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REFERENCE: U-3330

PROJECT: 36596

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-3330	1	6

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	BORE LOG(S)
6	SOIL TEST RESULTS

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY NASH
PROJECT DESCRIPTION US 301 BYPASS FROM NC 43-48
(BENVENUE RD.) TO SR 1836 (MAY DR.)

SITE DESCRIPTION CULVERT OVER GOOSE BRANCH
AT -L- STA. 113+48

INVENTORY - ADDENDUM

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 1919 TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

D.G. PINTER

J.R. SWARTLEY

C. CONGLETON

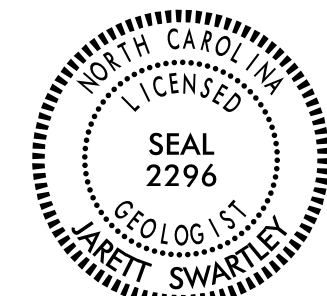
INVESTIGATED BY J.R. SWARTLEY

DRAWN BY T.T. WALKER

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE JUNE 2015



DocuSigned by:

Jarett Swartley

SIGNATURE DATE

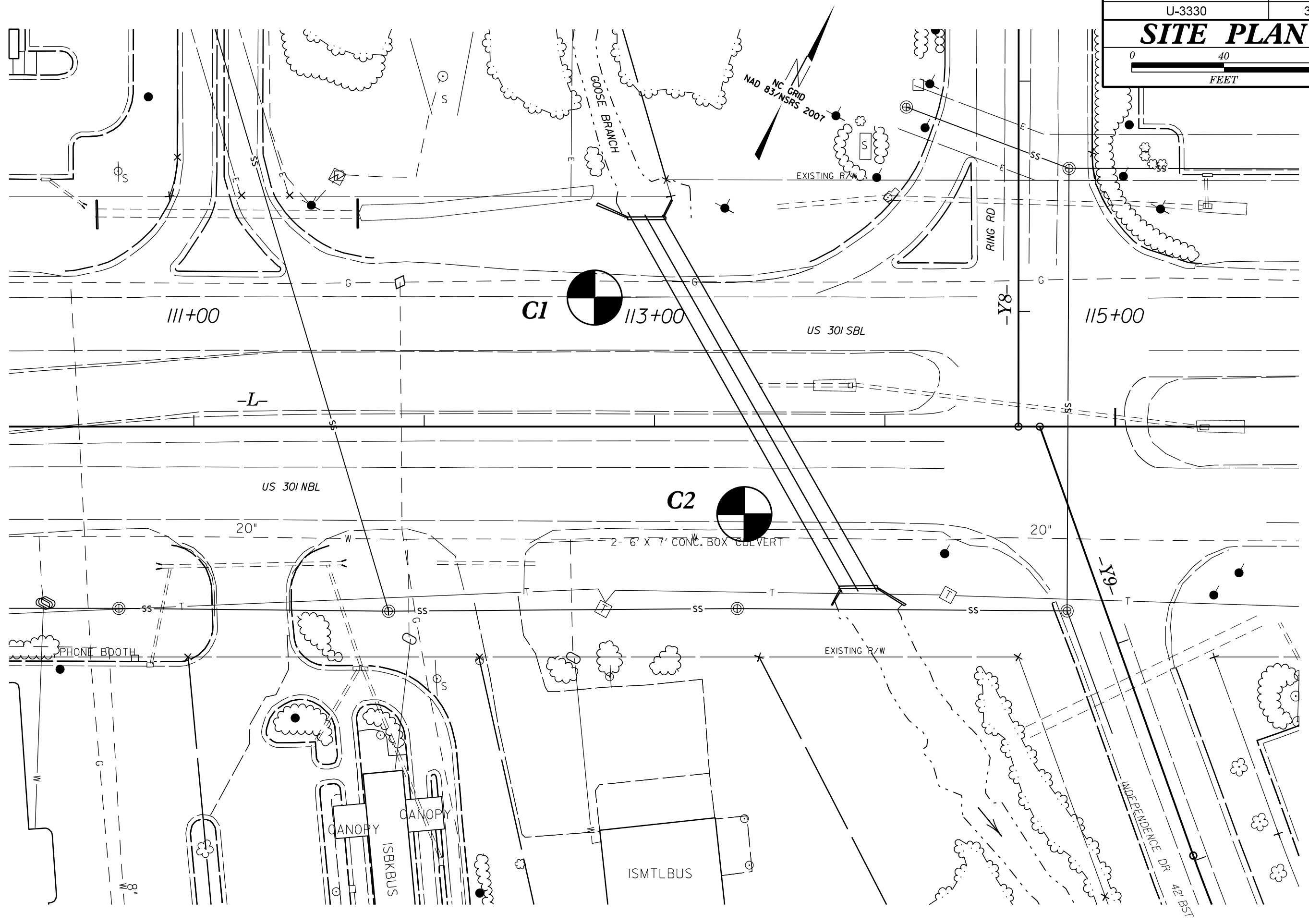
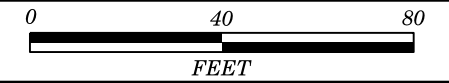
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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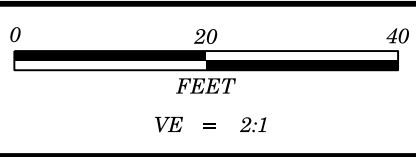
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

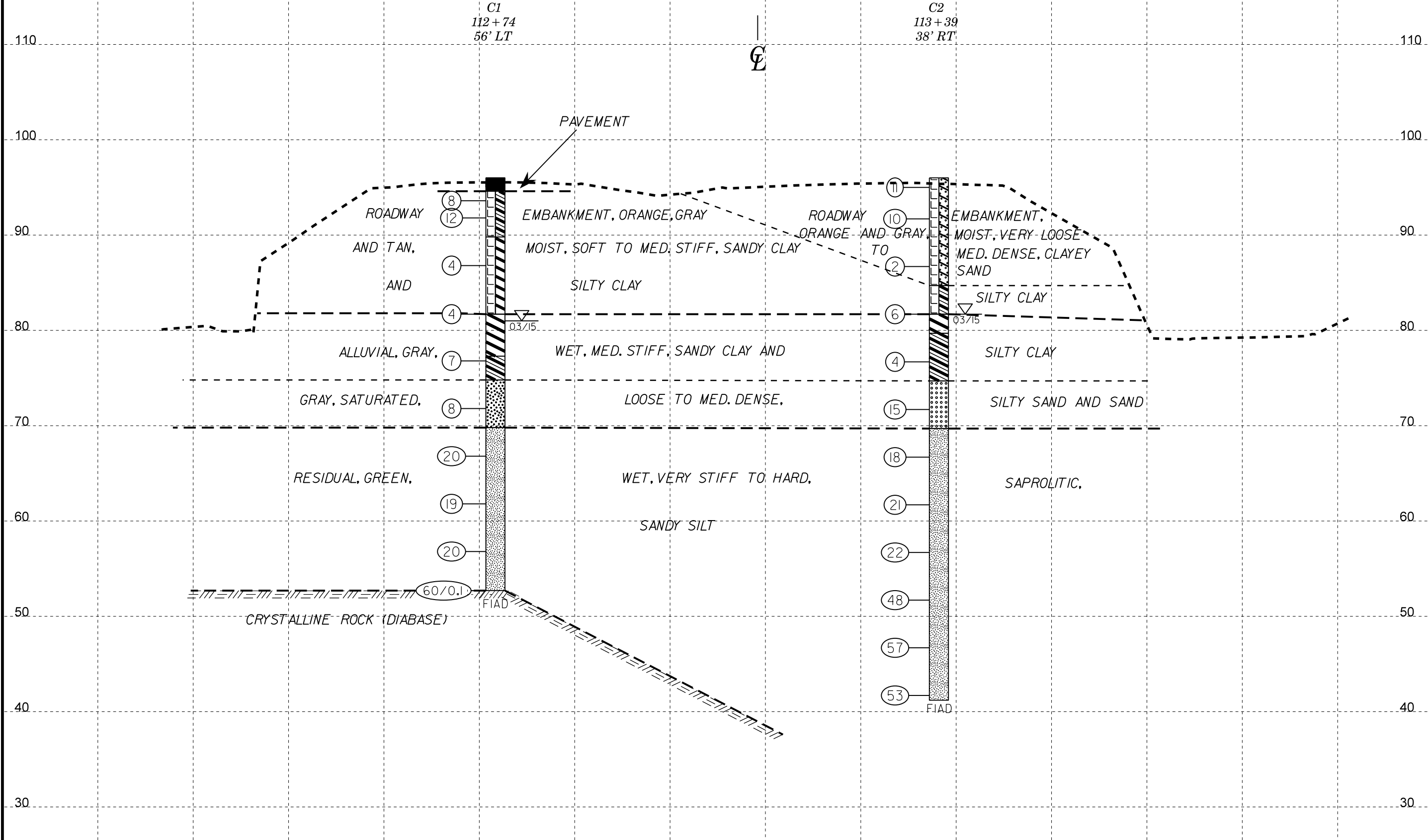
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																												
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED 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 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</p>	<p>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.</p>	<p>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:</p>	<p>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.) - IRRREGULARLY 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 (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																												
<p>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width:100%; text-align:center; font-size:small;"> <thead> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="6">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="6">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th colspan="2">A-1</th> <th colspan="2">A-3</th> <th colspan="2">A-2</th> <th colspan="2">A-4</th> <th colspan="2">A-5</th> <th colspan="2">A-6</th> <th colspan="2">A-7</th> <th>A-1, A-2</th> <th>A-3, A-5</th> </tr> </thead> <tbody> <tr> <td>GROUP CLASS.</td> <td colspan="2">A-1-a</td> <td colspan="2">A-1-b</td> <td colspan="2">A-2-4</td> <td colspan="2">A-2-5</td> <td colspan="2">A-2-6</td> <td colspan="2">A-2-7</td> <td colspan="2">A-7-5, A-7-6</td> <td colspan="2">A-3</td> </tr> <tr> <td>SYMBOL</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> <td colspan="2">[Symbol]</td> </tr> <tr> <td>% PASSING</td> <td colspan="2">50 MX</td> <td colspan="2">30 MX</td> <td colspan="2">25 MX</td> <td colspan="2">10 MN</td> <td colspan="2">5 MN</td> <td colspan="2">35 MX</td> <td colspan="2">35 MN</td> <td colspan="2">36 MN</td> </tr> <tr> <td>MATERIAL PASSING #10 PI</td> <td colspan="2">-</td> <td colspan="2">6 MX</td> <td colspan="2">-</td> <td colspan="2">40 MX</td> <td colspan="2">41 MN</td> <td colspan="2">40 MN</td> <td colspan="2">41 MN</td> <td colspan="2">40 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX</td> <td colspan="2">12 MX</td> <td colspan="2">16 MX</td> <td colspan="2">NO MX</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1" style="width:100%; text-align:center; font-size:small;"> <thead> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p>GROUND WATER</p> <ul style="list-style-type: none"> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP 	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	<p>WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) 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.</p> <p>SLIGHT (SL.) 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	
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SITE PLAN





PROJECT REFERENCE NO.	SHEET NO.
U-3330	4
CULVERT PROFILE PROJECTED ALONG -L- STA. 113+48 CROSS SECTION	



PROJ. NO. - 36596.1.2
ID NO. - U-3330
COUNTY - NASH

C1

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	56'LT	112+74	3.2-4.7	A-6(3)	35	22	43.0	18.7	12.1	26.2	87	60	36	-	-
SS-2	56'LT	112+74	8.2-9.7	A-7-6(33)	67	42	15.9	8.7	19.0	56.4	98	86	76	-	-
SS-3	56'LT	112+74	13.2-14.3	A-7-6(46)	81	52	9.1	5.8	18.6	66.5	92	86	80	-	-

C2

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	38'RT	113+39	18.3-19.8	A-6(5)	29	15	12.9	37.5	21.5	28.2	100	95	56	-	-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3330	1	7

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY NASH
PROJECT DESCRIPTION US 301 BYPASS FROM NC
43-48 (BENVENUE RD.) TO SR 1836 (MAY DR.)

ADDENDUM

REFERENCE: U-3330

PROJECT: 36596

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
3	INVENTORY TEXT
4	SITE PLAN
5-7	BORE LOG(S)

PERSONNEL	
<u>O.B. OTI</u>	_____
<u>D.G. PINTER</u>	_____
_____	_____
_____	_____
_____	_____
_____	_____

INVESTIGATED BY J.R. SWARTLEY
DRAWN BY J.R. SWARTLEY
CHECKED BY N.T. ROBERSON
SUBMITTED BY N.T. ROBERSON
DATE DECEMBER 2016

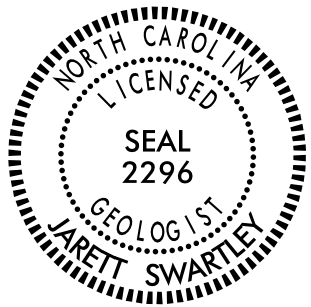
CAUTION NOTICE

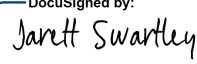
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.



DocuSigned by:
 12/30/2016
7F355C29E75A413
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
 (PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION																																																																																																																																			
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										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.																																																																																																																																			
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.																																																																																																																																			
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PLASTICITY										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.																																																																																																																																			
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

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 YIELD 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 SL.)	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 (SL.)	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. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>
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. <u>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</u>
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. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>
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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
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.
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.

FRACTURE SPACING

TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		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 (ROD) - 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 (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: *see note

ELEVATION: _____ FEET

NOTES:

elevations derived from geopak and the tin file 'u3330.ls_tin.tin' dated 10/10/14



PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

December 21, 2016

STATE PROJECT: 36596.1.1 (U-3330)
FEDERAL PROJECT: STP-030(28)
COUNTY: Nash

DESCRIPTION: US 301 Bypass from NC 43-48 (Benvenue Rd.) to SR 1836 (May Dr.)

SUBJECT: Geotechnical Report – Inventory Addendum

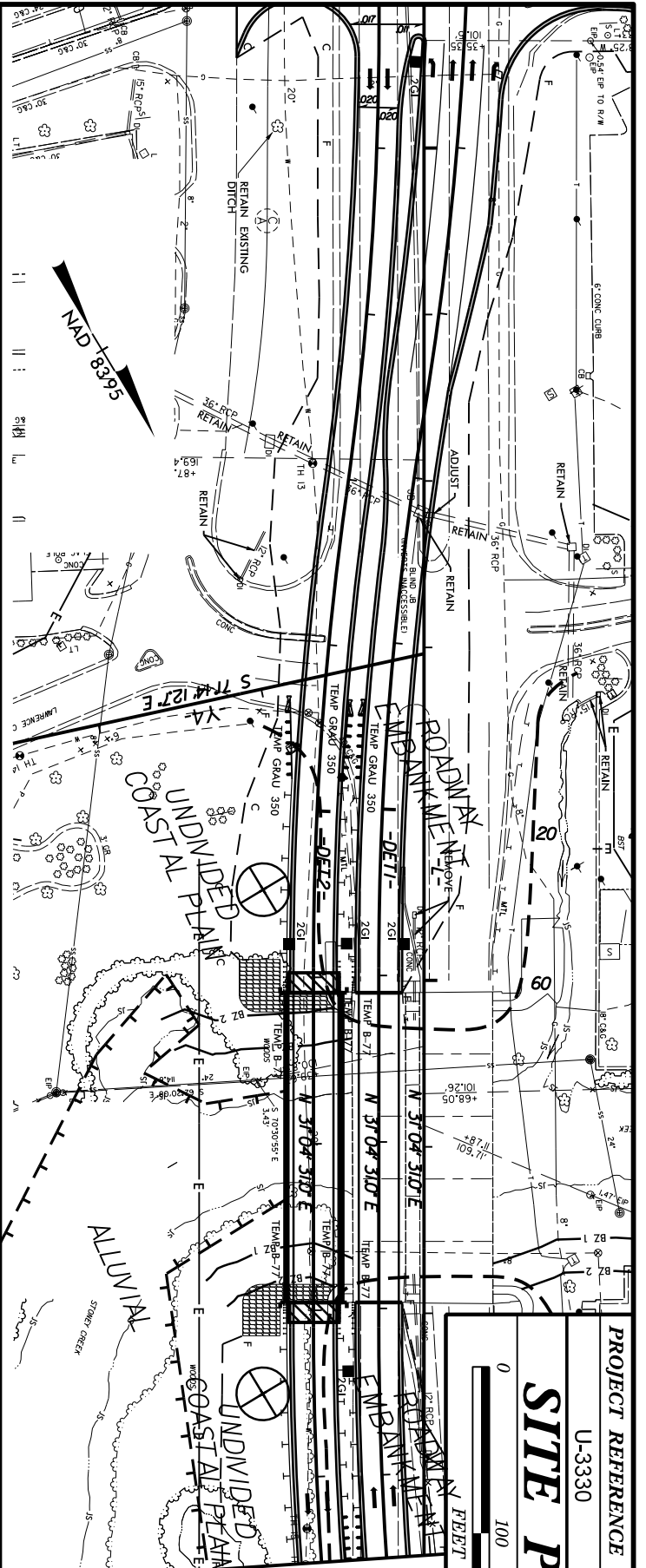
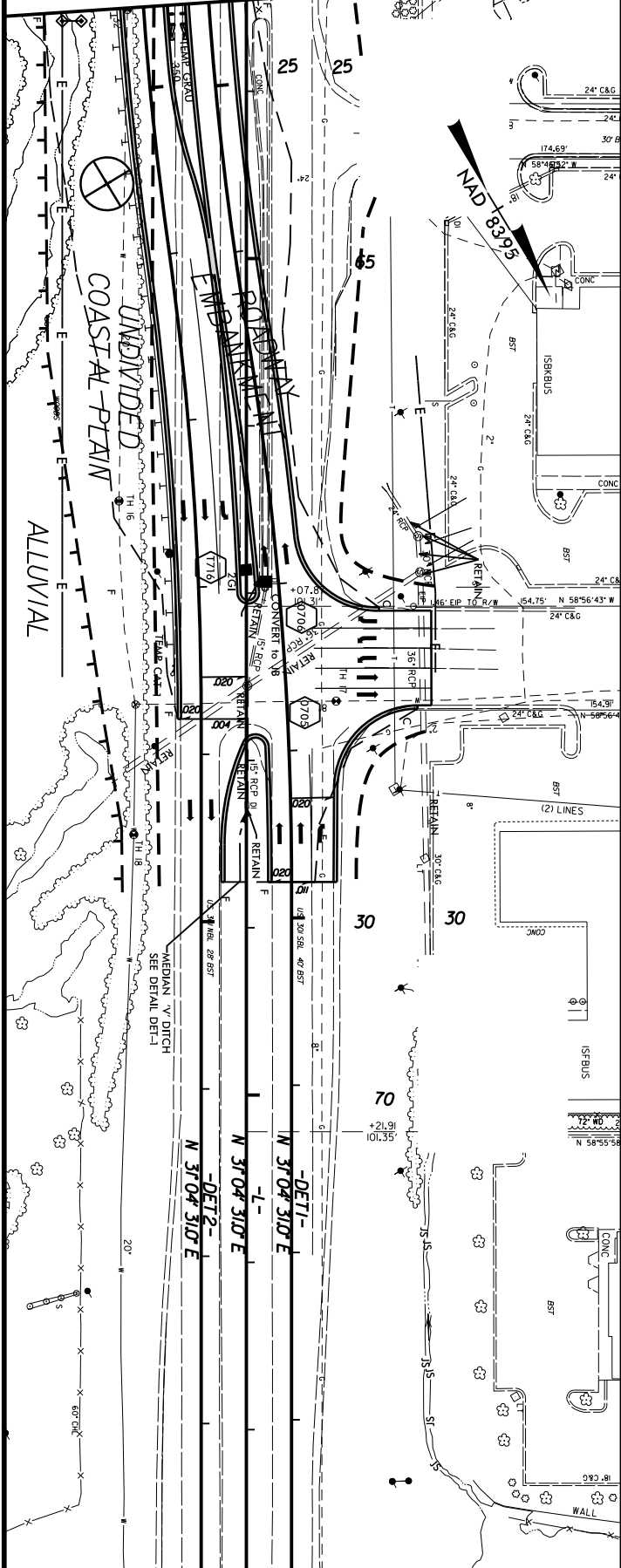
The Geotechnical Engineering Unit has completed a limited subsurface investigation for this project and presents the following inventory addendum. No profiles, or cross-sections will be submitted for this report.

Project Description

The project consists of the adding alignments for the third phase of the detour over Stoney Creek. Due to these revisions, the road will be widened along the eastern side of the bridge approaches. New fill sections will be added in previously unexplored areas of the project so additional borings were performed. A geotechnical investigation was conducted during November of 2016. Three hand auger borings were performed at selected locations with respect to -DET1-alignment stationings. Representative soil samples were collected for visual classification in the field.



MATCHLINE -DET1- STA. 24+50
SEE THIS SHEET



MATCHLINE -DET1- STA. 24+50
SEE THIS SHEET

PROJECT REFERENCE NO.	U-3330	SHEET NO.	4
<h1 style="text-align: center;">SITE PLAN</h1>		<p>0 100 200</p> <p>FEET</p>	

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 36591.1.1		TIP U-3330		COUNTY NASH		GEOLOGIST Oti, O. B.										
SITE DESCRIPTION US 301 BYP FROM MAY DRIVE TO NC 43							GROUND WTR (ft)									
BORING NO. 2050		STATION 20+50		OFFSET 70 ft RT		ALIGNMENT -DET1-										
COLLAR ELEV. 90.5 ft		TOTAL DEPTH 6.0 ft		NORTHING 806,838		EASTING 2,349,031										
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A										
DRILLER Pinter, D. G.		START DATE 11/21/16		COMP. DATE 11/21/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
95																
90														90.5	GROUND SURFACE 0.0	
85														86.5	UNDIVIDED COASTAL PLAIN TAN, GRAY AND BROWN, SILTY SAND AND CLAYEY SAND 4.0	
														84.5	Boring Terminated at Elevation 84.5 ft IN DENSE CLAYEY SAND 6.0	

NCDOT BORE SINGLE U3330_GEO_RDWY_DET_REVISIONS_BORINGS.GPJ NC_DOT.GDT 12/15/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 36591.1.1		TIP U-3330		COUNTY NASH		GEOLOGIST Oti, O. B.											
SITE DESCRIPTION US 301 BYP FROM MAY DRIVE TO NC 43							GROUND WTR (ft)										
BORING NO. 2350		STATION 23+50		OFFSET 70 ft RT		ALIGNMENT -DET1-	0 HR. Dry										
COLLAR ELEV. 87.3 ft		TOTAL DEPTH 6.0 ft		NORTHING 807,098		EASTING 2,349,188	24 HR. FIAD										
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A											
DRILLER Pinter, D. G.		START DATE 11/21/16		COMP. DATE 11/21/16		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
90																	
														87.3		GROUND SURFACE	
85																UNDIVIDED COASTAL PLAIN TAN AND BROWN, SILTY SAND	
														81.3		Boring Terminated at Elevation 81.3 ft IN DENSE SILTY SAND	

NCDOT BORE SINGLE U3330_GEO_RDWY_DET_REVISIONS_BORINGS.GPJ NC_DOT.GDT 12/15/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 36591.1.1		TIP U-3330		COUNTY NASH		GEOLOGIST Oti, O. B.										
SITE DESCRIPTION US 301 BYP FROM MAY DRIVE TO NC 43							GROUND WTR (ft)									
BORING NO. 2550		STATION 25+50		OFFSET 70 ft RT		ALIGNMENT -DET1-										
COLLAR ELEV. 87.3 ft		TOTAL DEPTH 6.0 ft		NORTHING 807,282		EASTING 2,349,282										
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD Hand Auger		HAMMER TYPE N/A										
DRILLER Pinter, D. G.		START DATE 11/21/16		COMP. DATE 11/21/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
90																
														87.3	GROUND SURFACE	0.0
85															UNDIVIDED COASTAL PLAIN TAN AND BROWN, SANDY SILT	
														81.3	Boring Terminated at Elevation 81.3 ft IN STIFF SANDY SILT	6.0

NCDOT BORE SINGLE U3330_GEO_RDWY_DET_REVISIONS_BORINGS.GPJ NC_DOT.GDT 12/15/16

SEE SHEET 2A 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-3330	1	61

CONTENTS

LINE	STATION	PLAN
L	23+25-37+00	4
L	37+00-51+00	5
L	51+00-65+00	6
L	65+00-79+00	7
L	79+00-92+00	8
L	92+00-106+00	9
L	106+00-119+00	10
L	119+00-131+15	11
Y1	11+75-24+04	5
Y1LPC	10+00-15+34	5
Y1RPA	10+00-17+46	5
Y1RPB	10+00-17+52	5
Y1RPD	10+00-17+81	5
Y2LPA	10+50-16+65	8
Y2RPC	10+70-13+00	7
Y3RPB	10+00-14+95	11
Y4	10+00-13+58	6
Y6	11+12-14+40	8
Y7A	10+00-11+70	9
Y7B	10+68-13+50	9

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY NASH
PROJECT DESCRIPTION US 301 BYPASS FROM NC 43-48
(BENVENUE RD) TO SR 1836 (MAY DR.)

