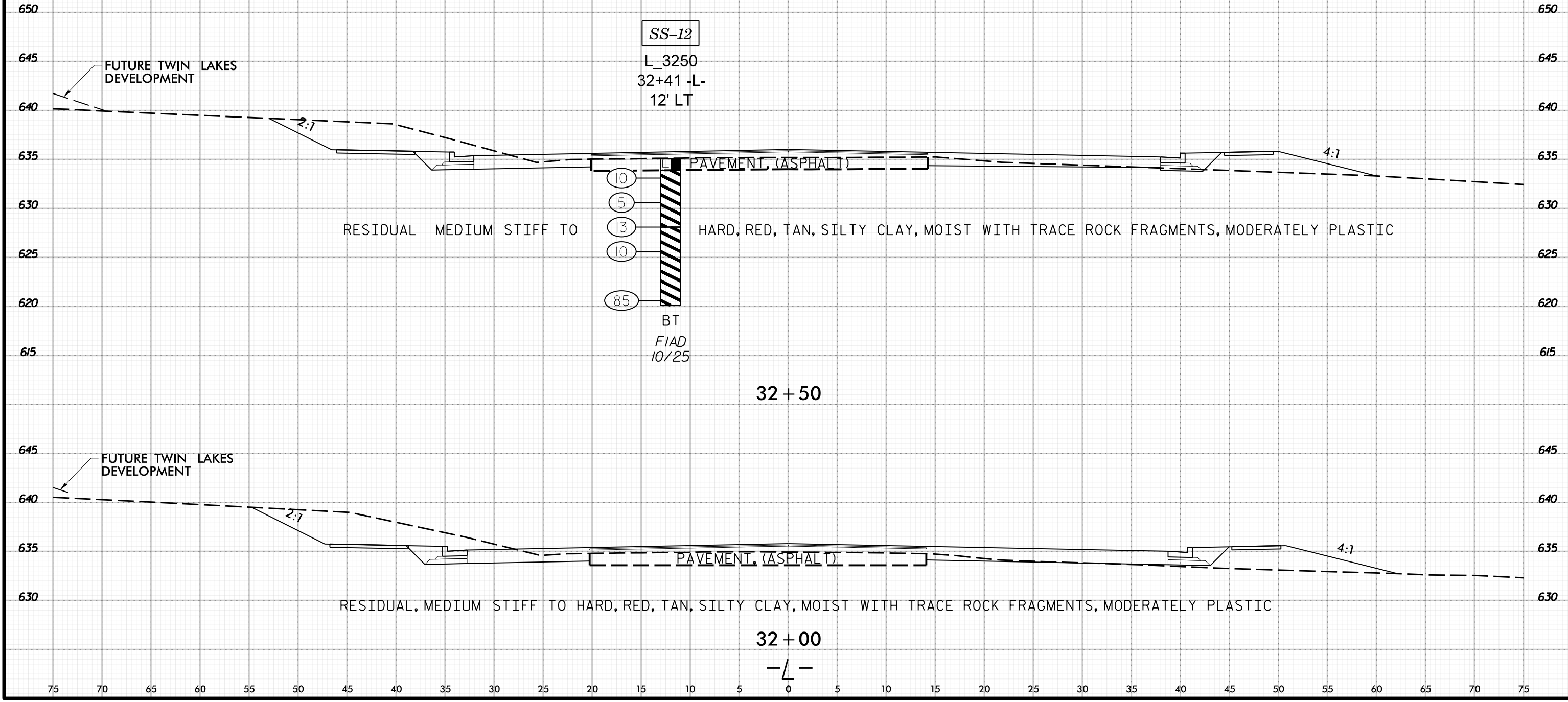
PROJ. REFERENCE NO.	SHEET NO.
U-6010	23



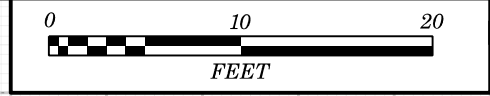


PROJ. REFERENCE NO.	SHEET NO.
U-6010	24

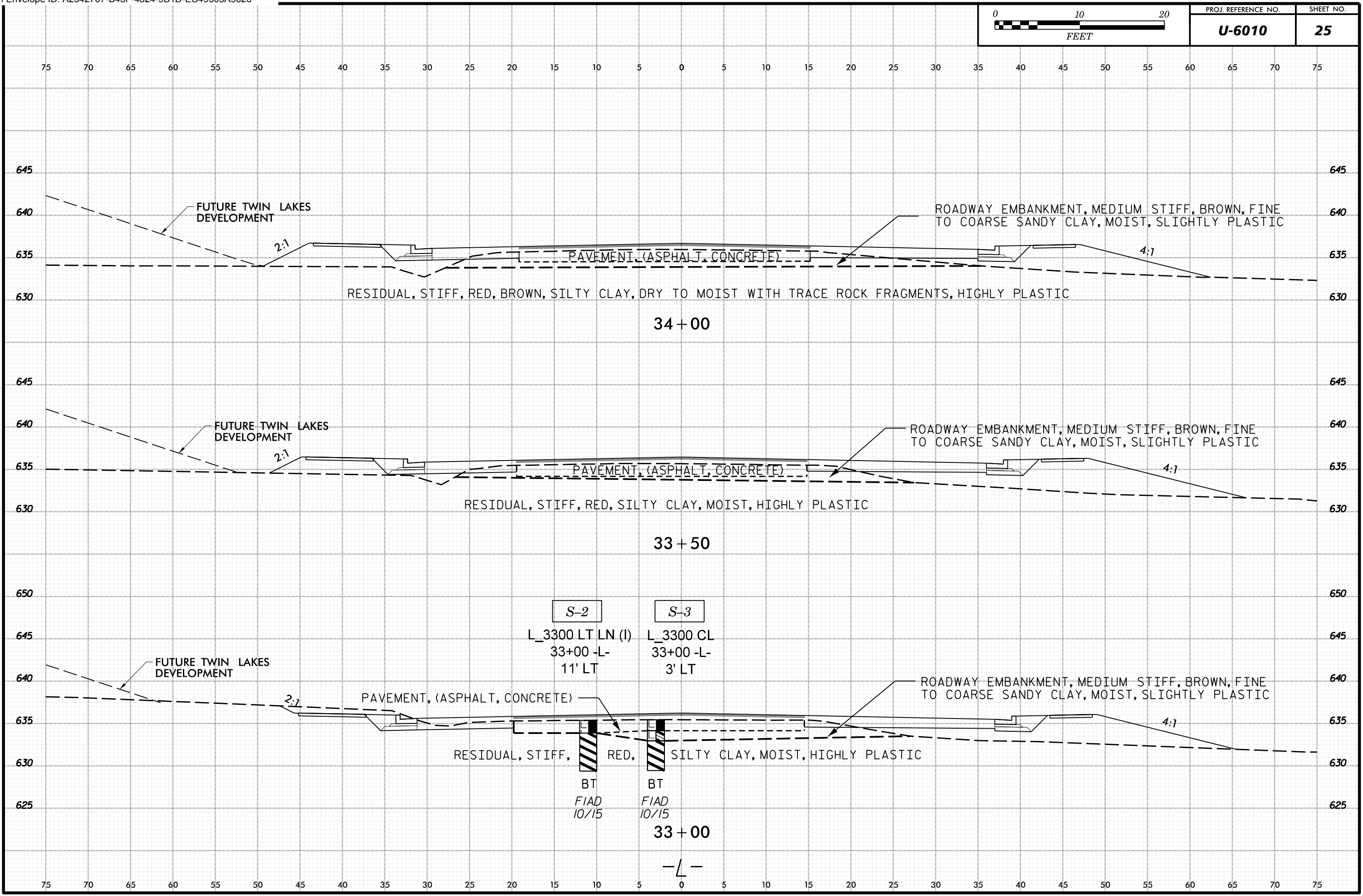
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

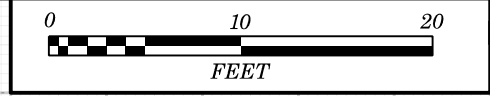


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

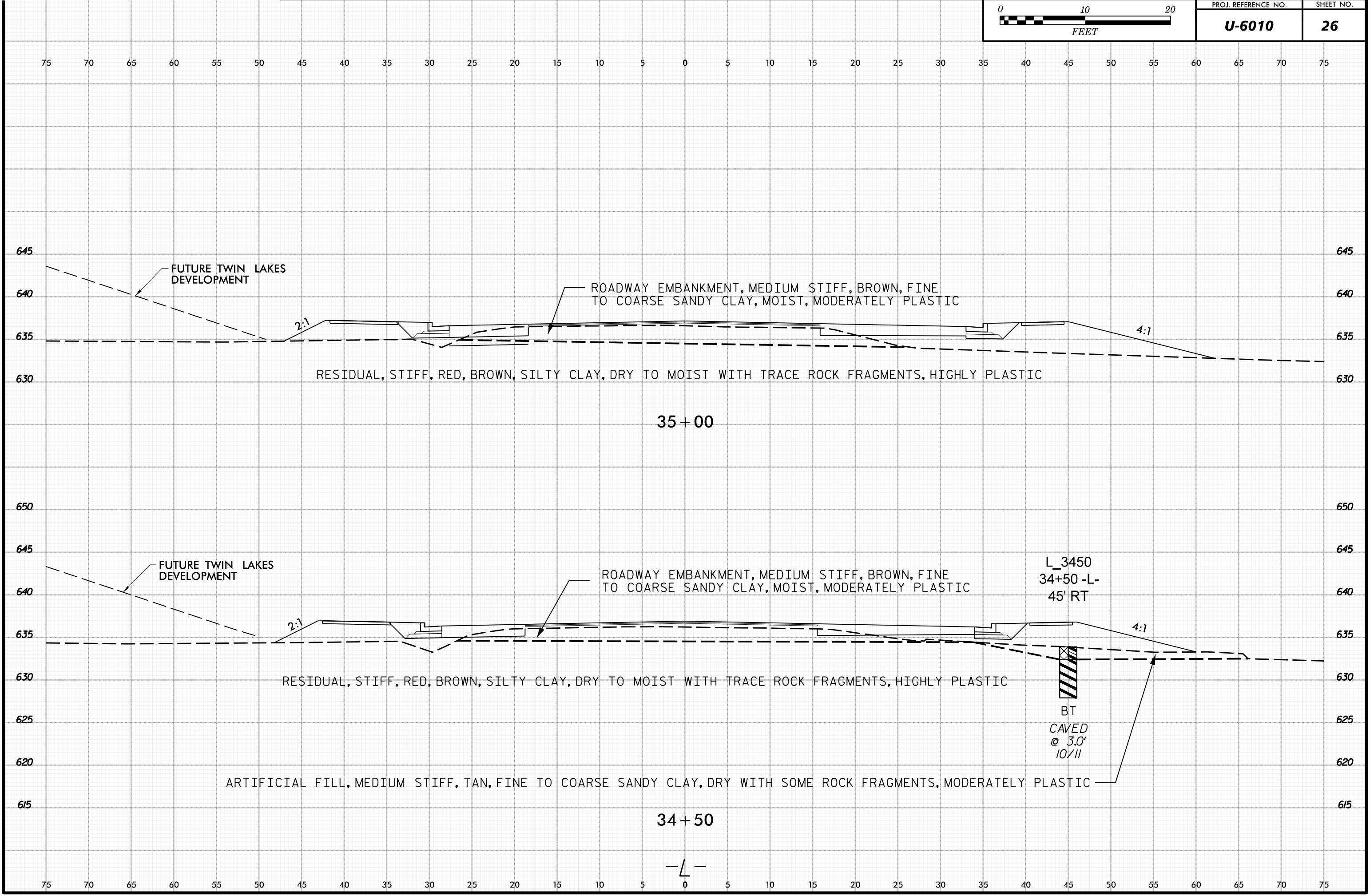


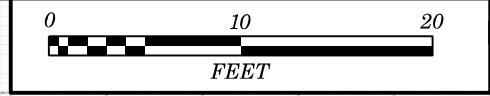
PROJ. REFERENCE NO.	SHEET NO.
U-6010	25





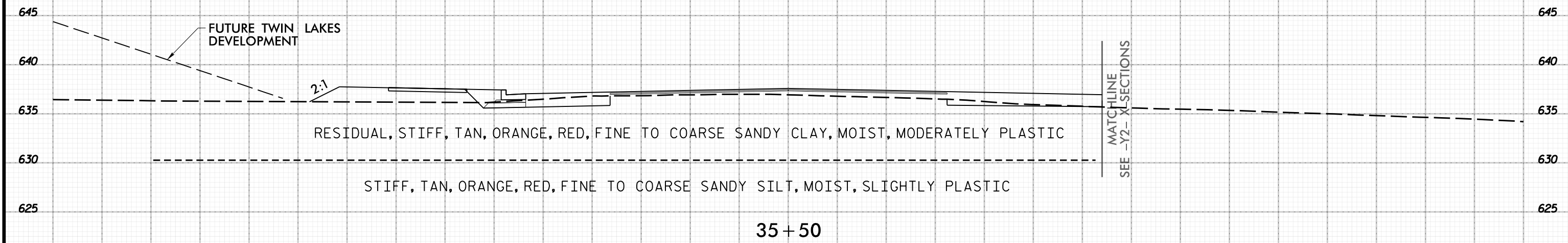
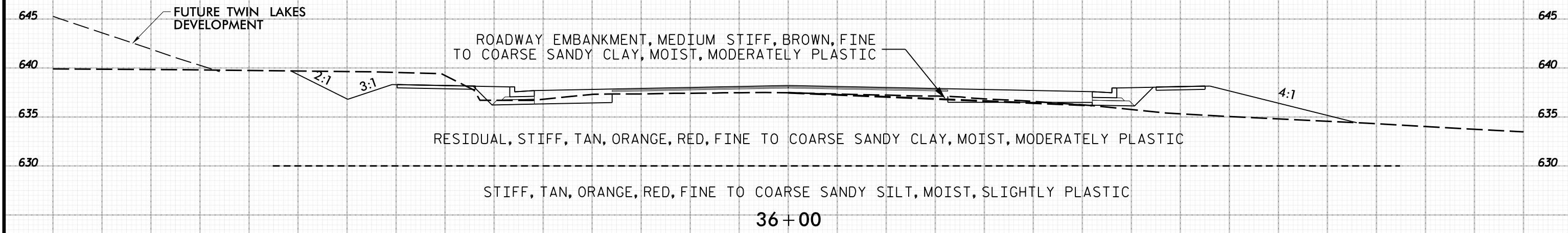
PROJ. REFERENCE NO.	SHEET NO.
U-6010	26



