

NOTE: 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-5018B	1	55
FIG. NO.	F.A. PROJ. NO.	DESCRIPTION	
41431.1.1		PE	
41431.2.1		RW	
41431.3.3		CONST.	

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	12+25 TO 145+84	4-14	15-24

CROSS SECTIONS

LINE	STATION	SHEET NO.
-L-	13+50 TO 53+00	25-44
-L-	57+50 TO 81+50	45-55

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 41431.1.1 (U-5018) F.A. PROJ. STP-0043 (8)
COUNTY PITT
PROJECT DESCRIPTION NC 43 FROM US 264 TO NC 11
(MEMORIAL DRIVE)

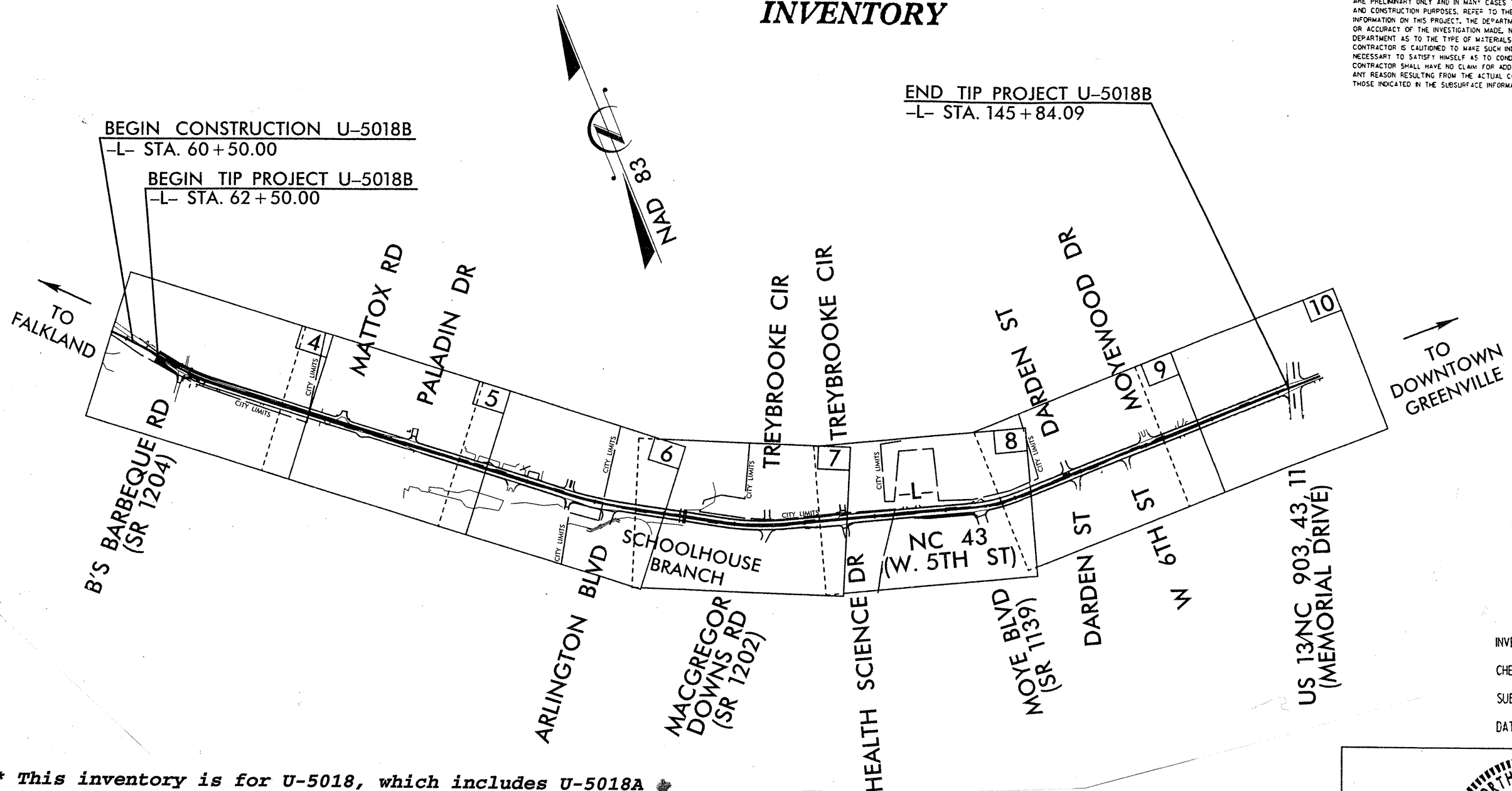
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THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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INVENTORY



CONTRACT: C202134 ID: U-5018B

PERSONNEL

TCB
JRS
RES
S&ME

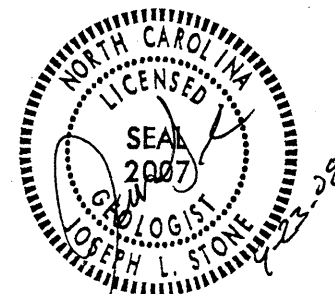
INVESTIGATED BY TC BOTTOMS
CHECKED BY DN ARGENBRIGHT
SUBMITTED BY DN ARGENBRIGHT
DATE AUGUST, 2008

* This inventory is for U-5018, which includes U-5018A & U-5018B sections. Please refer to the respective portions for your needs.

DRAWN BY: T.C. BOTTOMS, C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.



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																																																																																																																																															
<p>SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. ALSO POORLY GRADED!</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED WOULD YIELD SPT REFUSAL 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><u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.</p> <p><u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p><u>ARTESIAN</u> - 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.</p> <p><u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.</p> <p><u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><u>FORMATION (FM.)</u> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><u>LENS</u> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><u>MOTTLED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><u>PERCHED WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><u>ROCK QUALITY DESIGNATION (ROQ)</u> - 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.</p> <p><u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><u>SILL</u> - 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.</p> <p><u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><u>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</u> - NUMBER OF BLOWS IN 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.</p> <p><u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><u>STRATA ROCK QUALITY DESIGNATION (SROQ)</u> - 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.</p> <p><u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																															
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1, A-1-b, A-3</td> <td>A-2, A-2-4, A-2-5, A-2-6, A-2-7</td> <td>A-4, A-5, A-6, A-7, A-7-5, A-7-6</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>50 MX, 30 MX, 15 MX, 10 MX, 5 MX</td> <td>40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX</td> <td>40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6 MX</td> <td>NP, 10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX</td> <td>40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>FINE SAND, SAND</td> <td>SILT, SILTY SAND, SILTY CLAY, CLAY</td> <td>CLAYEY SOILS</td> </tr> <tr> <td>GENERALITY AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, UNSUITABLE</td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>		GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS.	A-1, A-1-b, A-3	A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, A-5, A-6, A-7, A-7-5, A-7-6	SYMBOL				% PASSING	50 MX, 30 MX, 15 MX, 10 MX, 5 MX	40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX	40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX	LIQUID LIMIT PLASTIC INDEX	6 MX	NP, 10 MX, 15 MX, 20 MX, 25 MX, 30 MX, 35 MX, 40 MX, 45 MX, 50 MX, 55 MX, 60 MX, 65 MX, 70 MX, 75 MX, 80 MX, 85 MX, 90 MX, 95 MX	40 MX, 30 MX, 20 MX, 15 MX, 10 MX, 5 MX	GROUP INDEX	0	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	USUAL TYPES OF MAJOR MATERIALS	FINE SAND, SAND	SILT, SILTY SAND, SILTY CLAY, CLAY	CLAYEY SOILS	GENERALITY AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, UNSUITABLE	<p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p> <p>LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td> SPT TEST BORING</td> <td> SAMPLE DESIGNATIONS</td> </tr> <tr> <td> SOIL SYMBOL</td> <td> AUGER BORING</td> <td>S - BULK SAMPLE</td> </tr> <tr> <td> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td> CORE BORING</td> <td>SS - SPLIT SPOON SAMPLE</td> </tr> <tr> <td> INFERRED SOIL BOUNDARY</td> <td> MONITORING WELL</td> <td>ST - SHELBY TUBE SAMPLE</td> </tr> <tr> <td> INFERRED ROCK LINE</td> <td> PIEZOMETER INSTALLATION</td> <td>RS - ROCK SAMPLE</td> </tr> <tr> <td> ALLUVIAL SOIL BOUNDARY</td> <td> SLOPE INDICATOR INSTALLATION</td> <td>RT - RECOMPACTED TRIAXIAL SAMPLE</td> </tr> <tr> <td> DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td> SPT N-VALUE</td> <td>CBR - CALIFORNIA BEARING RATIO SAMPLE</td> </tr> <tr> <td> SOUNDING ROD</td> <td> SPT REFUSAL</td> <td></td> </tr> </table> <p style="text-align: center;">ABBREVIATIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>HL - HIGHLY</td> <td>M - MOISTURE CONTENT</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MD - MEDIUM</td> <td>V - VERY</td> </tr> <tr> <td>CL - CLAY</td> <td>MICA - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>MOD - MODERATELY</td> <td>WEA - WEATHERED</td> </tr> <tr> <td>CSE - COARSE</td> <td>NP - NON PLASTIC</td> <td>γ - UNIT WEIGHT</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>ORG - ORGANIC</td> <td>γ_d - DRY UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>o - VOID RATIO</td> <td>SAP - SAPROLITIC</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SD - SAND, SANDY</td> <td></td> </tr> <tr> <td>FOSS - FOSSILIFEROUS</td> <td>SL - SILT, SILTY</td> <td></td> </tr> <tr> <td>FRAC - FRACTURED, FRACTURES</td> <td>SLI - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAGS - FRAGMENTS</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY				35% AND ABOVE	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	SPT TEST BORING	SAMPLE DESIGNATIONS	SOIL SYMBOL	AUGER BORING	S - BULK SAMPLE	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	CORE BORING	SS - SPLIT SPOON SAMPLE	INFERRED SOIL BOUNDARY	MONITORING WELL	ST - SHELBY TUBE SAMPLE	INFERRED ROCK LINE	PIEZOMETER INSTALLATION	RS - ROCK SAMPLE	ALLUVIAL SOIL BOUNDARY	SLOPE INDICATOR INSTALLATION	RT - RECOMPACTED TRIAXIAL SAMPLE	DIP & DIP DIRECTION OF ROCK STRUCTURES	SPT N-VALUE	CBR - CALIFORNIA BEARING RATIO SAMPLE	SOUNDING ROD	SPT REFUSAL		AR - AUGER REFUSAL	HL - HIGHLY	M - MOISTURE CONTENT	BT - BORING TERMINATED	MD - MEDIUM	V - VERY	CL - CLAY	MICA - MICACEOUS	VST - VANE SHEAR TEST	CPT - CONE PENETRATION TEST	MOD - MODERATELY	WEA - WEATHERED	CSE - COARSE	NP - NON PLASTIC	γ - UNIT WEIGHT	DMT - DILATOMETER TEST	ORG - ORGANIC	γ _d - DRY UNIT WEIGHT	DPT - DYNAMIC PENETRATION TEST	PMT - PRESSUREMETER TEST		o - VOID RATIO	SAP - SAPROLITIC		F - FINE	SD - SAND, SANDY		FOSS - FOSSILIFEROUS	SL - SILT, SILTY		FRAC - FRACTURED, FRACTURES	SLI - SLIGHTLY		FRAGS - FRAGMENTS	TCR - TRICONE REFUSAL		<p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT CAN BE GROUDED 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.</p> <p>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.</p> <p style="text-align: center;">ROCK HARDNESS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> <p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>		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 FEET	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
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<p style="text-align: center;">PLASTICITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NONPLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table> <p style="text-align: center;">COLOR</p> <p>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.</p>		NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH	LOW PLASTICITY	0-5	VERY LOW	MED. PLASTICITY	6-15	SLIGHT	HIGH PLASTICITY	16-25	MEDIUM		26 OR MORE	HIGH	<p style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td> <p>DRILL UNITS:</p> <input type="checkbox"/> MOBILE B- _____</td> <td> <p>ADVANCING TOOLS:</p> <input type="checkbox"/> CLAY BITS <input checked="" type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/8" * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT</td> <td> <p>HAMMER TYPE:</p> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td> <p>CORE SIZE:</p> <input type="checkbox"/> -B _____ <input type="checkbox"/> -N _____ <input type="checkbox"/> -H _____</td> <td> <p>HAND TOOLS:</p> <input checked="" type="checkbox"/> POST HOLE DIGGER <input checked="" type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</td> <td></td> </tr> </table>		<p>DRILL UNITS:</p> <input type="checkbox"/> MOBILE B- _____	<p>ADVANCING TOOLS:</p> <input type="checkbox"/> CLAY BITS <input checked="" type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 1/8" * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG-CARB. <input type="checkbox"/> CORE BIT	<p>HAMMER TYPE:</p> <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<p>CORE SIZE:</p> <input type="checkbox"/> -B _____ <input type="checkbox"/> -N _____ <input type="checkbox"/> -H _____	<p>HAND TOOLS:</p> <input checked="" type="checkbox"/> POST HOLE DIGGER <input checked="" type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST																																																																																																																														
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<p style="text-align: center;">BENCH MARK:</p> <p style="text-align: right;">ELEVATION: _____ FT.</p>		<p style="text-align: center;">NOTES:</p>																																																																																																																																																			