INVENTORY

CROSS SECTIONS

LINE	STATION	SHEETS
L	30+00, 33+00	12
L	34+00-40+00	13-15
L	41+00-50+00	16-20
L	51+00, 53+50	21
L	56+50, 63+00, 66+00	22
L	68+00, 70+00, 72+00,	23
L	73+50-86+00	24-29
L	87+00, 88+50	30
L	89+00-107+00	31-38
L	108+00	39
L	109+50-112+50	39-41
L	113+50	41
L	116+00, 119+00, 122+00	42
L	123+50-127+00	43-44
L	128+00	44
Y1	13+00, 16+50, 20+00	45
Y1LPC	10+00-15+00	46-48
Y1RPA	10+00	49
Y1RPA	11+50-15+50	49-51
Y1RPA	16+50	51
Y1RPB	11+00-14+00	52-53
Y1RPD	12+00, 16+00	54
Y2LPA	14+00	55
Y2RPC	11+00	56
Y3RPB	11+50	57
Y4	11+50-12+50	58
Y6	13+50	59
Y7A	11+00-11+50	60
Y7B	12+00	61

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

O.B. OTI

J.R. MATULA

H.R. CONLEY

J.R. SWARTLEY

R.E. SMITH

D.G. PINTER

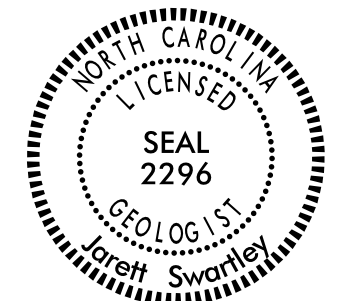
INVESTIGATED BY J.R. SWARTLEY

DRAWN BY T.T. WALKER

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE NOVEMBER 2014



DocuSigned by:
Jarett Swartley 12/11/2014

REFERENCE: U-3330

PROJECT: 36596

SIGNATURE

DATE

SIGNATURE

DATE

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

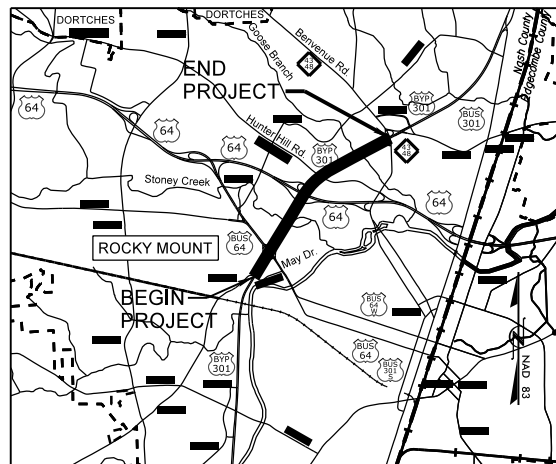
SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION.

09.08/99

TIP PROJECT: U-3330

CONTRACT: 36596

See Sheet 1-A For Index of Sheets



VICINITY MAP

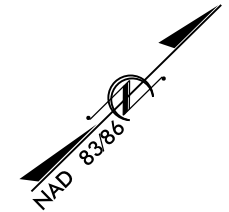
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NASH COUNTY

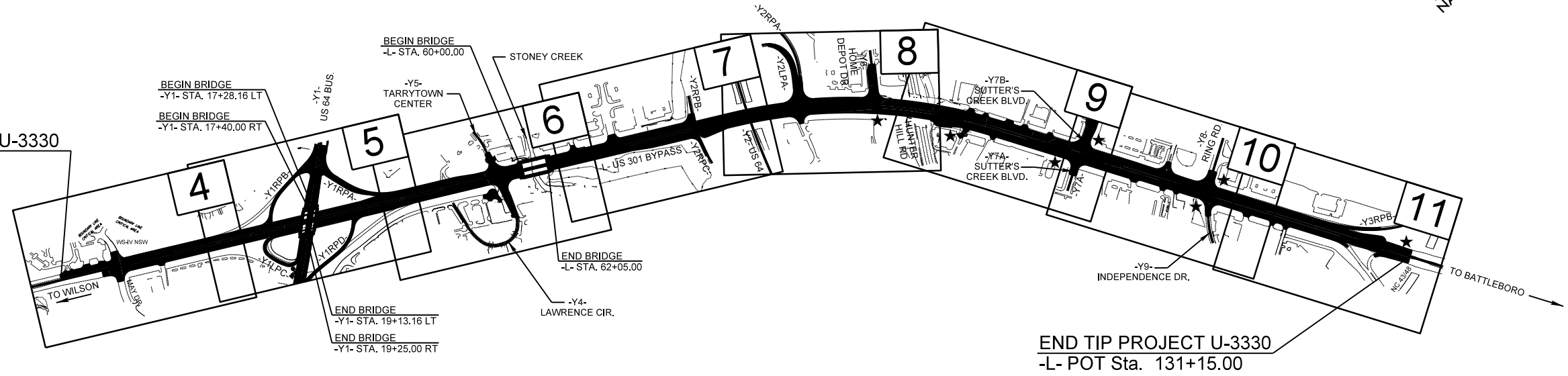
LOCATION: ROCKY MOUNT - US 301 BYPASS FROM SR 1836 (MAY DRIVE) TO NC 43/48 (BENVENUE ROAD) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3330	2A	61
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
36596.1.2	STP - 0301 (28)	PE	
36596.2.1	STP - 0301 (28)	RW	
36596.2.U1	STP - 0301 (28)	UTIL.	



BEGIN TIP PROJECT U-3330
-L- Sta. 23+25.00



END TIP PROJECT U-3330
-L- POT Sta. 131+15.00

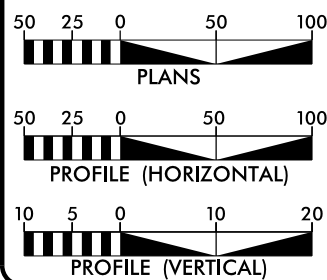
NOTES:

- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.
- THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
- THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF ROCKY MOUNT.

★ TRAFFIC SIGNAL

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES



DESIGN DATA

ADT 2019 = 39,850
ADT 2039 = 48,375
K = 10%
D = 55%
T = 4%*
V = 50 mph

*TTST 2% DUAL 2%
FUNCTIONAL CLASS.: URBAN
ARTERIAL STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-3330 2.005 Miles
LENGTH STRUCTURE TIP PROJECT U-3330 0.039 Mile
TOTAL LENGTH TIP PROJECT U-3330 2.044 Miles

Prepared In the Office of:



FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 21, 2016

LETTING DATE:
JANUARY 15, 2019

NCDOT CONTACT:

Steve A. Drum, P.E.
PROJECT ENGINEER

Michael A. Holt, P.E.
PROJECT DESIGN ENGINEER

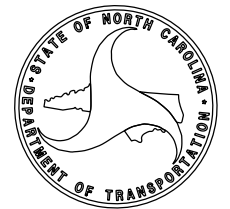
Brenda Moore, P.E., CPM
PROJECT ENGINEER - ROADWAY DESIGN

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

November 6, 2014

STATE PROJECT: 36596.1.2 (U-3330)
 FEDERAL PROJECT: STP-0301(28)
 COUNTY: Nash
 DESCRIPTION: Rocky Mount – US 301 Bypass From NC 43-48 (Benvenue Rd.) to SR 1836 (May Dr.)
 SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory. Plans, profiles and cross-sections will be included in this report.

Project Description

This project consists of widening existing US 301 Bypass from a four-lane roadway to a six-lane roadway (-L-) in Rocky Mount. The project begins at the intersection of SR 1836 (May Dr.) and extends northeastward for 3.0 miles. Intersections with other existing roads occur as follows from south to north. Sunset Avenue (US 64 Bus., -Y1-), Lawrence Circle/Tarrytown Center (-Y4- & -Y5-), US 64 (-Y2-), Home Depot Drive (-Y6-), Sutters Creek Blvd. (-Y7A- & -Y7B-), and Ring Road/Independence Drive (-Y8- & -Y9-)

The geotechnical field investigation was conducted during the period of May through August 2014. The Geotechnical Engineering Unit's drill crew was used to drill, sample, and log the borings in this report. The Geotechnical Engineering Unit used a track-mounted CME-55 with an automatic hammer during the investigation. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers, hand augers and bridge rods. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 3.3 miles, were investigated. Subsurface soil profiles, and cross-sections, of these alignments are included in this report.

<u>Line</u>	<u>Station</u>
-L-	23+25 to 131+15
-Y1-	11+75 to 24+04
-Y1LPC-	10+00 to 15+34
-Y1RPA-	10+00 to 17+46

-Y1RPB-	10+00 to 17+52
-Y1RPD-	10+00 to 17+81
-Y2LPA-	10+50 to 16+65
-Y2RPC-	10+70 to 13+00
-Y3RPB-	10+00 to 14+95
-Y4-	10+00 to 13+58
-Y6-	11+12 to 14+40
-Y7A-	10+00 to 13+00
-Y7B-	10+00 to 13+50

Areas of Special Geotechnical Interest

- 1) The following borehole locations encountered soft, cohesive soils which have the potential to cause embankment stability and/or long term settlement problems:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	70+00	80 RT
-Y2RPC-	11+00	50 LT

- 2) **Highly Plastic Clays:** Highly plastic clays (PI > 25) were encountered on the project at the following borehole locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	36+00	100 LT
-L-	39+93	107 LT
-L-	42+00	80 LT
-L-	43+50	100 RT
-L-	63+00	85 RT
-L-	75+00	80 RT
-L-	79+00	100 LT
-L-	84+00	80 LT
-L-	88+43	98 LT
-L-	93+00	90 RT
-L-	96+00	80 RT
-L-	105+00	85 RT
-L-	116+00	80 RT
-L-	125+00	60 RT
-Y1-	13+00	80 LT
-Y1-	20+00	110 RT
-Y1LPC-	12+00	CL
-Y1RPA-	13+50	15 LT
-Y1RPB-	11+00	30 LT
-Y1RPD-	12+00	30 RT
-Y1RPD-	16+00	20 LT
-Y3RPB-	11+50	40 LT

-Y6-	13+50	55 LT
-Y7A-	11+00	45 RT

- 3) Shallow Groundwater: Shallow groundwater (within 6 feet of grade), which may cause problems during construction, was encountered in the following locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	51+00	80 LT
-L-	75+00	80 RT
-L-	79+00	100 LT
-L-	87+00	65 RT
-L-	88+43	98 LT
-L-	93+00	90 RT
-L-	105+00	85 RT
-L-	122+00	80 LT
-Y1RPA-	9+87	29 RT
-Y1RPD-	12+00	30 RT
-Y3RPB-	11+50	40 LT
-Y6-	13+50	55 LT

- 4) Crystalline Rock: The following borehole locations encountered crystalline rock above or within 6 feet of grade:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	36+00	100 LT
-L-	36+50	100 LT
-L-	37+50	75 RT
-L-	38+00	75 RT
-L-	38+50	75 RT
-L-	39+47	111 RT
-L-	42+00	80 LT to 80 RT
-L-	43+50	100 RT
-L-	44+00	90 LT to 90 RT
-L-	44+61	123 LT
-L-	45+00	90 RT
-Y1LPC-	10+00 to 12+50	LT to RT
-Y4-	11+50 to 12+50	LT to RT

Physiography and Geology

The project is located along the boundary of the Coastal Plain and Piedmont physiographic provinces of North Carolina. A mixture of fields and wooded areas lie within the project corridor. The project corridor is predominantly urban with commercial businesses located adjacent to US 301. Topography along the project is generally flat to slightly rolling. Surficial soils in this area are Quaternary-Tertiary aged alluvial deposits categorized as Undivided Coastal Plain deposits. These deposits are underlain by Pennsylvanian to Permian aged residual soils of the Eastern Slate Belt. These residual soils are underlain by weathered and crystalline rock. Some surface exposures of rock outcrop can be seen along the project corridor.

Soil Properties

Soils encountered at the project site include roadway embankment, alluvial sediments, Undivided Coastal Plain sediments, and residual soils.

Roadway embankment soil occurs underneath US 301 Bypass and the overpass approaches to US 64 and Hunter Hill Rd. (US 64 Bus.). The existing embankment is generally one to two feet in height along US 301 Byp. and consists of gray and orange, med. dense, silty sand (A-2-4) and medium stiff, sandy clay (A-6). Roadway embankment cohesive soils exhibit medium to high plasticity indexes.

Alluvial soils occur in and around the Stoney Creek floodplain. The alluvial soils are approximately up to 8 feet thick, and consist of gray, very soft to medium stiff, wet, sandy silt (A-4), sandy clay (A-6), silty clay (A-7-6) and very loose, silty sand (A-2-4).

Undivided Coastal Plain soils make up the surficial deposits across most of the upland areas of the project. These soils consist of gray, tan and orange, very soft to medium stiff silty clay (A-7-6), sandy clay (A-6), sandy silt (A-4) and silty sand (A-2-4). The cohesive soils exhibit medium to high plasticity indexes and have natural moisture contents of 20 to 30 percent.

Residual soils belonging to the Eastern Slate Belt underlay the Undivided Coastal Plain soils and are exposed at the surface along much of the project. These soils consist of gray, very soft to medium stiff silty clay (A-7-6), sandy clay (A-6), sand and silty sand (A-3,A-2-4). The cohesive soils exhibit low to high plasticity indexes and have natural moisture contents of 20 to 30 percent

Groundwater

Groundwater was encountered in most borings. Groundwater ranges from 1.0' to 8.5' below the ground surface. Drainage along the project is poor to moderate due to low permeability, clayey soils.

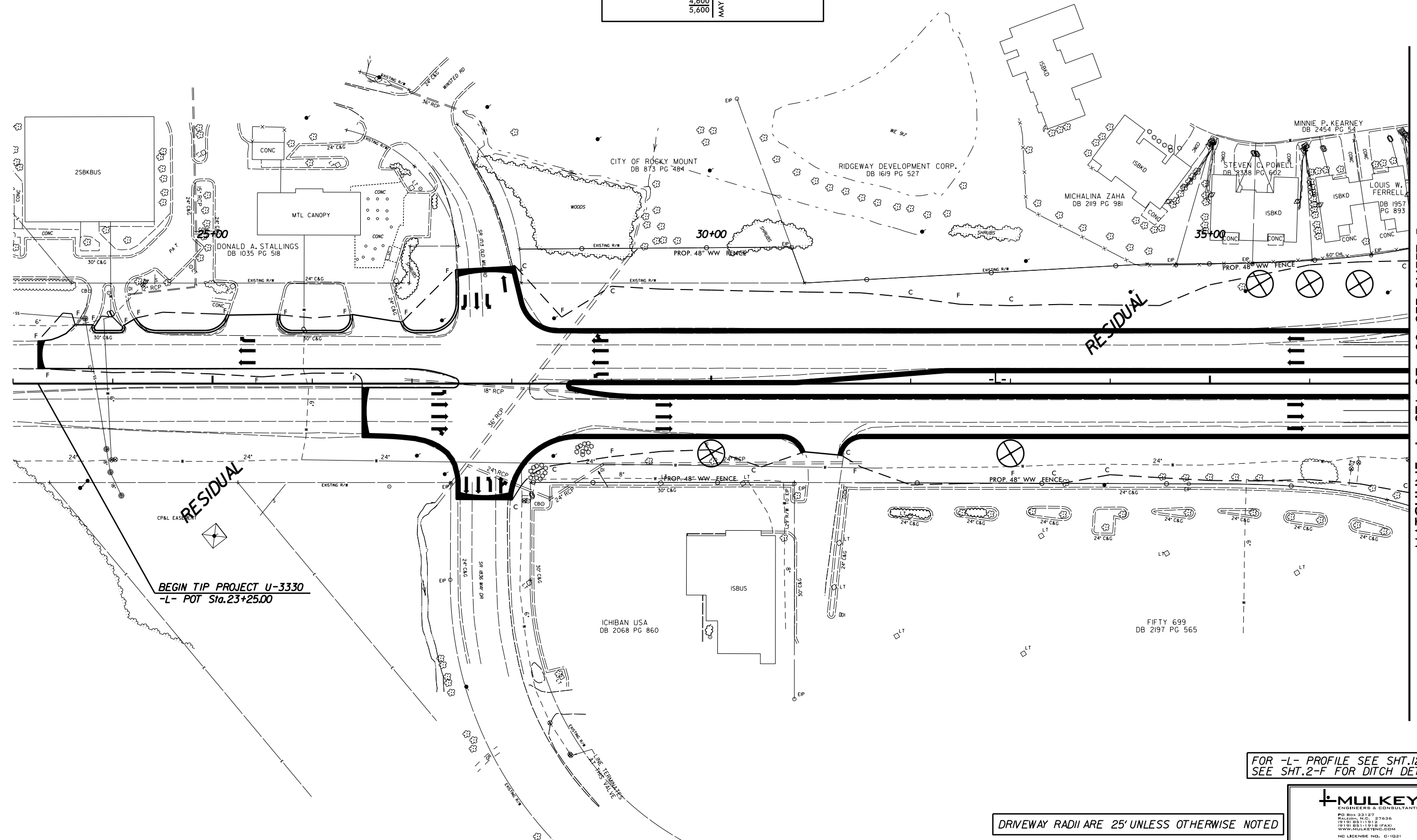
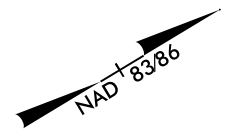
Prepared by,

Jarett Swartley
Project Geological Engineer

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PROJECT REFERENCE NO. U-3330	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

TRAFFIC DIAGRAM			
ADT 2019	ADT 2039	OLD MILL RD	6,900 8,400
26,200 31,800	1,800 2,200	3,400 4,200	26,400 32,100
US 301 BYPASS		MAY DR	700 900
		4,600 5,600	



BEGIN TIP PROJECT U-3330
 -L- POT Sta. 23+25.00

MATCHLINE -L- STA. 37+00 SEE SHEET 5

FOR -L- PROFILE SEE SHT.12
 SEE SHT.2-F FOR DITCH DETAILS

DRIVEWAY RADII ARE 25' UNLESS OTHERWISE NOTED

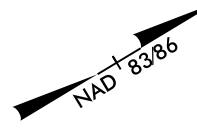
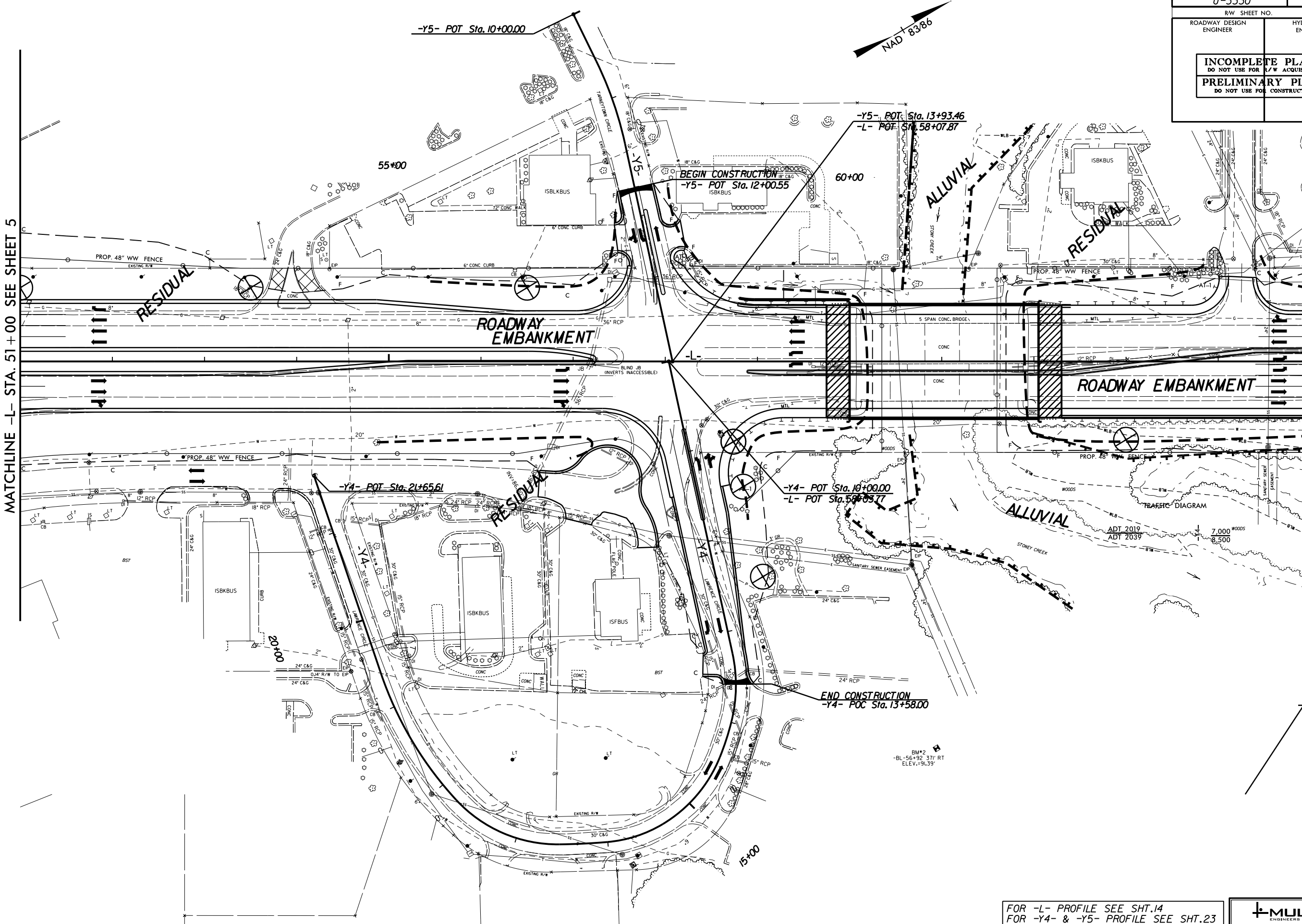
MULKEY
 ENGINEERS & CONSULTANTS
 801 Bldg. 333 S.W.
 Raleigh, N.C. 27636
 (919) 851-1112 FAX
 WWW.MULKEYINC.COM
 NC LICENSE NO. E-10321

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PROJECT REFERENCE NO. U-3330	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

MATCHLINE -L- STA. 51+00 SEE SHEET 5

MATCHLINE -L- STA. 65+00 SEE SHEET 7



DRIVEWAY RADII ARE 25' UNLESS OTHERWISE NOTED

FOR -L- PROFILE SEE SHT.14
 FOR -Y4- & -Y5- PROFILE SEE SHT.23
 SEE SHT.2-F FOR DITCH DETAILS
 SEE SHT.2-G FOR INTERSECTION DETAILS

MULKEY
 ENGINEERS & CONSULTANTS
 10101 BELLEVILLE RD.
 SUITE 100
 ST. LOUIS, MO 63122
 TEL: 314-991-1111
 FAX: 314-991-1112
 WWW.MULKEY-ENG.COM
 NO. LICENSE NO. 0-1021

8.17/99

PROJECT REFERENCE NO. U-3330	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR P/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

BEGIN CONSTRUCTION
-Y2LPA- POS Sta. 10+50.03

-Y2LPA- PC Sta. 10+00.00

-Y6- POT Sta. 10+00.00

BEGIN CONSTRUCTION
-Y6- POT Sta. 11+2.05

BEGIN CONSTRUCTION
-Y2RPA- POS Sta. 16+85.00

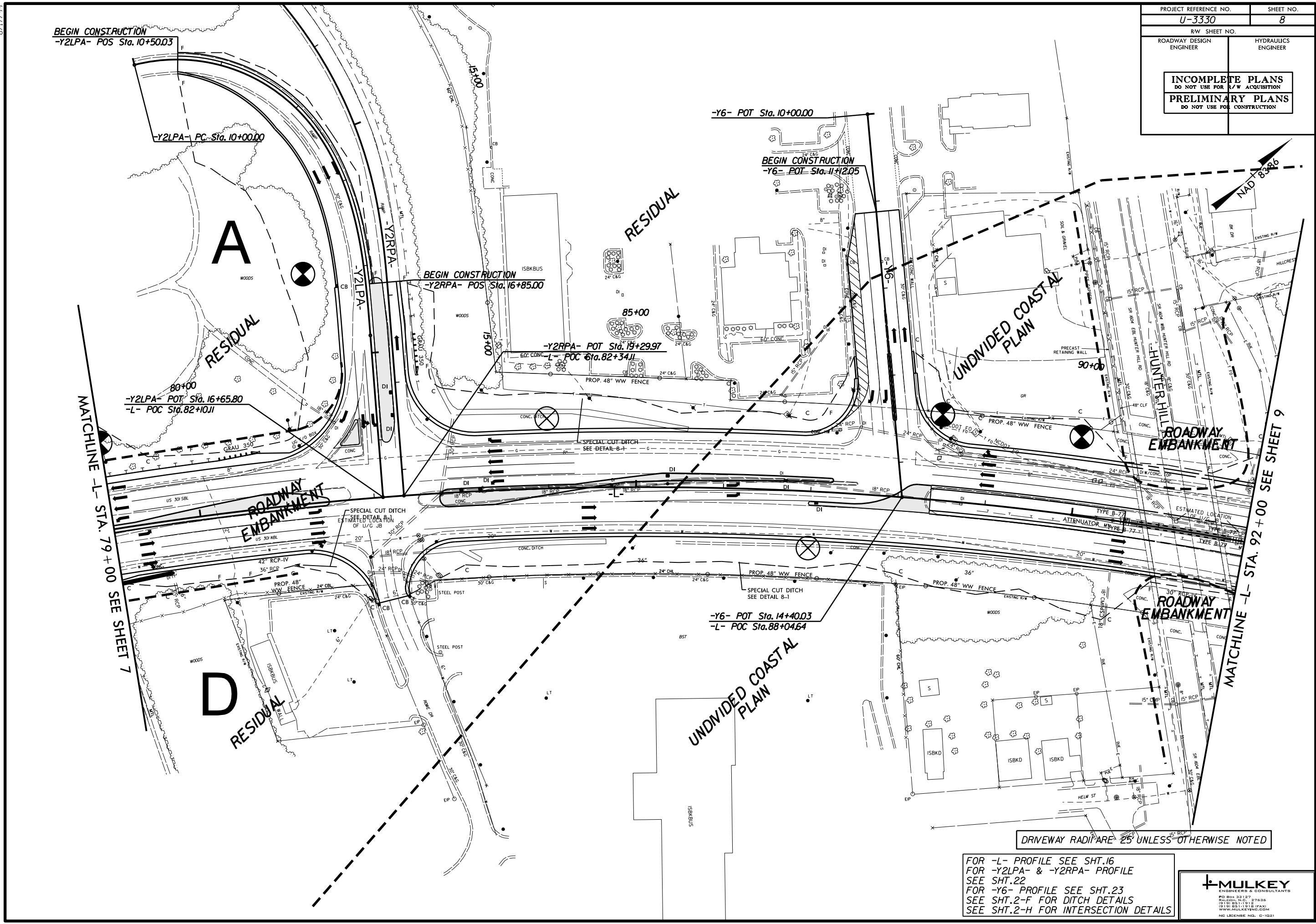
-Y2RPA- POT Sta. 18+29.97
-L- POC Sta. 82+34.11