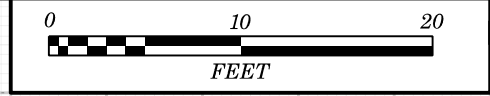


PROJ. REFERENCE NO.	SHEET NO.
U-6010	27

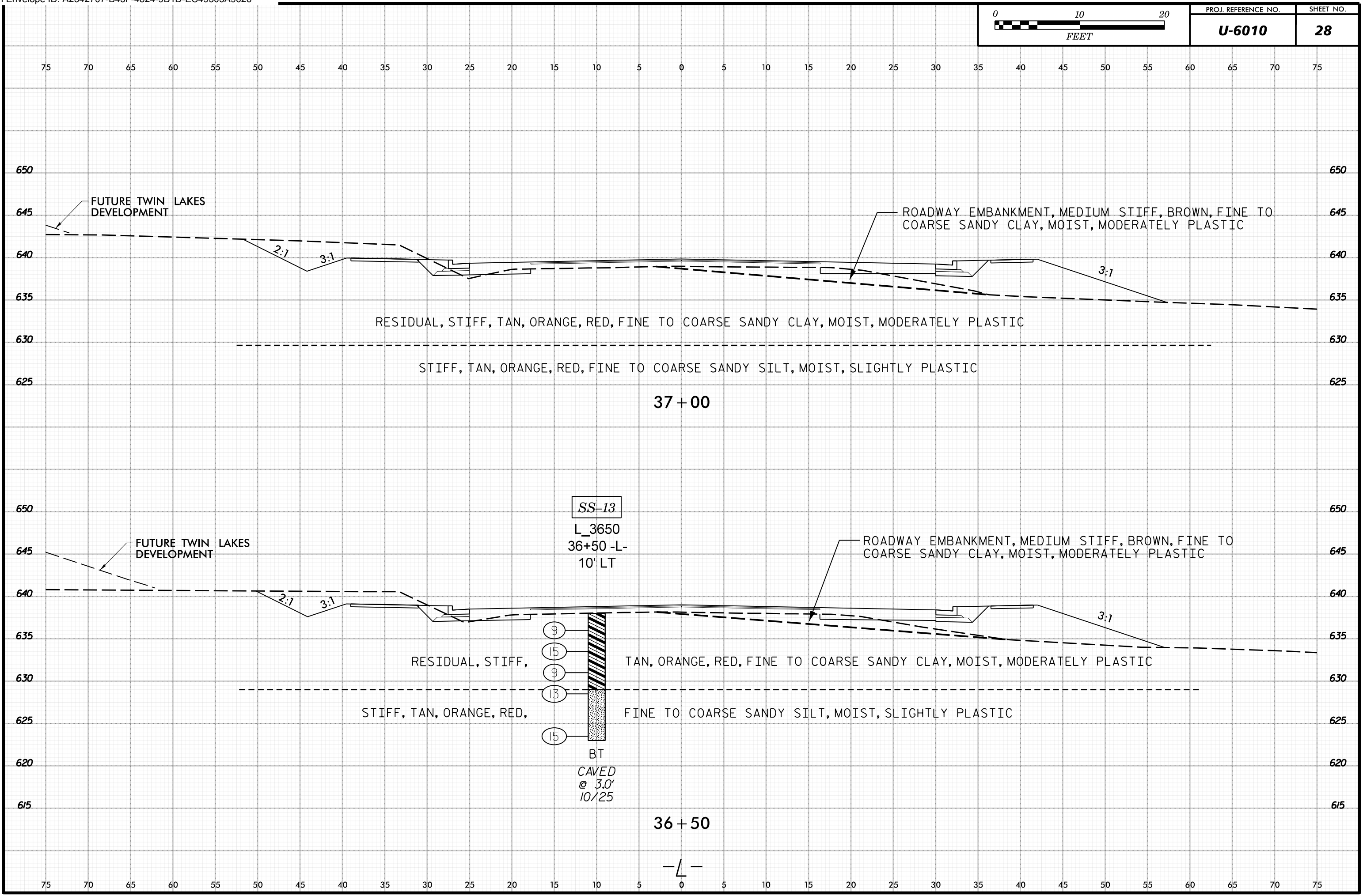
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

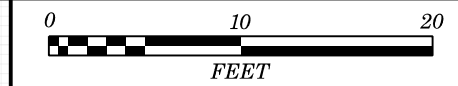


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

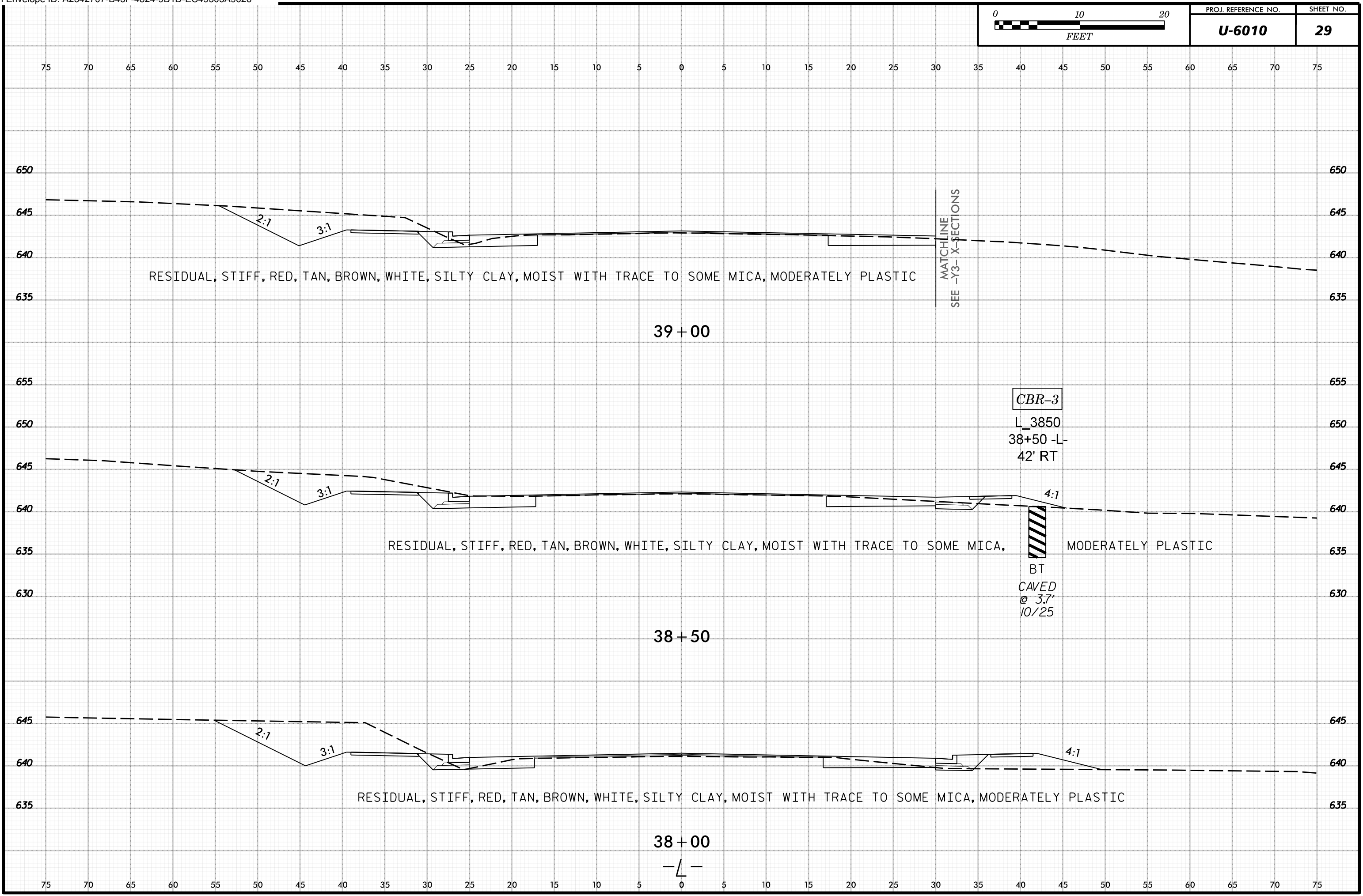


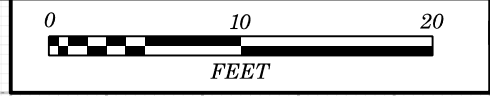
PROJ. REFERENCE NO.	SHEET NO.
U-6010	28





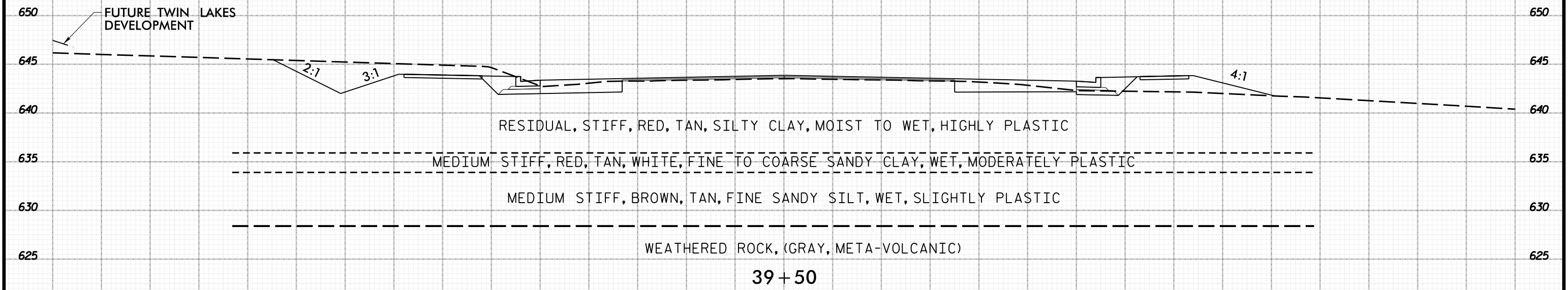
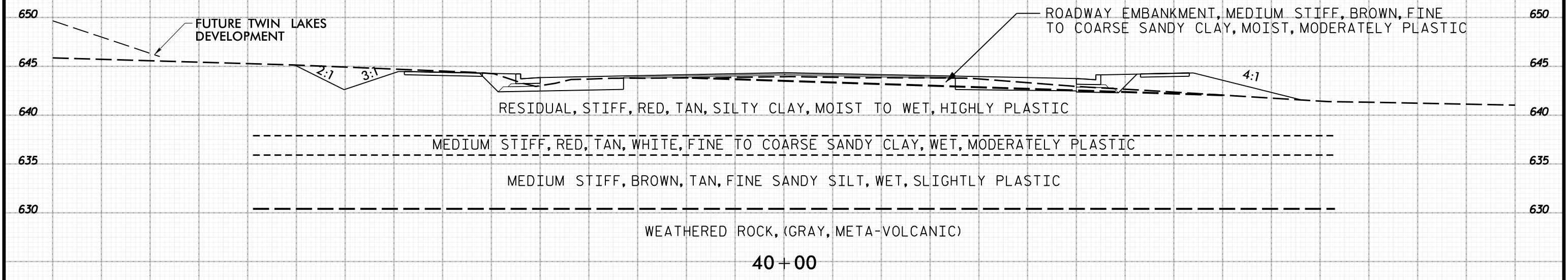
PROJ. REFERENCE NO.	SHEET NO.
U-6010	29



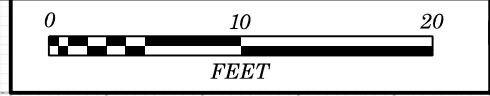


PROJ. REFERENCE NO.	SHEET NO.
U-6010	30

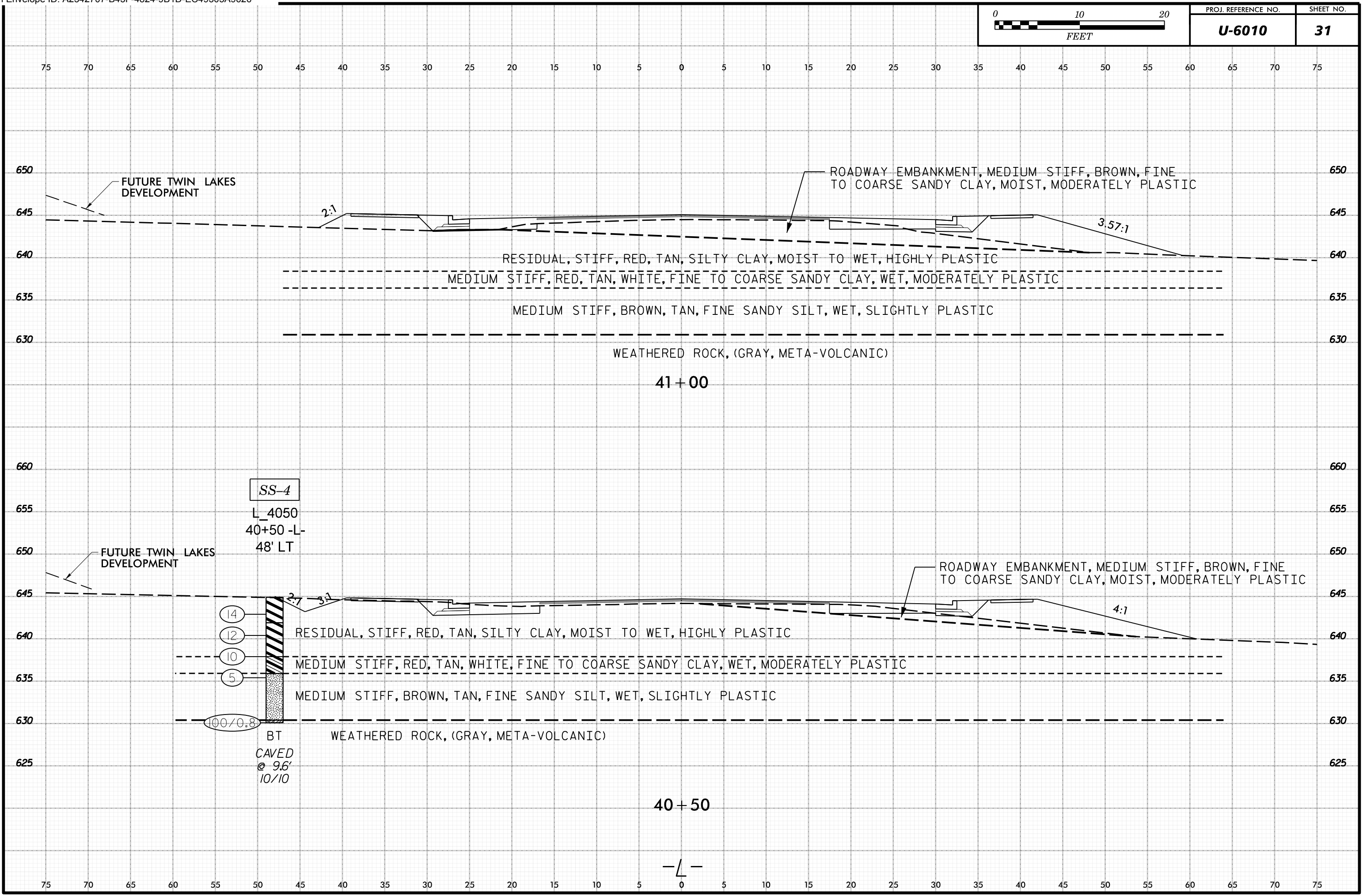
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

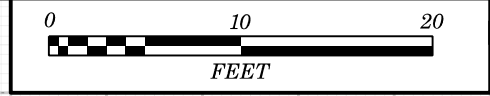


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



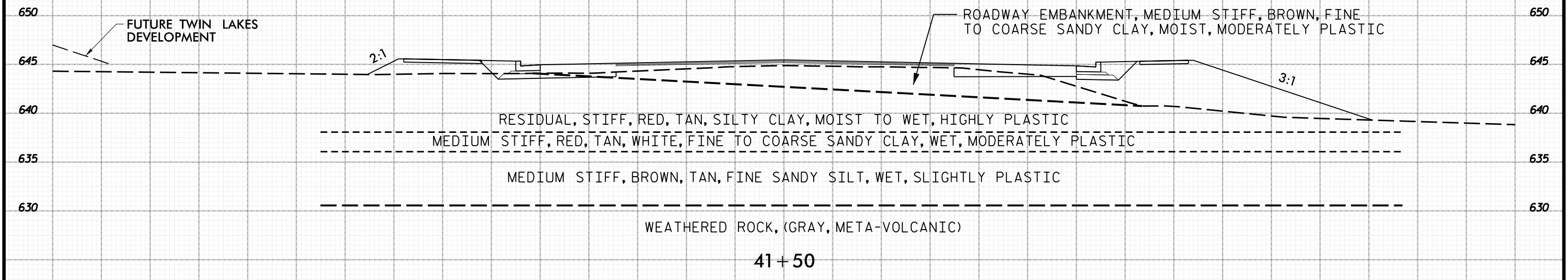
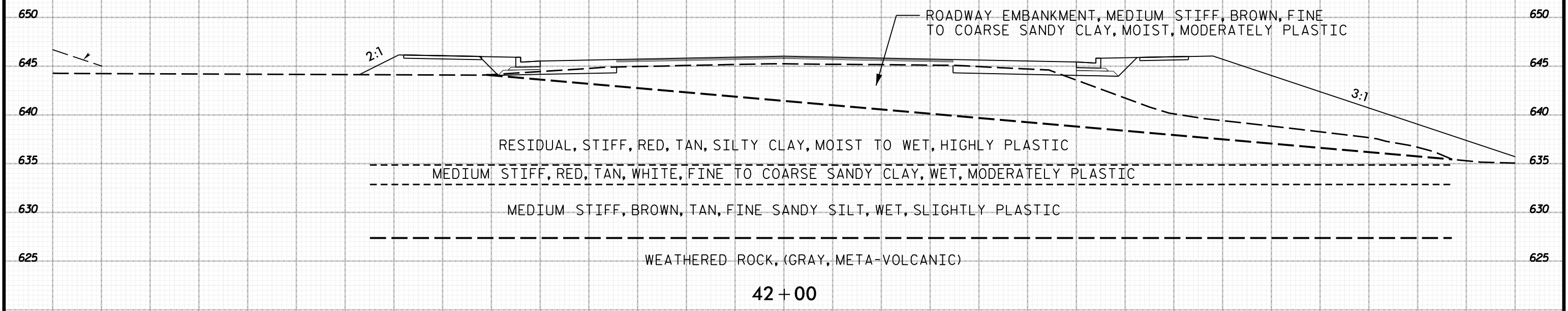
PROJ. REFERENCE NO.	SHEET NO.
U-6010	31