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

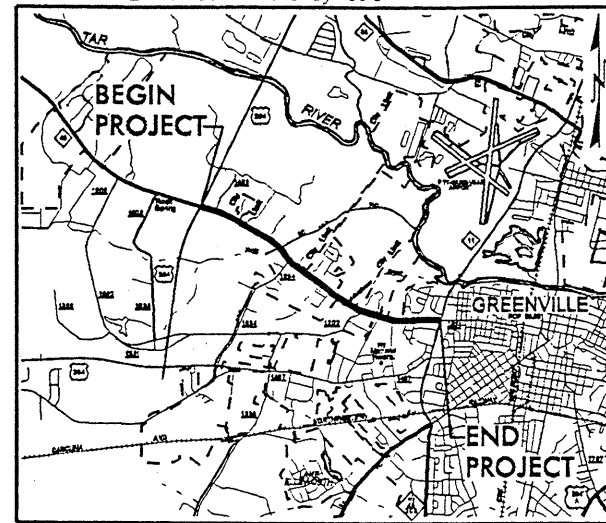
PITT COUNTY

LOCATION: NC 43 FROM US 264 TO NC 11

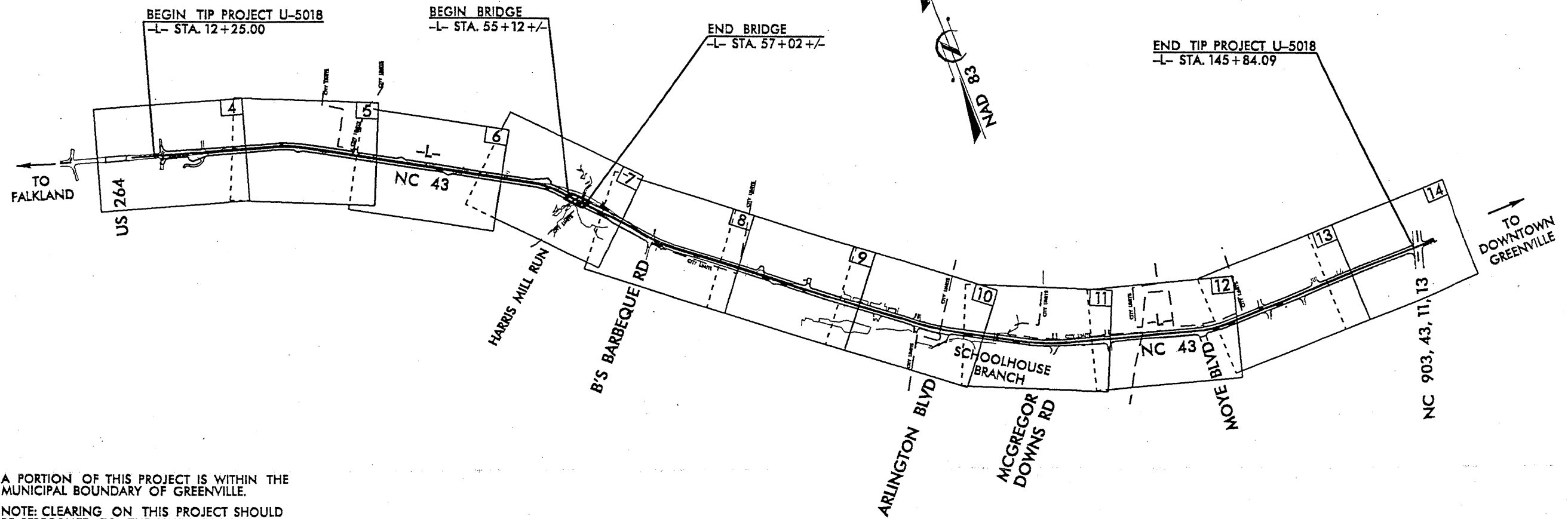
TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE

STATE	STATE PROJECT APPROPRIATION NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5018	2A	
ITEM NO.	F.A. PROJ. NO.	DESCRIPTION	
41431.1.1	STP-0043(8)	P.E.	
41431.3.1	STP-0043(8)	CONST.	

CONTRACT: C201904 **TIP PROJECT: U-5018**



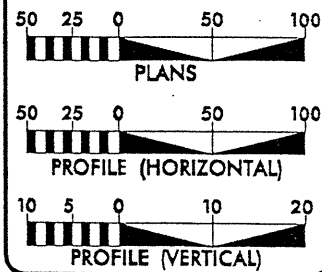
VICINITY MAP



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARY OF GREENVILLE.

NOTE: CLEARING ON THIS PROJECT SHOULD BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

GRAPHIC SCALES



DESIGN DATA

ADT 2007 = 19,700
ADT 2029 = 40,600
DHV = 10 %
D = 50 %
T = 6 % *
V = 50 MPH
(* TTST 2 % + DUAL 4 %)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5018 = 2.494 MILES
LENGTH STRUCTURE TIP PROJECT U-5018 = 0.036 MILES
TOTAL LENGTH TIP PROJECT U-5018 = 2.530 MILES

Prepared In the Office of:
MULKEY
ENGINEERS & CONSULTANTS
FOR
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
???????

LETTING DATE:
AUGUST 19, 2008

NCDOT CONTACT: JOHN ROUSE

TIM JORDAN, PE
PROJECT ENGINEER

JEFF RECK, PE
HYDRAULICS ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER P.E.

01-AUG-2008 09:01
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

August 11, 2008

STATE PROJECT: 41431.1.1 (U-5018)
F.A. PROJECT: STP-0043 (8)
COUNTY: Pitt

DESCRIPTION: NC 43 from US 264 to NC 11 (Memorial Drive)

SUBJECT: Geotechnical Inventory

Project Description

The project area lies just west of the city of Greenville along existing NC 43, beginning east of the intersection of US 264 Bypass and NC 43, (Sta. 12+25), and extending eastward approximately 2.5 miles to the intersection of NC 43 and NC 11 (Sta. 145+84.) This project consists primarily of the widening of existing NC 43 from two lanes to four, with medians and turn lanes. This will be accomplished through the addition of a new travel lane to the north and south of existing NC 43 from Sta. 12+25 to Sta. 80+00. NC 43 will be realigned to the south from Sta. 51+00 to 63+50 to accommodate the bridge construction. Additionally, slight widening and resurfacing is proposed from Sta. 80+00 to Sta. 145+84. Limited subsurface information was collected from station 80+00 to 145+84 due to the scope of proposed construction.

The geotechnical field investigation was completed from April to June of 2008. Borings were advanced with a track mounted Diedrich D-50 drill machine with an automatic hammer. Standard penetration tests were performed in selected borings. Hand auger borings were also completed. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignment was investigated. Subsurface profiles and selected cross sections of this alignment are included in this report.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
Fax: 919-250-4237
Website: www.ncdot.org/doh

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

<u>Line</u>	<u>Station (±)</u>
-L-	12+25 to 145+84

Areas of Special Geotechnical Interest

- 1) The following sections contain cohesive soils which have the potential to cause embankment stability and/or long term settlement problems:

<u>Line</u>	<u>Station (±)</u>
-L-	13+50 to 59+75
-L-	62+75 to 65+25
-L-	67+25 to 68+75
-L-	71+25 to 73+75
-L-	77+75 to 82+00

- 2) The following sections were found to exhibit seasonal high ground water, or the potential for ground water related construction problems:

<u>Line</u>	<u>Station (±)</u>
-L-	13+75 to 18+25
-L-	20+25 to 21+00
-L-	27+50 to 37+50
-L-	39+50 to 53+00
-L-	54+50 to 57+00
-L-	65+50 to 82+00

Physiography and Geology

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project varies from nearly flat to moderately sloping and generally exhibits adequate surface drainage. Elevations ranged from 55± to 90± feet in upland areas to 20± to 55± feet in the flood plains. Surface waters from this area flow southeast into the various tributaries of Harris Mill Run, and ultimately into the Tar River.

Surficial soils in this area are generally derived from alluvial deposition and the weathering of existing formational material. Alluvial soils are restricted to areas in and around Harris Mill Run. These soils were not encountered during this roadway investigation. The upland sections are composed primarily of oxidized formational soils. These surface units are underlain by the Pliocene marine deposits of the Yorktown Formation and Cretaceous deposits of the Peedee Formation.

Ground Water

Ground water data was collected during April, May, June and August 2008, during a time of below normal precipitation. Ground water elevations ranged from 50± to 73± feet in upland areas to 18± to 50± feet in the flood plains.

Soils

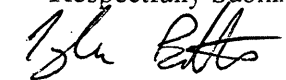
Soils within this project area have been divided into three categories, upland soils, formational soils, and roadway embankment soils.

Upland soils within this project area have been derived from weathering of the underlying formational material. These soils are characterized by various degrees of oxidation, and primarily consist of 2± or more feet of soft to stiff sandy silt and sandy clayey silt (A-4). These units typically have greater than 50 percent passing the no. 200 sieve and exhibit non-plastic to low plastic characteristics. These soils have a natural moisture content of about 34 percent. Alternating with these silt rich horizons are 1± to 8 or more feet of soft to stiff sandy clay and silty clay (A-6, A-7-6). These soils generally have more than 50 percent passing the no. 200 sieve and exhibit low to medium plastic characteristics. These cohesive units have a natural moisture content of 14 to 38 percent. Scattered within these silty and clayey units, localized sand rich horizons have been identified. Typically, these units consist of 1± to 8 or more feet of loose to medium dense sand and silty sand (A-2-4, A-3).

Formational soils encountered belong to the Pliocene age Yorktown Formation and Cretaceous age Peedee Formation. The Yorktown Formation is composed of 15 or more feet of medium dense silty sand (A-2-4), and 5 or more feet of medium dense sandy silt (A-4) layers. The Peedee Formation is composed of 15 or more feet of stiff to very stiff sandy silt and silty clay (A-4, A-7-6). The cohesive units found within this formation have greater than 50 percent passing the no. 200 sieve and exhibit low to medium plasticity indices.

Roadway Embankment material was generally encountered along existing NC 43 and consists of 1± to 7± feet of medium stiff sandy and silty clay (A-6, A-7-6) and 2± feet of loose silty sand (A-2-4).

Respectfully Submitted,



Tyler Bottoms
Engineering Geologist I

PROJECT NO. : U-5018B

COUNTY: PITT

EARTHWORK BALANCE SHEET

38/55

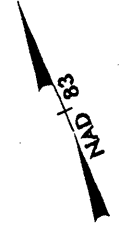
LOCATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
	TOTAL EXCAVATION	ROCK	UNDERCUT	UNSUITABLE	SUITABLE	TOTAL EMBANKMENT	ROCK	EARTH EMBANKMENT	EMBANKMENT PLUS 25%		ROCK	SUITABLE	UNSUITABLE	TOTAL
-L-														
60+50.00 TO 90+50.00	7225		4100	3000	4225	1456		1456	1820			2405	7100	9505
90+50.00 TO 120+50.00	1345				1345	64		64	80			1265		1265
120+50.00 TO 145+84.09	566				566							566		566
TOTAL	9136		4100	3000	6136	1520		1520	1900			4236	7100	11336
ADDITIONAL UNDERCUT			200										200	200
PROJECT TOTAL	9136		4300	3000	6136	1520		1520	1900			4236	7300	11536
GRAND TOTAL	9136													
SAY	9300													

EST. DDE = 75 CY
 EST. FABRIC FOR SOIL STABILIZATION = 4550 SY
 EST. SELECT GRANULAR MATERIAL = 4550 CY
 EST. SELECT MATERIAL, CLASS IV = 250 TON
 EST. SHOULDER BORROW = 60 CY

EMBANKMENT DOES NOT INCLUDE BACKFILL FOR UNDERCUT.
 SELECT GRANULAR MATERIAL WILL BE USED TO BACKFILL UNDERCUT AS PER GEOTECHNICAL REPORT DATED APRIL 2, 2009.
Earthwork quantities are calculated by Division 2. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

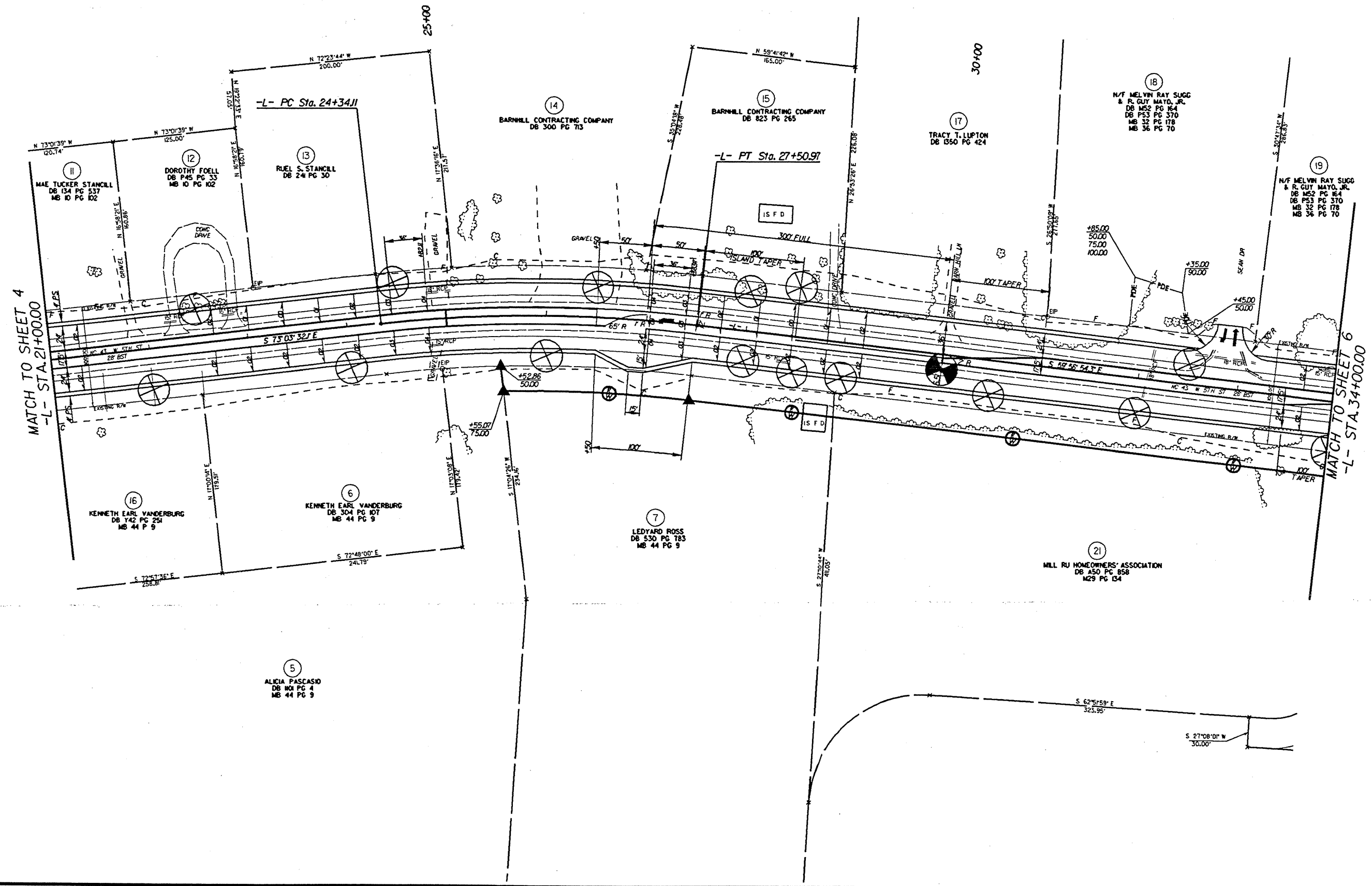
5/28/99

-L-
 PI Sta 25+93.23
 $\Delta = 13^{\circ}08'37.8''$ (RT)
 $D = 408'15.5''$
 $L = 316.86'$
 $T = 159.12'$
 $R = 1384.74'$
 $SE = 04'$
 $RO = 144'$