-Y2LPA- POT Sta. 16+65.80
-L- POC Sta. 82+10.11

-Y6- POT Sta. 14+40.03
-L- POC Sta. 88+04.64

MATCHLINE -L- STA. 79+00 SEE SHEET 7

MATCHLINE -L- STA. 92+00 SEE SHEET 9



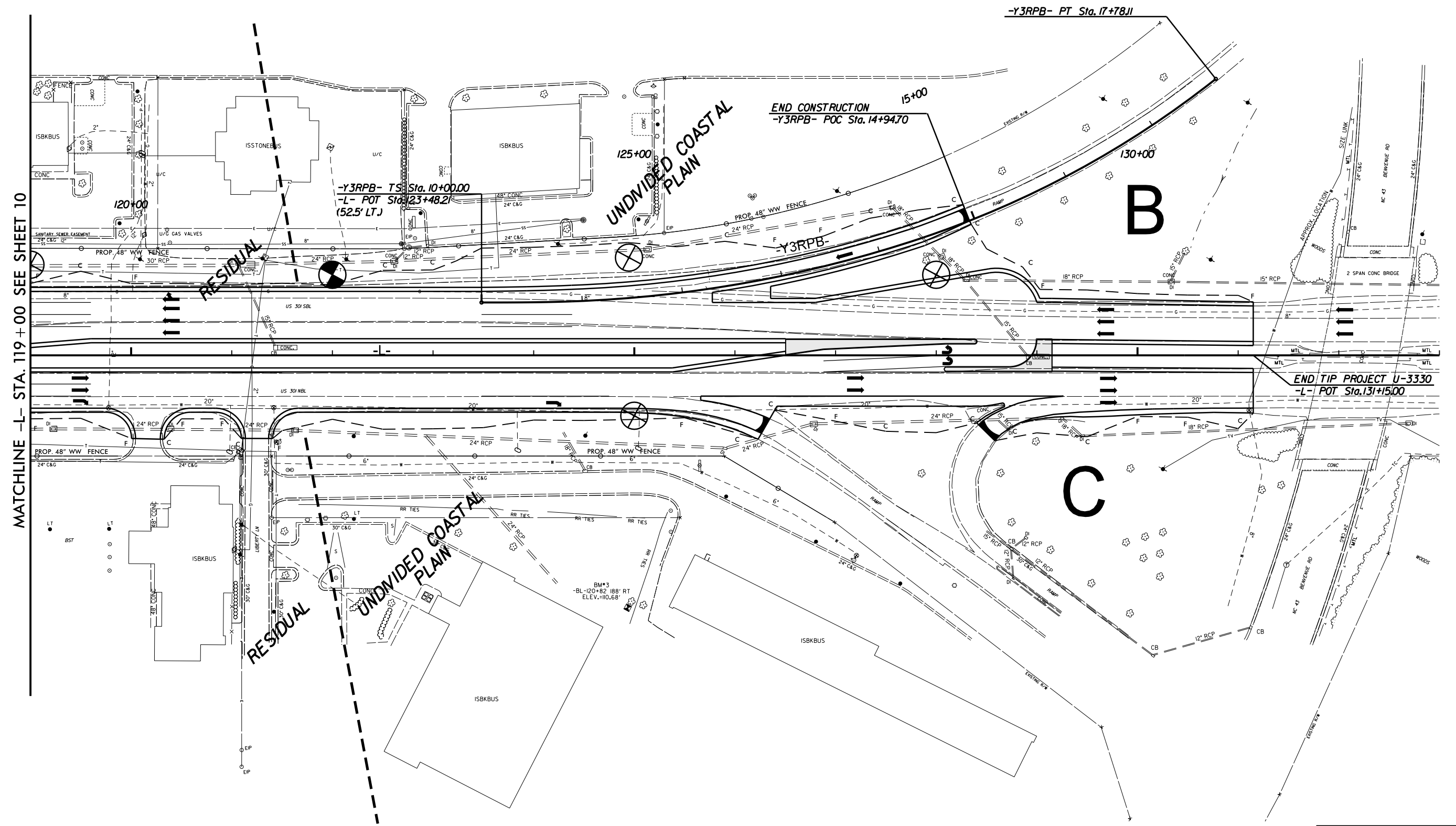
DRIVEWAY RADII ARE 25' UNLESS OTHERWISE NOTED

FOR -L- PROFILE SEE SHT.16
 FOR -Y2LPA- & -Y2RPA- PROFILE
 SEE SHT.22
 FOR -Y6- PROFILE SEE SHT.23
 SEE SHT.2-F FOR DITCH DETAILS
 SEE SHT.2-H FOR INTERSECTION DETAILS



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PROJECT REFERENCE NO. U-3330	SHEET NO. 11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA. 119+00 SEE SHEET 10

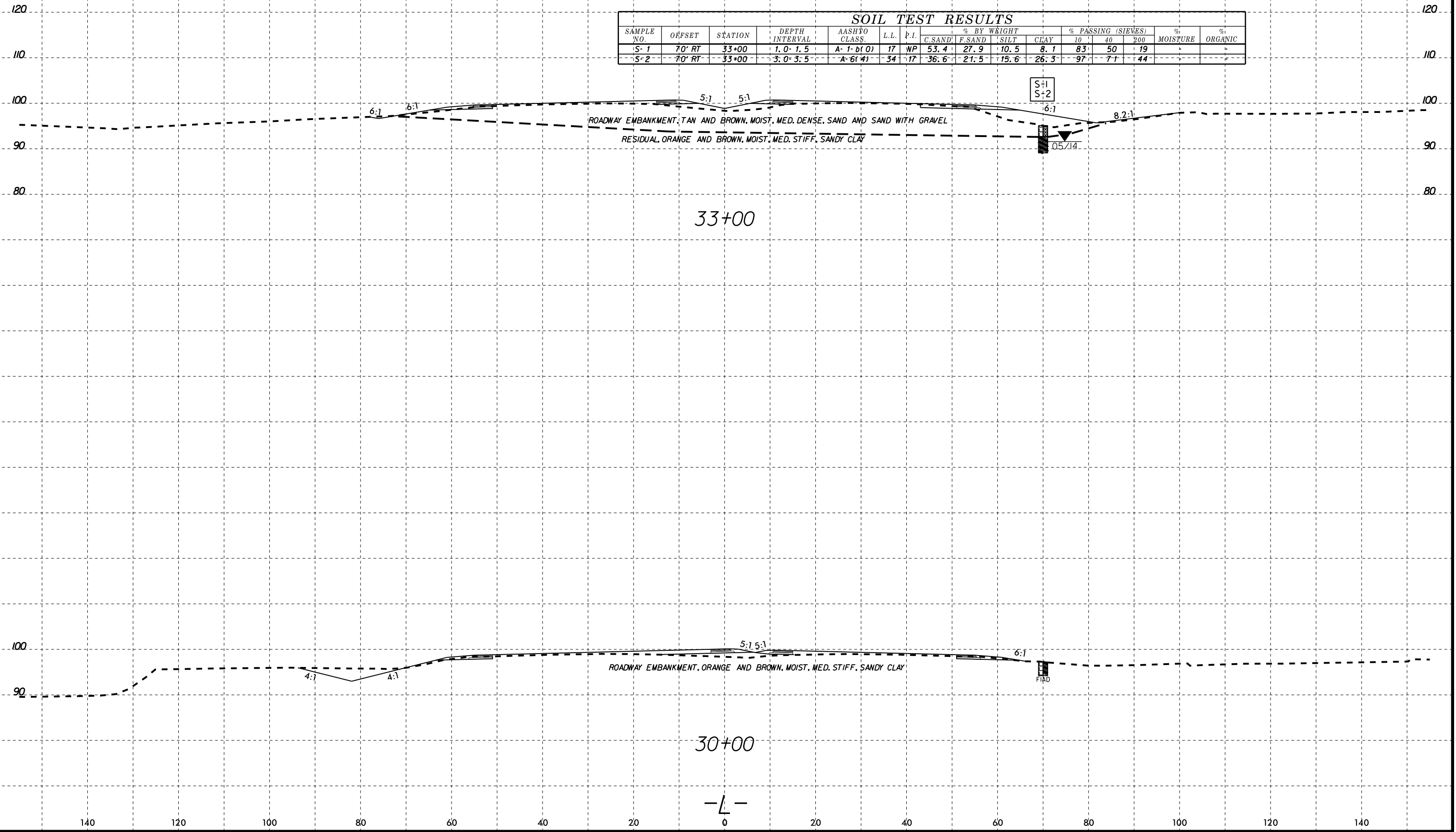
DRIVEWAY RADII ARE 25' UNLESS OTHERWISE NOTED

FOR -L- PROFILE SEE SHT.18 & 19
 FOR -Y3RPB- PROFILE SEE SHT.22
 FOR DITCH DETAILS SEE SHT.2-F

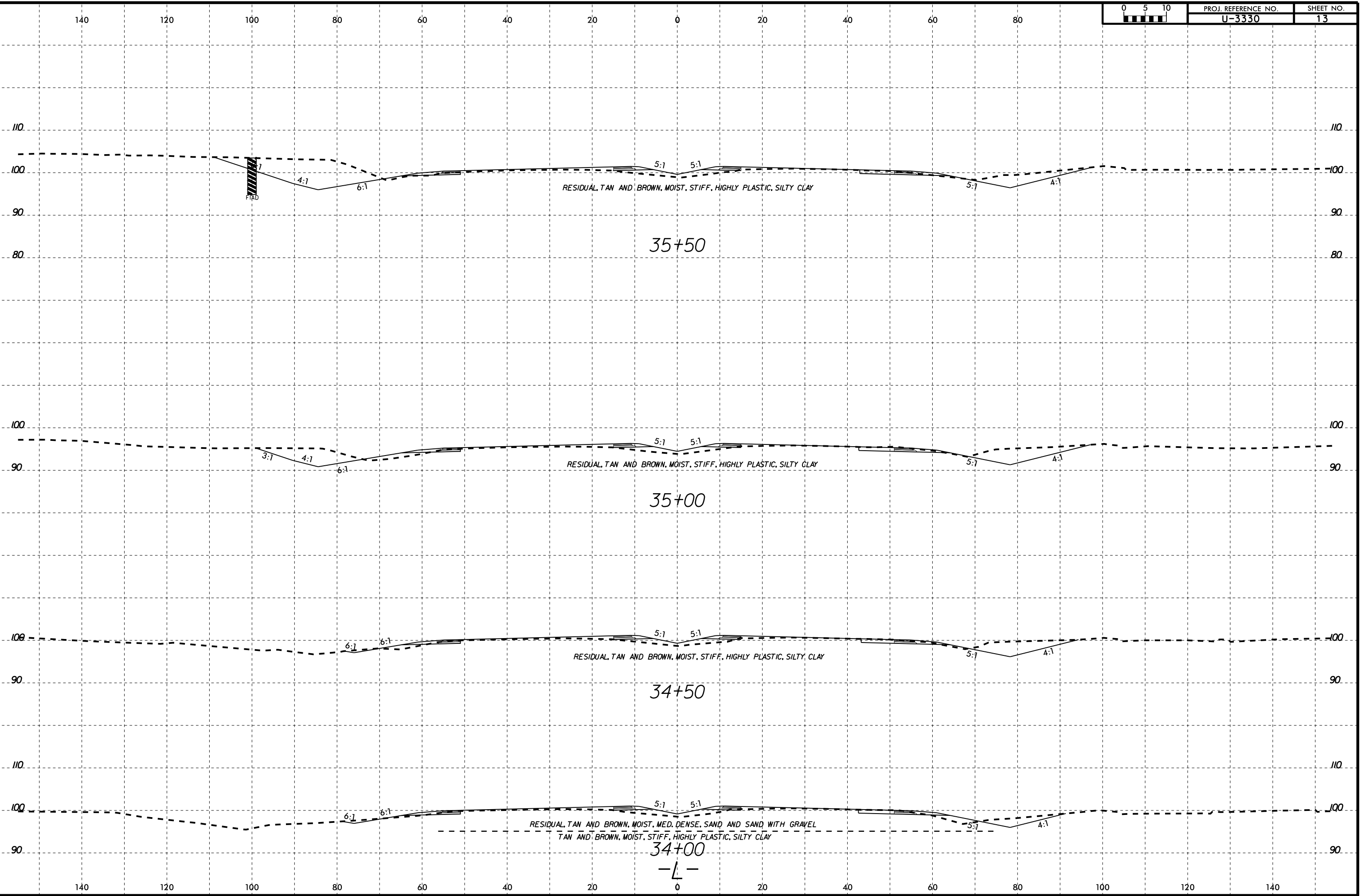
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 800 Bldg. 333 S.W.
 Raleigh, N.C. 27636
 (919) 851-1112
 WWW.MULKEYINC.COM
 NC LICENSE NO. E-10321

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	70' RT	33+00	1.0-1.5	A-1-b(0)	17	NP	53.4	27.9	10.5	8.1	83	50	19	-	-
S-2	70' RT	33+00	3.0-3.5	A-6(4)	34	17	36.6	21.5	15.6	26.3	97	71	44	-	-

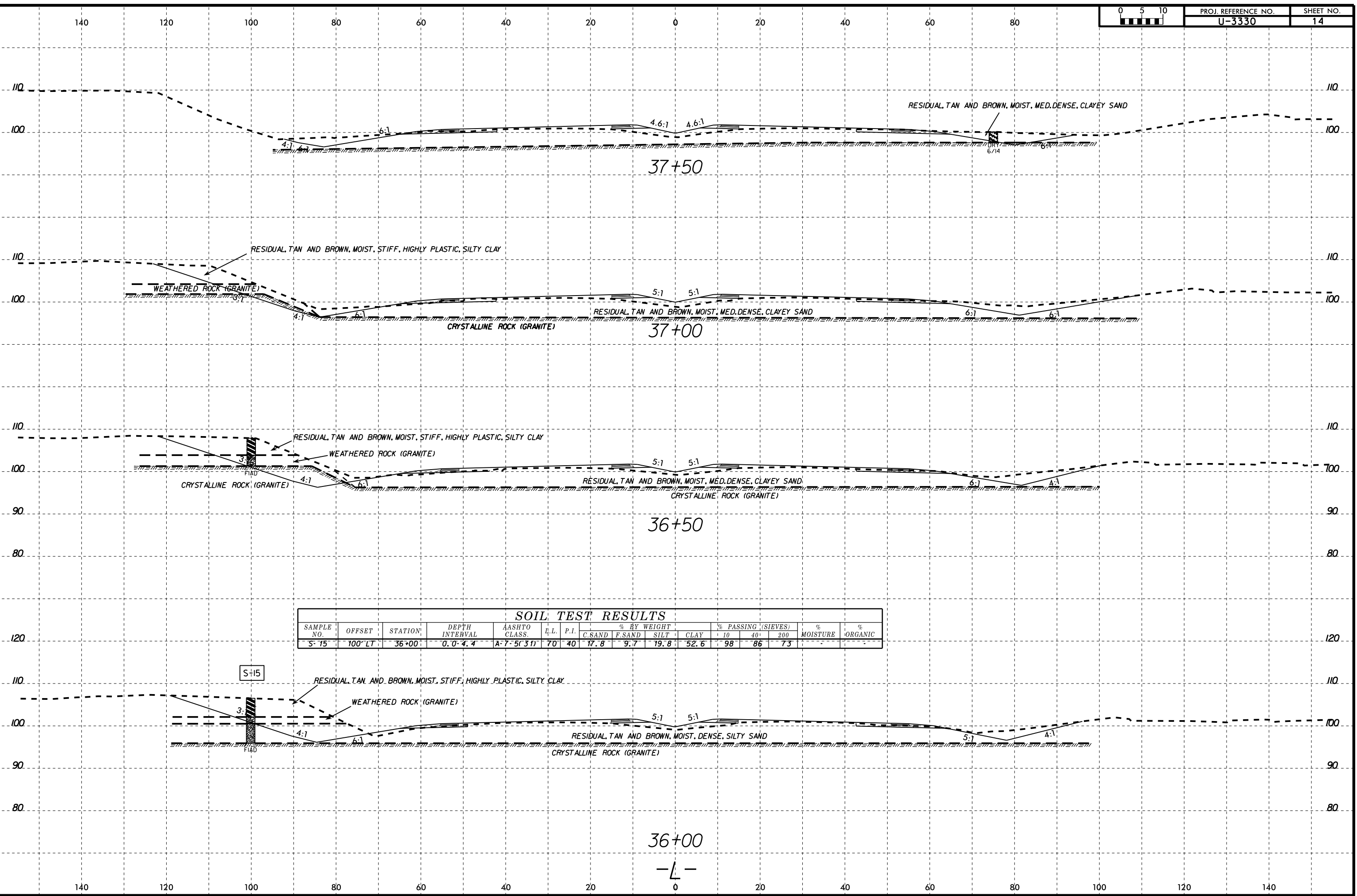


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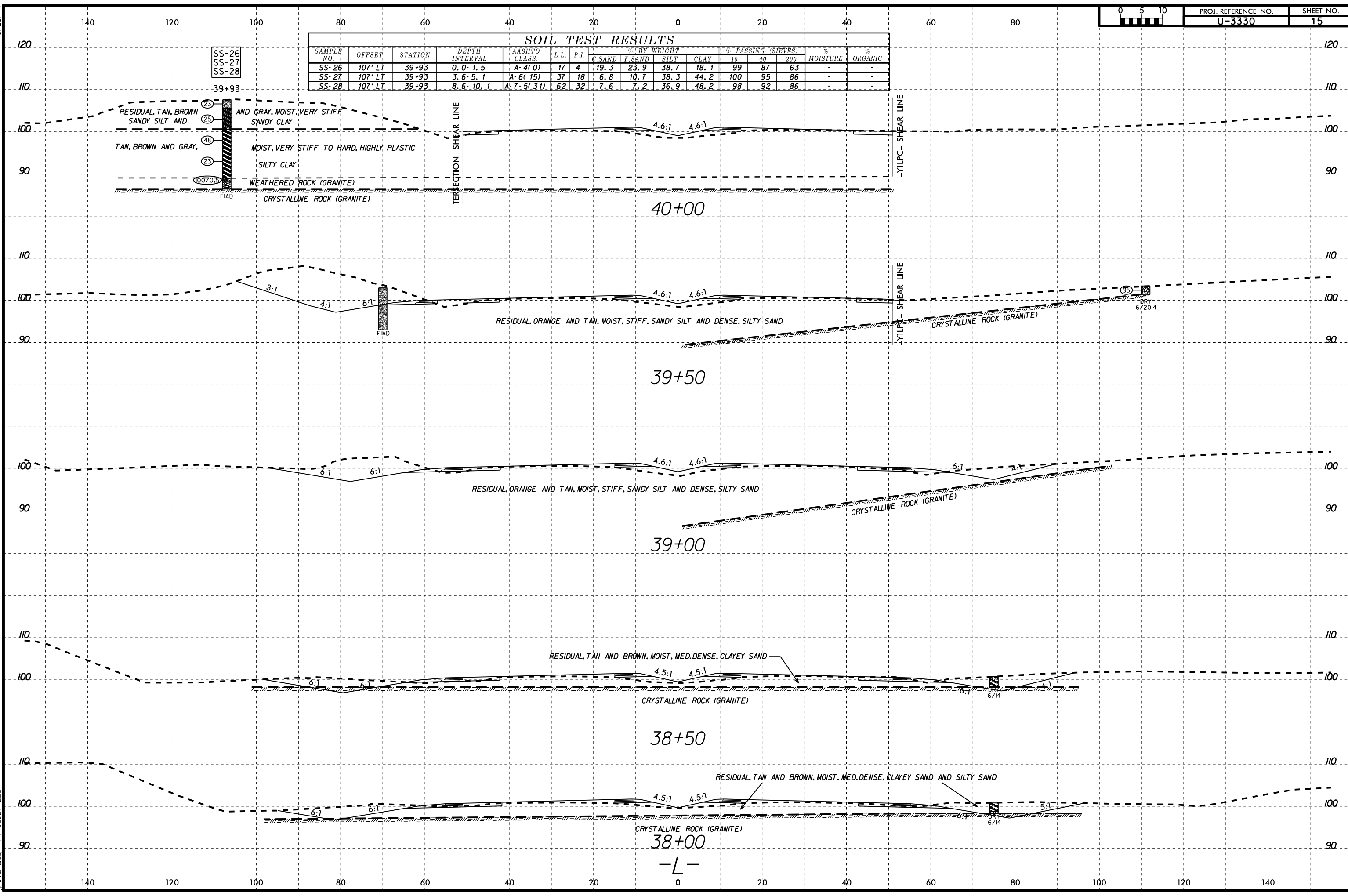
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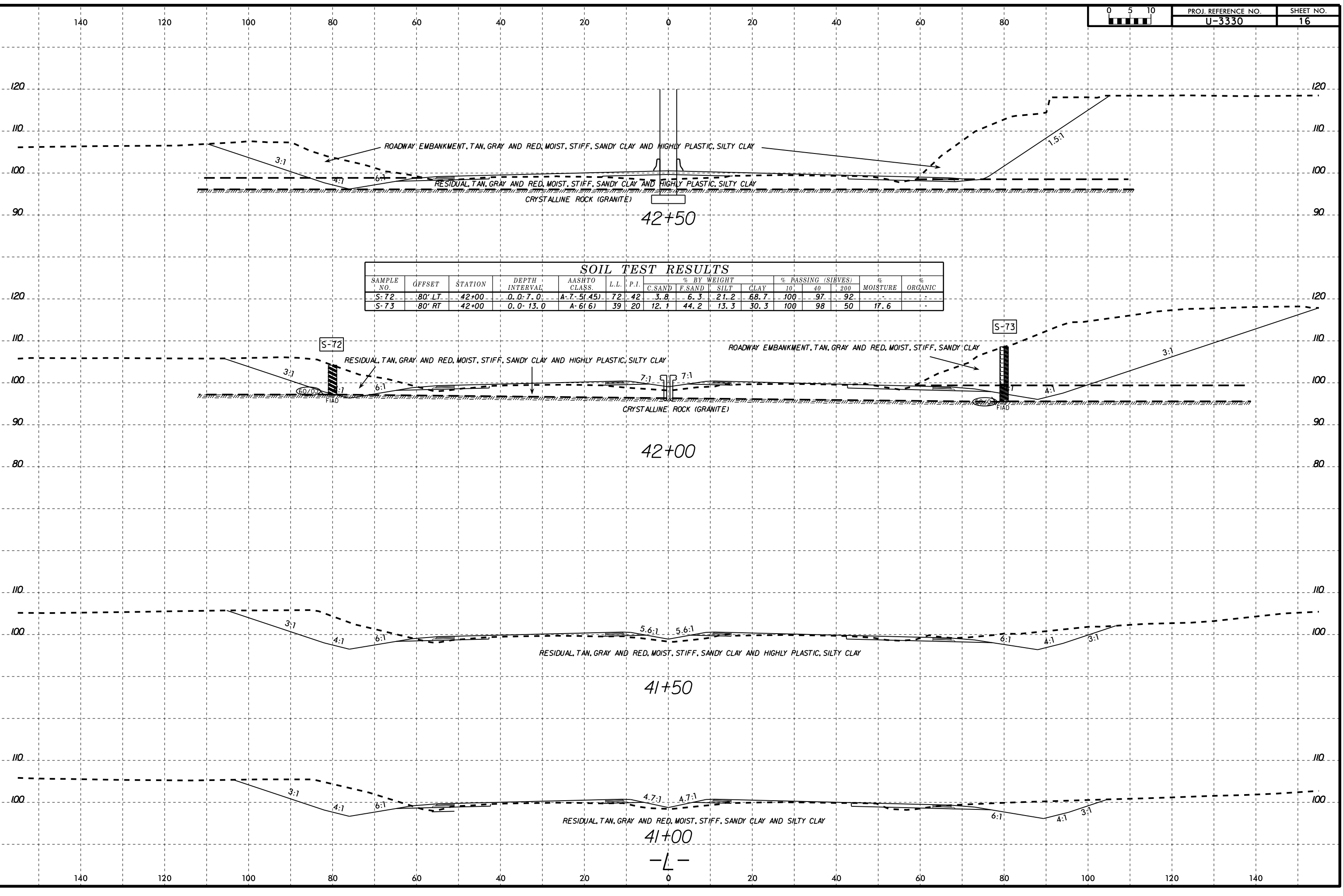


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-15	100' LT	36+00	0.0'-4.4'	A-7-5(31)	70	40	17.8	9.7	19.8	52.6	98	86	73		

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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-26	107' LT	39+93	0.0' 1.5'	A-4(0)	17	4	19.3	23.9	38.7	18.1	99	87	63	-	-
SS-27	107' LT	39+93	3.6' 5.1'	A-6(15)	37	18	6.8	10.7	38.3	44.2	100	95	86	-	-
SS-28	107' LT	39+93	8.6' 10.1'	A-7-5(31)	62	32	7.6	7.2	36.9	48.2	98	92	86	-	-