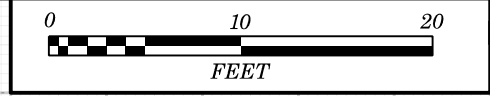


PROJ. REFERENCE NO.	SHEET NO.
U-6010	32

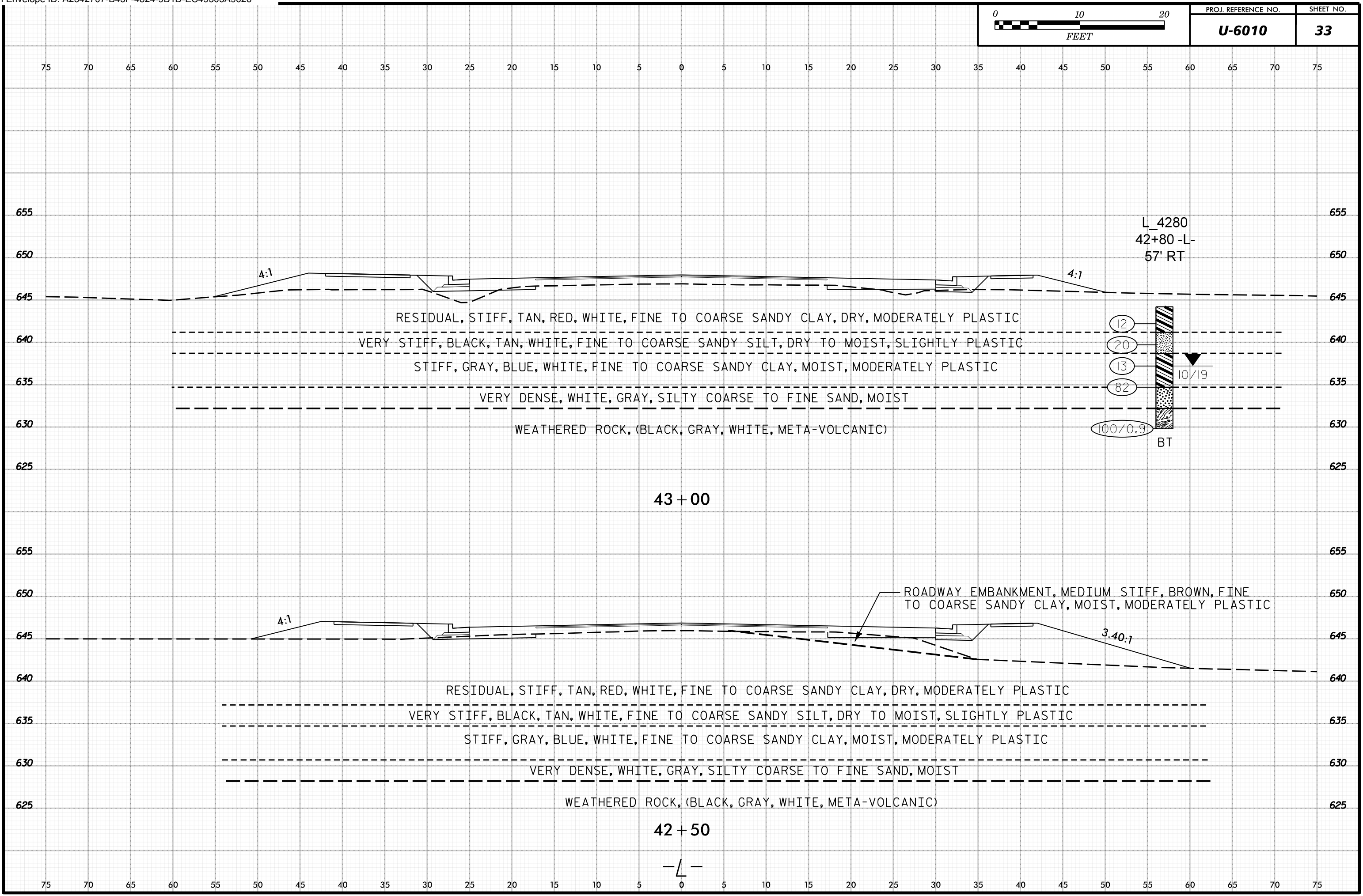
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



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



PROJ. REFERENCE NO.	SHEET NO.
U-6010	33



L_4280
42+80 -L-
57' RT

4:1

4:1

RESIDUAL, STIFF, TAN, RED, WHITE, FINE TO COARSE SANDY CLAY, DRY, MODERATELY PLASTIC

VERY STIFF, BLACK, TAN, WHITE, FINE TO COARSE SANDY SILT, DRY TO MOIST, SLIGHTLY PLASTIC

STIFF, GRAY, BLUE, WHITE, FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC

VERY DENSE, WHITE, GRAY, SILTY COARSE TO FINE SAND, MOIST

WEATHERED ROCK, (BLACK, GRAY, WHITE, META-VOLCANIC)

12

20

13

82

100/0.9

BT

10/19

43 + 00

ROADWAY EMBANKMENT, MEDIUM STIFF, BROWN, FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC

4:1

3.40:1

RESIDUAL, STIFF, TAN, RED, WHITE, FINE TO COARSE SANDY CLAY, DRY, MODERATELY PLASTIC

VERY STIFF, BLACK, TAN, WHITE, FINE TO COARSE SANDY SILT, DRY TO MOIST, SLIGHTLY PLASTIC

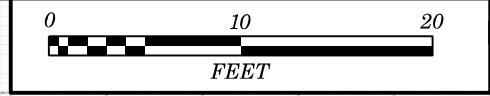
STIFF, GRAY, BLUE, WHITE, FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC

VERY DENSE, WHITE, GRAY, SILTY COARSE TO FINE SAND, MOIST

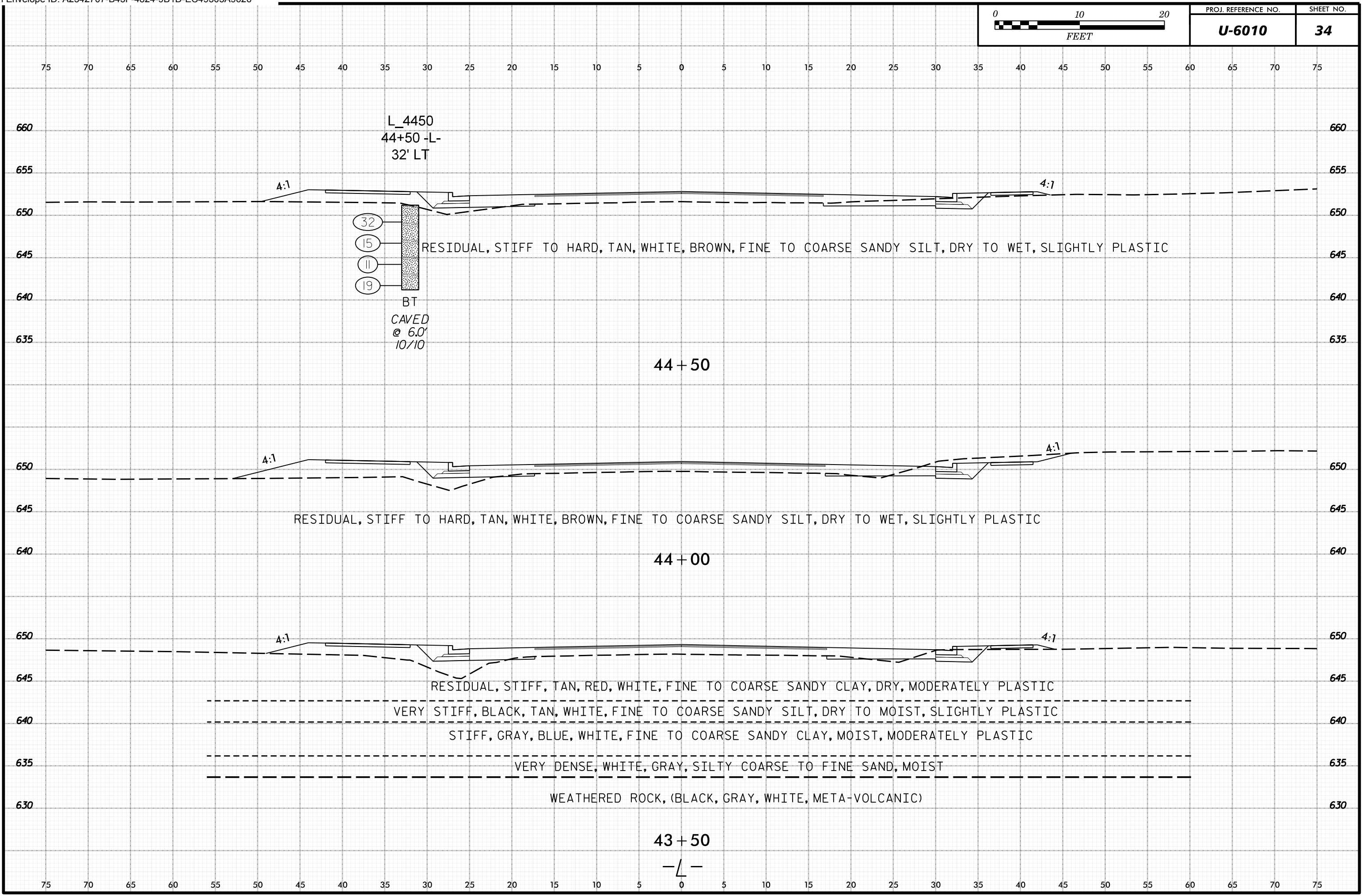
WEATHERED ROCK, (BLACK, GRAY, WHITE, META-VOLCANIC)