MULKEY
 ENGINEERS & CONSULTANTS
 1000 W. 11th St.
 11100 Ballisville Road
 www.mulkey.com

PROJECT REFERENCE NO. U-5018	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
FOR -L- PROFILE SEE SHEET 15	



REVISIONS

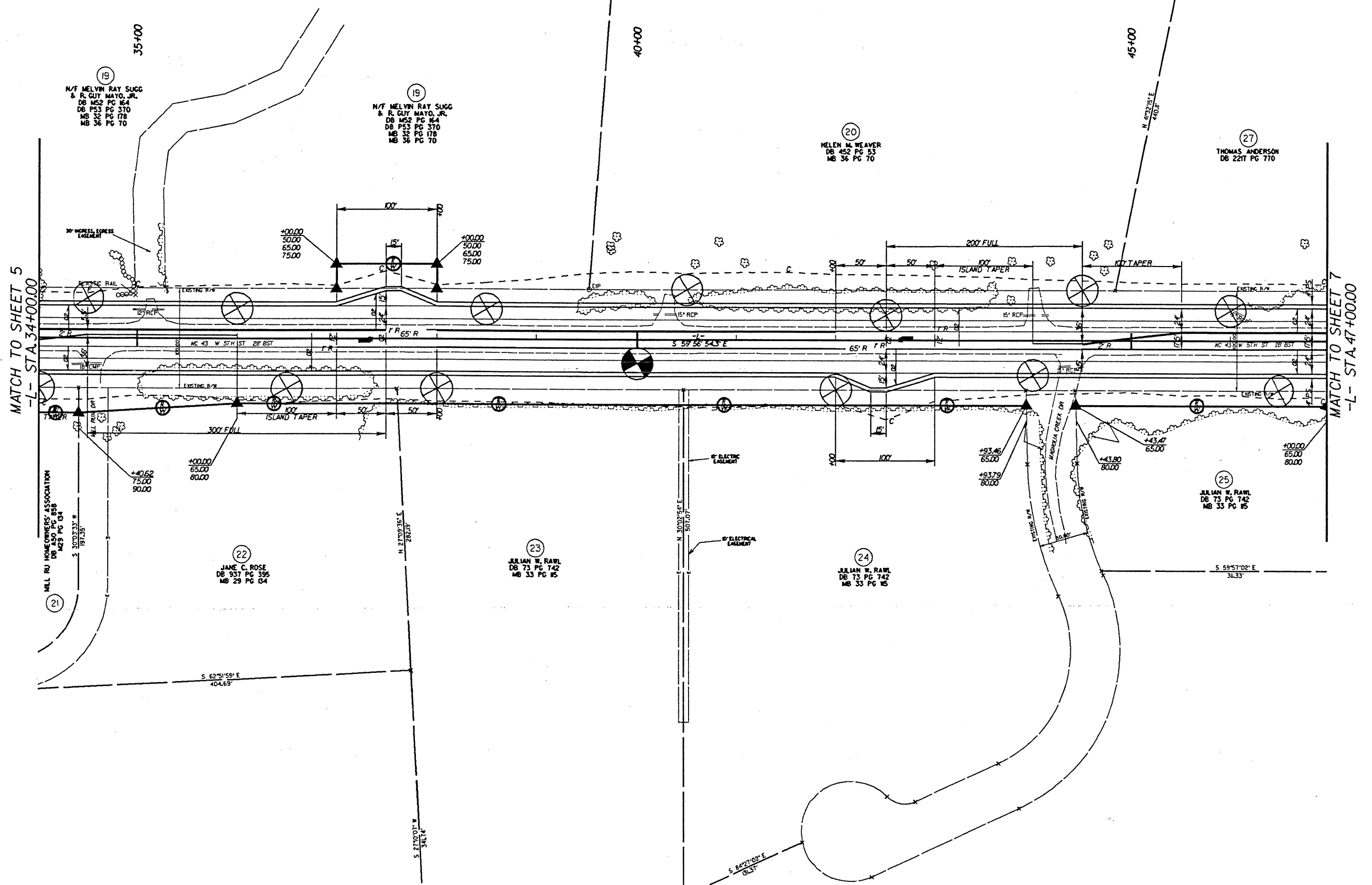
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5/28/09



PROJECT REFERENCE NO. U-5018	SHEET NO. 6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

FOR -L- PROFILE SEE SHEET 16



REVISIONS

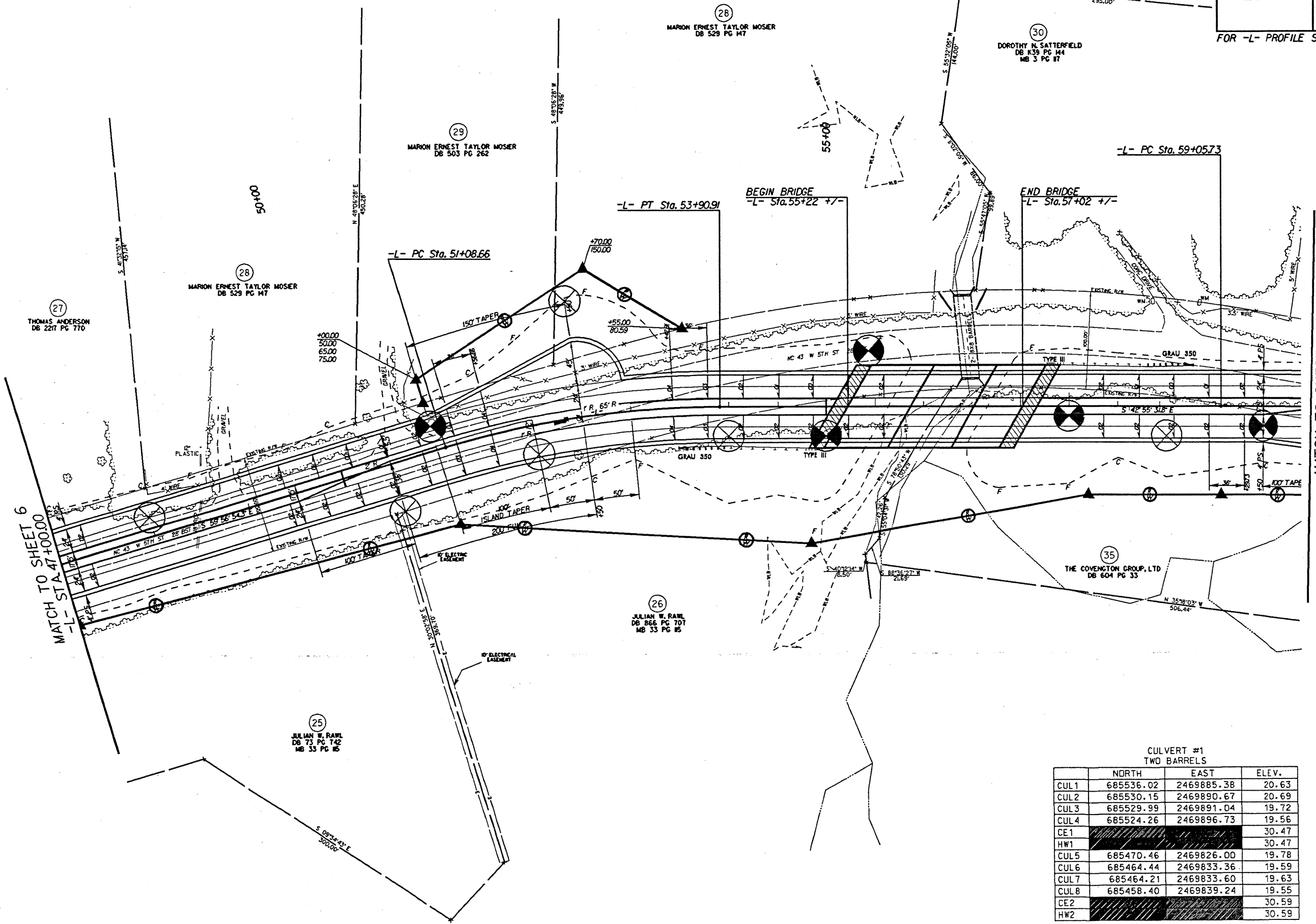
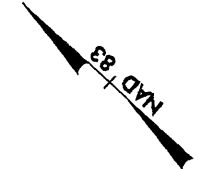
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5/28/08

MULKEY
ENGINEERS & CONSULTANTS
10000 W. 11th St.
Suite 100
Denver, CO 80202
303.751.1111
www.mulkey-engineers.com

PROJECT REFERENCE NO. U-5018	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
FOR -L- PROFILE SEE SHEET 16	

-L-
 PI Sta 52+50.83 PI Sta 61+27.90
 $\Delta = 17^{\circ} 22.4' (RT)$ $\Delta = 5^{\circ} 09' 00.9' (RT)$
 $D = 6^{\circ} 0' 52.1''$ $D = 1^{\circ} 09' 35.4''$
 $L = 282.25'$ $L = 444.05'$
 $T = 142.17'$ $T = 222.17'$
 $R = 950.00'$ $R = 4940.00'$
 $SE = 04$ $SE = 02$
 $RO = 144'$ $RO = 72'$



REVISIONS

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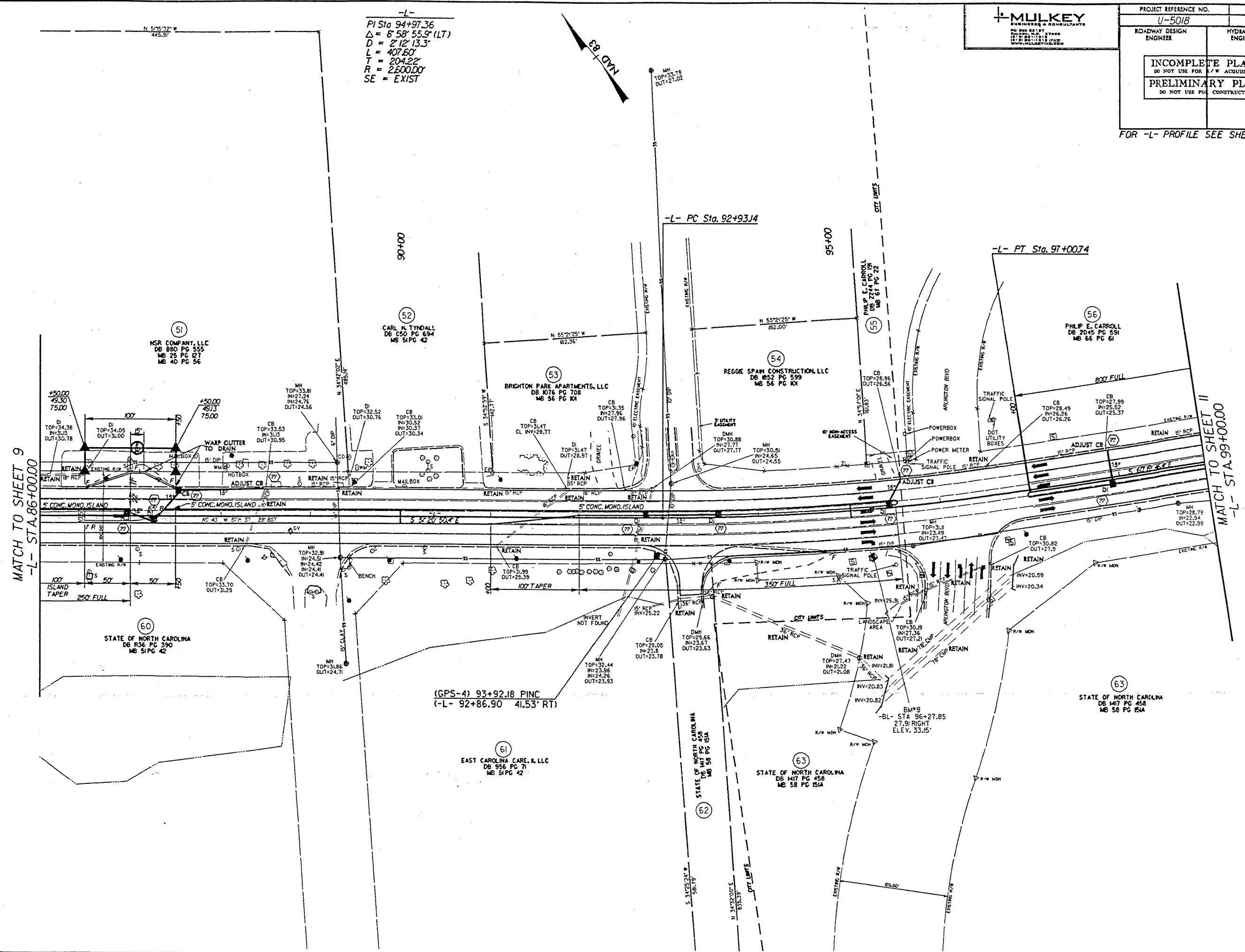
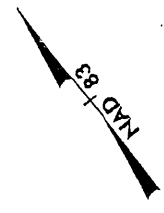
MATCH TO SHEET 6
 -L- STA. 47+00.00