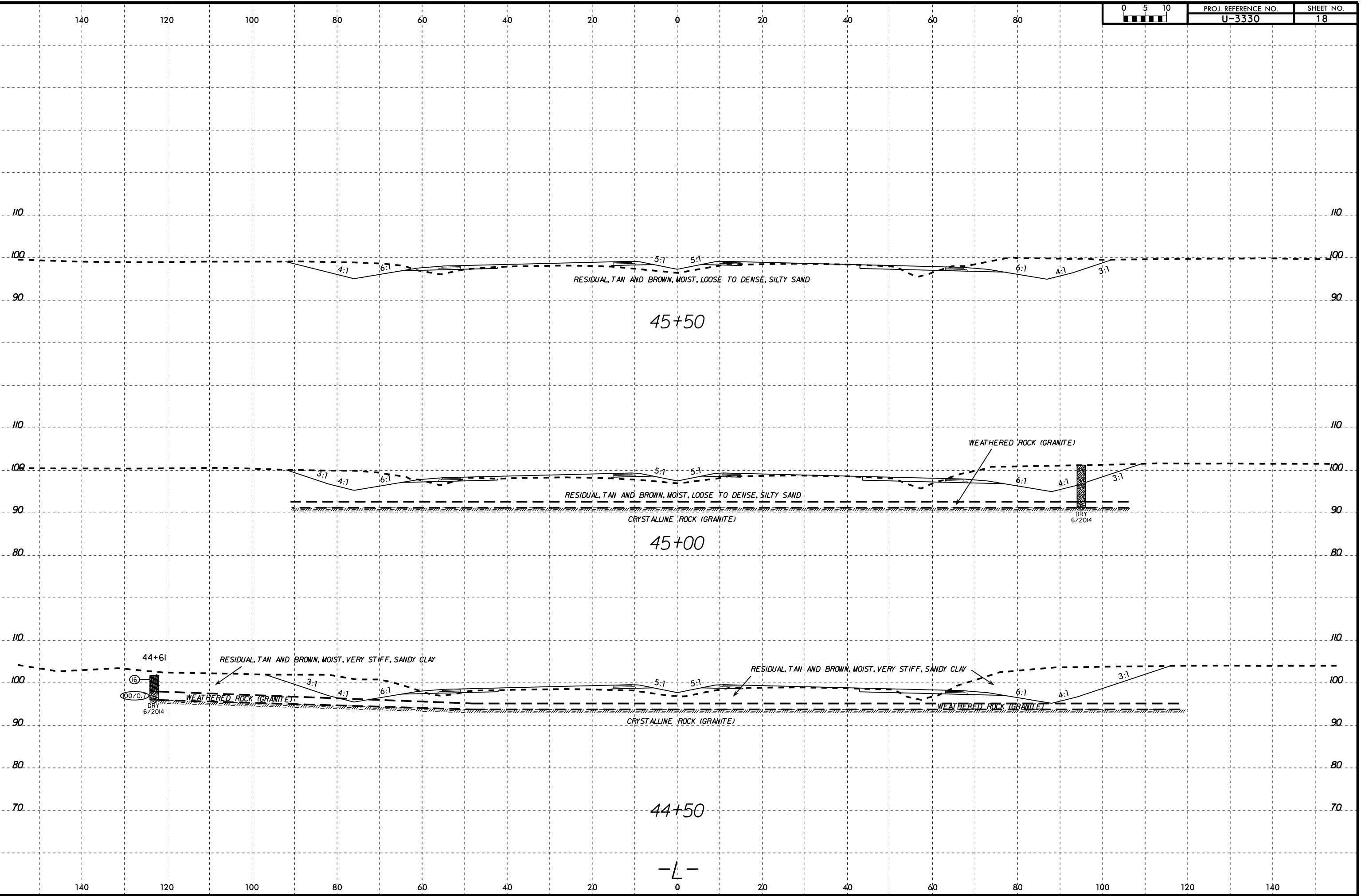


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-72	80' LT.	42+00	0.0-7.0	A-7.5(45)	72	42	3.8	6.3	21.2	68.7	100	97	92		
S-73	80' RT	42+00	0.0-13.0	A-6(6)	39	20	12.1	44.2	13.3	30.3	100	98	50	17.6	

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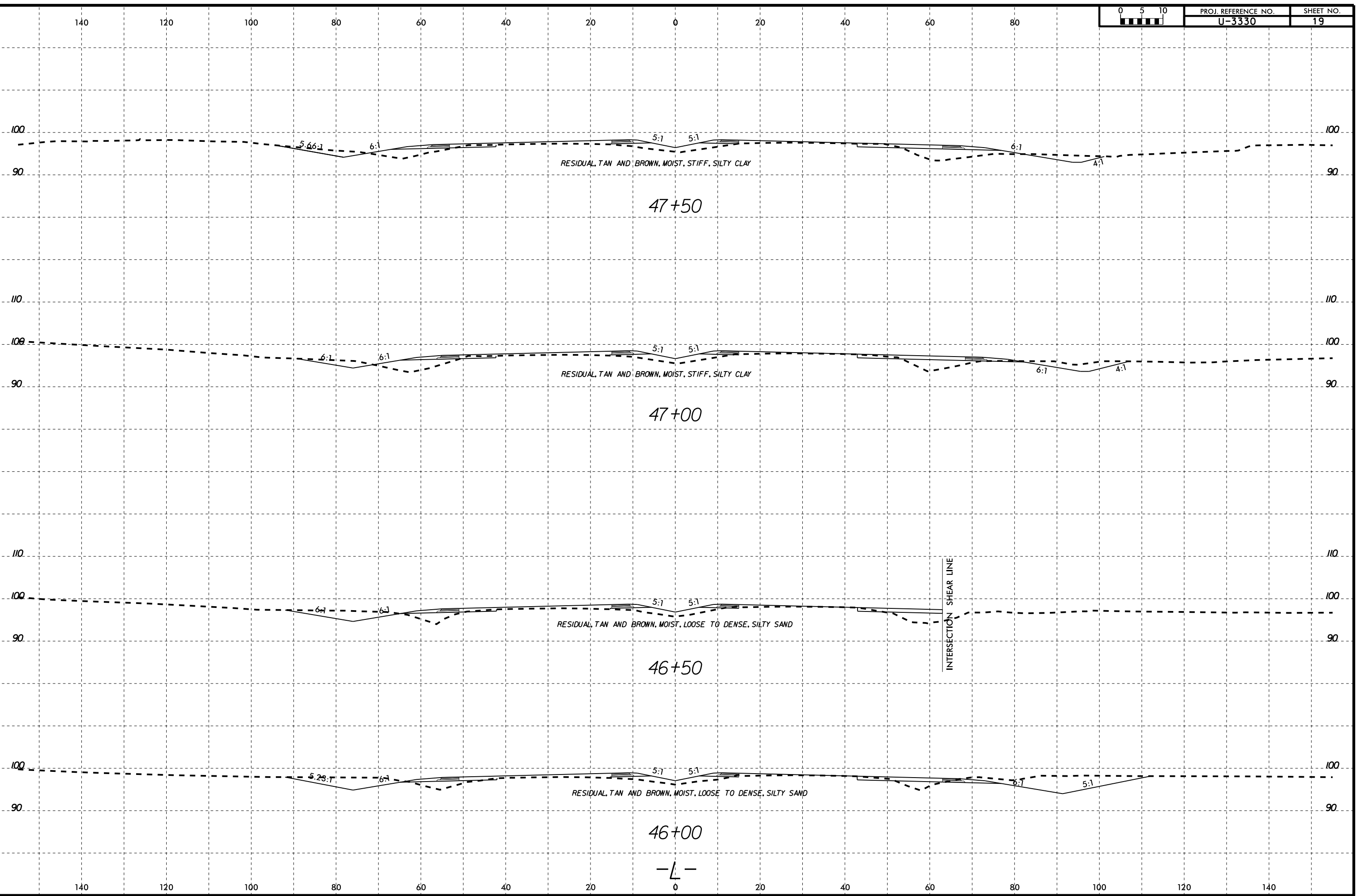
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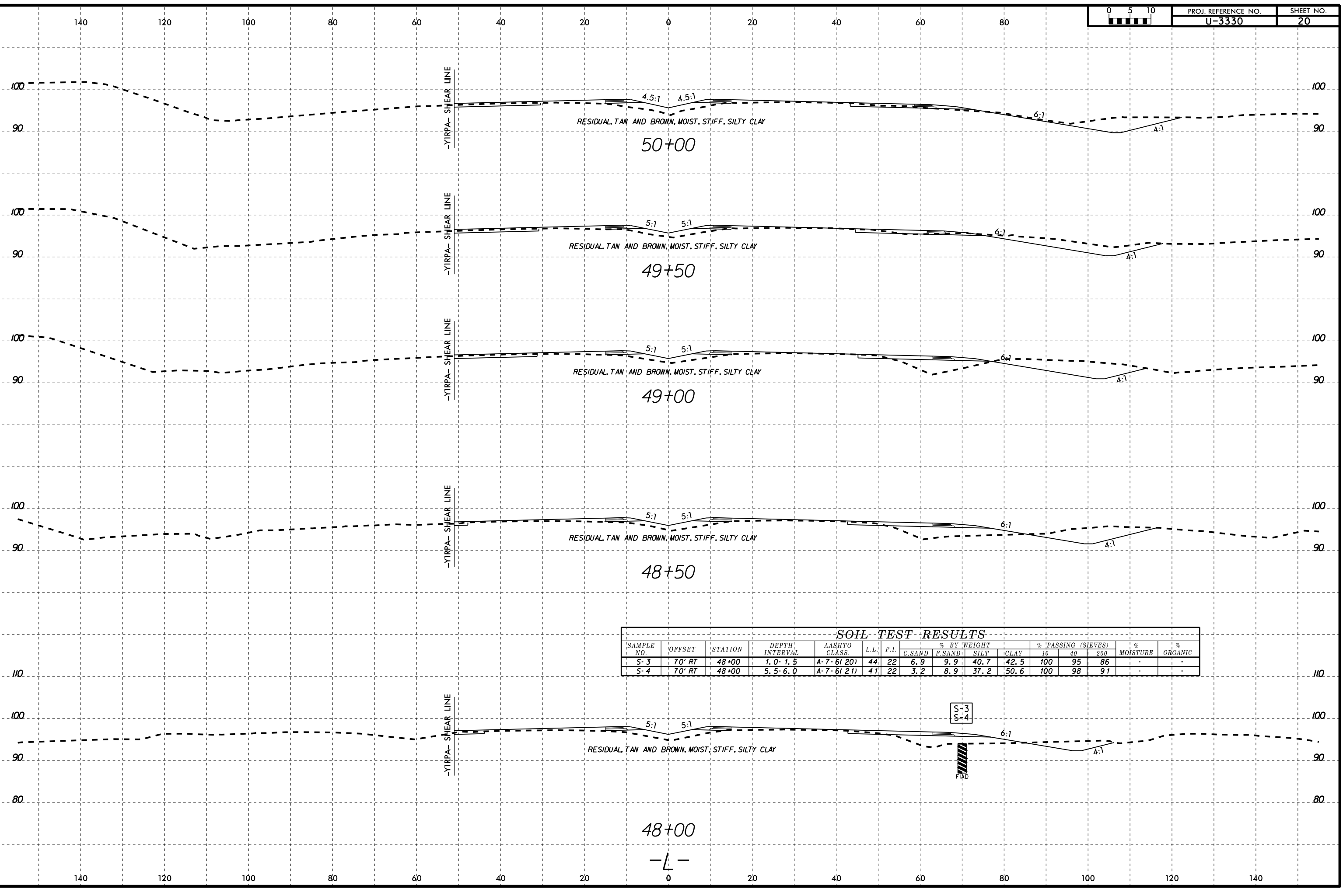
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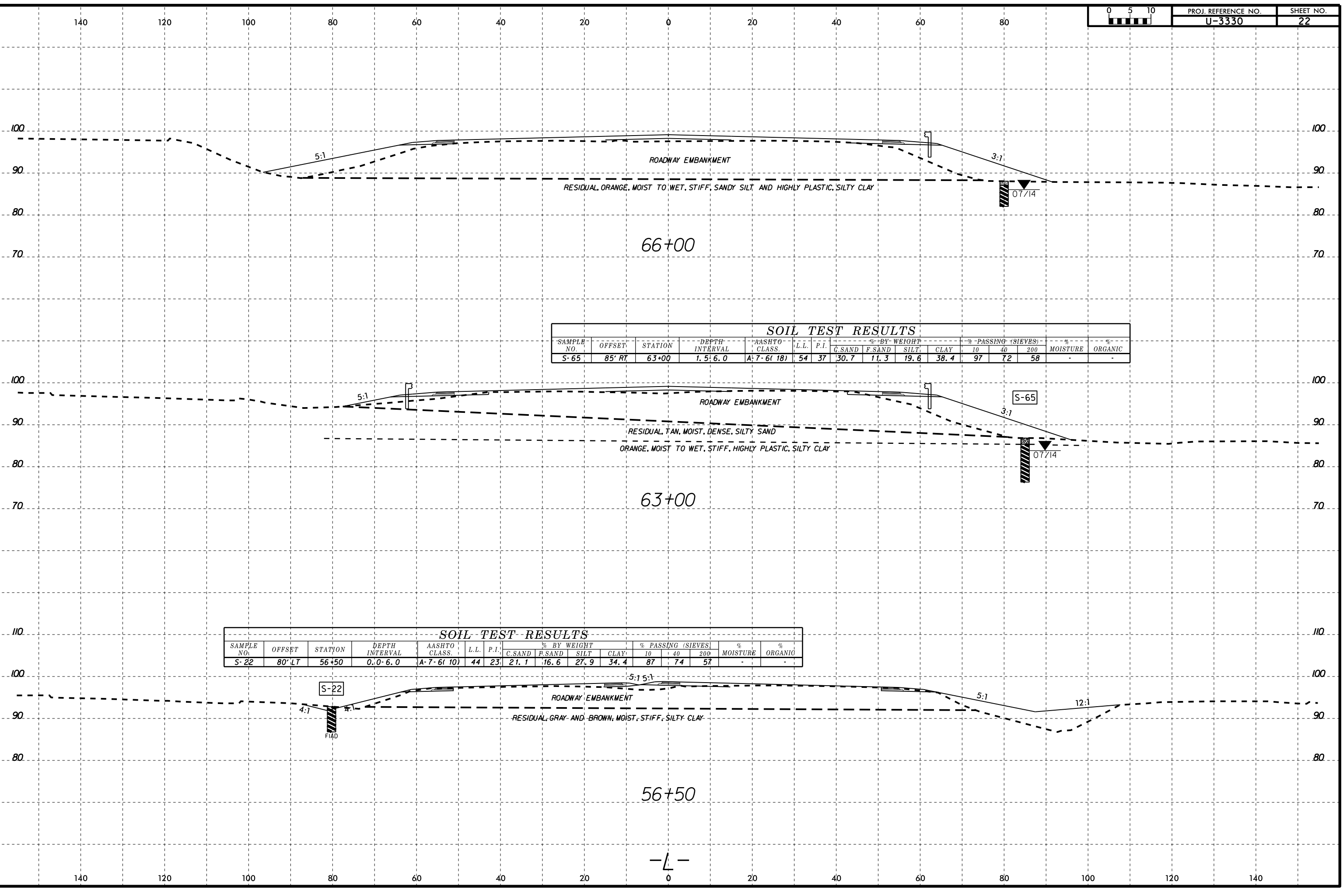


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-3	70' RT	48+00	1.0-1.5	A-7-6(20)	44	22	6.9	9.9	40.7	42.5	100	95	86	-	-
S-4	70' RT	48+00	5.5-6.0	A-7-6(21)	41	22	3.2	8.9	37.2	50.6	100	98	91	-	-

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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-65	85' RT	63+00	1.5' 6.0	A-7-6(18)	54	37	30.7	11.3	19.6	38.4	97	72	58	-	-

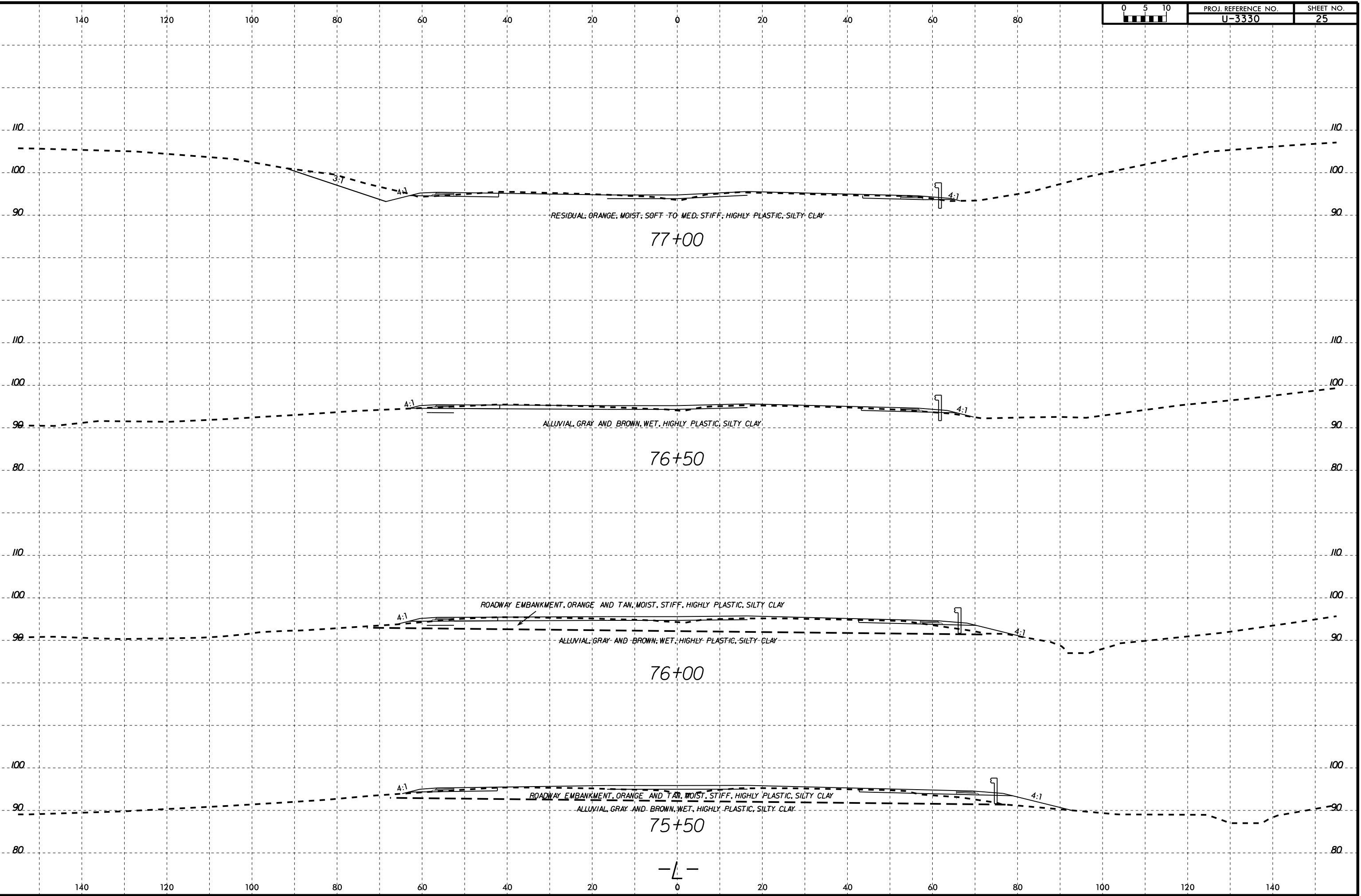
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-22	80' LT	56+50	0.0-6.0	A-7-6(10)	44	23	21.1	16.6	27.9	34.4	87	74	57	-	-

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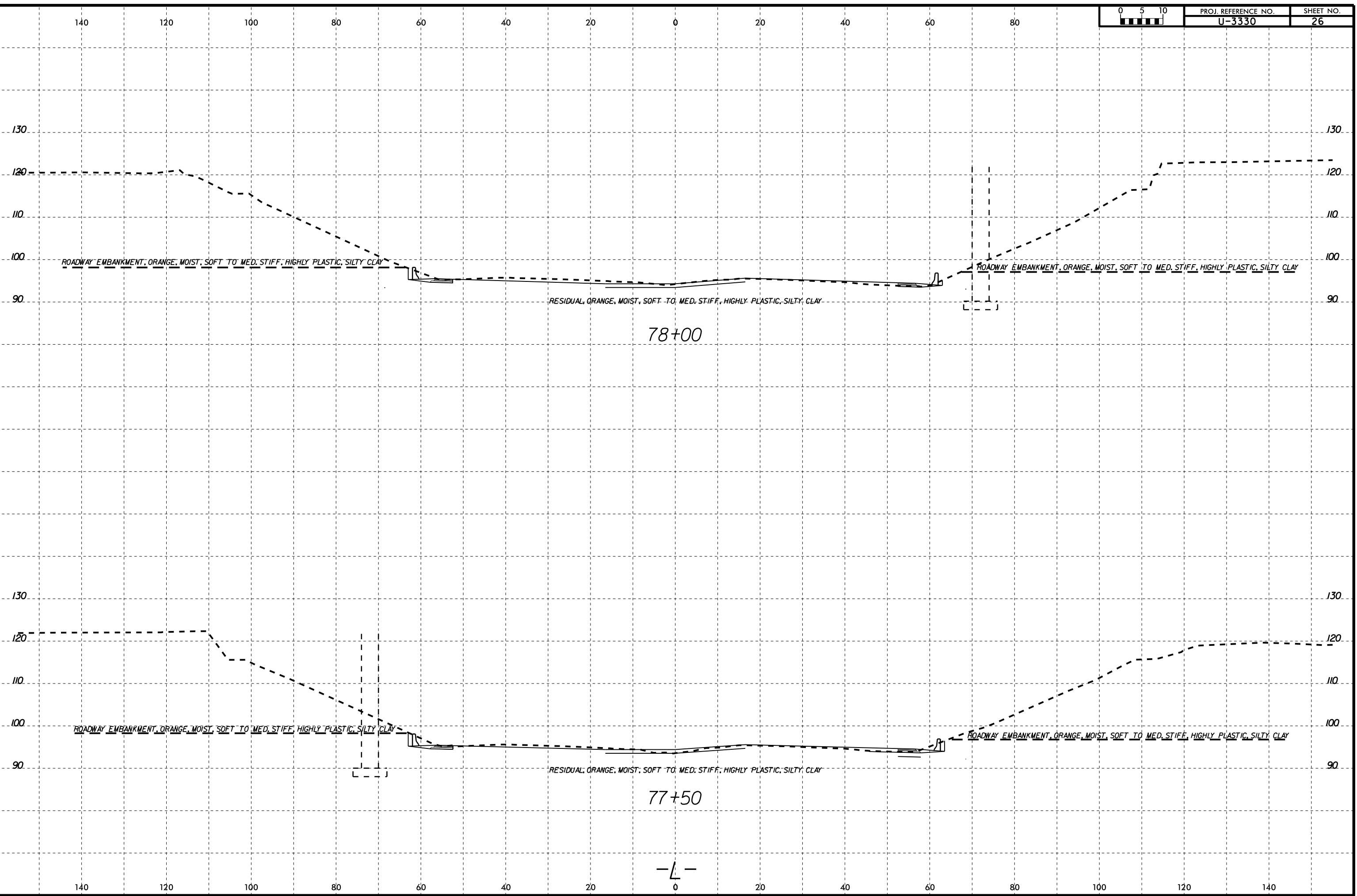
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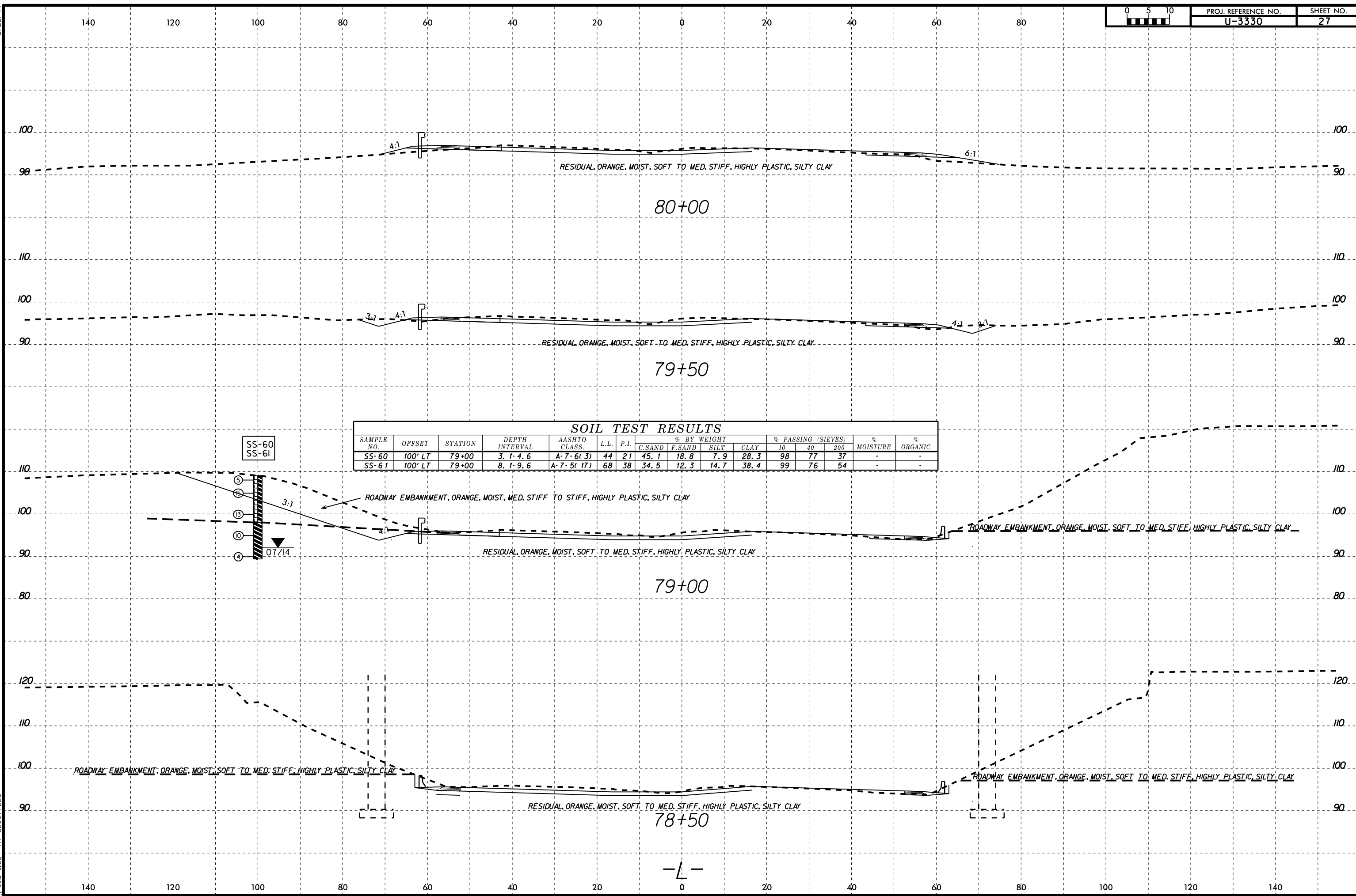
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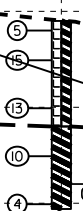
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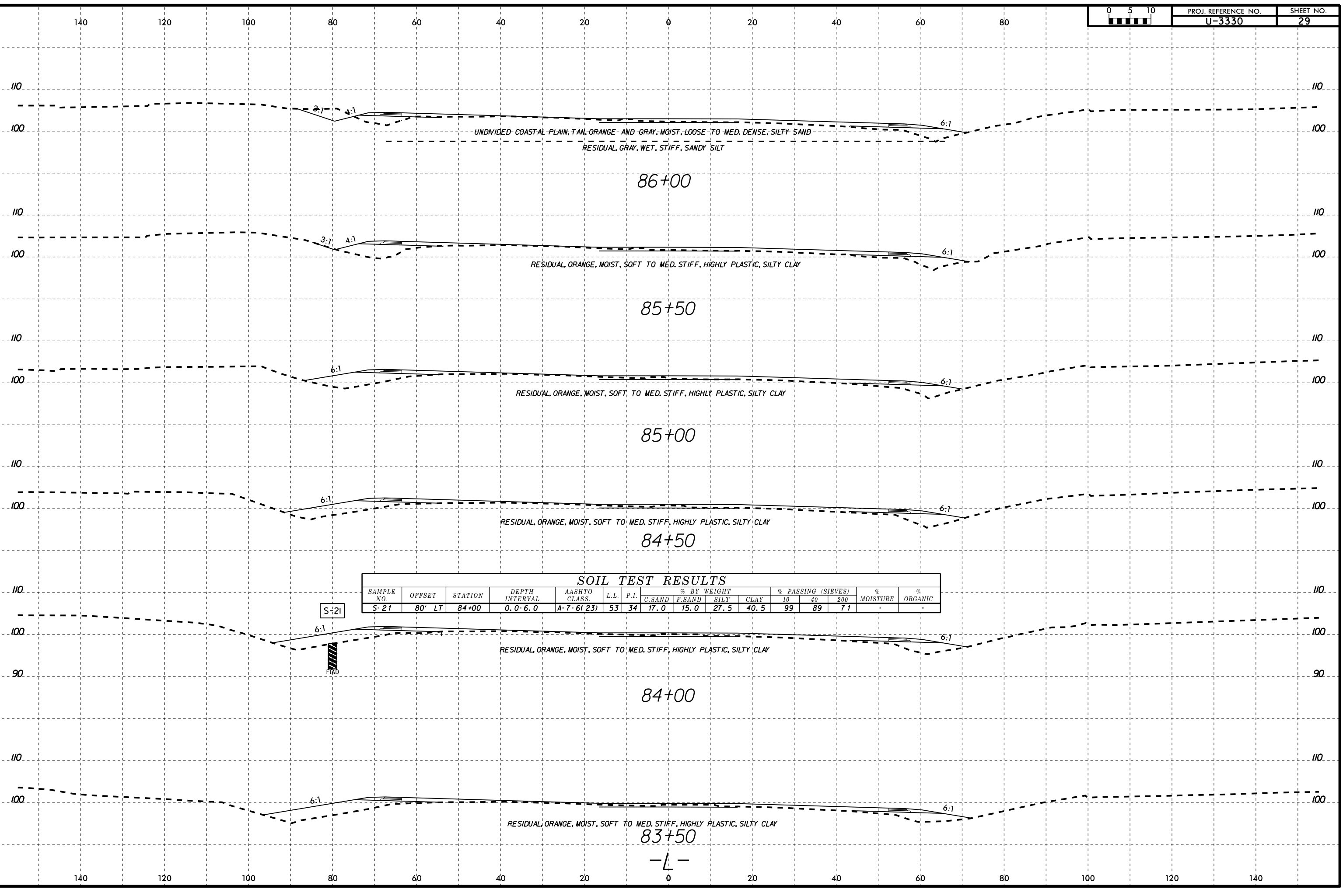