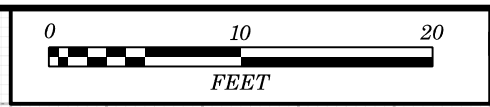
42 + 50

—L—



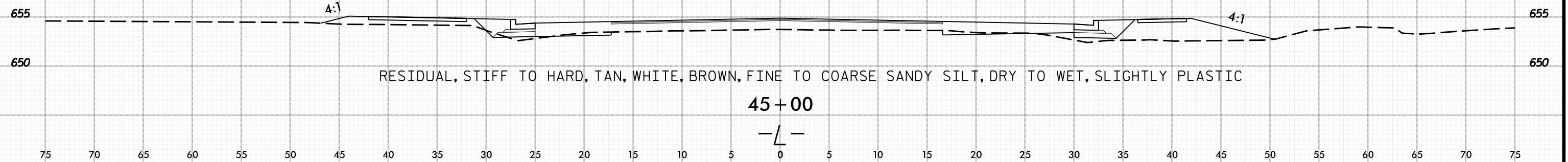
PROJ. REFERENCE NO.	SHEET NO.
U-6010	34





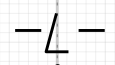
PROJ. REFERENCE NO.	SHEET NO.
U-6010	35

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

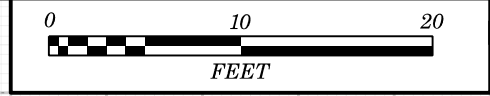


RESIDUAL, STIFF TO HARD, TAN, WHITE, BROWN, FINE TO COARSE SANDY SILT, DRY TO WET, SLIGHTLY PLASTIC

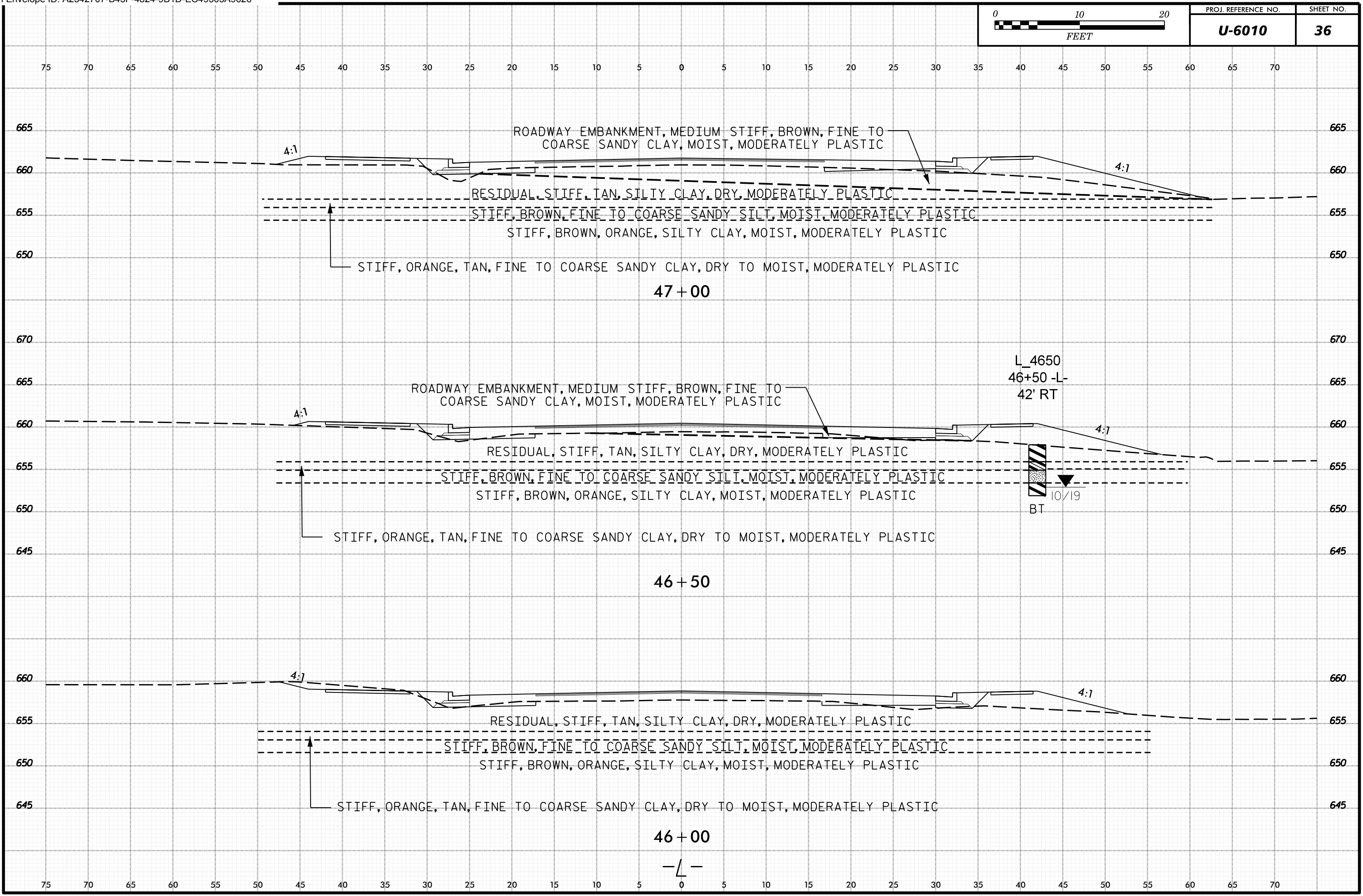
45 + 00



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



PROJ. REFERENCE NO.	SHEET NO.
U-6010	36



47 + 00

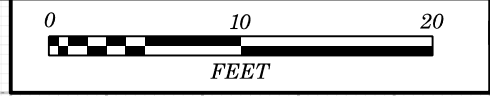
46 + 50

46 + 00

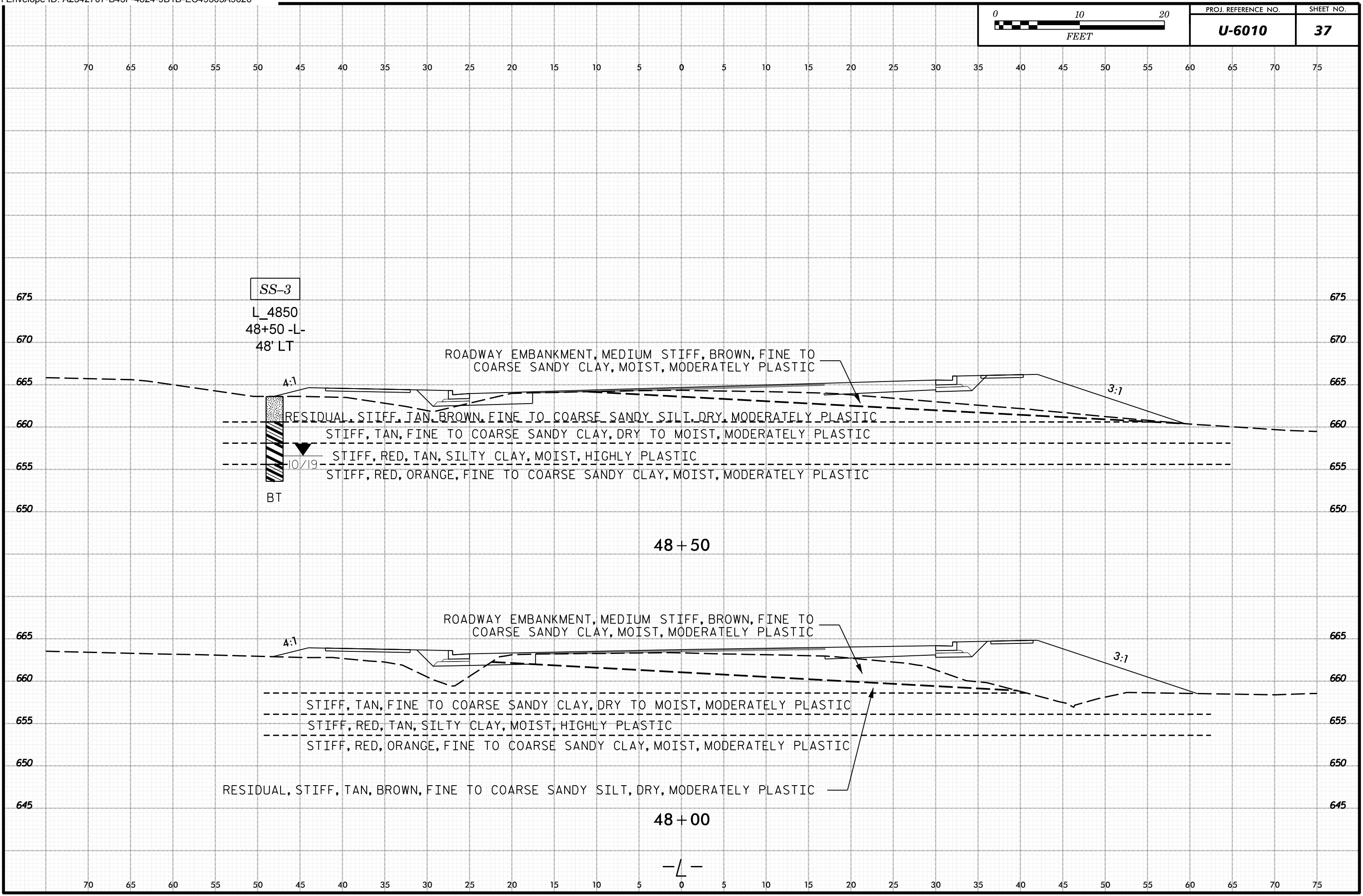
L_4650
46+50 -L-
42' RT

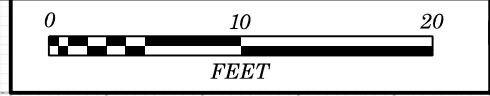
BT

10/19

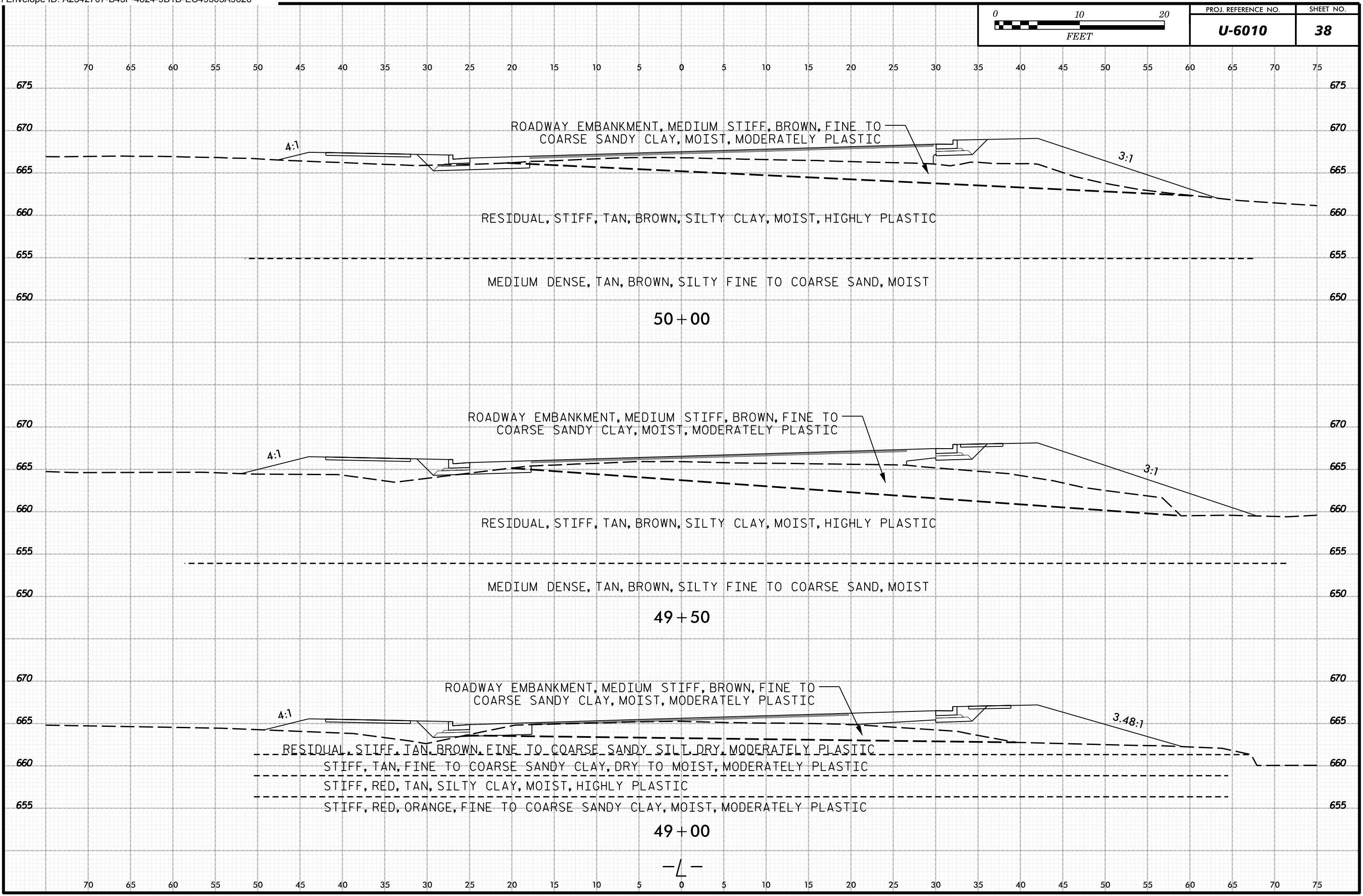


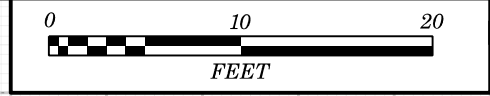
PROJ. REFERENCE NO.	SHEET NO.
U-6010	37





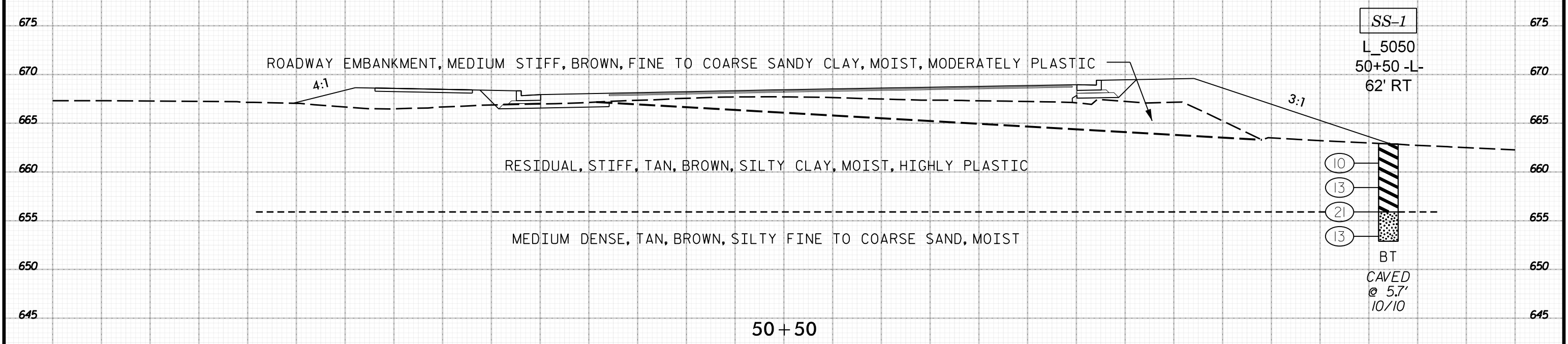
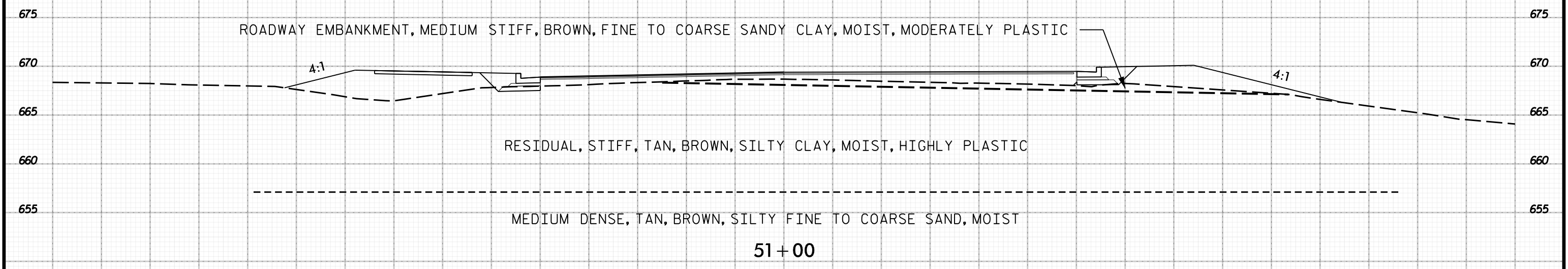
PROJ. REFERENCE NO.	SHEET NO.
U-6010	38



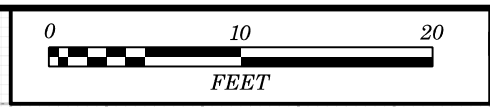


PROJ. REFERENCE NO.	SHEET NO.
U-6010	39

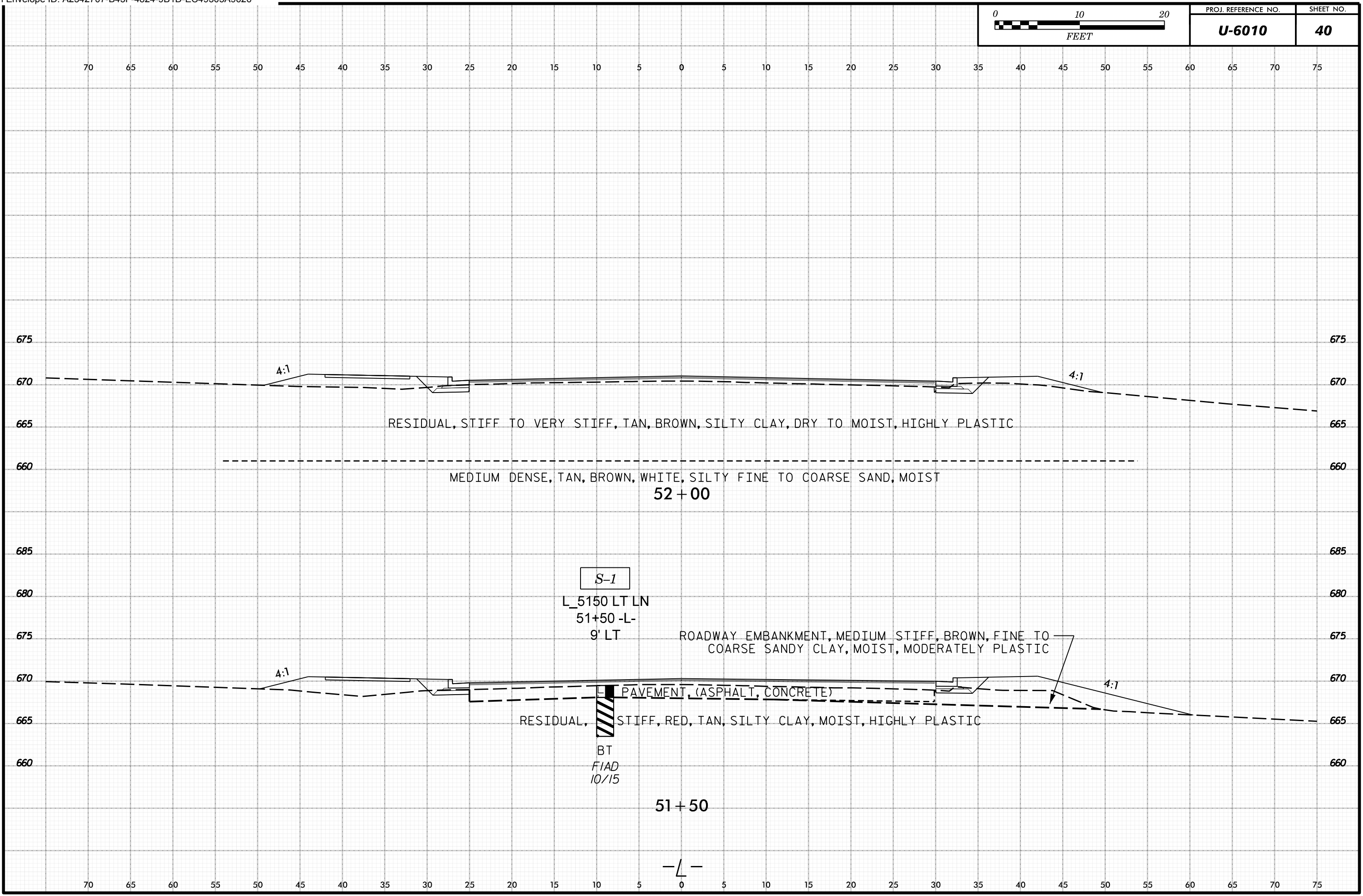
70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



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



PROJ. REFERENCE NO.	SHEET NO.
U-6010	40



RESIDUAL, STIFF TO VERY STIFF, TAN, BROWN, SILTY CLAY, DRY TO MOIST, HIGHLY PLASTIC

MEDIUM DENSE, TAN, BROWN, WHITE, SILTY FINE TO COARSE SAND, MOIST

52 + 00

S-1

L_5150 LT LN
51+50 -L-
9' LT

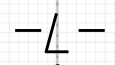
ROADWAY EMBANKMENT, MEDIUM STIFF, BROWN, FINE TO COARSE SANDY CLAY, MOIST, MODERATELY PLASTIC