MATCH TO SHEET 8
 -L- STA. 60+00.00

CULVERT #1
TWO BARRELS

	NORTH	EAST	ELEV.
CUL1	685536.02	2469885.38	20.63
CUL2	685530.15	2469890.67	20.69
CUL3	685529.99	2469891.04	19.72
CUL4	685524.26	2469896.73	19.56
CE1			30.47
HW1			30.47
CUL5	685470.46	2469826.00	19.78
CUL6	685464.44	2469833.36	19.59
CUL7	685464.21	2469833.60	19.63
CUL8	685458.40	2469839.24	19.55
CE2			30.59
HW2			30.59

-L-
PI Sta 94+97.36
 $\Delta = 8' 58'' 55.9'' (LT)$
 $D = 2' 12'' 13.3''$
 $L = 407.60'$
 $T = 204.22'$
 $R = 2,600.00'$
SE = EXIST



REVISIONS

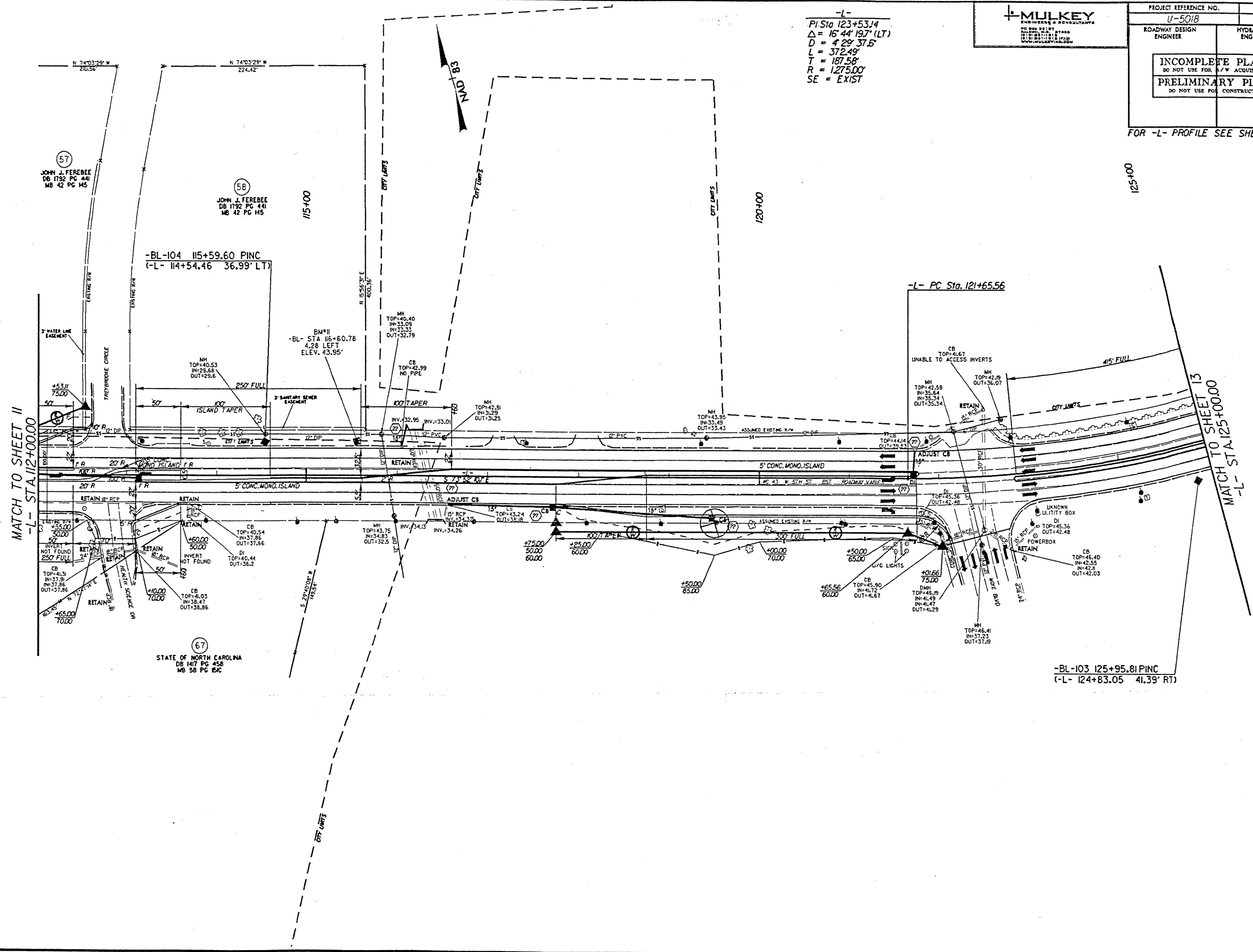
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5/28/09



PROJECT REFERENCE NO. U-5018	SHEET NO. 12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
FOR -L- PROFILE SEE SHEET 19	

-L-
 PI Sta 123+53.14
 $\Delta = 16' 44' 19.7"$ (LT)
 $D = 4' 29' 37.5"$
 $L = 372.49'$
 $T = 187.58'$
 $R = 1275.00'$
 SE = EXIST



REVISIONS

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-BL-103 125+95.81 PINC
 (-L- 124+83.05 41.39' RT)

5/29/99
-L- AUG-2008 10:03
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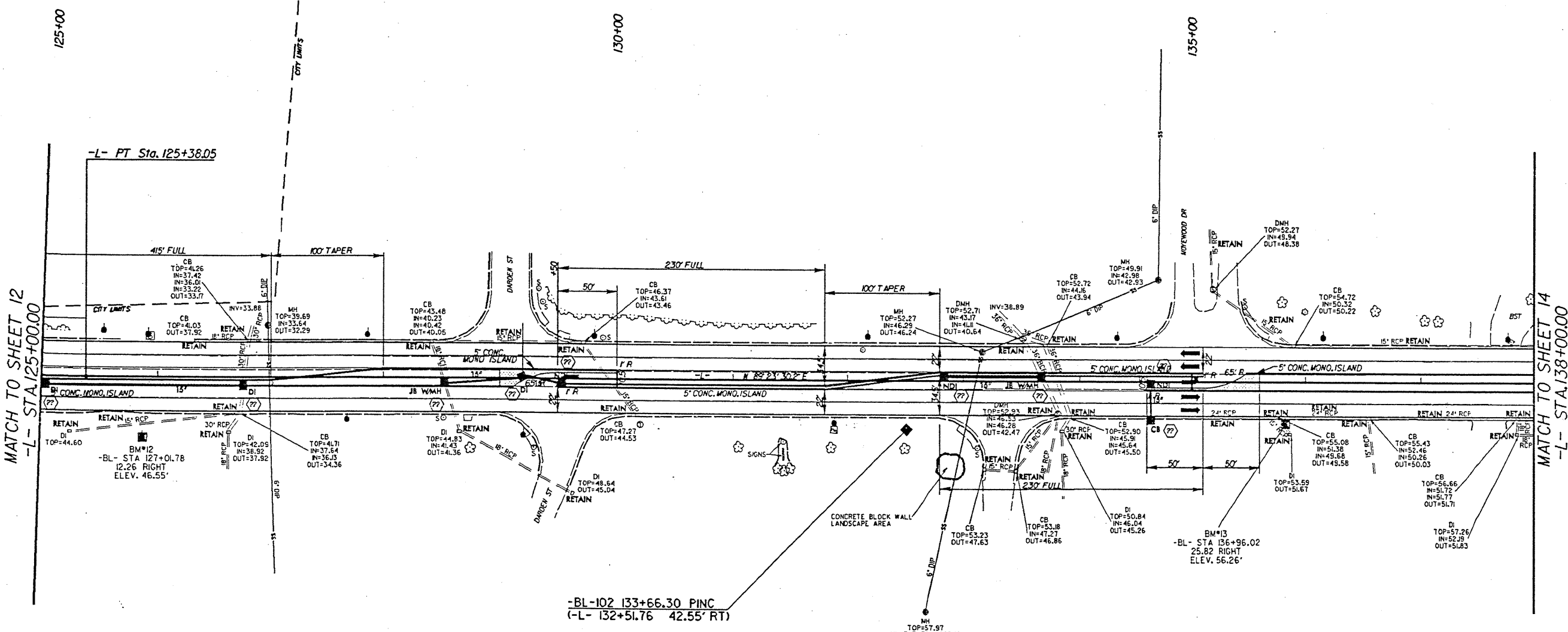
-L-
PI Sta 123+53.14
 $\Delta = 16' 44" 19.7" (LT)$
 $D = 4' 29" 37.6"$
 $L = 372.49'$
 $T = 187.58'$
 $R = 1,275.00'$
SE = EXIST

NAD 83

MULKEY
ENGINEERS & CONSULTANTS
1000 BELLEVUE BLVD, SUITE 200
BELLEVUE, WA 98007
TEL: 206.461.1111 FAX: 206.461.1112
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. U-5018	SHEET NO. 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

FOR -L- PROFILE SEE SHEET 19



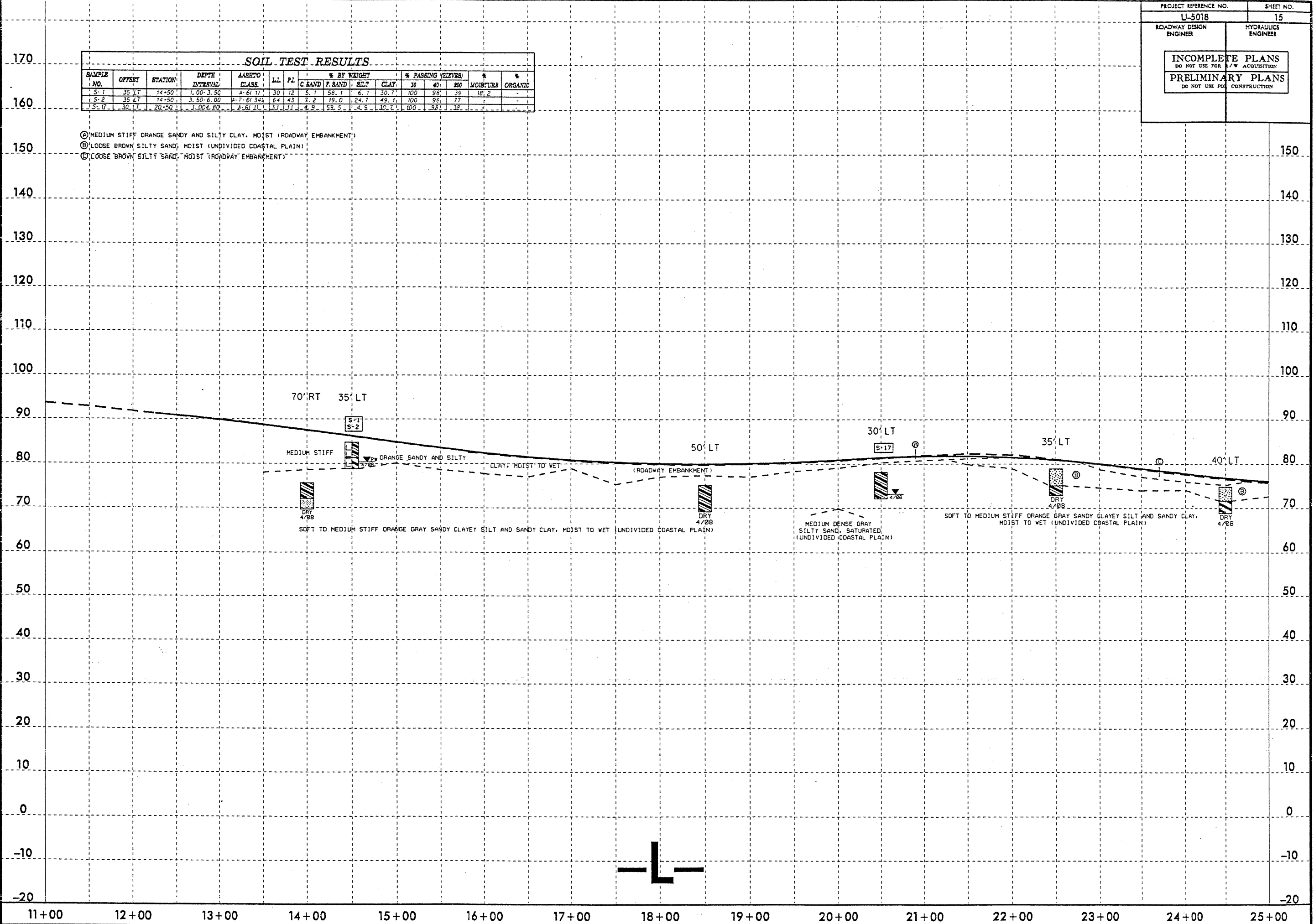
-BL-102 133+66.30 PINC
(-L- 132+51.76 42.55' RT)

BM#13
-BL- STA 136+96.02
25.82 RIGHT
ELEV. 56.26'

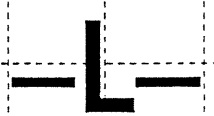
REVISIONS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	MOISTURE CLASS	LL	PL	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	#10	#40		
S-1	35' LT	14+50	1.00-3.50	A-6(1)	30	12	5.1	58.1	6.1	30.7	100	98	35	16.2
S-2	35' LT	14+50	3.50-6.00	A-7(6)3(4)	64	43	7.2	19.0	24.7	49.1	100	96	77	-
S-17	30' LT	20+50	1.00-4.00	A-6(1)	33	11	4.9	59.5	1.4	30.2	100	98	35	-

- Ⓐ MEDIUM STIFF ORANGE SANDY AND SILTY CLAY, MOIST (ROADWAY EMBANKMENT)
- Ⓑ LOOSE BROWN SILTY SAND, MOIST (UNDIVIDED COASTAL PLAIN)
- Ⓒ LOOSE BROWN SILTY SAND, MOIST (ROADWAY EMBANKMENT)