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-60	100' LT	79+00	3.1-4.6	A-7-6(3)	44	21	45.1	18.8	7.9	28.3	98	77	37	-	-
SS-61	100' LT	79+00	8.1-9.6	A-7-5(17)	68	38	34.5	12.3	14.7	38.4	99	76	54	-	-

SS-60
SS-61





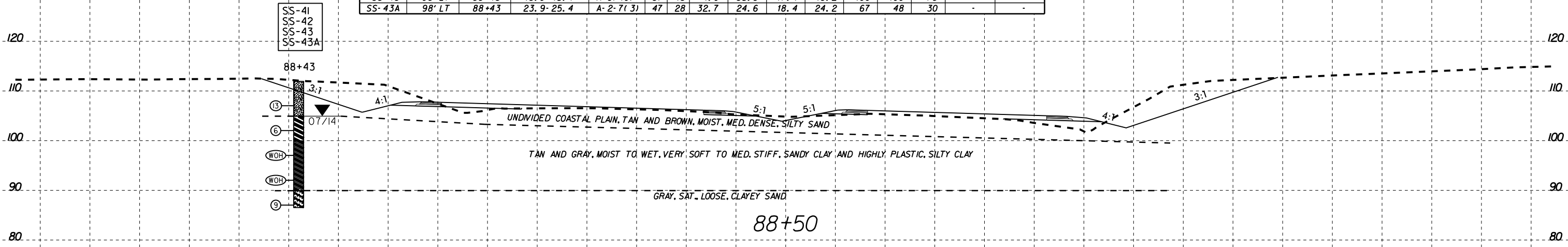
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-21	80' LT	84+00	0.0-6.0	A-7-6(23)	53	34	17.0	15.0	27.5	40.5	99	89	71	-	-

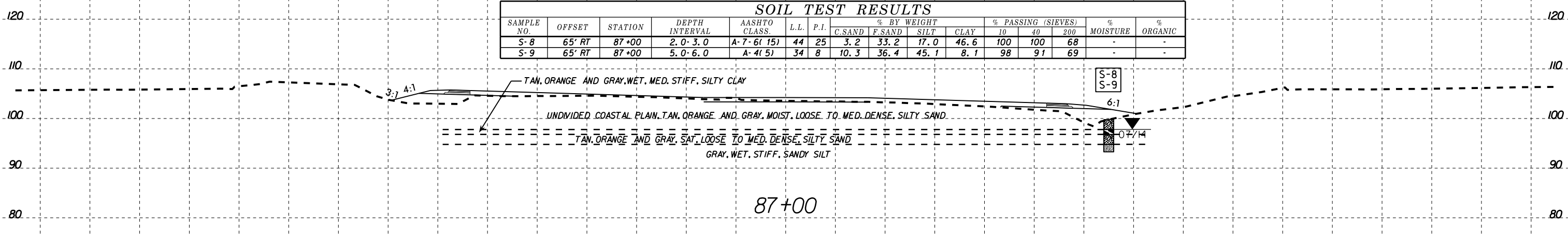
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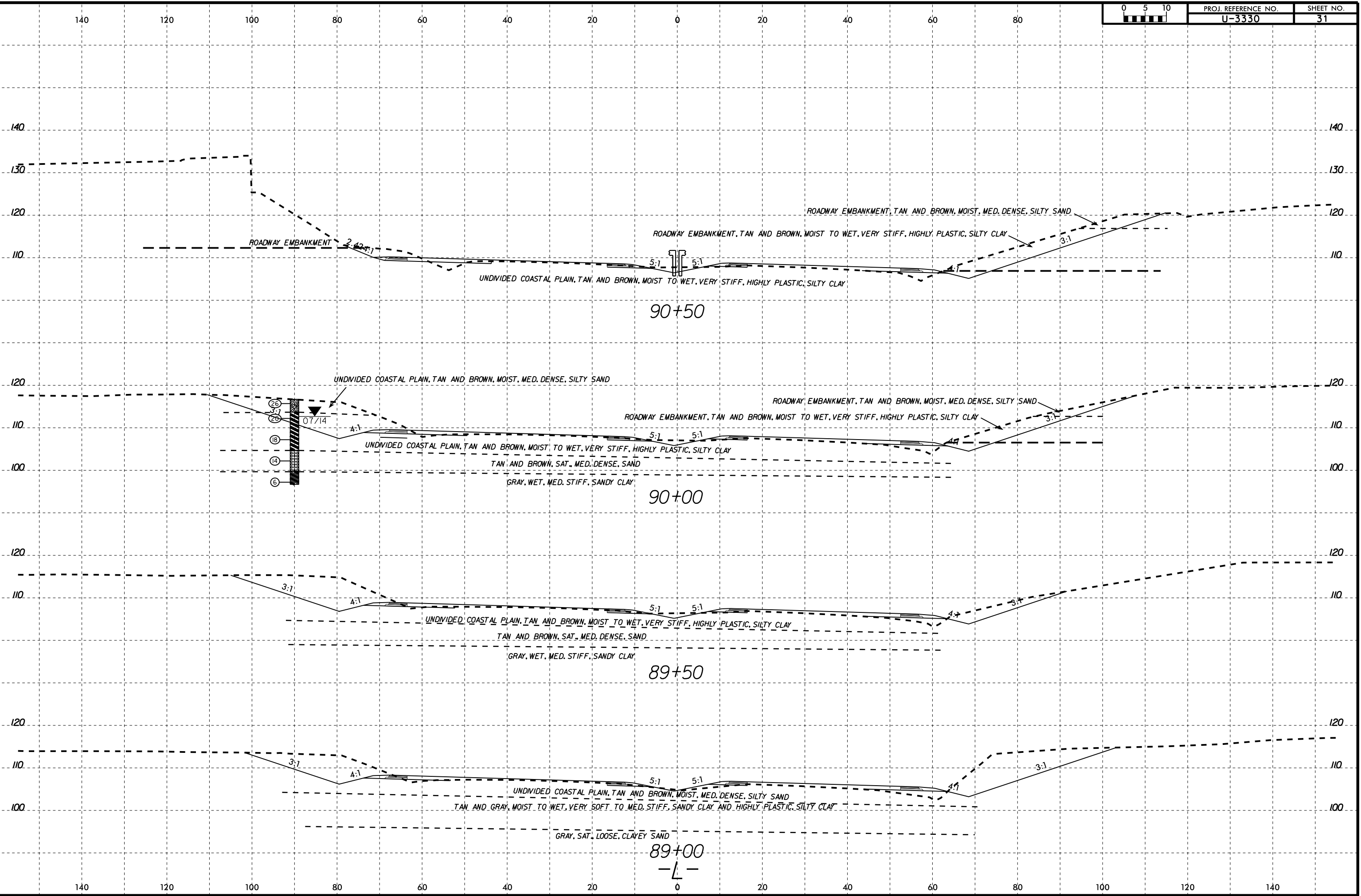
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-41	98' LT	88+43	3.9- 5.4	A-2-4(0)	20	7	44.4	27.3	12.1	16.2	99	71	31	-	-
SS-42	98' LT	88+43	8.9- 10.4	A-7-6(43)	76	50	11.9	5.1	28.5	54.5	94	85	80	-	-
SS-43	98' LT	88+43	13.9- 15.4	A-6(10)	37	13	1.0	35.8	47.1	16.2	100	100	78	-	-
SS-43A	98' LT	88+43	23.9- 25.4	A-2-7(3)	47	28	32.7	24.6	18.4	24.2	67	48	30	-	-



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-8	65' RT	87+00	2.0- 3.0	A-7-6(15)	44	25	3.2	33.2	17.0	46.6	100	100	68	-	-
S-9	65' RT	87+00	5.0- 6.0	A-4(5)	34	8	10.3	36.4	45.1	8.1	98	91	69	-	-

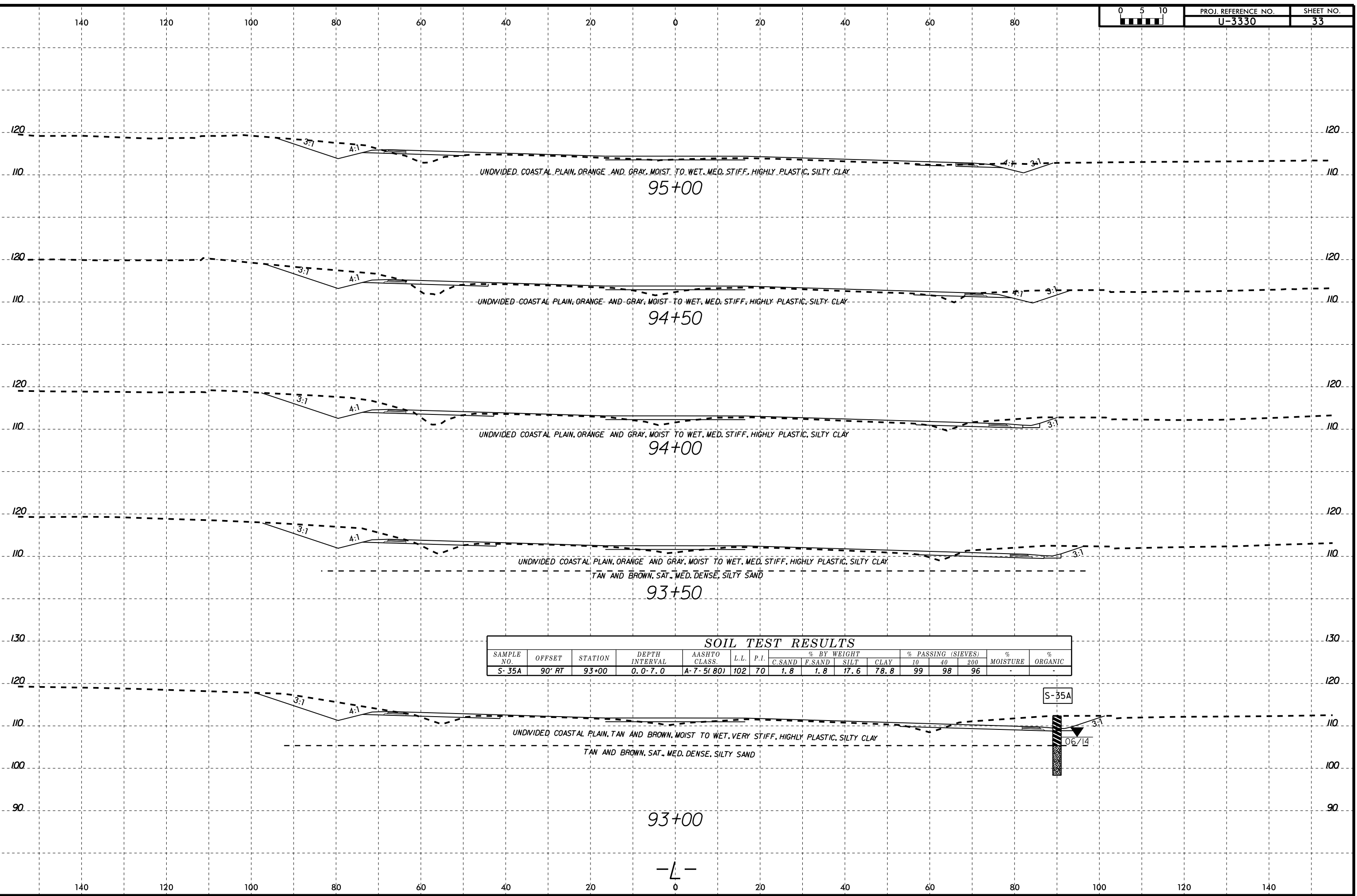
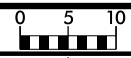


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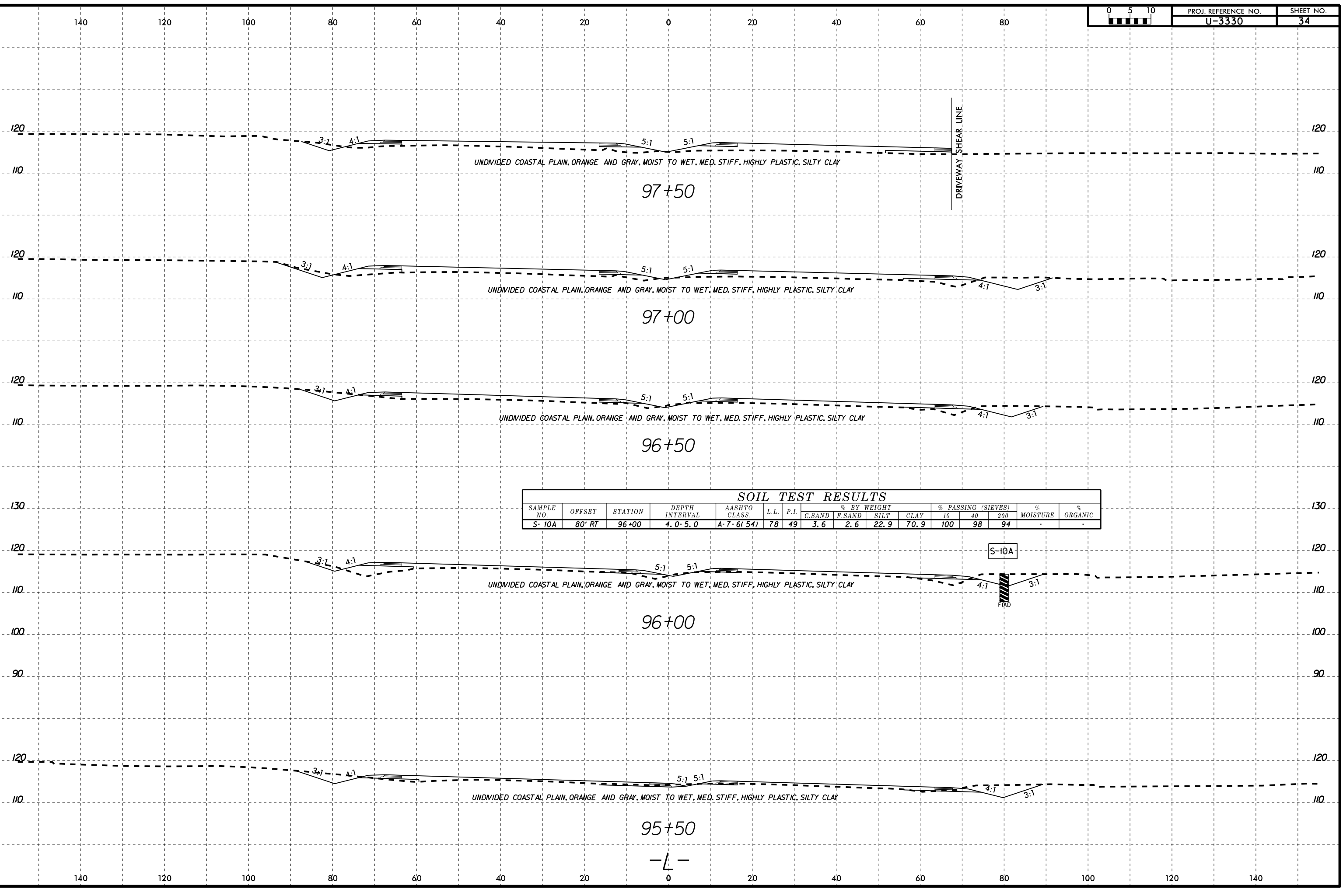
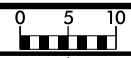
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-35A	90' RT	93+00	0.0-7.0	A-7-5(80)	102	70	1.8	1.8	17.6	78.8	99	98	96	-	-

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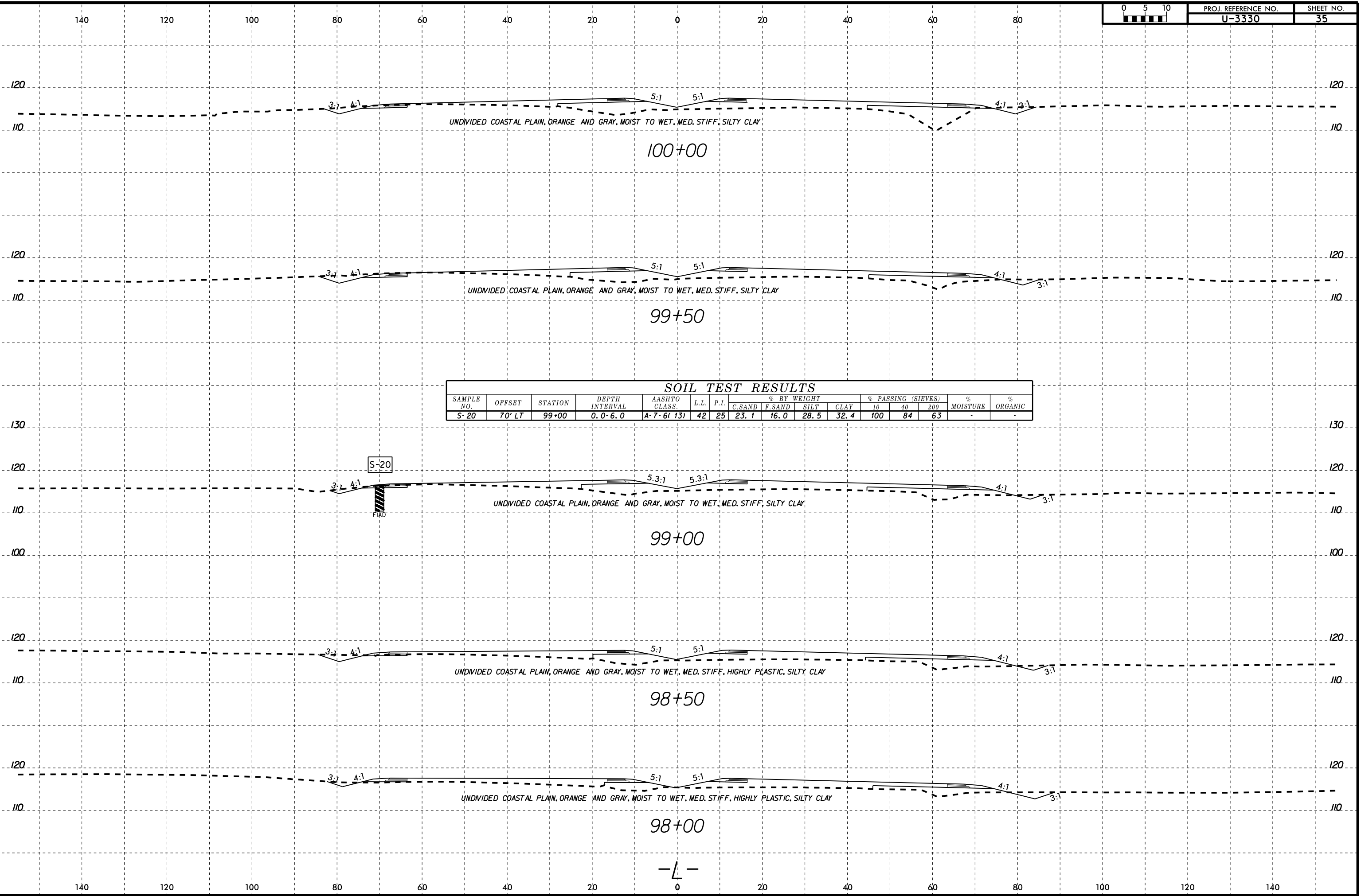
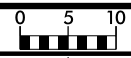
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-10A	80' RT	96+00	4.0'-5.0'	A-7-6(54)	78	49	3.6	2.6	22.9	70.9	100	98	94	-	-

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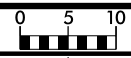


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-20	70' LT	99+00	0.0-6.0	A-7-6(13)	42	25	23.1	16.0	28.5	32.4	100	84	63	-	-

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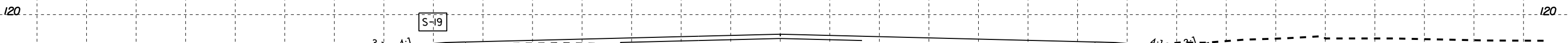
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UNDIVIDED COASTAL PLAIN, TAN, GRAY AND BROWN, MOIST TO WET, MED. STIFF TO VERY STIFF, SANDY CLAY

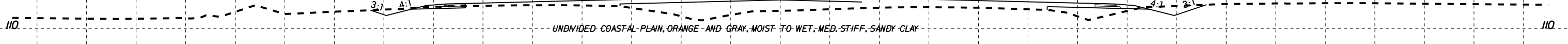
102+50

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-19	70' LT	102+00	0.0-6.0	A-6(9)	37	22	19.6	26.7	25.3	28.3	95	83	55	-	-



UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY, MOIST TO WET, MED. STIFF, SANDY CLAY

102+00



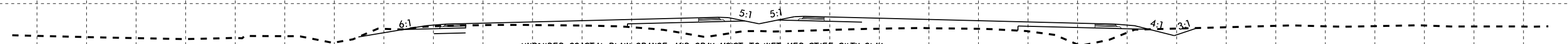
UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY, MOIST TO WET, MED. STIFF, SANDY CLAY

101+50



UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY, MOIST TO WET, MED. STIFF, SANDY CLAY