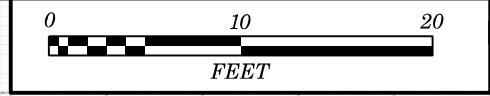
PAVEMENT, (ASPHALT, CONCRETE)

RESIDUAL, STIFF, RED, TAN, SILTY CLAY, MOIST, HIGHLY PLASTIC

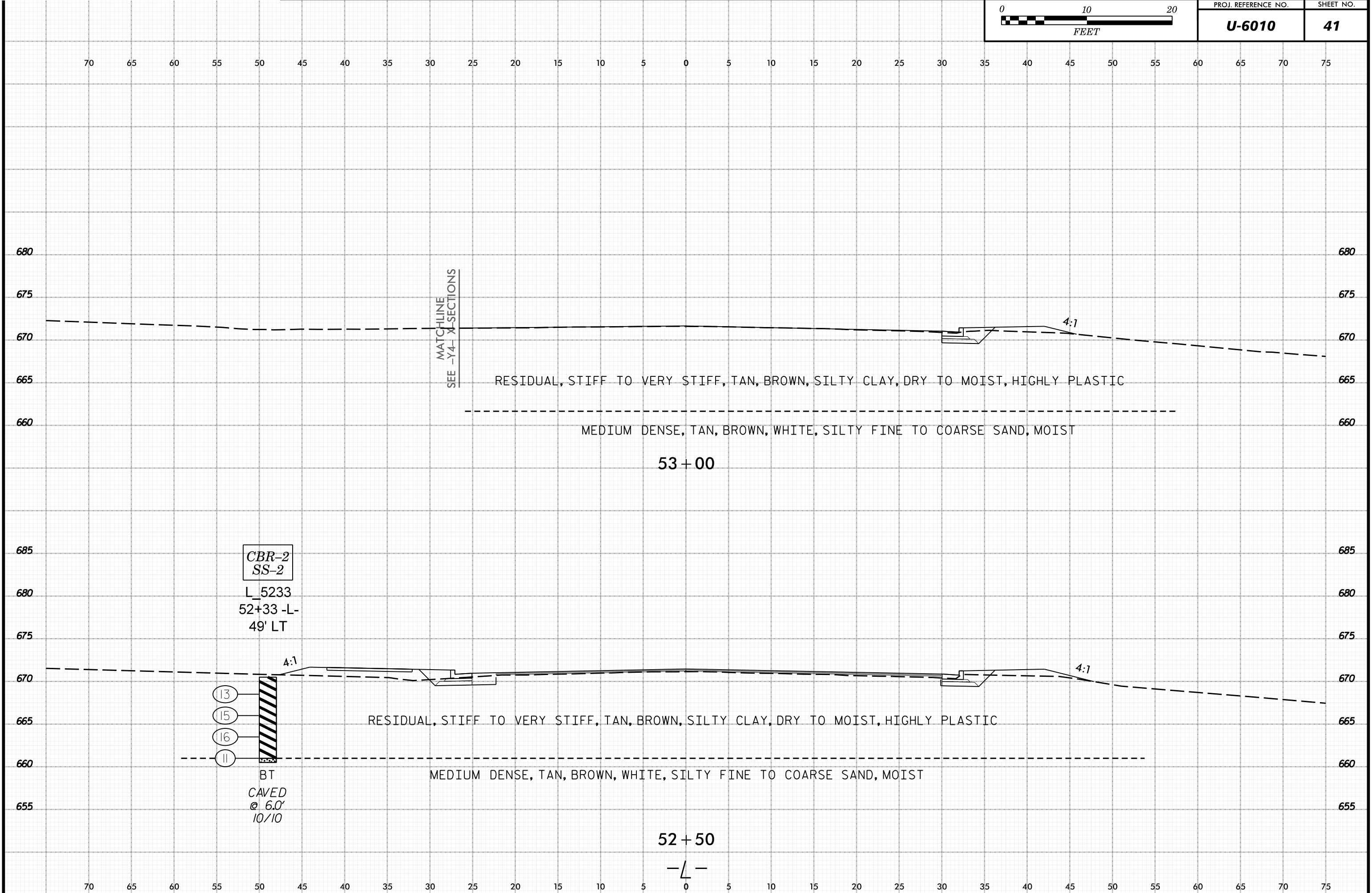
BT
FIAD
10/15

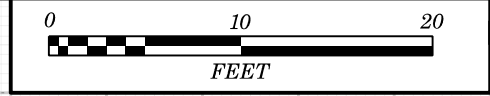
51 + 50



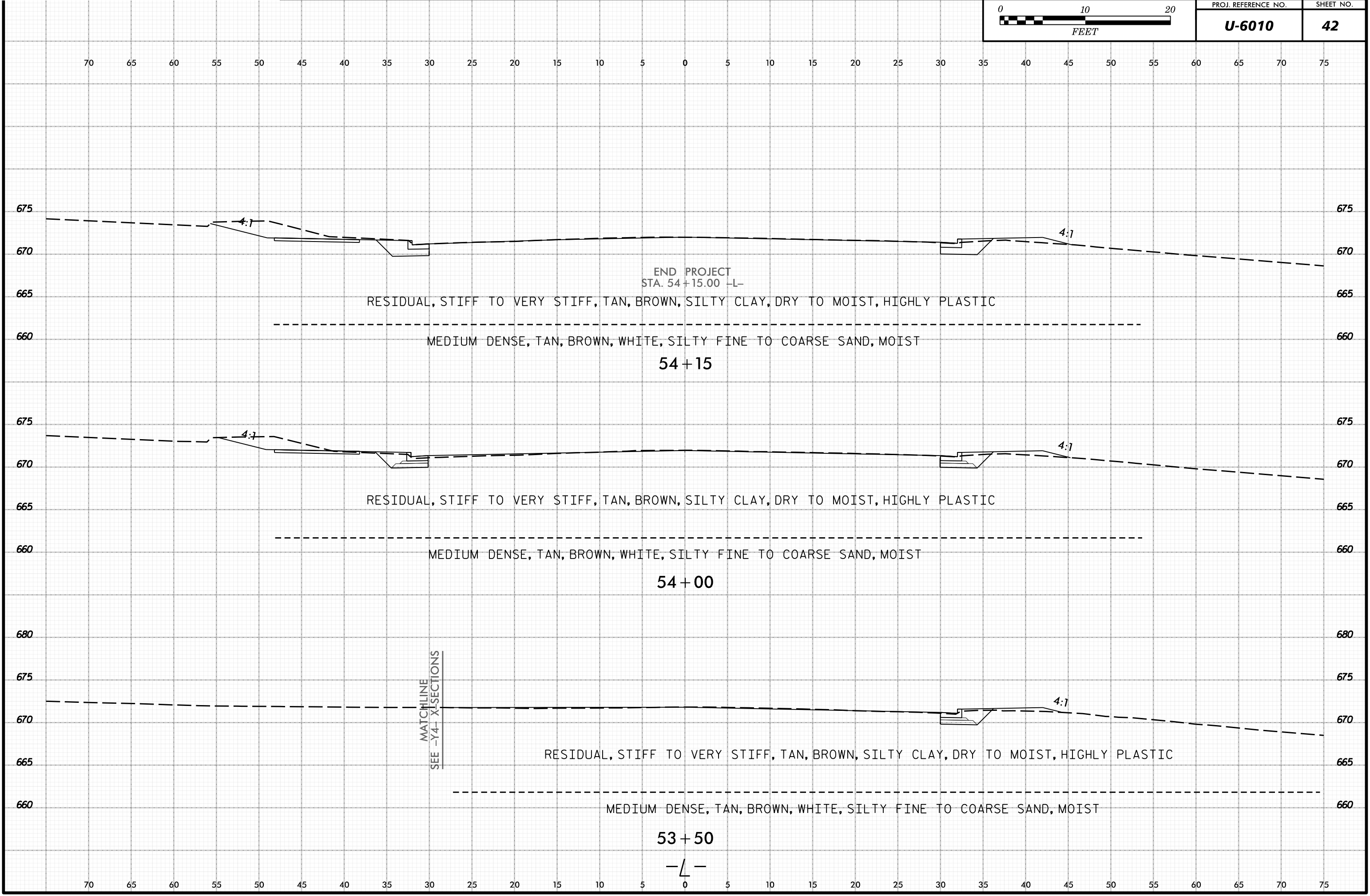


PROJ. REFERENCE NO.	SHEET NO.
U-6010	41





PROJ. REFERENCE NO.	SHEET NO.
U-6010	42



END PROJECT
STA. 54+15.00 -L-

RESIDUAL, STIFF TO VERY STIFF, TAN, BROWN, SILTY CLAY, DRY TO MOIST, HIGHLY PLASTIC

MEDIUM DENSE, TAN, BROWN, WHITE, SILTY FINE TO COARSE SAND, MOIST

54+15

RESIDUAL, STIFF TO VERY STIFF, TAN, BROWN, SILTY CLAY, DRY TO MOIST, HIGHLY PLASTIC

MEDIUM DENSE, TAN, BROWN, WHITE, SILTY FINE TO COARSE SAND, MOIST

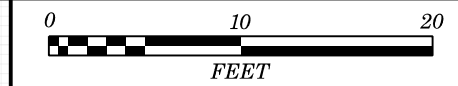
54+00

RESIDUAL, STIFF TO VERY STIFF, TAN, BROWN, SILTY CLAY, DRY TO MOIST, HIGHLY PLASTIC

MEDIUM DENSE, TAN, BROWN, WHITE, SILTY FINE TO COARSE SAND, MOIST

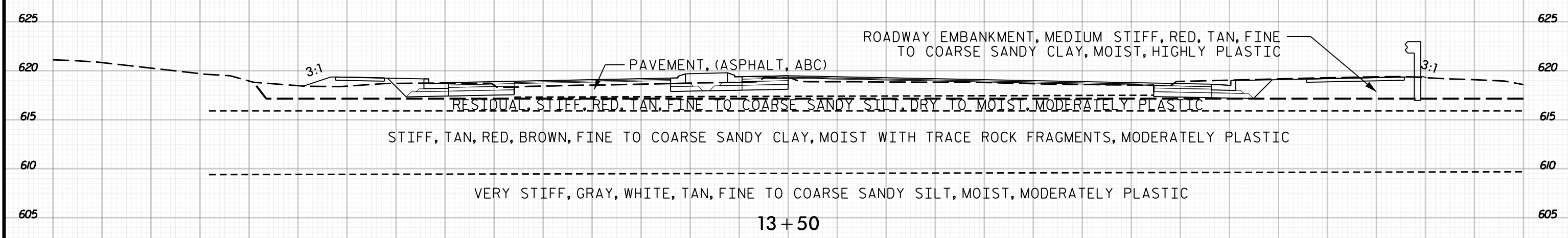
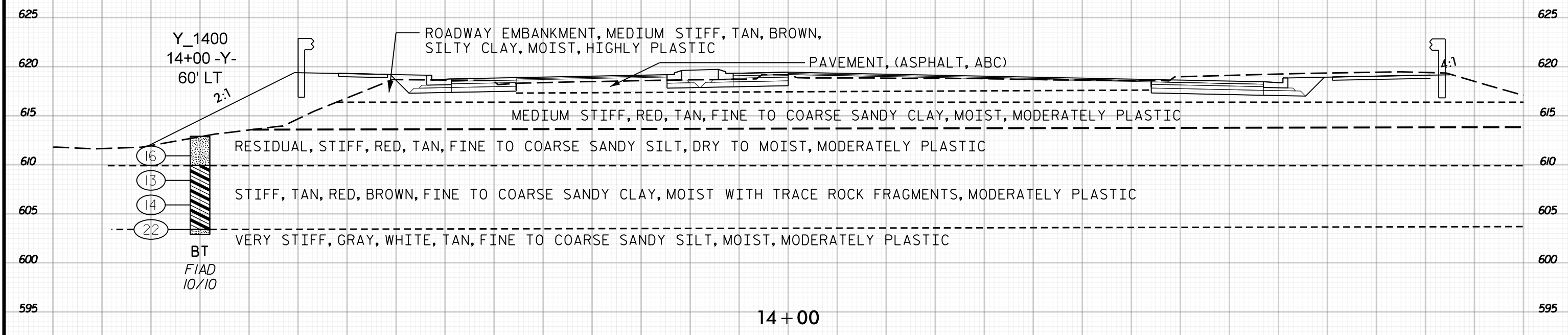
53+50

-L-



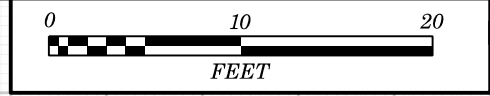
PROJ. REFERENCE NO.	SHEET NO.
U-6010	43

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



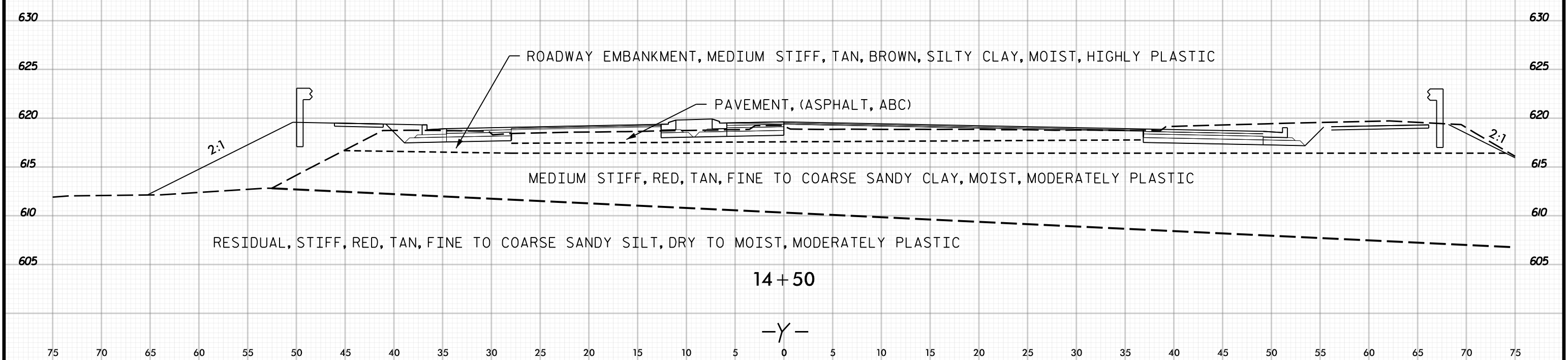
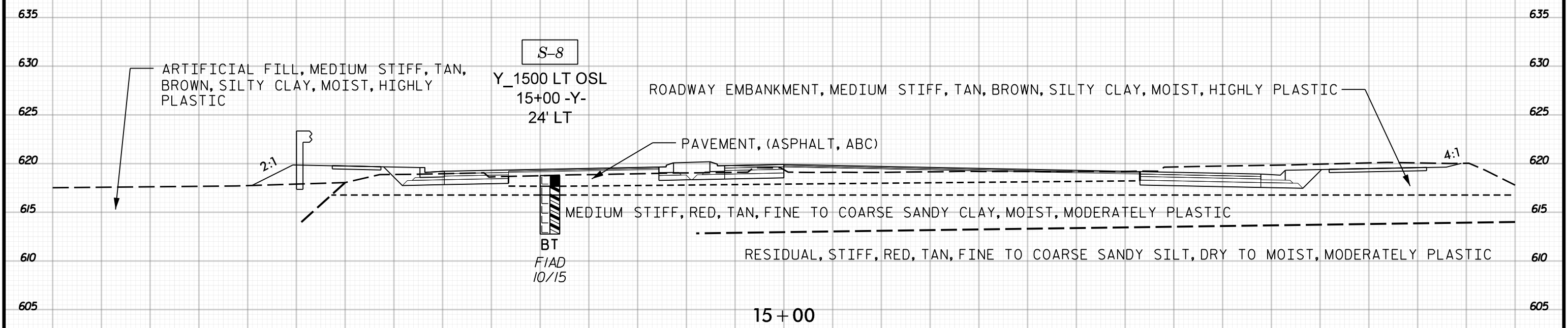
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