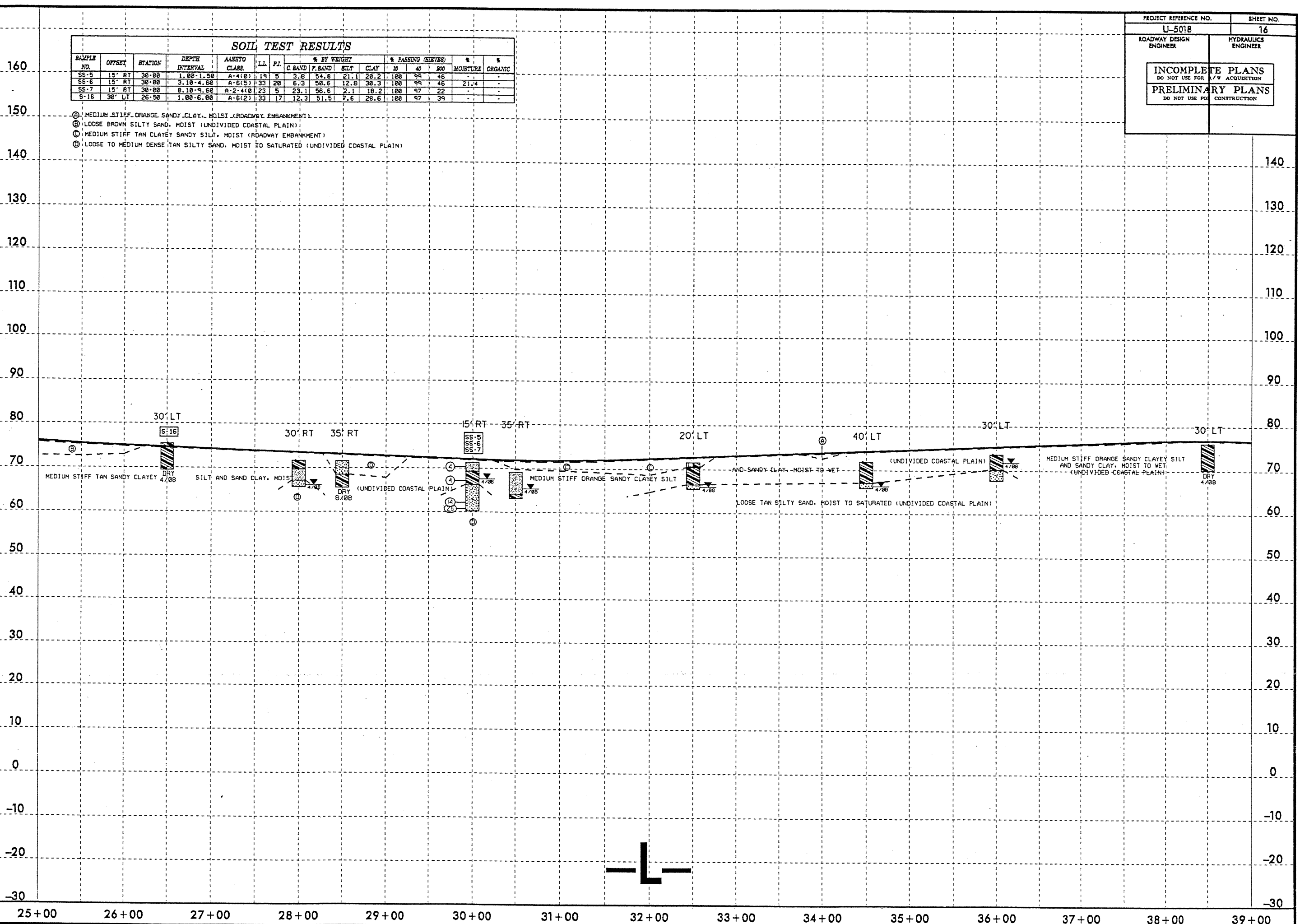
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 5/11/09



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASTO CLASS	LL	P.I.	% BY WEIGHT				% PASSING (SIZES)			MOISTURE %	ORGANIC %
							C BAND	F BAND	SLT	CLAY	10	40	200		
SS-5	15' RT	30+00	1.00-1.50	A-4(0)	19	5	3.8	54.8	21.1	20.2	100	99	46	-	-
SS-6	15' RT	30+00	3.10-4.60	A-6(5)	33	20	6.3	50.6	12.8	30.3	100	99	46	21.4	-
SS-7	15' RT	30+00	8.10-9.60	A-2-4(0)	23	5	23.1	56.6	2.1	18.2	100	97	22	-	-
S-16	30' LT	26+50	1.00-6.00	A-6(2)	33	17	12.3	51.5	7.6	28.6	100	97	39	-	-

- Ⓐ MEDIUM STIFF ORANGE SANDY CLAY, MOIST (ROADWAY EMBANKMENT)
- Ⓑ LOOSE BROWN SILTY SAND, MOIST (UNDIVIDED COASTAL PLAIN)
- Ⓒ MEDIUM STIFF TAN CLAYEY SANDY SILT, MOIST (ROADWAY EMBANKMENT)
- Ⓓ LOOSE TO MEDIUM DENSE TAN SILTY SAND, MOIST TO SATURATED (UNDIVIDED COASTAL PLAIN)

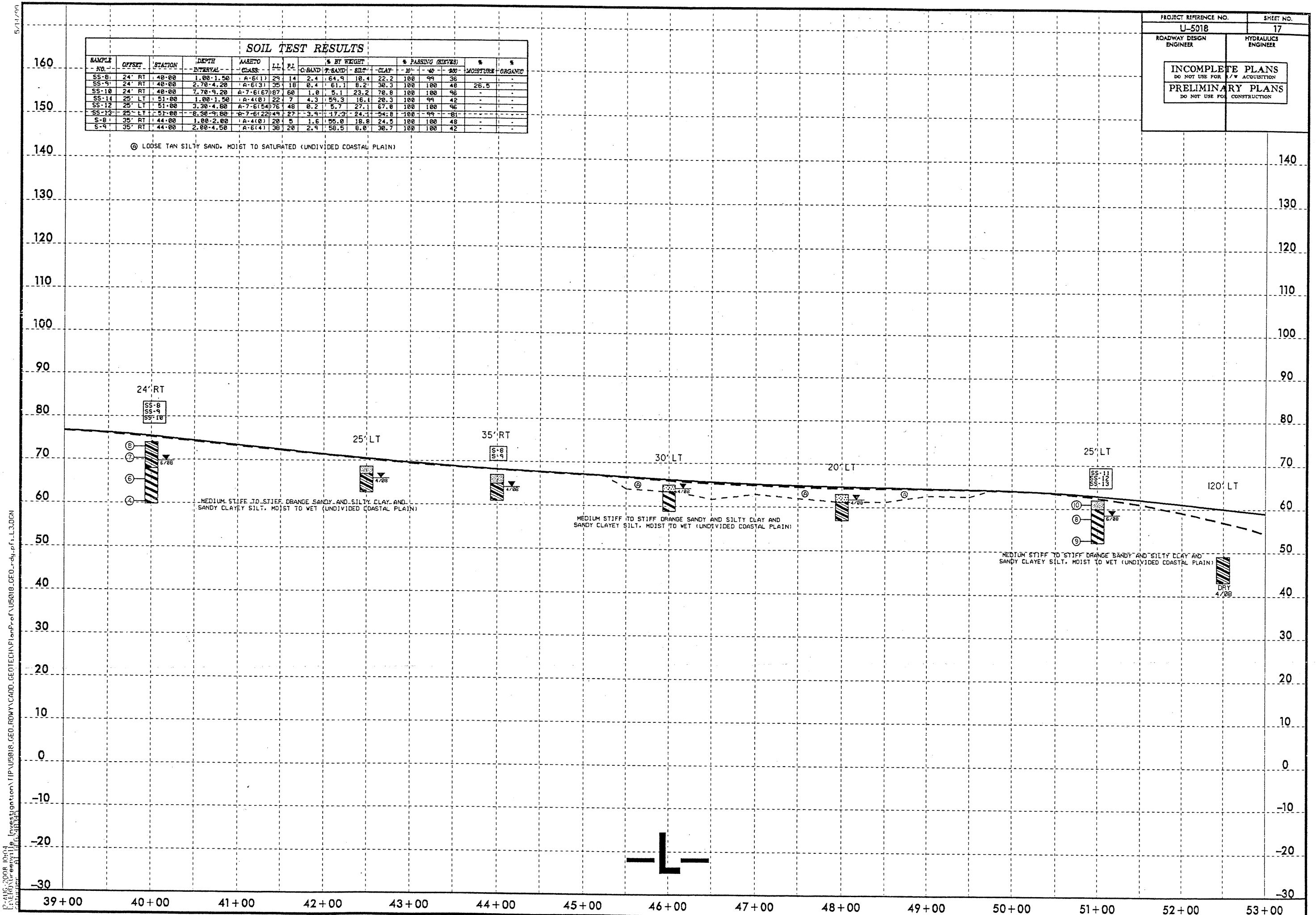
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 16



25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00 39+00

SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	SPECTRO CLASS.	LL	PL	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C-BAND	F-BAND	SLT	CLAY	10	40		
SS-8	24' RT	40+00	1.00-1.50	A-6(1)	29	14	2.4	64.9	10.4	22.2	100	99	36	-
SS-9	24' RT	40+00	2.70-4.20	A-6(3)	35	18	0.4	61.1	8.2	30.3	100	100	48	26.5
SS-10	24' RT	40+00	7.70-9.20	A-7-6(67)	87	60	1.0	5.1	23.2	70.8	100	100	96	-
SS-11	25' LT	51+00	1.00-1.50	A-4(6)	22	7	4.3	59.3	16.1	20.3	100	99	42	-
SS-12	25' LT	51+00	3.30-4.80	A-7-6(54)	76	48	0.2	5.7	27.1	67.0	100	100	96	-
SS-13	25' LT	51+00	8.30-9.80	A-7-6(22)	49	27	3.9	17.3	24.1	54.8	100	99	81	-
S-8	35' RT	44+00	1.00-2.00	A-4(6)	28	5	1.6	65.0	18.8	24.5	100	100	48	-
S-9	35' RT	44+00	2.00-4.50	A-6(4)	36	20	2.9	56.5	6.0	30.7	100	100	42	-

⊙ LOOSE TAN SILTY SAND, MOIST TO SATURATED (UNDIVIDED COASTAL PLAIN)