101+00



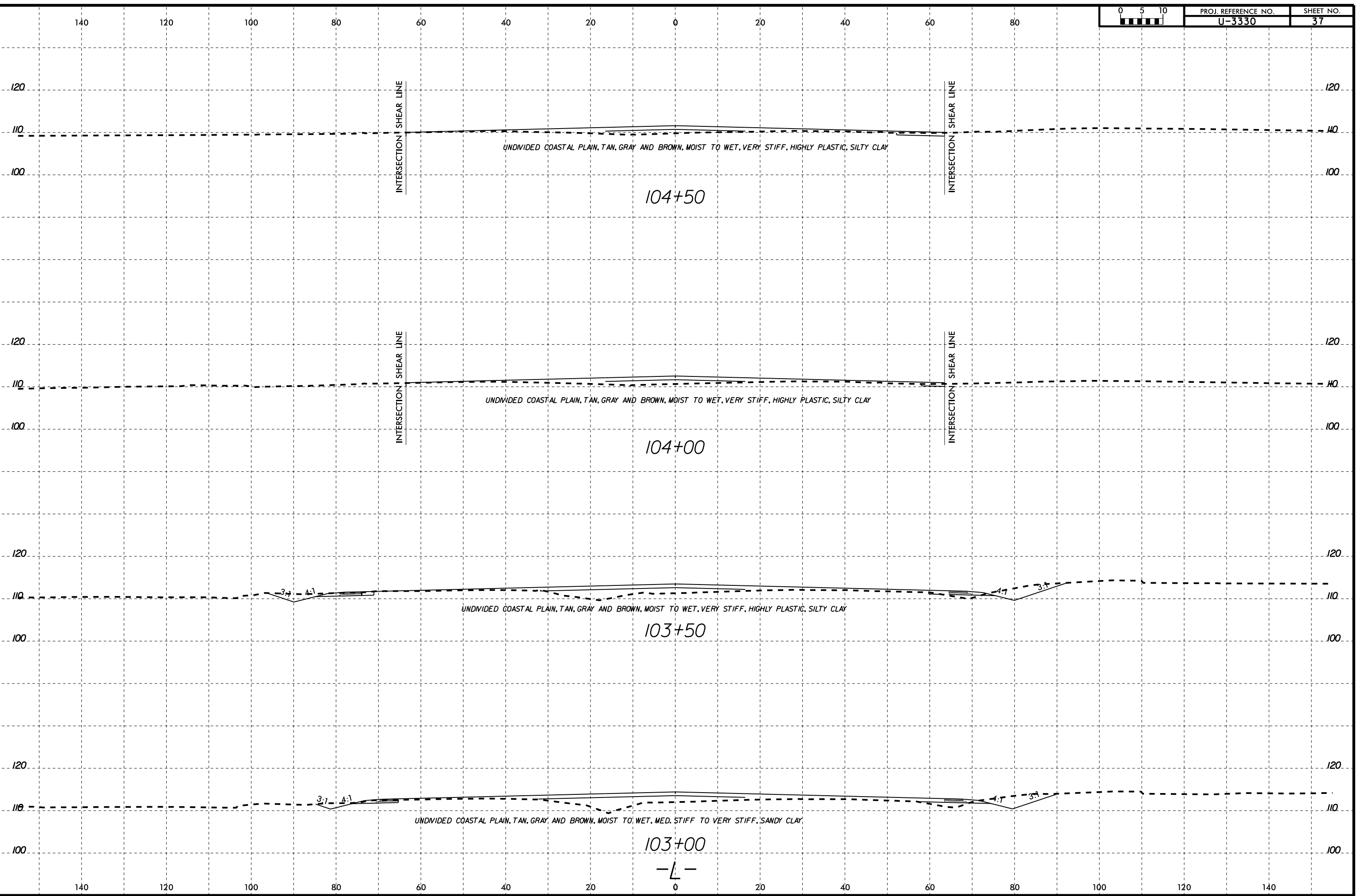
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100+50

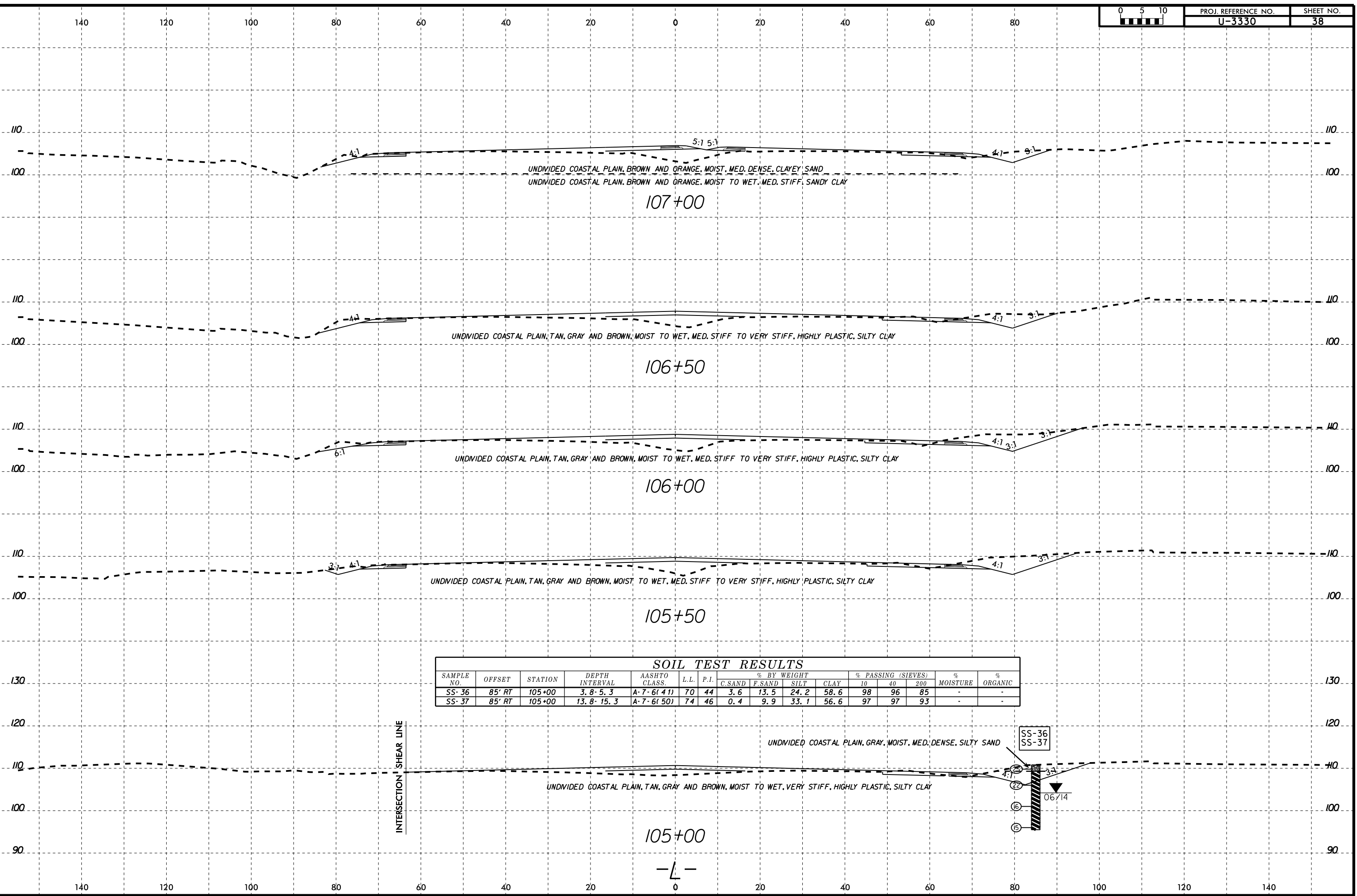
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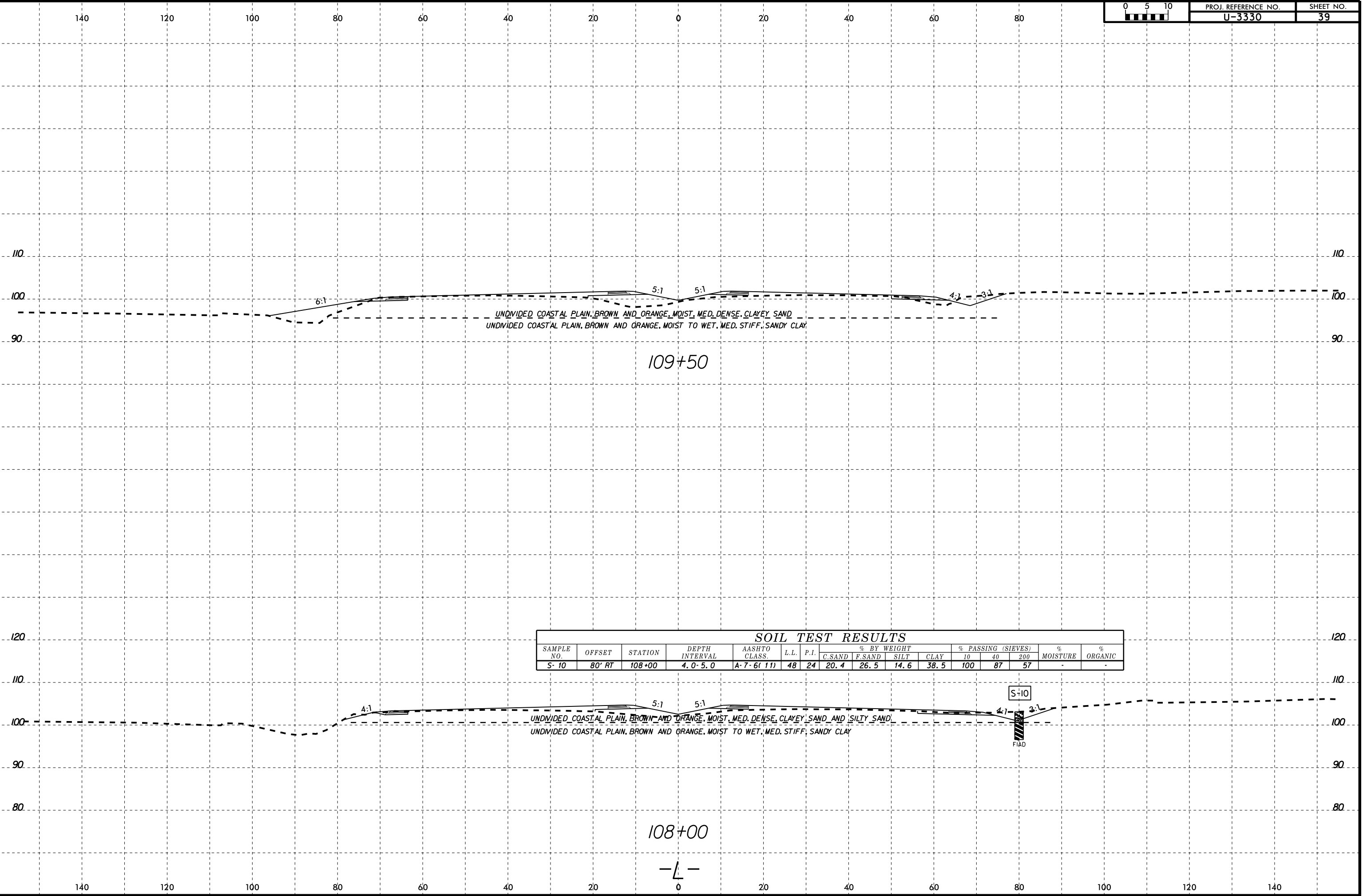
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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-36	85' RT	105+00	3.8- 5.3	A-7- 6(41)	70	44	3.6	13.5	24.2	58.6	98	96	85	-	-
SS-37	85' RT	105+00	13.8- 15.3	A-7- 6(50)	74	46	0.4	9.9	33.1	56.6	97	97	93	-	-

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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-10	80' RT	108+00	4.0-5.0	A-7-6(11)	48	24	20.4	26.5	14.6	38.5	100	87	57	-	-

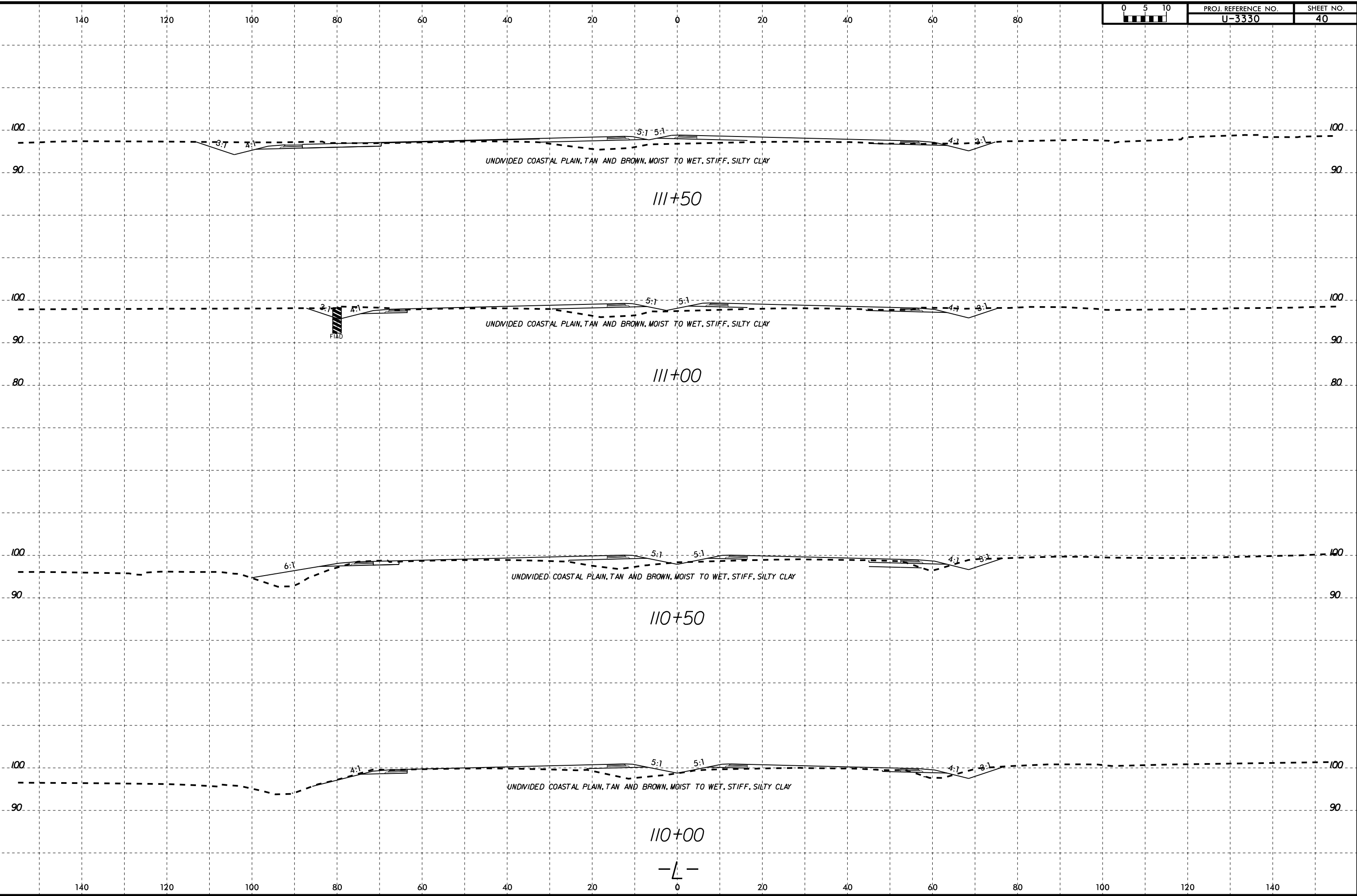
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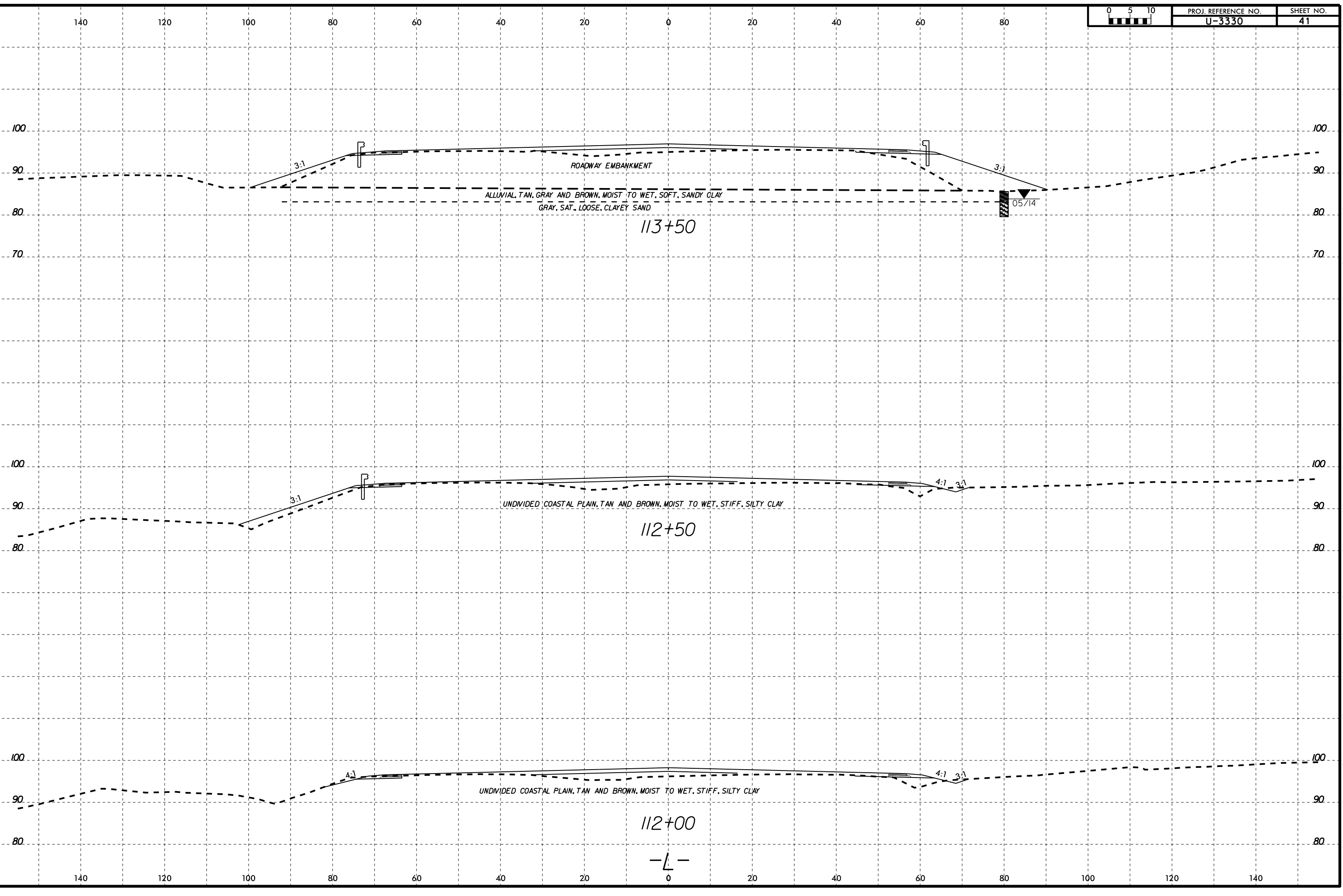
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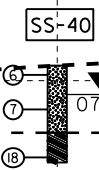


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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-40	80' LT	122+00	8.6-10.1	A-6(2)	26	13	29.3	30.5	20.0	20.2	99	78	46	-	-



UNDIVIDED COASTAL PLAIN, TAN AND BROWN, MOIST, LOOSE, SILTY SAND
 RESIDUAL, GRAY AND BROWN, MOIST TO WET, MED. STIFF, SANDY CLAY

122+00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-14	90' LT	119+00	2.0-3.0	A-7-6(6)	41	25	17.4	40.3	14.0	28.3	97	85	43	-	-

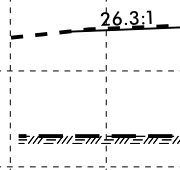


RESIDUAL, TAN AND BROWN, MOIST TO WET, STIFF, SILTY CLAY

119+00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-38	80' RT	116+00	0.0-1.5	A-7-6(12)	45	27	26.5	19.4	21.8	32.3	96	77	57	-	-

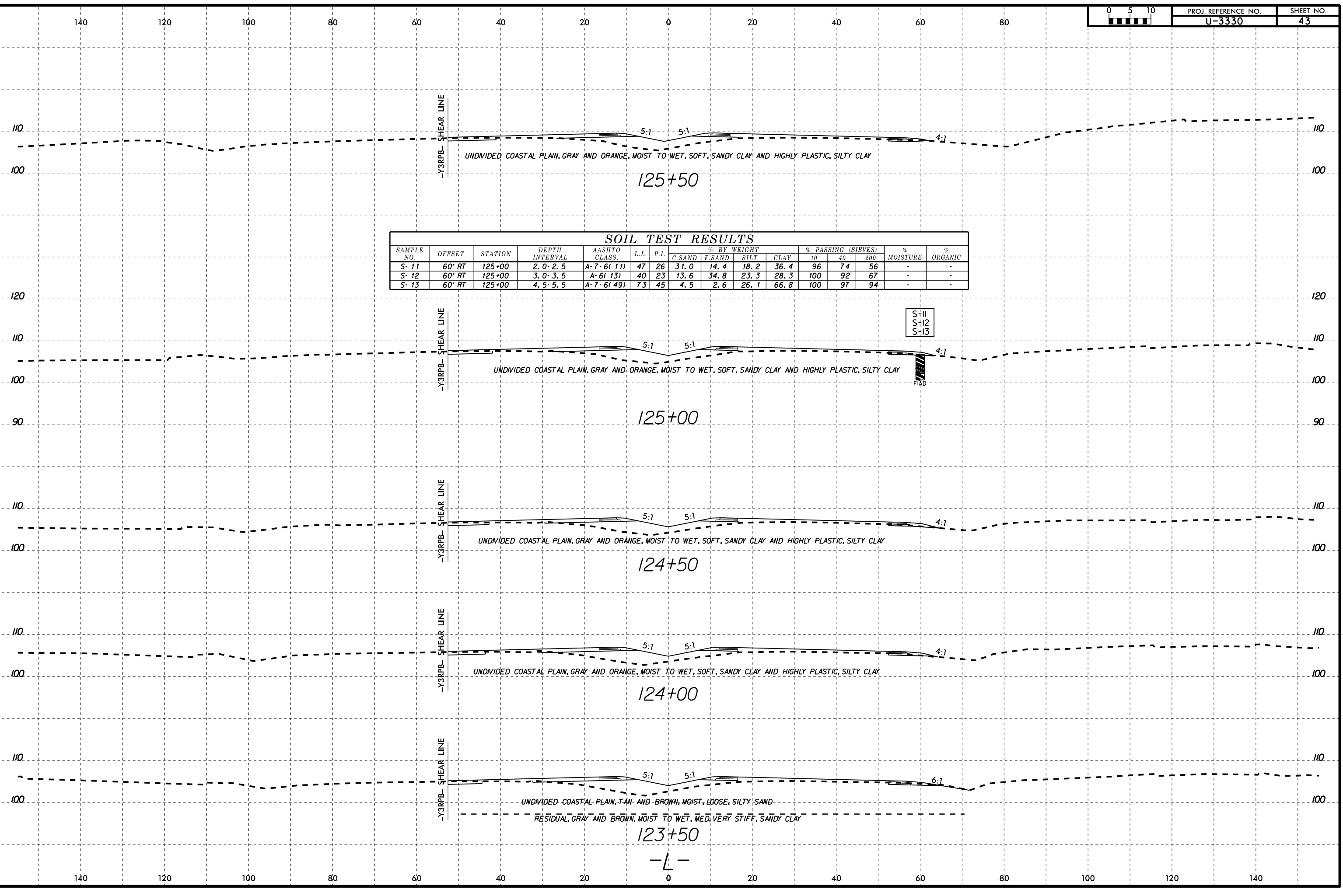


RESIDUAL, TAN AND BROWN, MOIST, STIFF, HIGHLY PLASTIC, SILTY CLAY

CRYSTALLINE ROCK (GRANITE)