-Y-

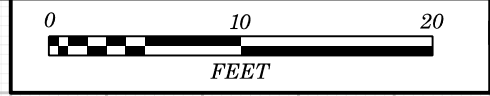


PROJ. REFERENCE NO.	SHEET NO.
U-6010	44

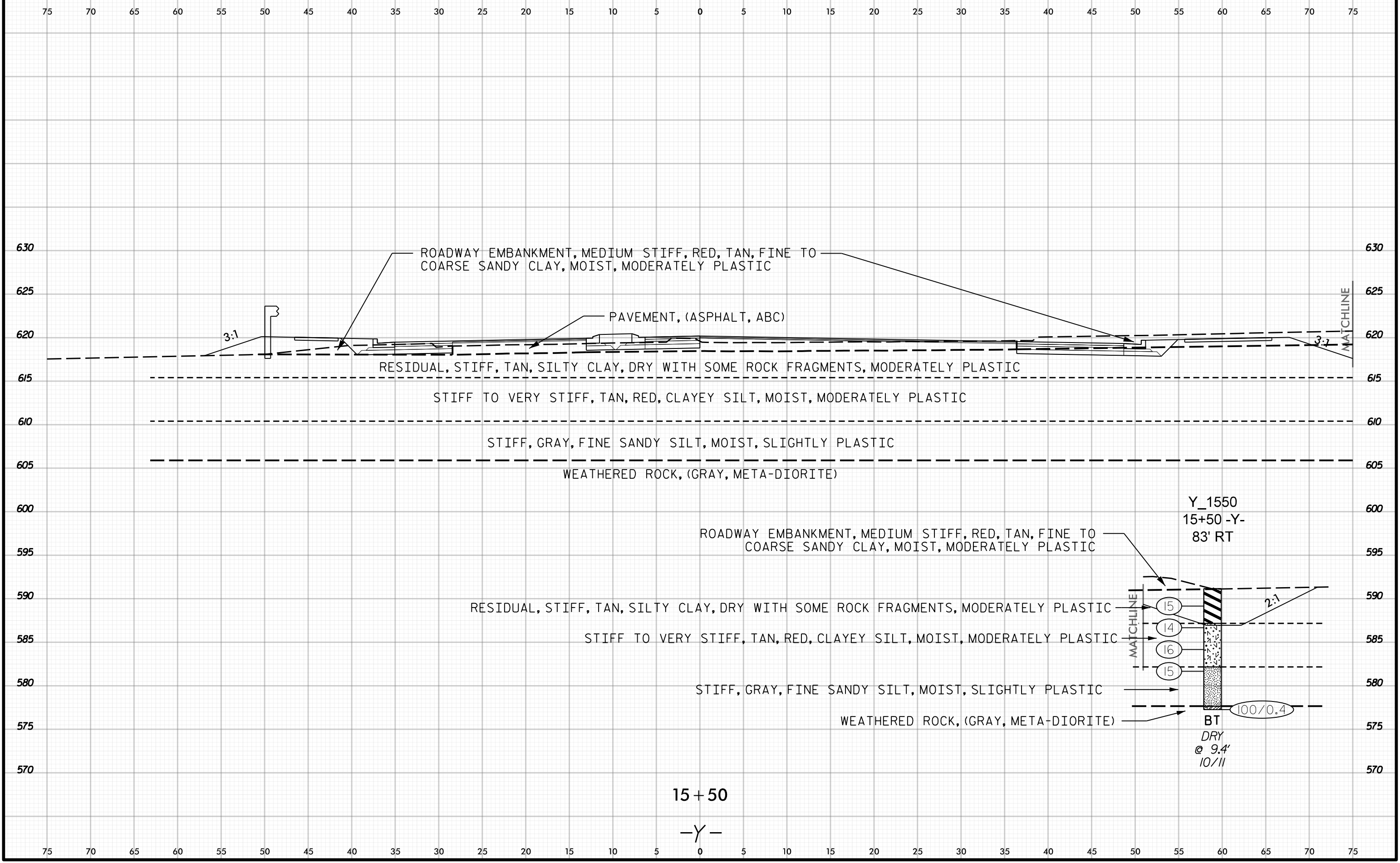
75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

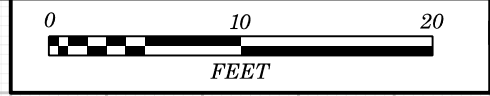


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

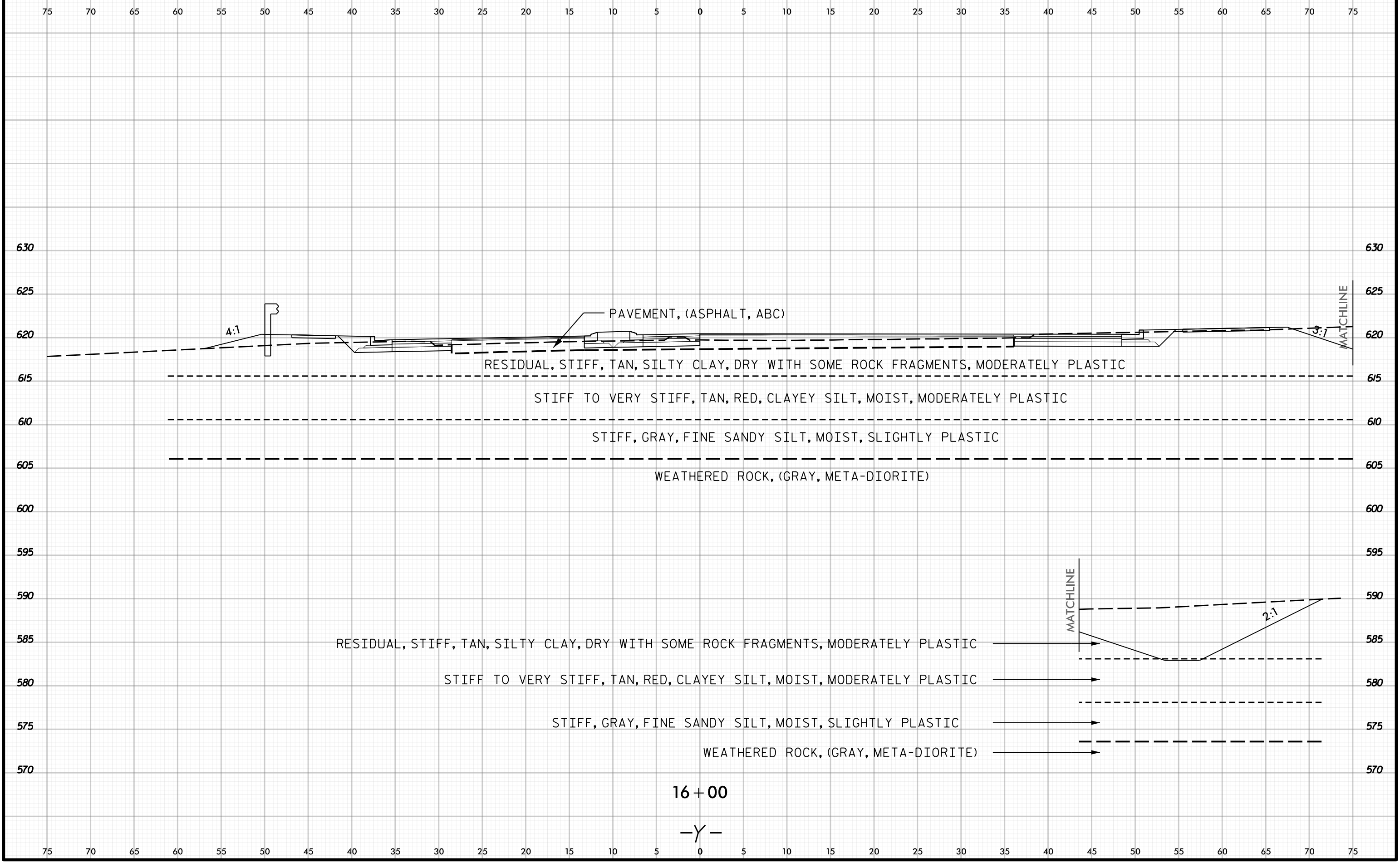


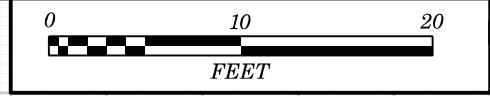
PROJ. REFERENCE NO.	SHEET NO.
U-6010	45



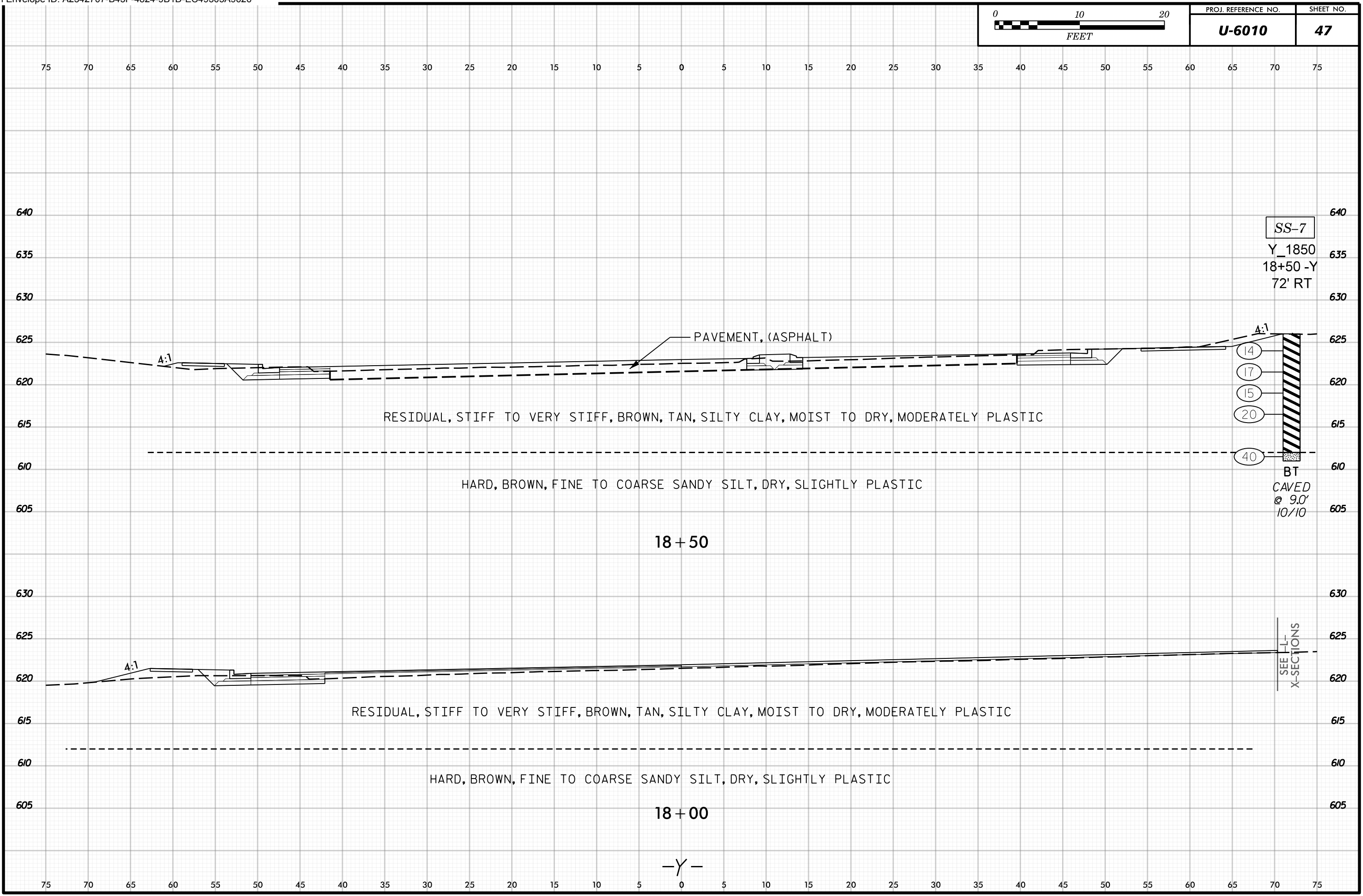


PROJ. REFERENCE NO.	SHEET NO.
U-6010	46





PROJ. REFERENCE NO.	SHEET NO.
U-6010	47



18 + 50

18 + 00

-Y-

SS-7

Y_1850
18+50 -Y
72' RT

4:1

PAVEMENT, (ASPHALT)

4:1

RESIDUAL, STIFF TO VERY STIFF, BROWN, TAN, SILTY CLAY, MOIST TO DRY, MODERATELY PLASTIC

HARD, BROWN, FINE TO COARSE SANDY SILT, DRY, SLIGHTLY PLASTIC

14

17

15

20

40

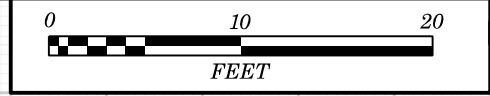
BT
CAVED
@ 9.0'
10/10

SEE L-L
X-SECTIONS

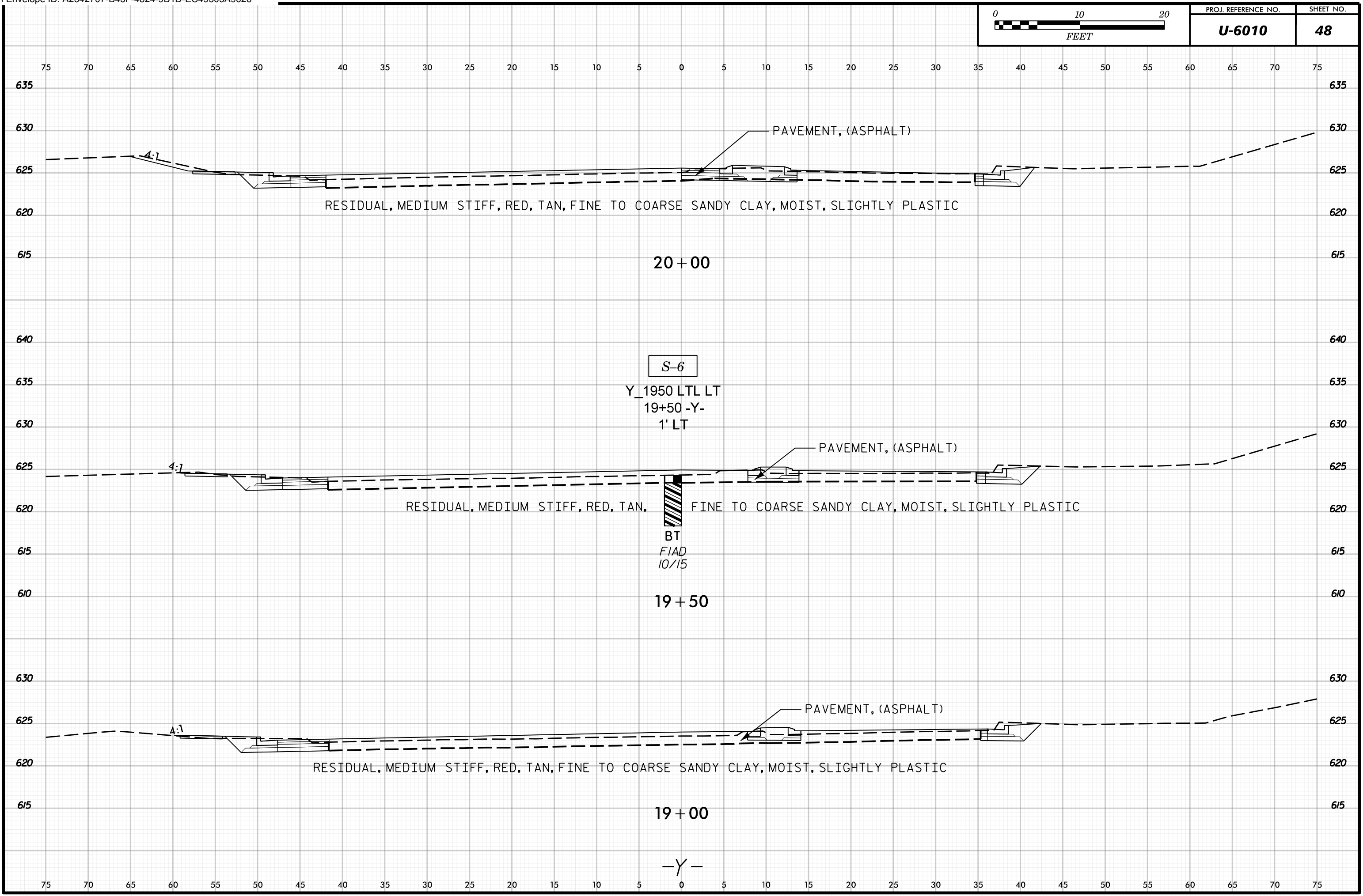
RESIDUAL, STIFF TO VERY STIFF, BROWN, TAN, SILTY CLAY, MOIST TO DRY, MODERATELY PLASTIC