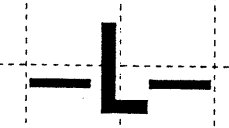
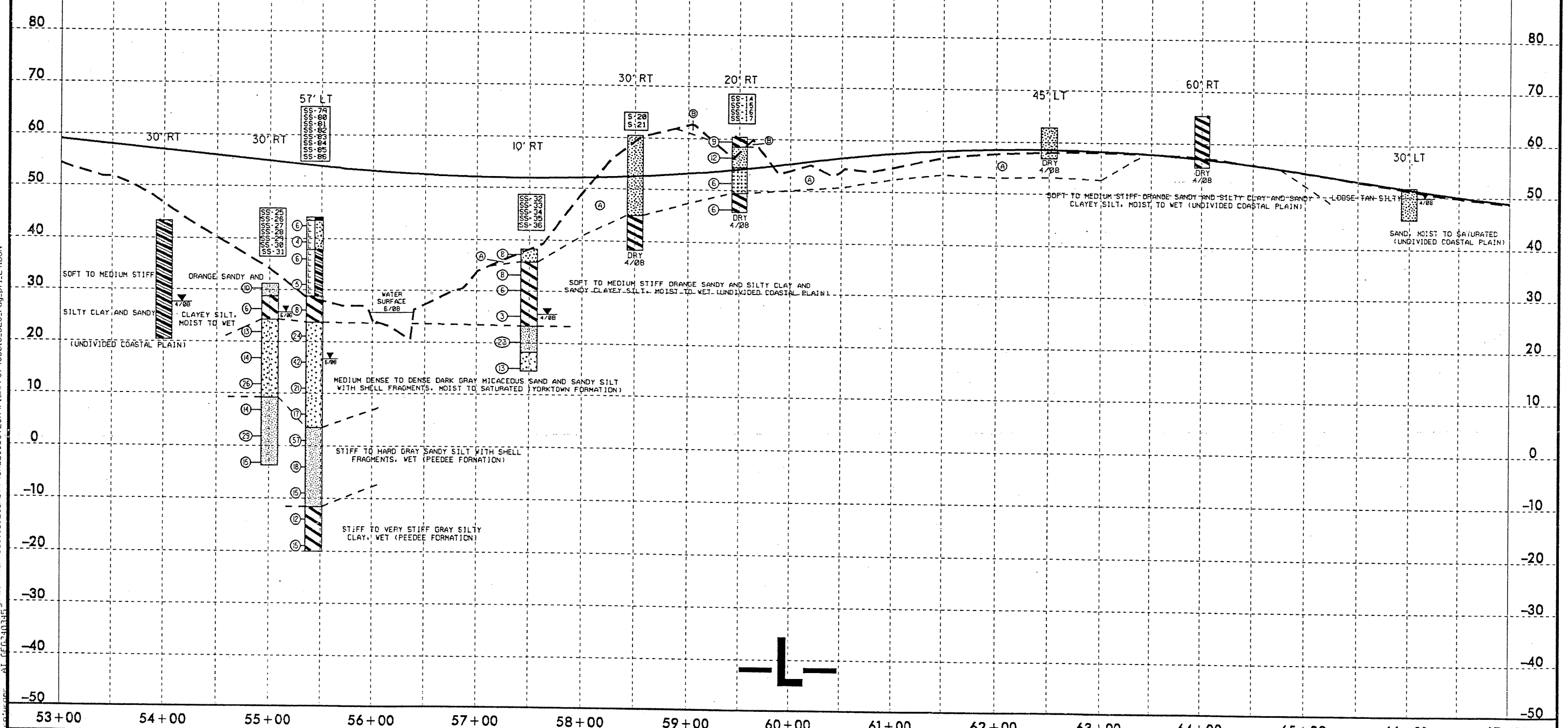
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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASHTO CLASS.	L.L.	P.L.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE %	ORGANIC %
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-14	20' RT	59+50	1.00-1.50	A-7.6(23)	54	26	3.0	18.9	19.2	58.9	100	99	81	-	-
SS-15	20' RT	59+50	3.10-4.60	A-2.4(0)	18	NP	18.1	63.6	4.2	14.2	100	96	19	-	-
SS-16	20' RT	59+50	6.10-9.60	A-3(0)	18	NP	19.3	71.0	1.6	8.1	100	98	10	-	-
SS-17	20' RT	59+50	13.10-14.60	A-7.6(28)	59	31	0.8	20.3	22.0	56.9	100	100	82	-	-
SS-25	30' RT	55+00	1.00-1.50	A-4(0)	23	5	4.4	54.2	19.1	22.2	100	99	46	-	-
SS-26	30' RT	55+00	4.00-5.50	A-7.6(32)	60	34	2.2	15.0	28.2	54.6	100	98	86	-	-
SS-27	30' RT	55+00	6.40-9.90	A-2.4(0)	18	4	50.6	24.2	16.2	9.1	98	78	26	-	-
SS-28	30' RT	55+00	13.40-14.90	A-2.4(0)	18	NP	65.0	23.5	4.4	7.1	94	61	12	-	-
SS-29	30' RT	55+00	18.40-19.90	A-2.4(0)	27	4	0.4	72.0	15.5	12.1	100	100	35	-	-
SS-30	30' RT	55+00	23.40-24.90	A-4(2)	31	7	2.6	64.5	14.7	18.2	100	98	52	34	-
SS-31	30' RT	55+00	28.40-29.90	A-4(1)	29	5	0.2	70.2	17.5	12.1	100	100	59	-	-
SS-79	57' LT	55+43	1.00-2.00	A-2.4(0)	18	2	6.9	63.5	11.2	18.3	98	95	93	-	-
SS-80	57' LT	55+43	7.10-8.60	A-6(4)	35	18	7.7	51.9	9.8	30.5	100	98	43	-	-
SS-81	57' LT	55+43	17.10-18.60	A-7.6(23)	53	26	3.5	18.5	21.0	57.0	100	98	61	-	-
SS-82	57' LT	55+43	22.10-23.60	A-2.4(0)	25	8	52.7	28.5	4.5	14.3	77	52	16	-	-
SS-83	57' LT	55+43	32.10-33.60	A-2.4(0)	29	3	1.8	75.2	6.7	16.3	99	98	33	-	-
SS-84	57' LT	55+43	42.10-43.60	A-4(0)	26	NP	0.8	82.6	10.5	6.1	98	97	37	-	-
SS-85	57' LT	55+43	47.10-48.60	A-4(1)	33	6	1.4	60.7	17.5	20.4	100	99	70	-	-
SS-86	57' LT	55+43	57.10-58.60	A-7.6(47)	43	25	2.6	45.2	17.5	34.6	100	99	73	-	-
SS-32	10' RT	57+50	1.00-1.50	A-2.4(0)	18	NP	12.9	62.7	16.3	8.1	100	98	27	-	-
SS-33	10' RT	57+50	4.00-5.50	A-7.6(36)	65	42	1.4	20.4	23.6	54.6	100	99	81	30	-
SS-34	10' RT	57+50	12.10-13.60	A-7.6(23)	50	29	8.9	15.4	35.3	40.4	100	96	78	-	-
SS-35	10' RT	57+50	17.10-18.60	A-4(0)	16	2	46.3	24.0	20.6	9.1	98	82	60	-	-
SS-36	10' RT	57+50	22.10-23.60	A-2.4(0)	21	NP	57.9	26.5	6.5	9.1	90	61	16	-	-
S-20	30' RT	58+50	1.00-15.50	A-2.4(0)	21	NP	21.2	61.7	2.9	14.3	100	97	18	-	-
S-21	30' RT	58+50	15.50-22.20	A-7.6(22)	54	26	1.4	23.3	20.0	55.2	100	100	78	34.3	-

Ⓐ LOOSE TO MEDIUM DENSE TAN SILTY SAND, MOIST (UNDIVIDED COASTAL PLAIN)
 Ⓑ MEDIUM STIFF ORANGE SILTY CLAY, MOIST (UNDIVIDED COASTAL PLAIN)

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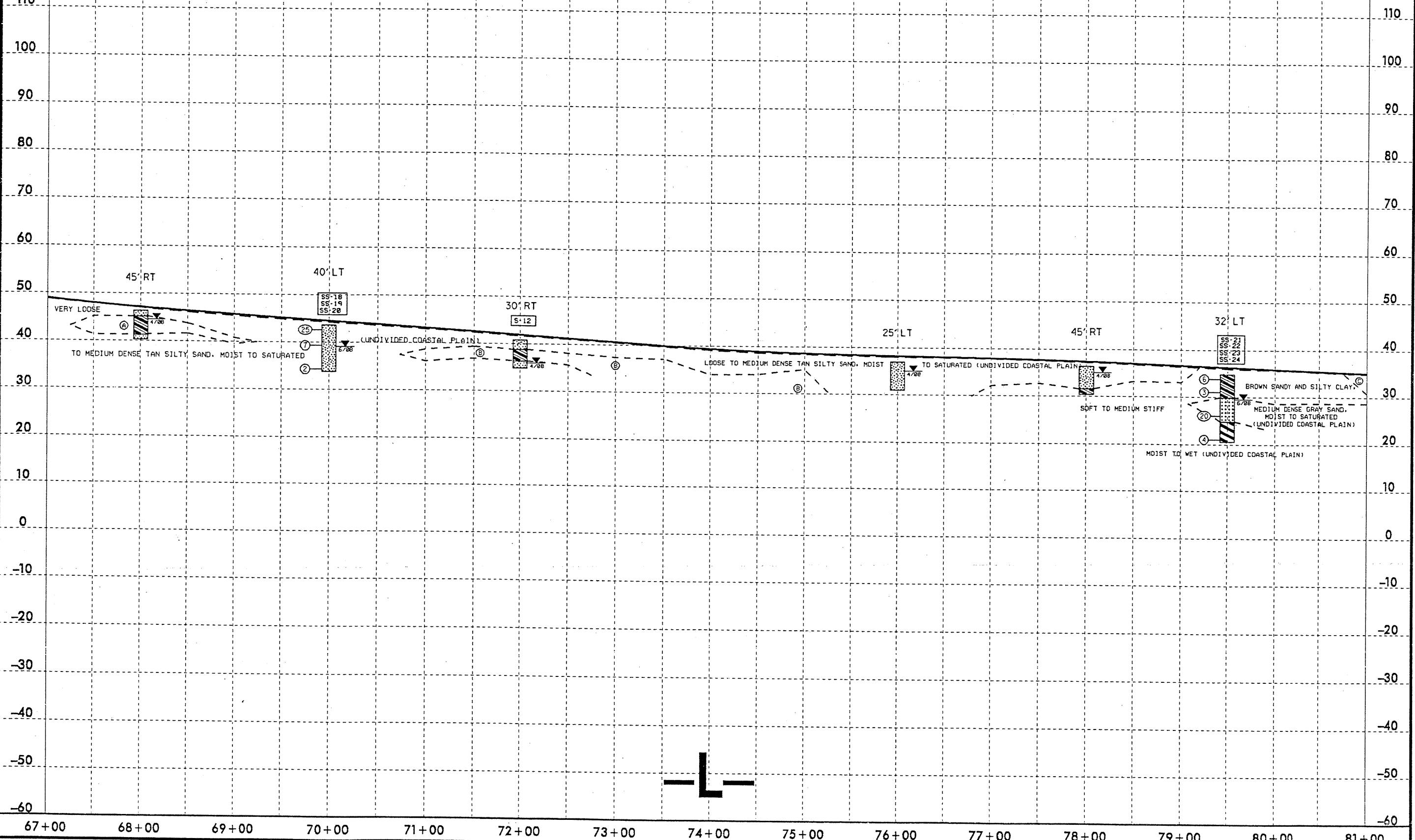
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SOIL TEST RESULTS														
SAMP. # NO.	OFFSET	STATION	DEPTH INTERVAL	CLASS	LL	PL	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C SAND	F SAND	SILT	CLAY	NO	40		
S-12	30 RT	72+00	2.00-4.50	A-6(2)	24	11	2.7	55.8	10.8	30.7	100	100	45	22.1
SS-18	40 LT	70+00	1.00-1.50	A-2-4(1)	20	21	2.8	71.6	7.0	18.3	100	100	28	-
SS-19	40 LT	70+00	3.30-4.80	A-2-4(1)	26	NP	2.5	64.8	3.5	18.2	100	100	12	-
SS-20	40 LT	70+00	8.30-9.80	A-2-4(1)	21	NP	1.3	73.2	6.0	19.3	100	100	28	-
SS-21	32 LT	79+50	1.00-1.50	A-6(5)	31	16	2.4	47.6	17.2	32.5	100	100	54	12.8
SS-22	32 LT	79+50	2.80-4.30	A-6(4)	28	18	2.6	47.6	19.0	30.5	100	100	55	-
SS-23	32 LT	79+50	7.80-9.30	A-3(1)	16	NP	46.2	49.6	2.2	2.0	100	80	6	-
SS-24	32 LT	79+50	12.80-14.30	A-7-6(14)	42	15	1.0	21.7	36.6	46.6	100	99	85	-

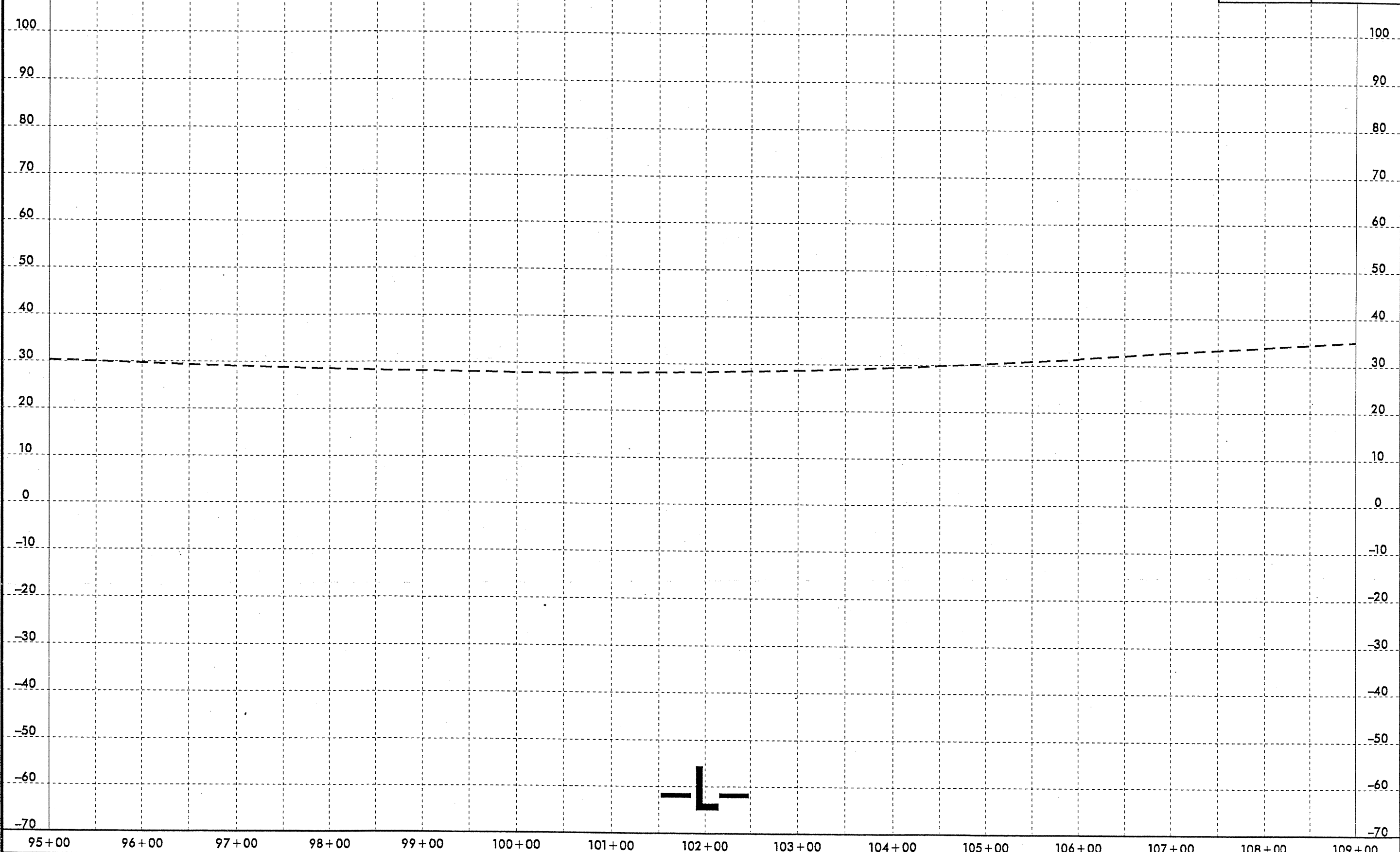
- Ⓐ MEDIUM STIFF TAN SANDY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)
- Ⓑ MEDIUM STIFF TAN SANDY CLAY, MOIST (UNDIVIDED COASTAL PLAIN)
- Ⓒ SOFT BROWN CLAYEY SANDY SILT, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

PROJECT REFERENCE NO. U-5018	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