116+00

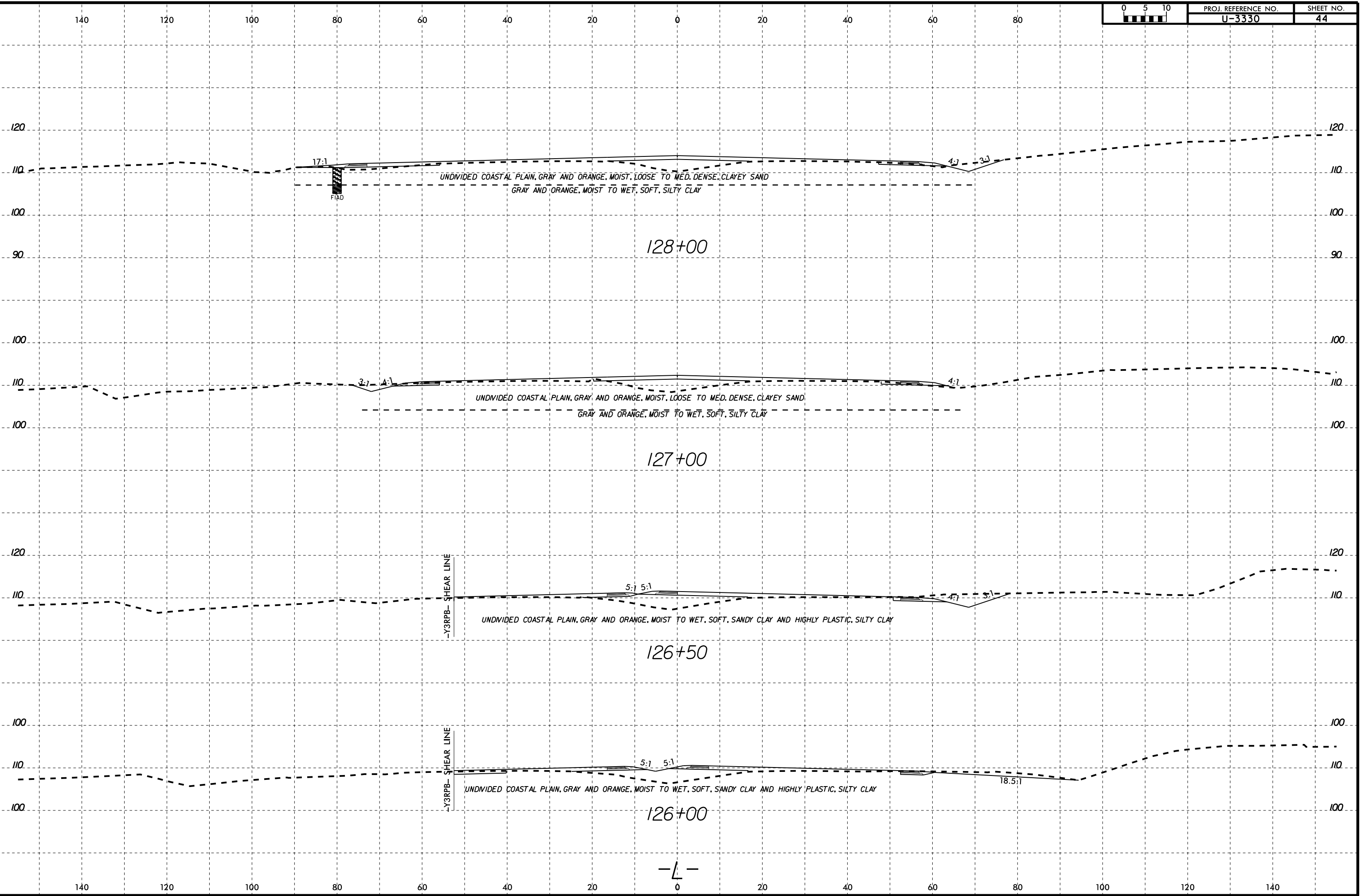
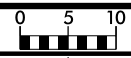
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SOIL TEST RESULTS

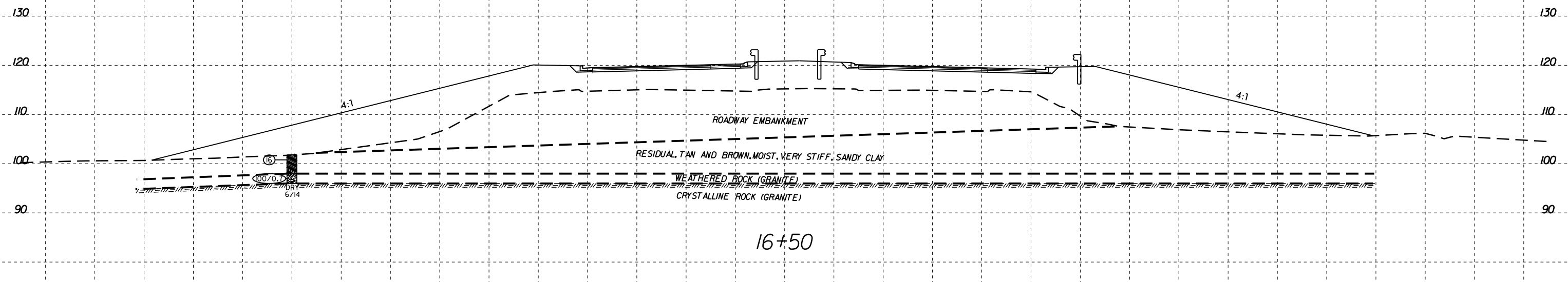
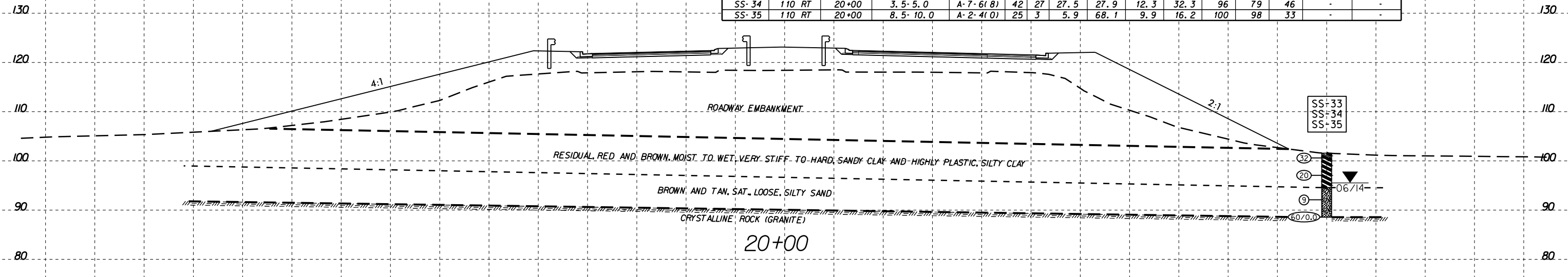
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-11	60' RT	125+00	2.0-2.5	A-7-6(11)	47	26	31.0	14.4	18.2	36.4	96	74	56	-	-
S-12	60' RT	125+00	3.0-3.5	A-6(13)	40	23	13.6	34.8	23.3	28.3	100	92	67	-	-
S-13	60' RT	125+00	4.5-5.5	A-7-6(49)	73	45	4.5	2.6	26.1	66.8	100	97	94	-	-

8/23/99

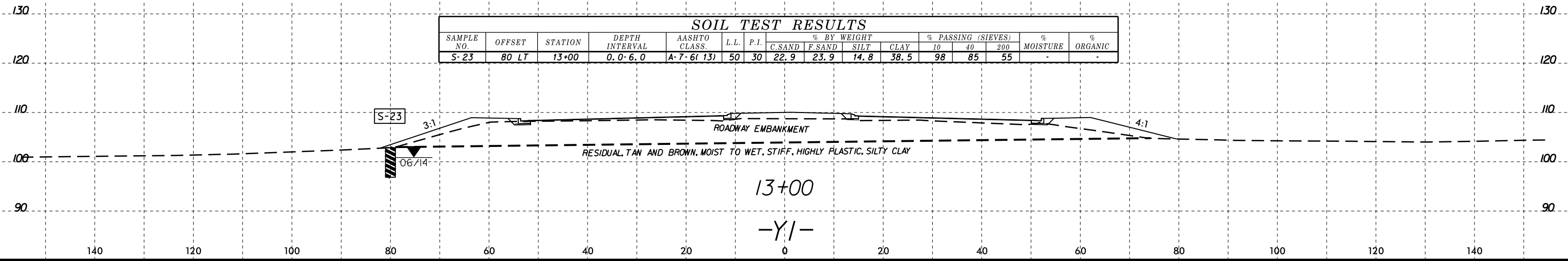


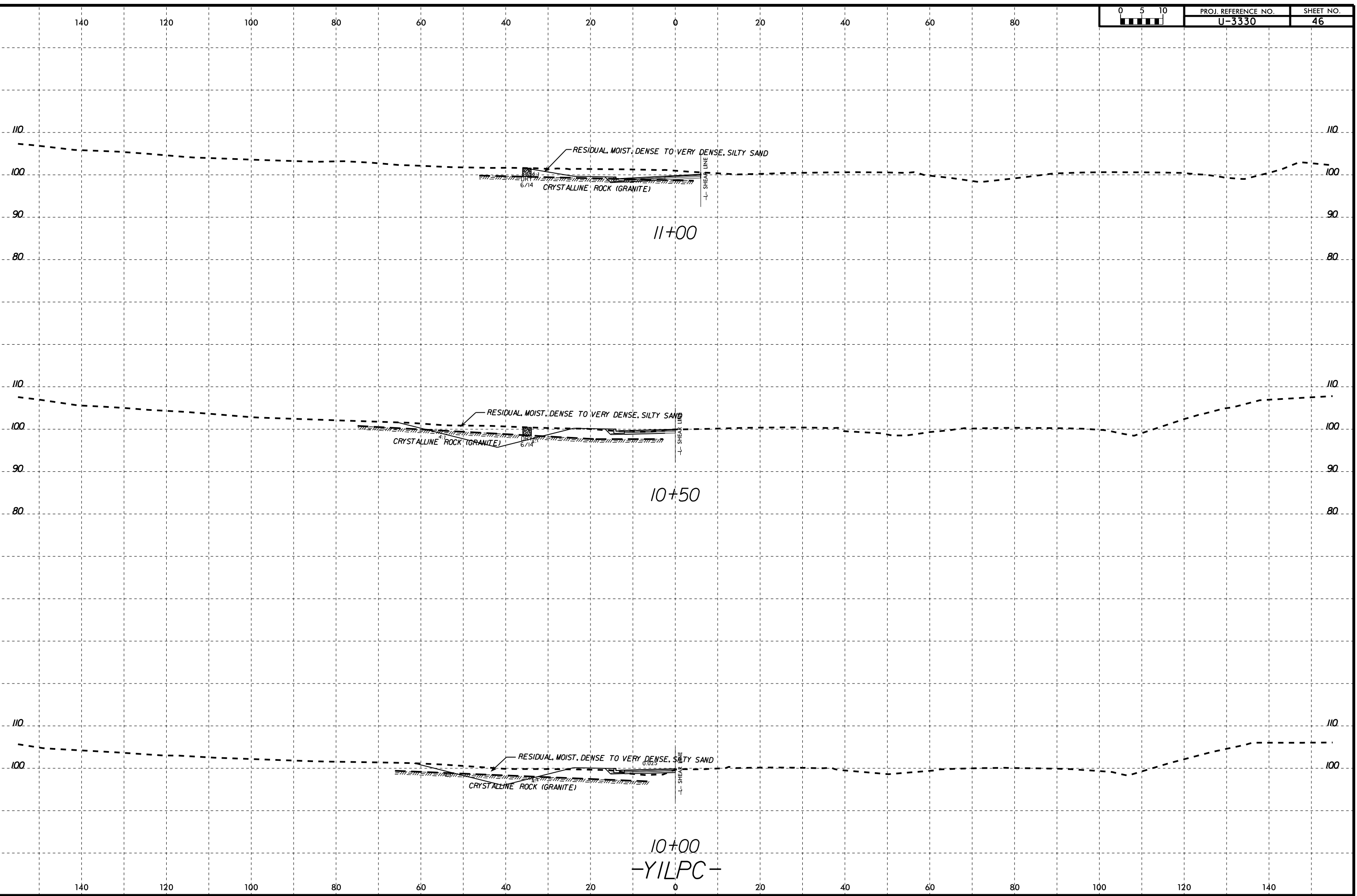
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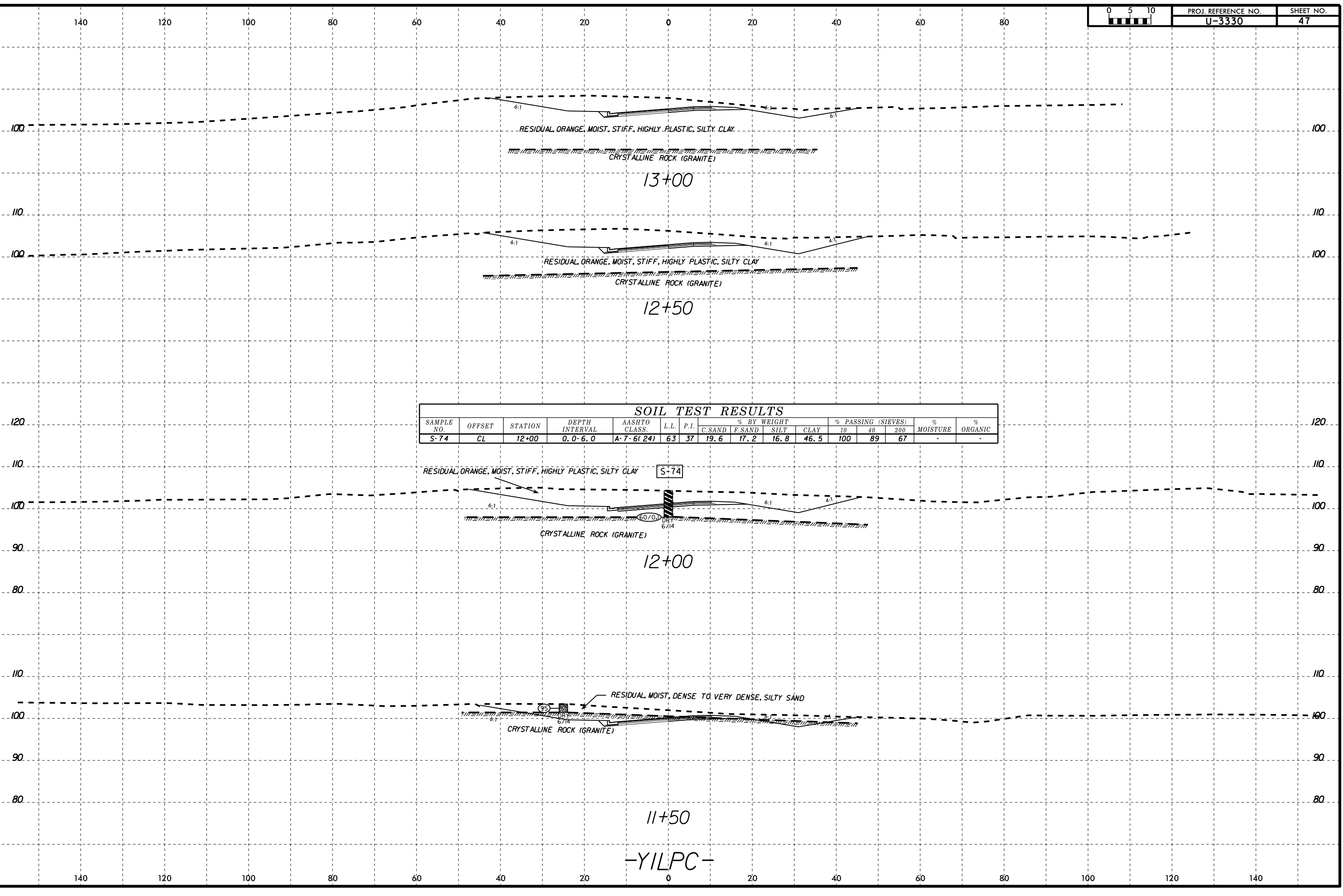
SOIL TEST RESULTS															
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-33	110 RT	20+00	0.0-1.5	A-6(9)	40	25	7.1	48.5	14.1	30.3	100	98	51	-	-
SS-34	110 RT	20+00	3.5-5.0	A-7-6(8)	42	27	27.5	27.9	12.3	32.3	96	79	46	-	-
SS-35	110 RT	20+00	8.5-10.0	A-2-4(0)	25	3	5.9	68.1	9.9	16.2	100	98	33	-	-



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-23	80 LT	13+00	0.0-6.0	A-7-6(13)	50	30	22.9	23.9	14.8	38.5	98	85	55	-	-







13+00

12+50

12+00

11+50

-YILPC-

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-74	CL	12+00	0.0-6.0	A-7-6(24)	63	37	19.6	17.2	16.8	46.5	100	89	67	-	-

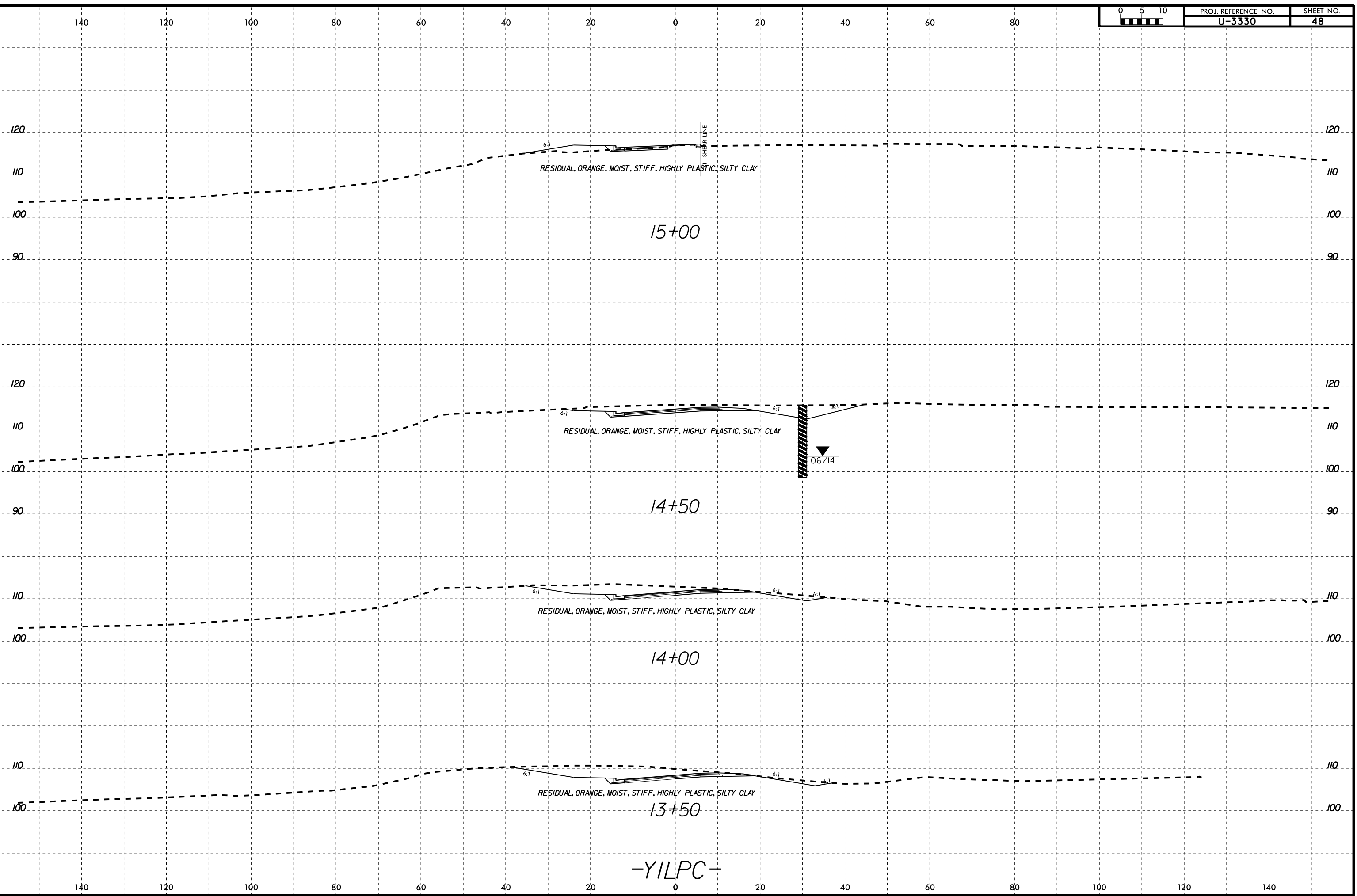
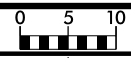
S-74

CRYSTALLINE ROCK (GRANITE)

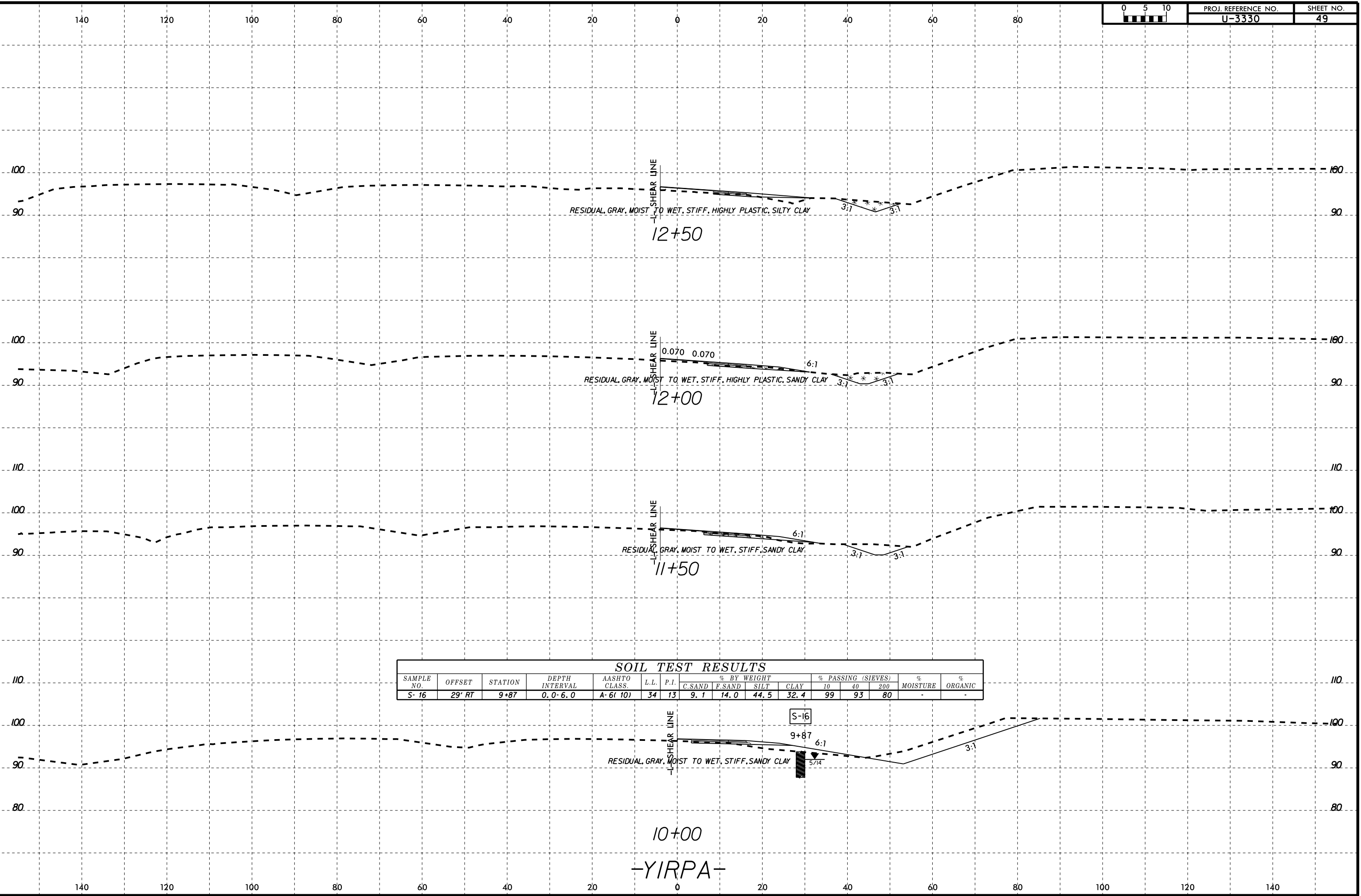
RESIDUAL, MOIST, DENSE TO VERY DENSE, SILTY SAND

CRYSTALLINE ROCK (GRANITE)

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

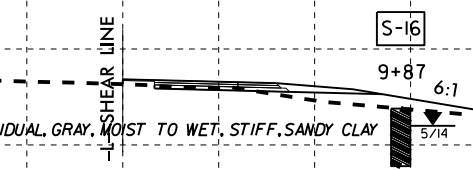


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IPswortley AT 6/27/25



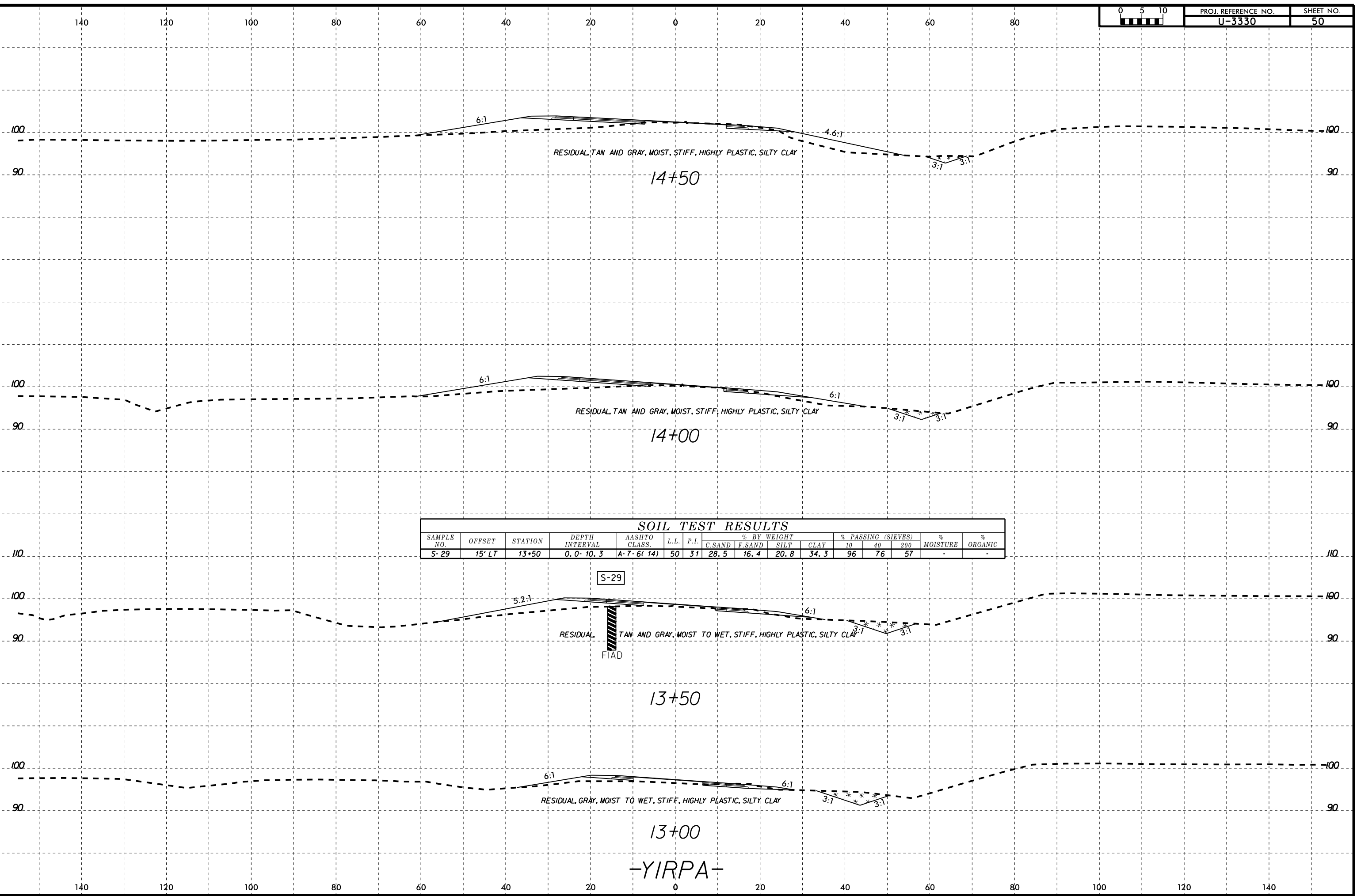
SOIL TEST RESULTS

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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-16	29' RT	9+87	0, 0-6.0	A-6(10)	34	13	9.1	14.0	44.5	32.4	99	93	80	-	-