HARD, BROWN, FINE TO COARSE SANDY SILT, DRY, SLIGHTLY PLASTIC

4:1



PROJ. REFERENCE NO.	SHEET NO.
U-6010	48



20 + 00

S-6
Y_1950 LTL LT
19+50 -Y-
1' LT

BT
FIAD
10/15

19 + 50

19 + 00

-Y-

PAVEMENT, (ASPHALT)

PAVEMENT, (ASPHALT)

PAVEMENT, (ASPHALT)

RESIDUAL, MEDIUM STIFF, RED, TAN, FINE TO COARSE SANDY CLAY, MOIST, SLIGHTLY PLASTIC

RESIDUAL, MEDIUM STIFF, RED, TAN, FINE TO COARSE SANDY CLAY, MOIST, SLIGHTLY PLASTIC

RESIDUAL, MEDIUM STIFF, RED, TAN, FINE TO COARSE SANDY CLAY, MOIST, SLIGHTLY PLASTIC

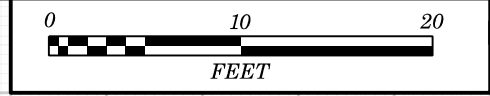
4:1

4:1

4:1

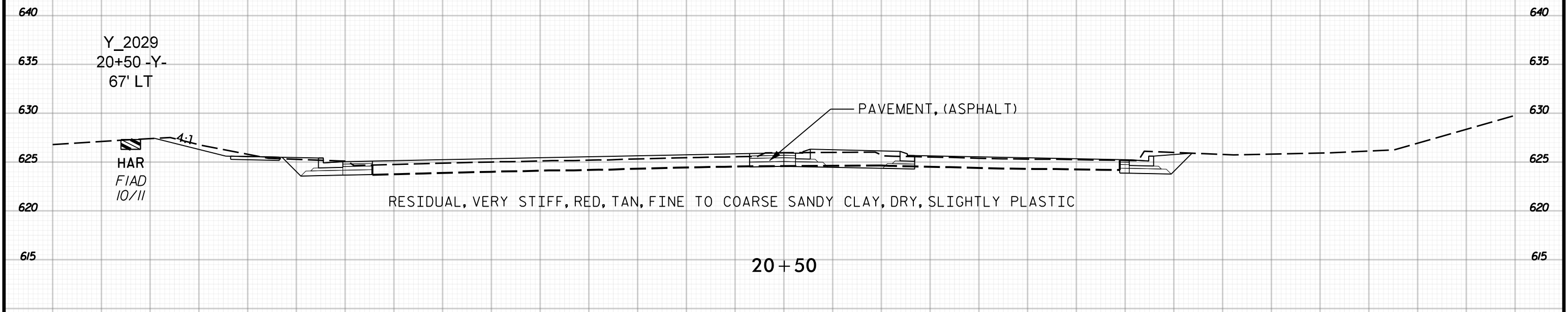
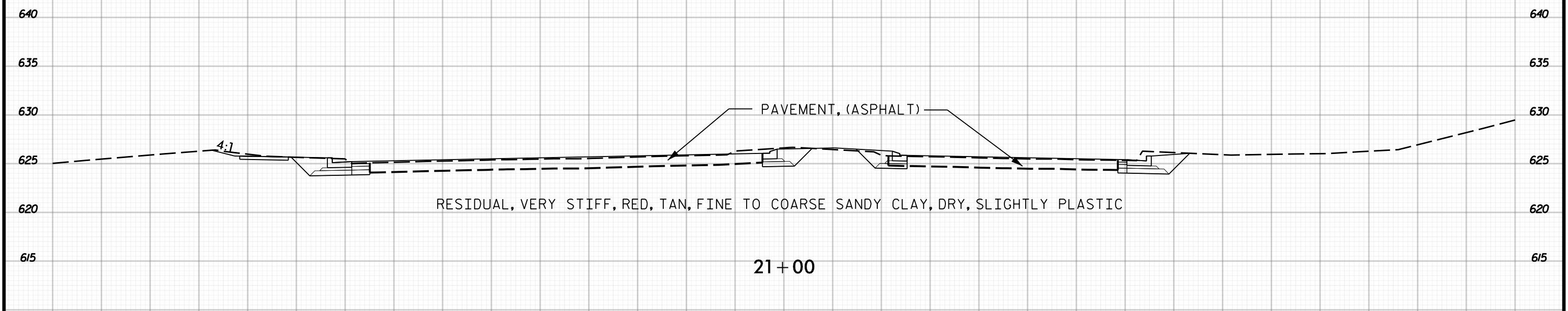
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75

635
630
625
620
615
640
635
630
625
620
615
610
630
625
620
615



PROJ. REFERENCE NO.	SHEET NO.
U-6010	49

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



Y_2029
20+50 -Y-
67' LT

HAR
FIAD
10/11

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6010	50	54

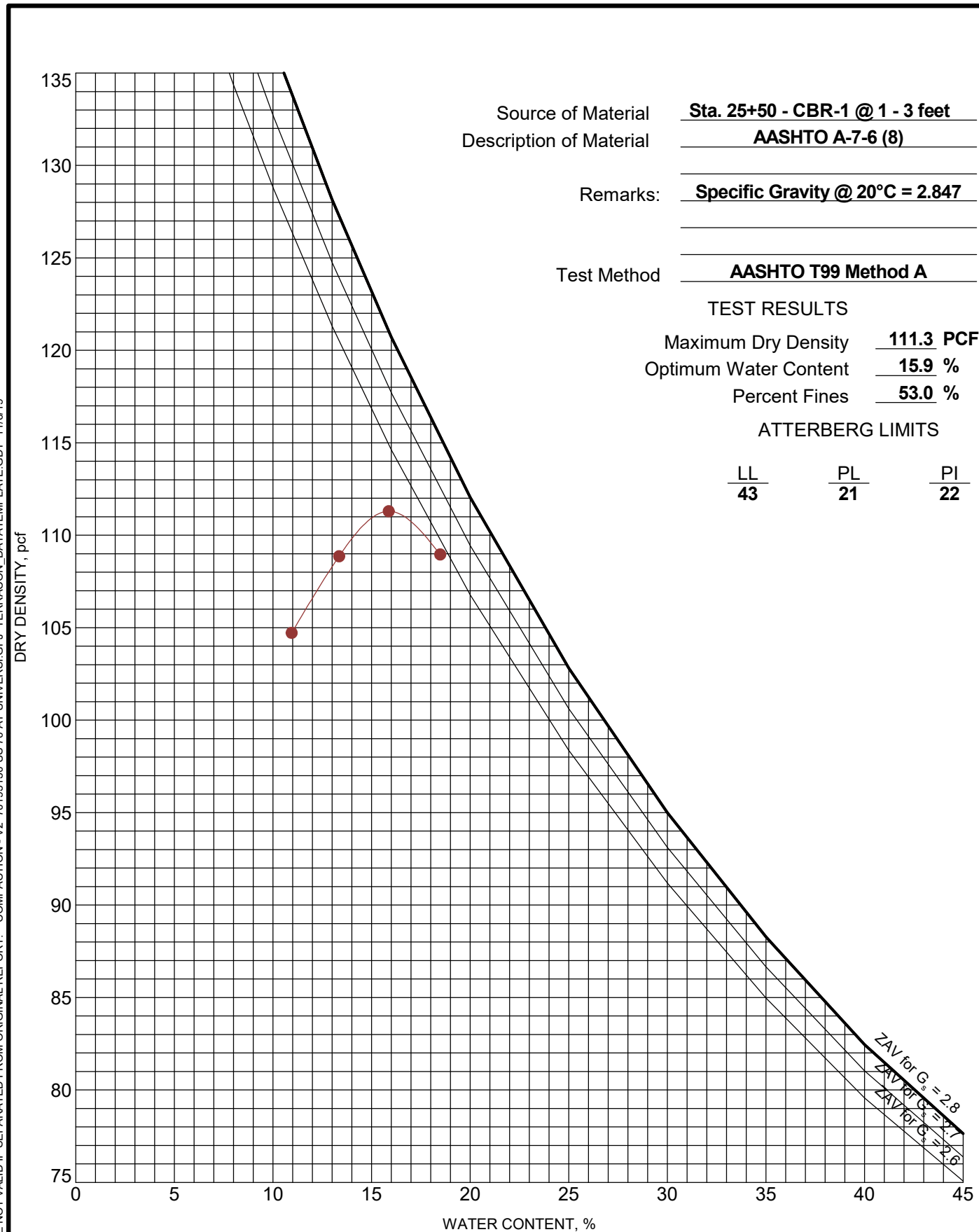
REFERENCE: U-6010

PROJECT: 47145.1.1

APPENDIX A
LABORATORY TESTING SUMMARY
PROCTOR /CBR RESULTS

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: Sta. 25+50 - CBR-1 @ 1 - 3 feet
 Description of Material: AASHTO A-7-6 (8)
 Remarks: Specific Gravity @ 20°C = 2.847
 Test Method: AASHTO T99 Method A

TEST RESULTS
 Maximum Dry Density: 111.3 PCF
 Optimum Water Content: 15.9 %
 Percent Fines: 53.0 %
ATTERBERG LIMITS
 LL: 43 PL: 21 PI: 22

REPORT FOR CALIFORNIA BEARING RATIO



2401 Brentwood Road, Suite 107
 Raleigh, NC 27604
 919-873-2211

Service Date: 10/29/19
 Report Date: 11/06/19

Client

Parsons
 Attn: David Wilver
 5540 Centerview Drive
 Suite 217
 Raleigh, North Carolina 27606-3386

Project

US 70 at University Drive
 South Church Street
 Burlington, North Carolina
 Project No. 70195130

SAMPLE INFORMATION

Sample Number: CBR-1 Proctor Method: AASHTO T99 - Method A
 Boring Number: _____ Maximum Dry Density (pcf): 111.3
 Sample Location: Station 25+50 75' LT Optimum Moisture: 15.9
 Depth: 1-3' Liquid Limit: 43
 Material Description: AASHTO A-7-6 (8) Plasticity Index: 22

CBR TEST DATA

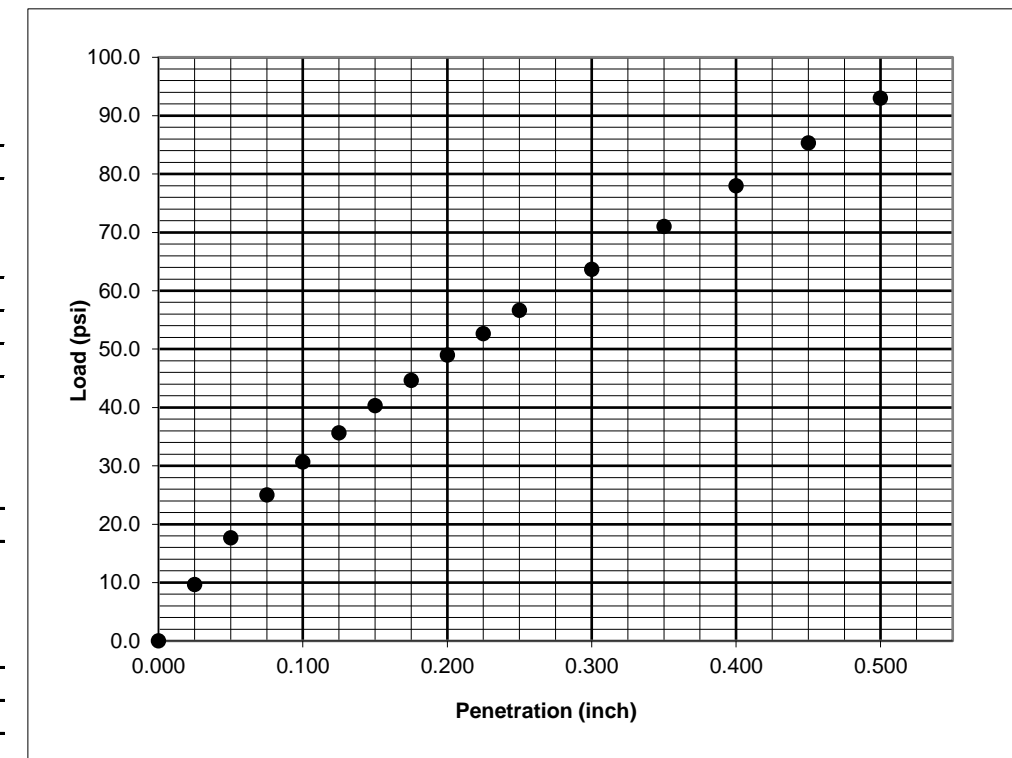
CBR Value at 0.100 inch: 3.1
 CBR Value at 0.200 inch: 3.3
 Surcharge Weight (lbs): 10
 Soaking Condition: Soaked
 Length of Soaking (hours): 96
 Swell (%): 2.0

DENSITY DATA

Dry Density Before Soaking (pcf): 111.8
 Compaction of Proctor (%): 100.4

MOISTURE DATA

Before Compaction (%): 17.0
 After Compaction (%): 16.3
 Top 1" After Soaking (%): 24.4
 Average After Soaking (%): 19.2



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman

Reported To: Buddy Riggs

Contractor:

Report Distribution

DocuSigned by:

 Reviewed by: Abner F. Riggs (Buddy)
 Geotechnical Project Manager

Test Methods: AASHTO T193

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written approval of Terracon. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTON - V2 70195130 US 70 AT UNIVERSITY.GPJ TERRACON.DATATEMPLATE.GDT 11/6/19