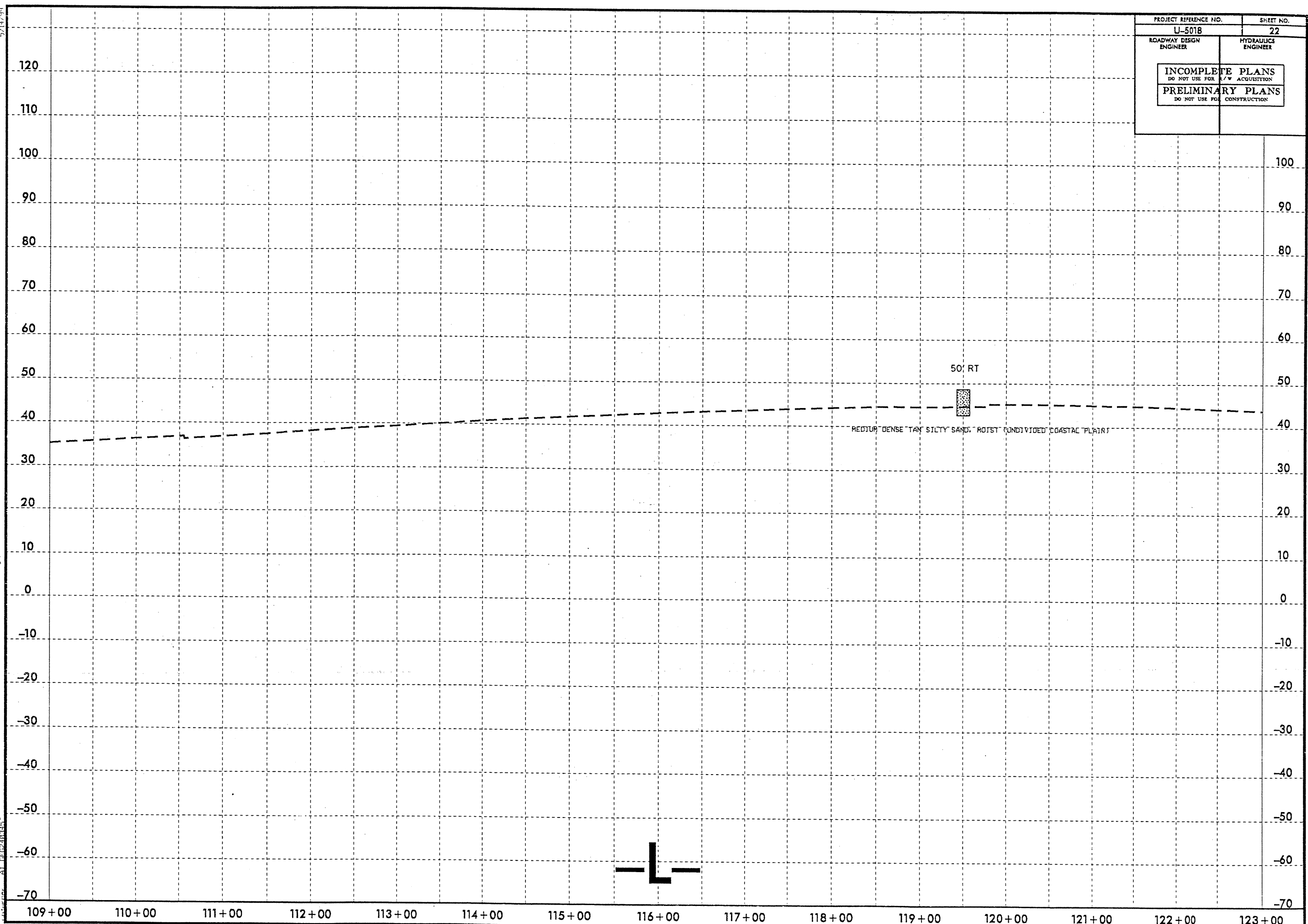
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Sheet 21 of 21

PROJECT REFERENCE NO. U-5018	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



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PROJECT REFERENCE NO. U-5018	SHEET NO. 22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



50: RT

MEDIUM DENSE TO SILTY SAND, NOT DIVIDED COASTAL PLAIN

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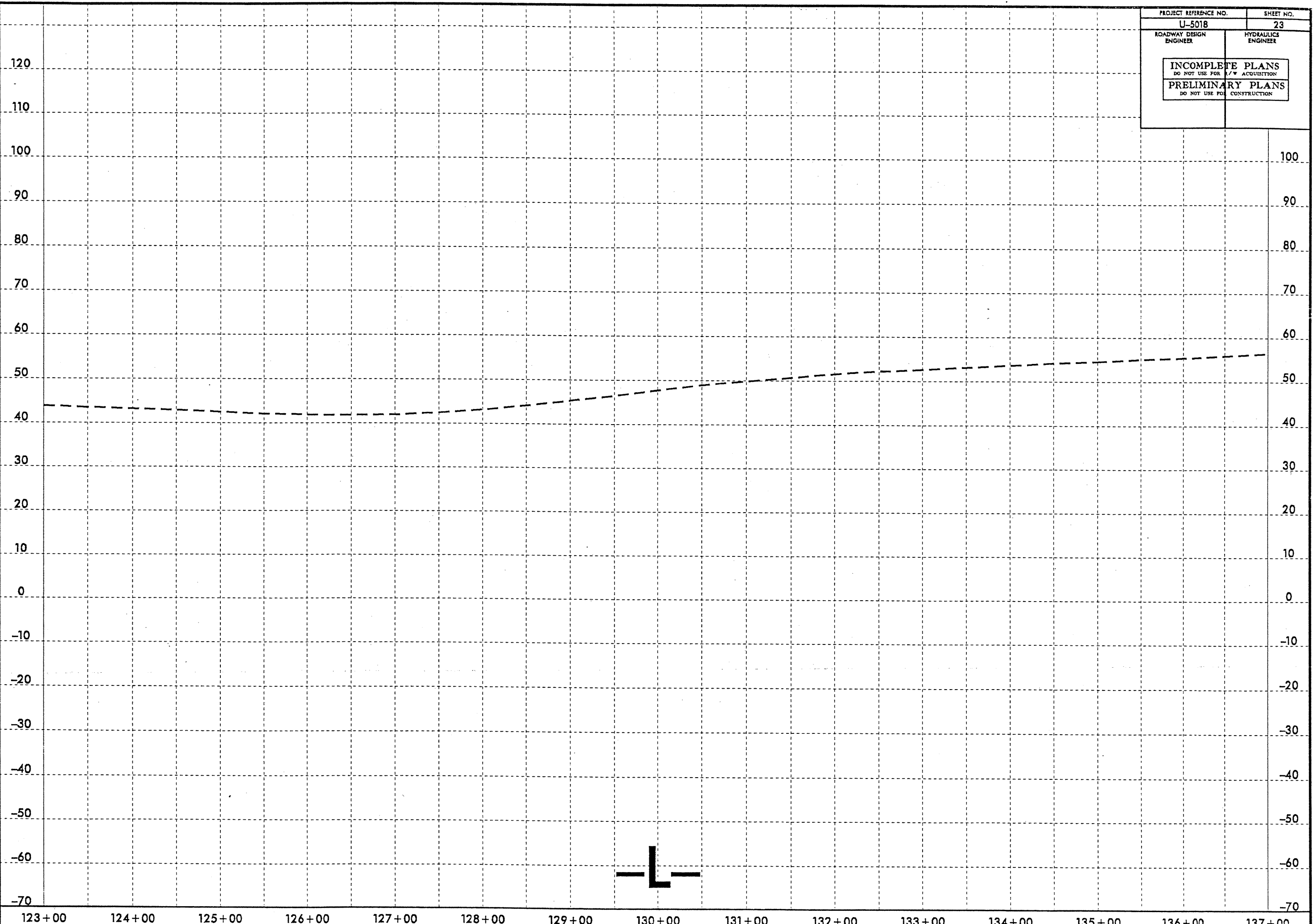
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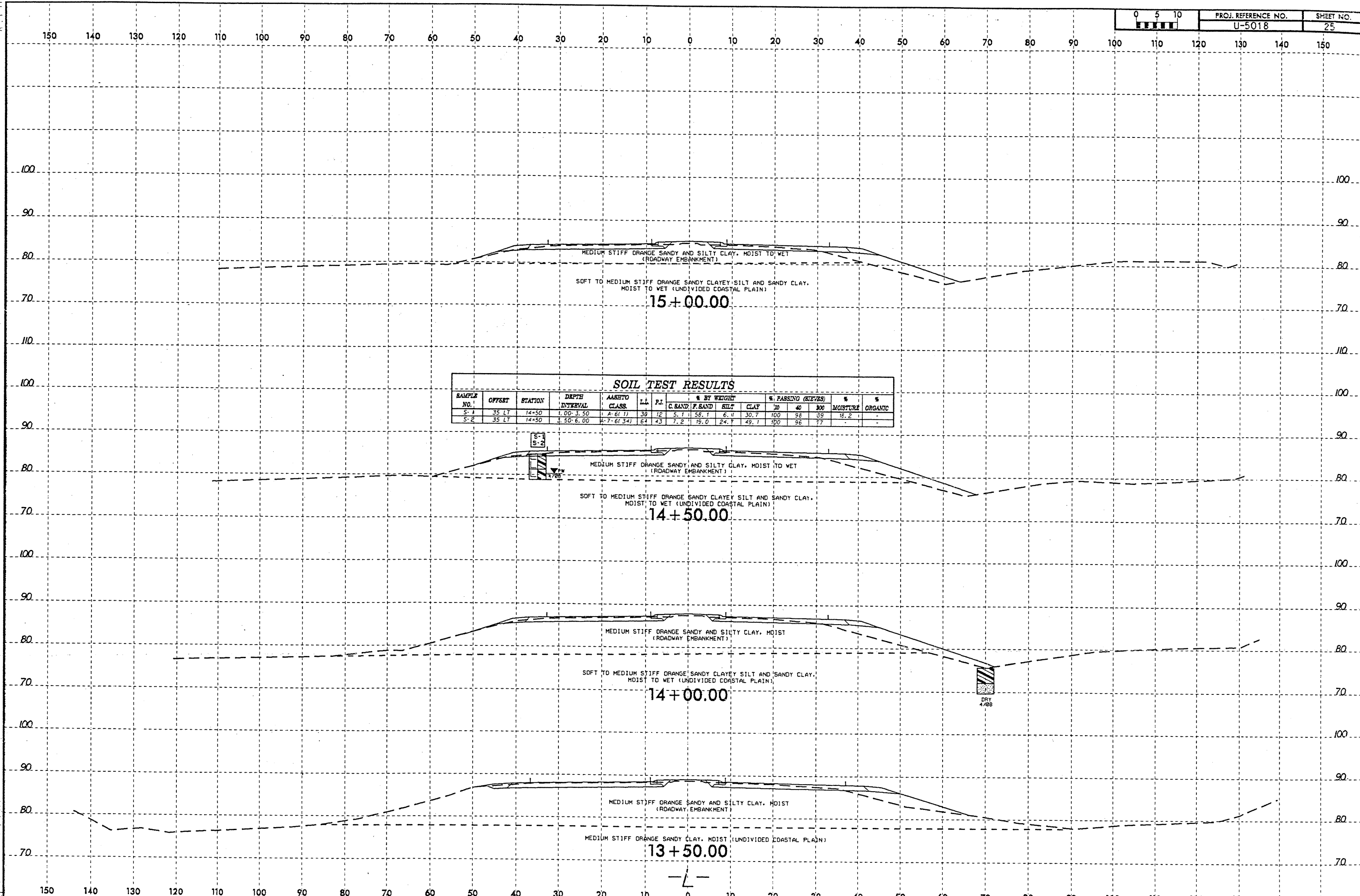
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PROJECT REFERENCE NO. U-5018	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

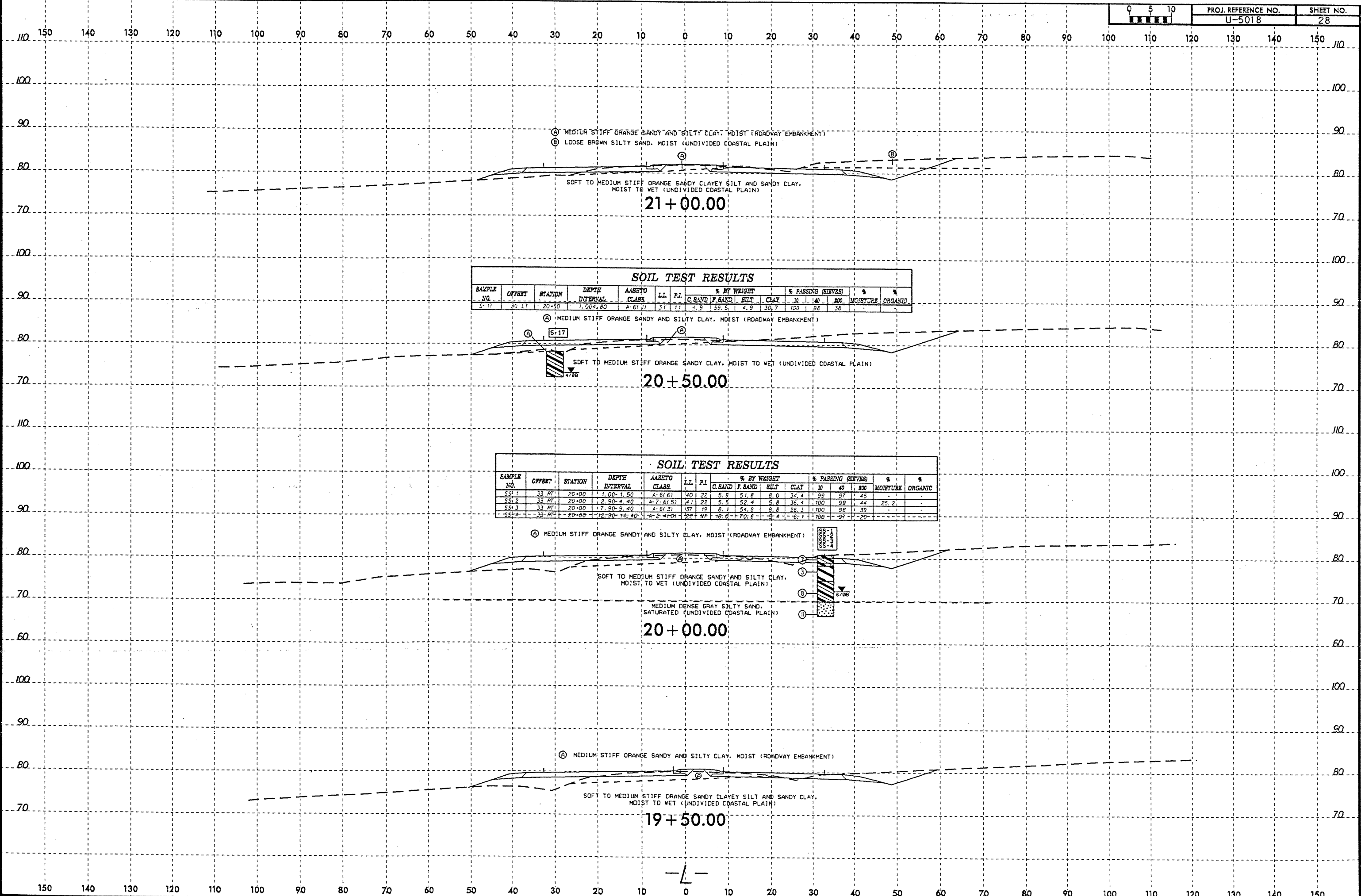




SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	LABORATORY CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	CLAY	#10	#40			
S-1	35 LT	14+50	1.00-3.50	A-6(1)	30	12	5.1	56.1	6.4	30.7	100	96	39	16.2	-
S-2	35 LT	14+50	3.50-6.00	A-7-6(34)	64	43	7.2	19.0	24.7	49.1	100	96	77	-	-