10+00
-YIRPA-

8/23/99



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-29	15' LT	13+50	0.0-10.3	A-7-6(14)	50	31	28.5	16.4	20.8	34.3	96	76	57	-	-

S-29



13+50

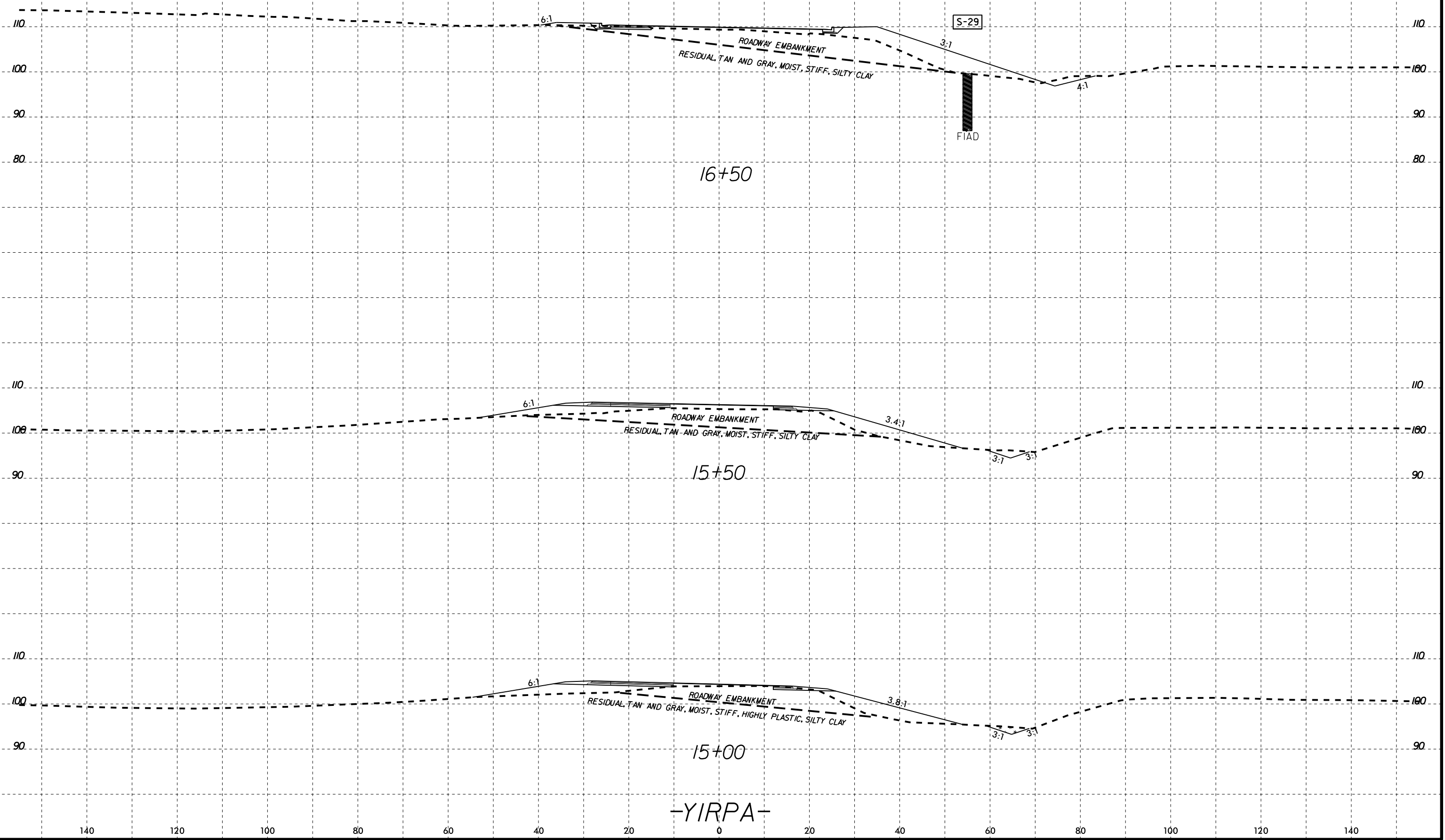
13+00

-YIRPA-

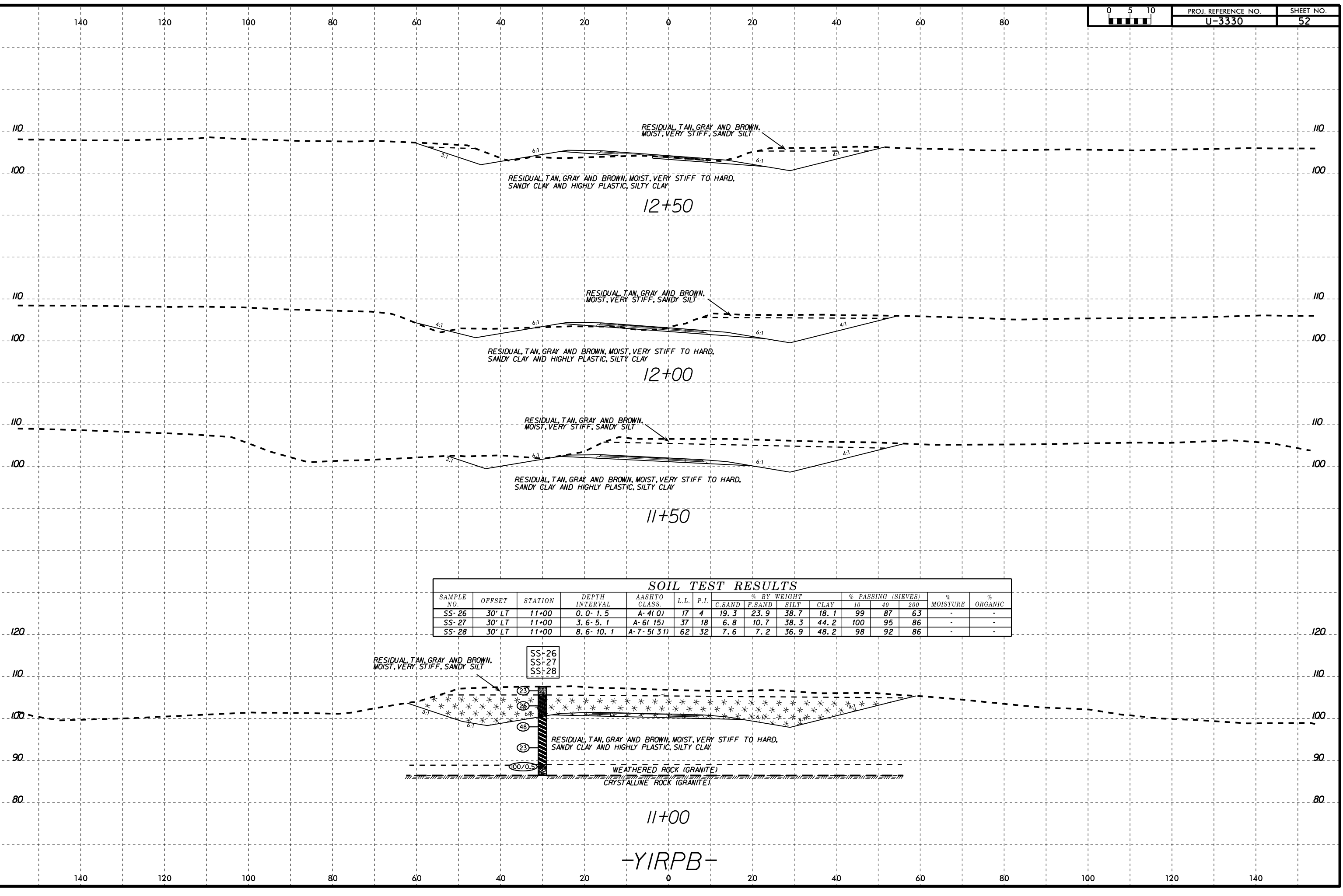
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-30	55' RT	16+50	0.0-12.6	A-6(1)	24	11	36.0	25.3	18.6	20.2	97	72	43	-	-



8/23/99



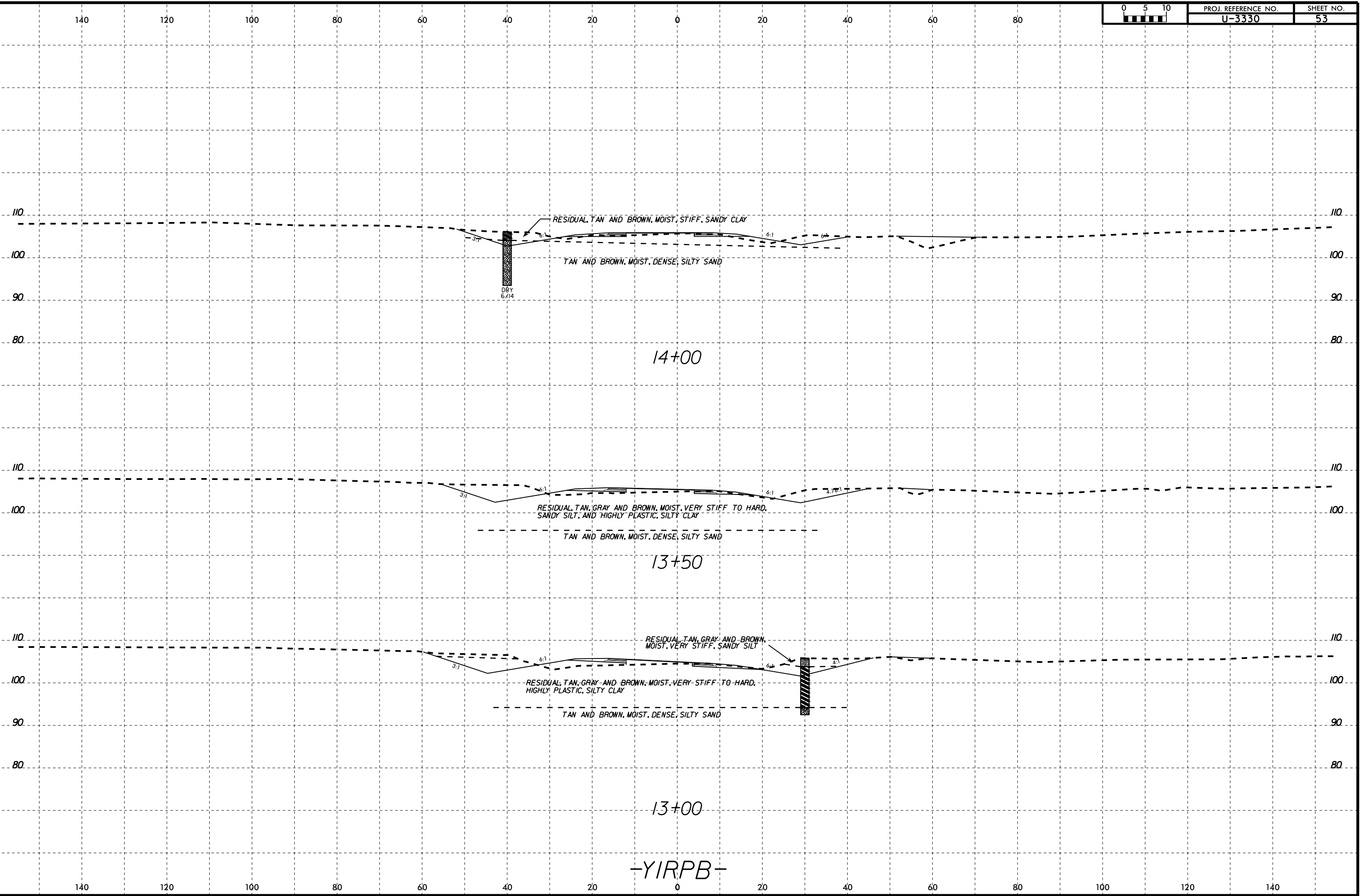
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-26	30' LT	11+00	0.0-1.5	A-4(0)	17	4	19.3	23.9	38.7	18.1	99	87	63	-	-
SS-27	30' LT	11+00	3.6-5.1	A-6(15)	37	18	6.8	10.7	38.3	44.2	100	95	86	-	-
SS-28	30' LT	11+00	8.6-10.1	A-7-5(31)	62	32	7.6	7.2	36.9	48.2	98	92	86	-	-

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-YIRPB-

8/23/99



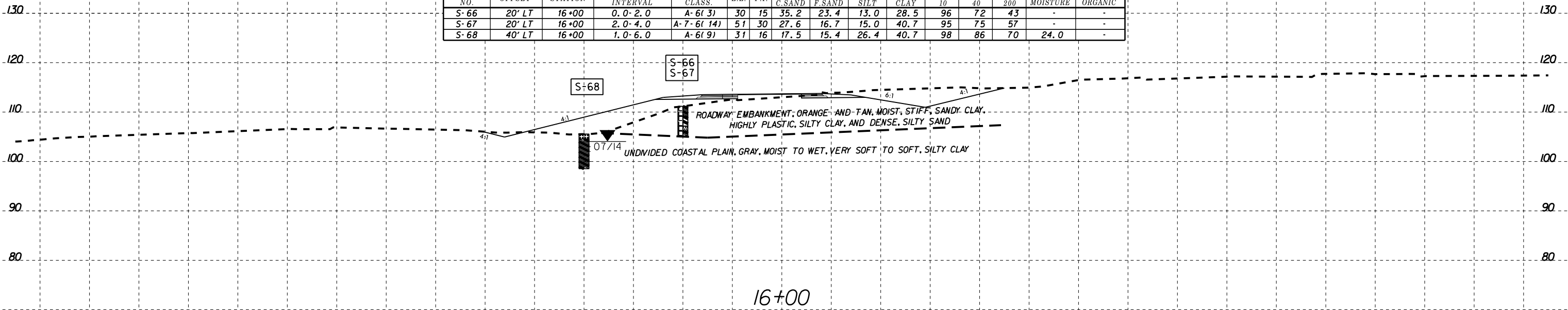
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8/23/99

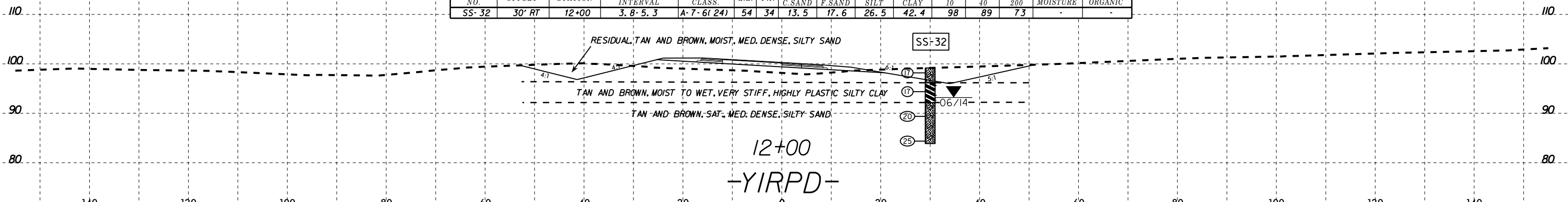
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-66	20' LT	16+00	0.0-2.0	A-6(3)	30	15	35.2	23.4	13.0	28.5	96	72	43	-	-
S-67	20' LT	16+00	2.0-4.0	A-7-6(14)	51	30	27.6	16.7	15.0	40.7	95	75	57	-	-
S-68	40' LT	16+00	1.0-6.0	A-6(9)	31	16	17.5	15.4	26.4	40.7	98	86	70	24.0	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-32	30' RT	12+00	3.8-5.3	A-7-6(24)	54	34	13.5	17.6	26.5	42.4	98	89	73	-	-

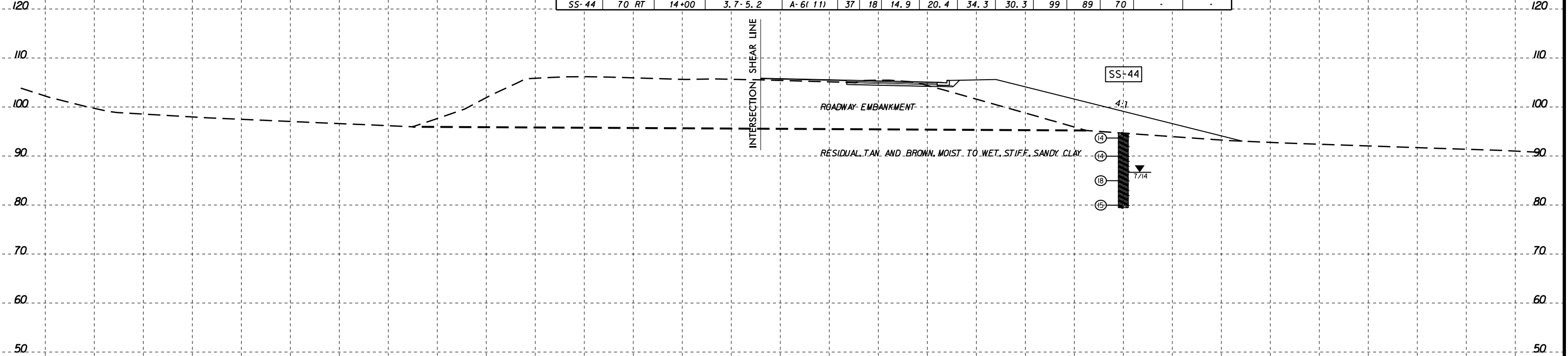


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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-44	70 RT	14+00	3.7 - 5.2	A-6(11)	37	18	14.9	20.4	34.3	30.3	99	89	70	-	-



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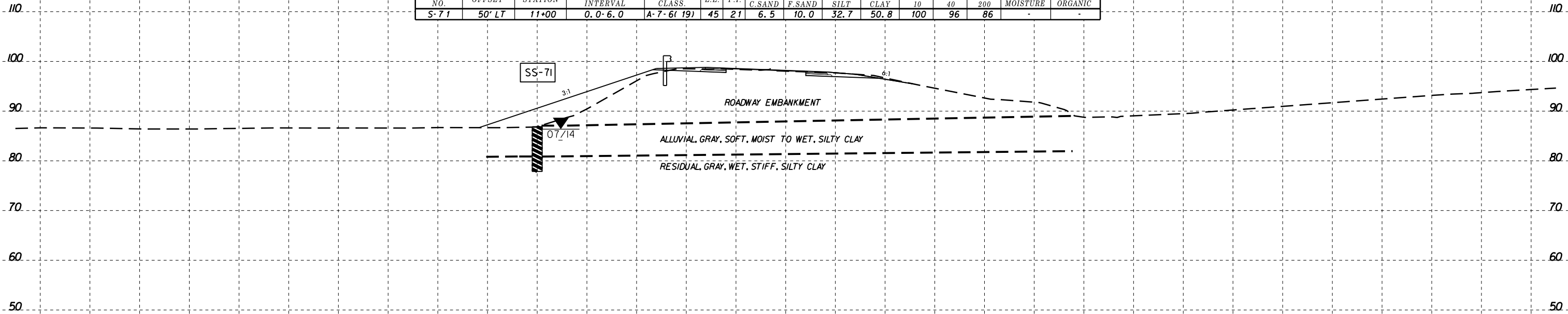
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PROJ. REFERENCE NO.
U-3330

SHEET NO.
56

SOIL TEST RESULTS															
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-71	50' LT	11+00	0.0-6.0	A-7-6(19)	45	21	6.5	10.0	32.7	50.8	100	96	86	-	-



11+00
-Y2RPC-

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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-39	40' LT	11+50	7.0- 15.0	A-7-6(42)	69	47	6.5	11.7	23.2	58.6	98	94	84	-	-

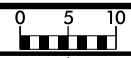
S-39

RESIDUAL TAN AND BROWN.
TAN AND BROWN.
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WET, STIFF, HIGHLY PLASTIC, SILTY CLAY

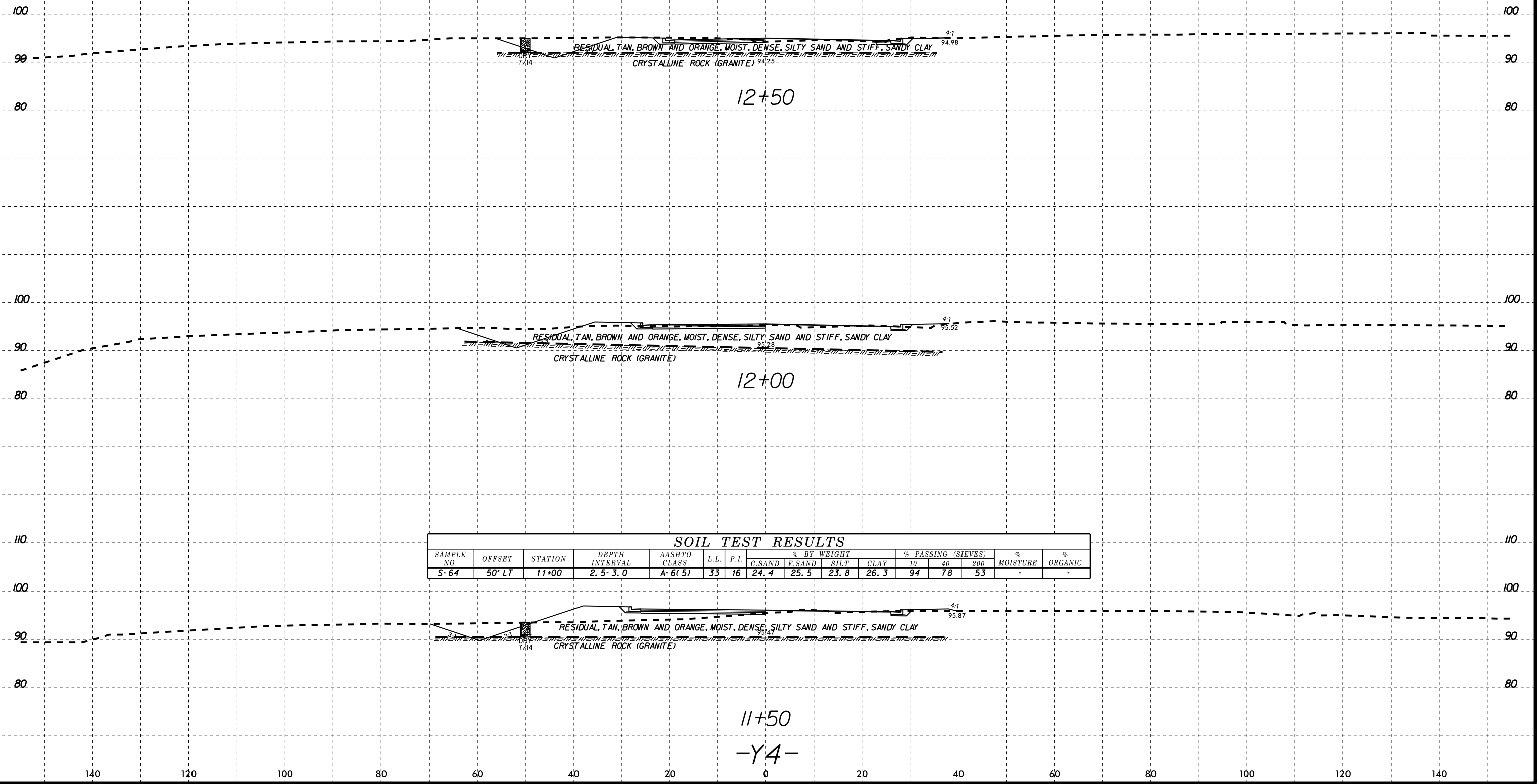
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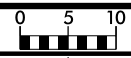
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SOIL TEST RESULTS															
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-64	50' LT	11+00	2.5-3.0	A-6(5)	33	16	24.4	25.5	23.8	26.3	94	78	53	-	-

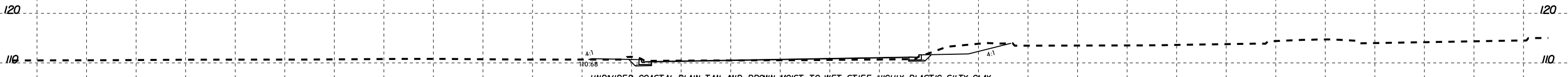
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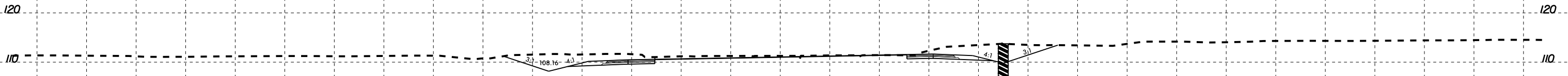


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11+50



11+00

-Y7A-

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