PROJECT: US 70 at University Drive

SITE: S Chuch Street
 Burlington, NC



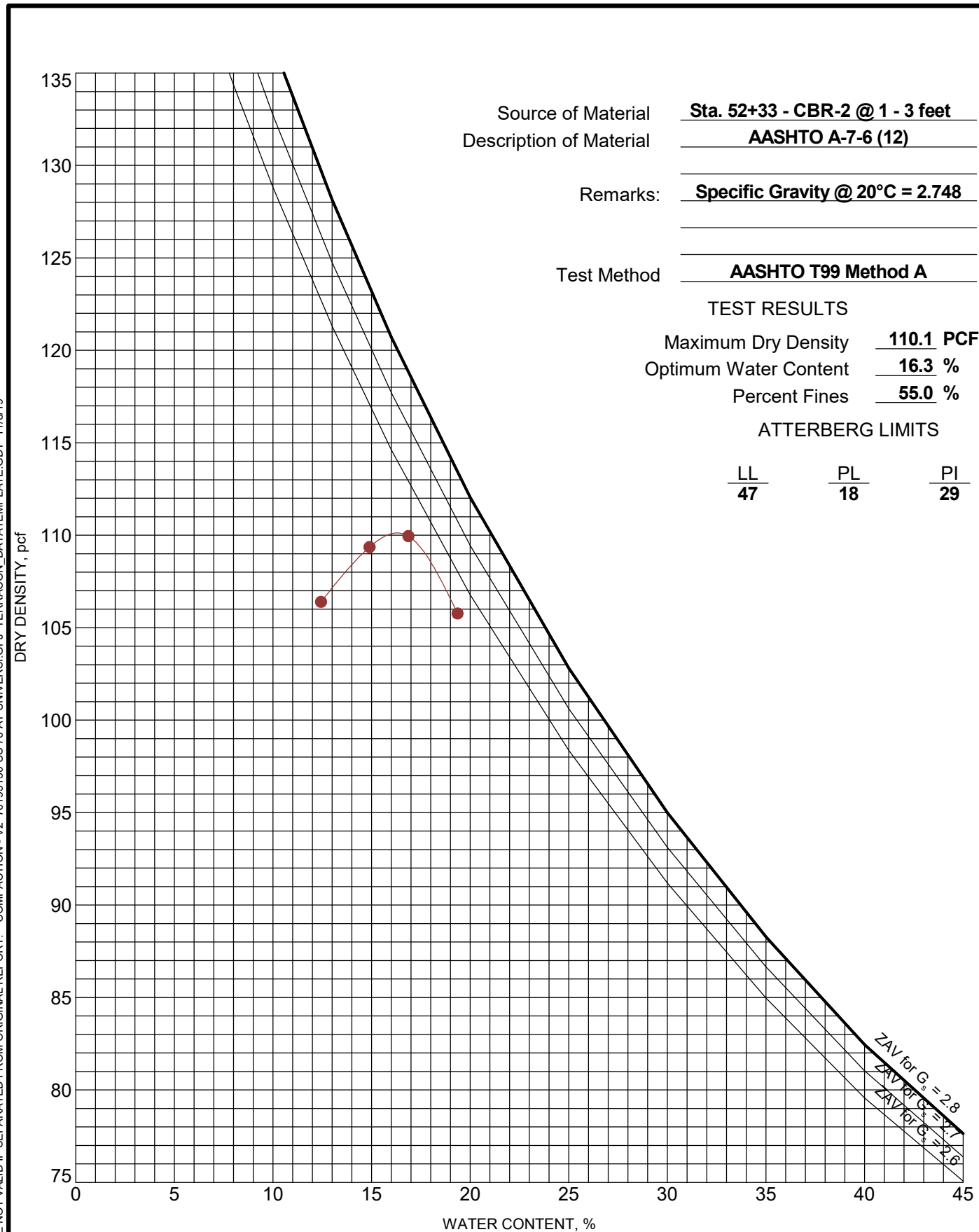
PROJECT NUMBER: 70195130

CLIENT: Parsons
 Raleigh, NC

EXHIBIT: B-1

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material Sta. 52+33 - CBR-2 @ 1 - 3 feet
 Description of Material AASHTO A-7-6 (12)

Remarks: Specific Gravity @ 20°C = 2.748

Test Method AASHTO T99 Method A

TEST RESULTS

Maximum Dry Density 110.1 PCF
 Optimum Water Content 16.3 %
 Percent Fines 55.0 %

ATTERBERG LIMITS

LL 47 PL 18 PI 29

REPORT FOR CALIFORNIA BEARING RATIO



2401 Brentwood Road, Suite 107
 Raleigh, NC 27604
 919-873-2211

Service Date: 10/29/19
 Report Date: 11/06/19

Client

Parsons
 Attn: David Wilver
 5540 Centerview Drive
 Suite 217
 Raleigh, North Carolina 27606-3386

Project

US 70 at University Drive
 South Church Street
 Burlington, North Carolina
 Project No. 70195130

SAMPLE INFORMATION

Sample Number:	<u>CBR-2</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:		Maximum Dry Density (pcf):	<u>110.1</u>
Sample Location:	<u>Station 52+33 49' LT</u>	Optimum Moisture:	<u>16.3</u>
Depth:	<u>1-3'</u>	Liquid Limit:	<u>47</u>
Material Description:	<u>AASHTO A-7-6 (12)</u>	Plasticity Index:	<u>29</u>

CBR TEST DATA

CBR Value at 0.100 inch 3.6
 CBR Value at 0.200 inch 3.5

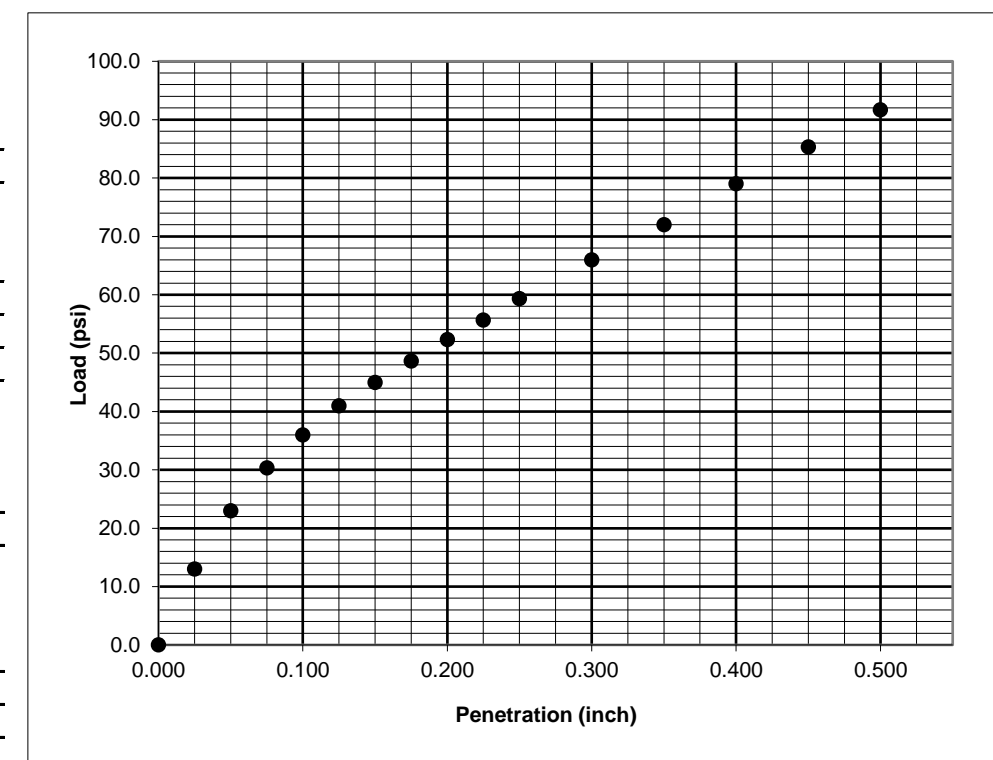
Surcharge Weight (lbs) 10
 Soaking Condition Soaked
 Length of Soaking (hours) 96
 Swell (%) 1.5

DENSITY DATA

Dry Density Before Soaking (pcf) 109.8
 Compaction of Proctor (%) 99.7

MOISTURE DATA

Before Compaction (%) 17.0
 After Compaction (%) 17.8
 Top 1" After Soaking (%) 22.0
 Average After Soaking (%) 19.2



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman

Reported To: Buddy Riggs

Contractor:

Report Distribution

Test Methods: AASHTO T193

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DocuSigned by:

 Reviewed by: Abner F. Riggs (Buddy)
 Geotechnical Project Manager

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 70195130 US 70 AT UNIVERSITY.GPJ TERRACON.DATATEMPLATE.GDT 11/6/19

PROJECT: US 70 at University Drive

SITE: S Chuch Street
 Burlington, NC



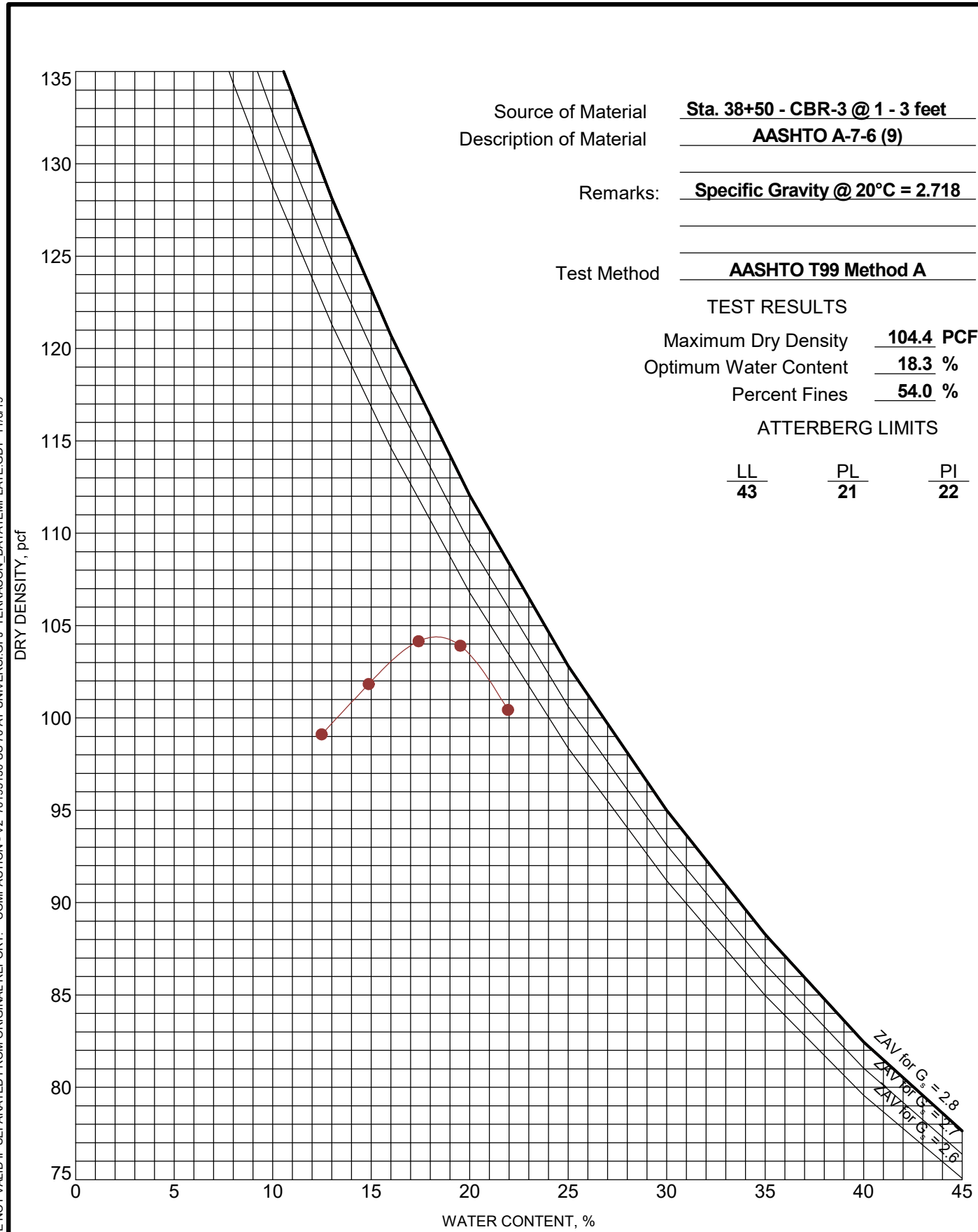
PROJECT NUMBER: 70195130

CLIENT: Parsons
 Raleigh, NC

EXHIBIT: B-2

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: Sta. 38+50 - CBR-3 @ 1 - 3 feet
 Description of Material: AASHTO A-7-6 (9)
 Remarks: Specific Gravity @ 20°C = 2.718
 Test Method: AASHTO T99 Method A

TEST RESULTS
 Maximum Dry Density: 104.4 PCF
 Optimum Water Content: 18.3 %
 Percent Fines: 54.0 %

ATTERBERG LIMITS

LL	PL	PI
43	21	22

REPORT FOR CALIFORNIA BEARING RATIO



2401 Brentwood Road, Suite 107
 Raleigh, NC 27604
 919-873-2211

Service Date: 10/29/19
 Report Date: 11/06/19

Client

Parsons
 Attn: David Wilver
 5540 Centerview Drive
 Suite 217
 Raleigh, North Carolina 27606-3386

Project

US 70 at University Drive
 South Church Street
 Burlington, North Carolina
 Project No. 70195130

SAMPLE INFORMATION

Sample Number:	<u>CBR-3</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:		Maximum Dry Density (pcf):	<u>104.4</u>
Sample Location:	<u>Station 38+50 42' RT</u>	Optimum Moisture:	<u>18.3</u>
Depth:	<u>1-3'</u>	Liquid Limit:	<u>43</u>
Material Description:	<u>AASHTO A-7-6 (9)</u>	Plasticity Index:	<u>22</u>

CBR TEST DATA

CBR Value at 0.100 inch: 6.1
 CBR Value at 0.200 inch: 7.3

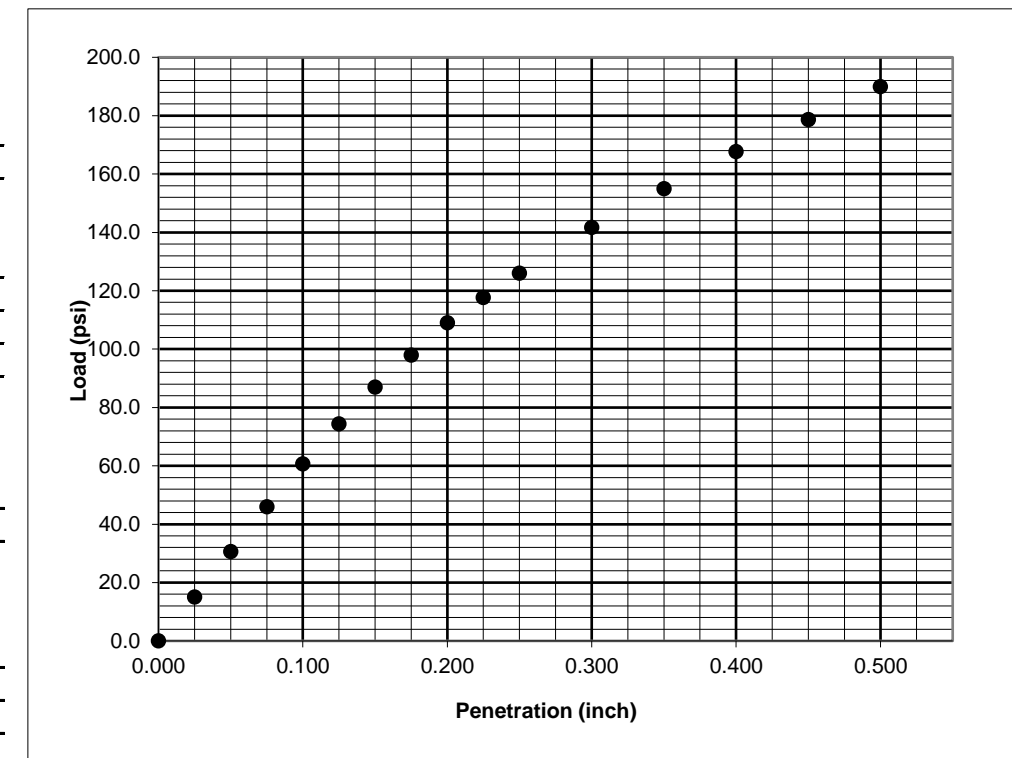
Surcharge Weight (lbs): 10
 Soaking Condition: Soaked
 Length of Soaking (hours): 96
 Swell (%): 1.2

DENSITY DATA

Dry Density Before Soaking (pcf): 103.8
 Compaction of Proctor (%): 99.4

MOISTURE DATA

Before Compaction (%): 18.8
 After Compaction (%): 19.4
 Top 1" After Soaking (%): 23.2
 Average After Soaking (%): 20.8



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman

Reported To: Buddy Riggs

Contractor:

Report Distribution

DocuSigned by:

 Reviewed by: Abner F. Riggs, Jr.
 Abner F. Riggs (Buddy)
 Geotechnical Project Manager

Test Methods: AASHTO T193

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LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTON - V2 70195130 US 70 AT UNIVERSITY.GPJ TERRACON_DATATEMPLATE.GDT 11/6/19

PROJECT: US 70 at University Drive

SITE: S Chuch Street
 Burlington, NC



PROJECT NUMBER: 70195130

CLIENT: Parsons
 Raleigh, NC

EXHIBIT: B-3