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SOIL TEST RESULTS

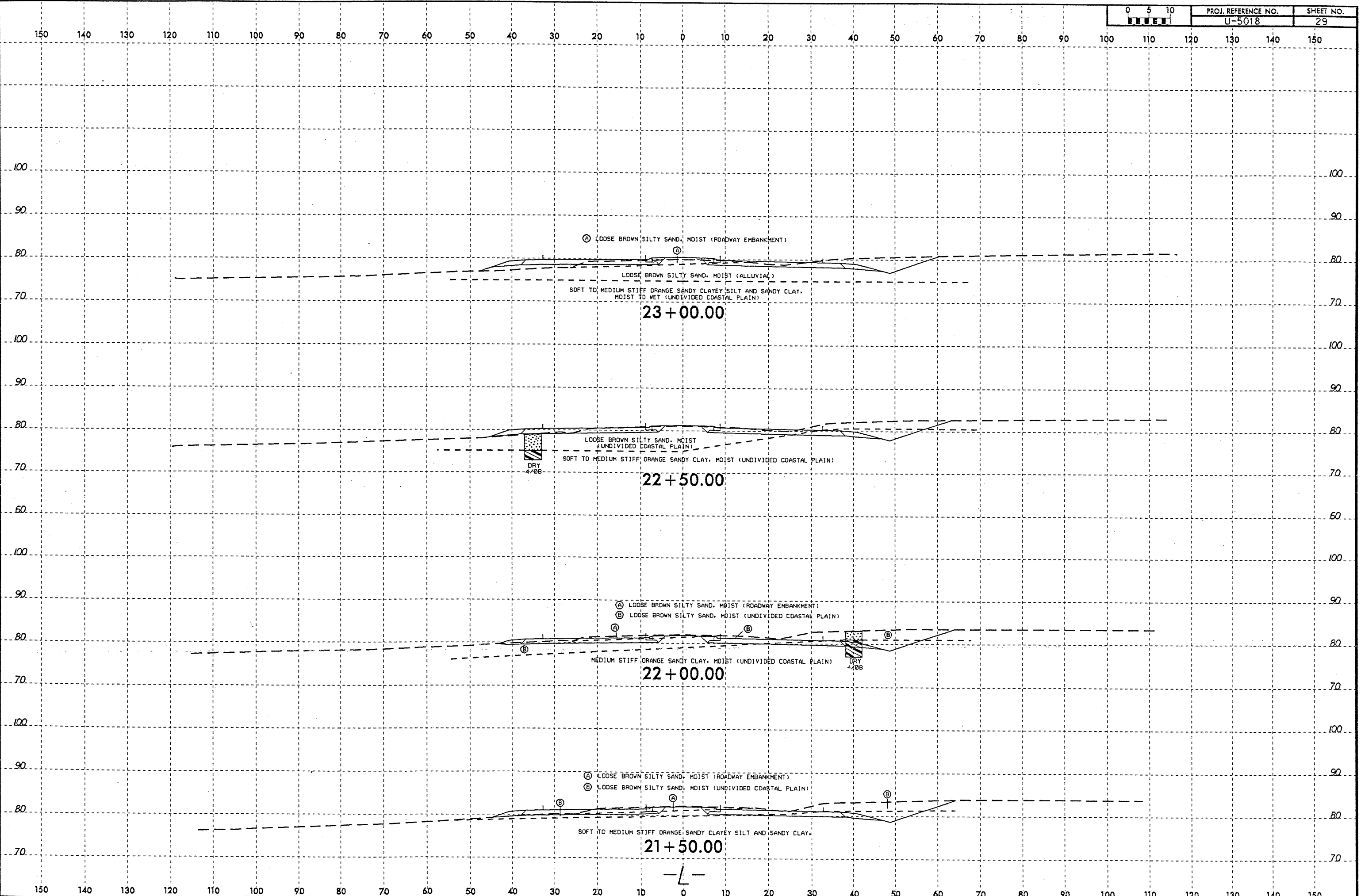
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PI	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-17	30 LT	20+50	1.00-4.00	A-6(1)	31	11	4.9	59.5	4.9	30.7	100	98	38		

SOIL TEST RESULTS

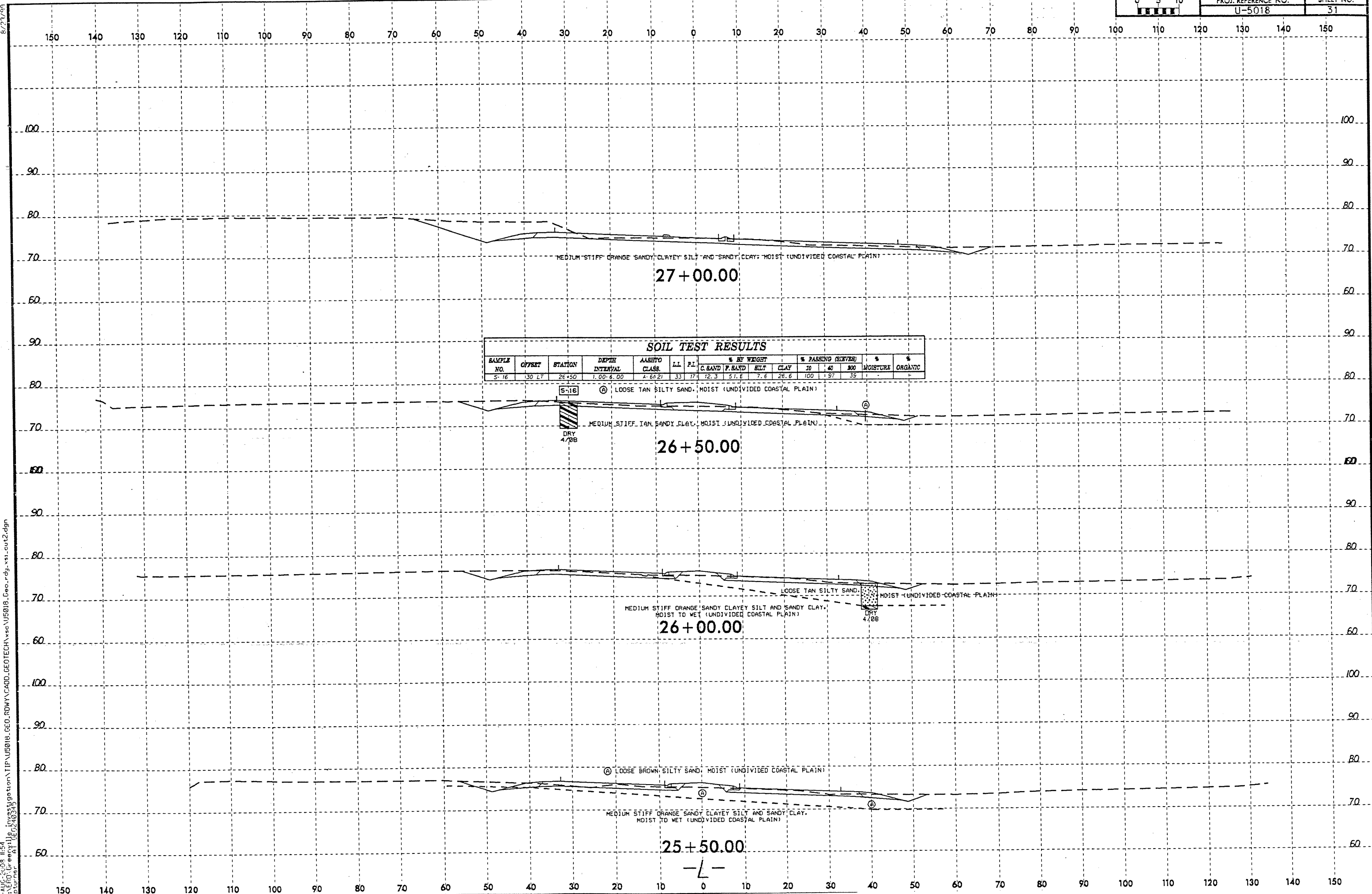
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	33 RT	20+00	1.00-1.50	A-6(6)	20	22	5.8	51.8	8.0	34.4	98	97	45		
SS-2	33 RT	20+00	2.90-4.40	A-7-6(5)	41	22	5.5	52.4	8.8	36.4	100	99	44	25.2	
SS-3	33 RT	20+00	7.90-9.40	A-6(3)	17	19	8.1	54.8	8.8	26.3	100	98	39		
SS-4	33 RT	20+00	12.90-14.40	A-2-4(1)	22	NP	16.6	70.6	4.4	6.1	100	97	20		

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8/27/90



27+00.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASTHO CLASS.	LL	PL	% BY WEIGHT				% PASSING (SIZES)		% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40		
S-16	130 L7	26+50	1.00-6.00	A-6(2)	33	17	12.3	51.6	7.6	28.6	100	97	35	

① LOOSE TAN SILTY SAND, MOIST (UNDIVIDED COASTAL PLAIN)

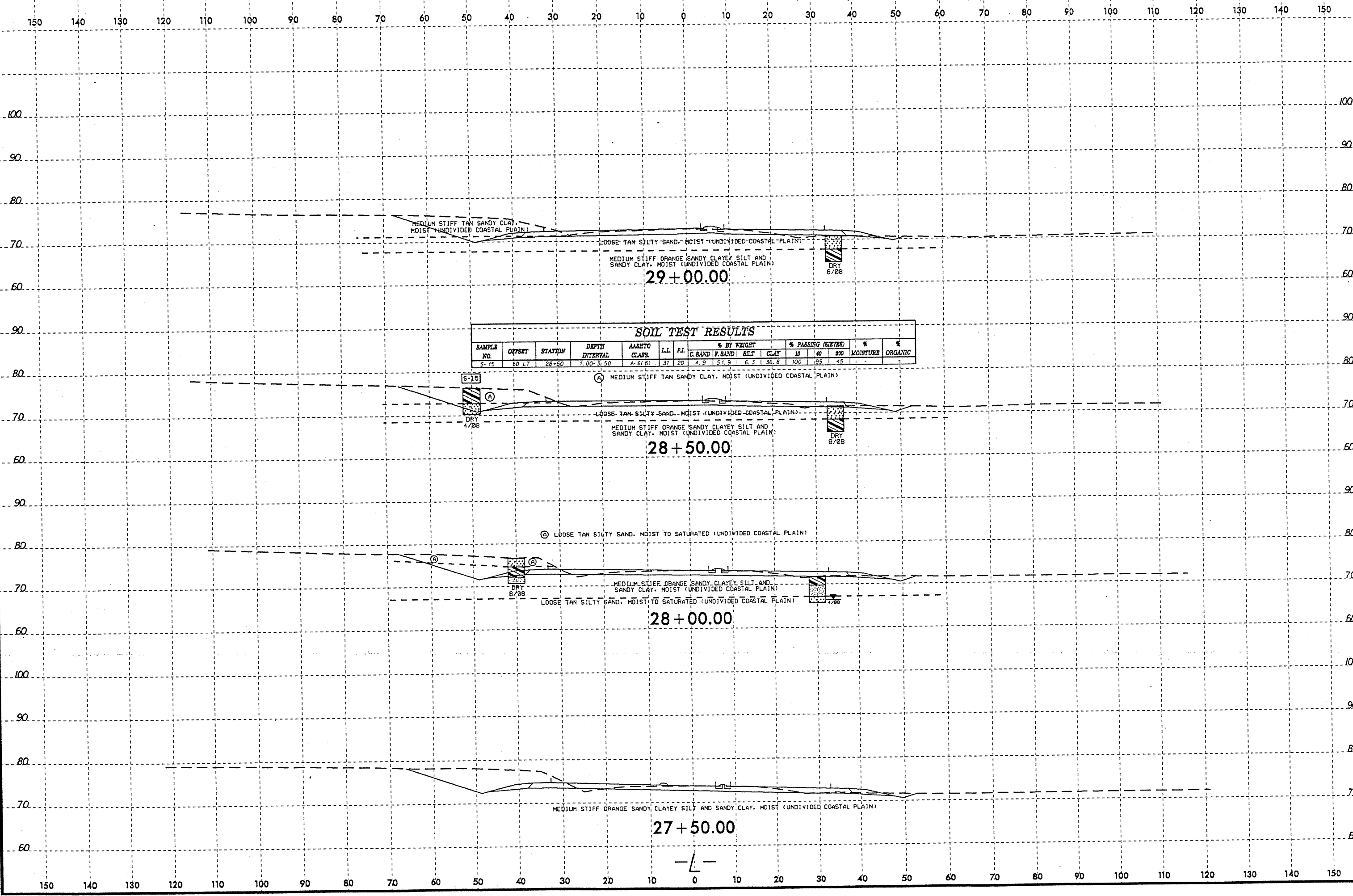
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26+00.00

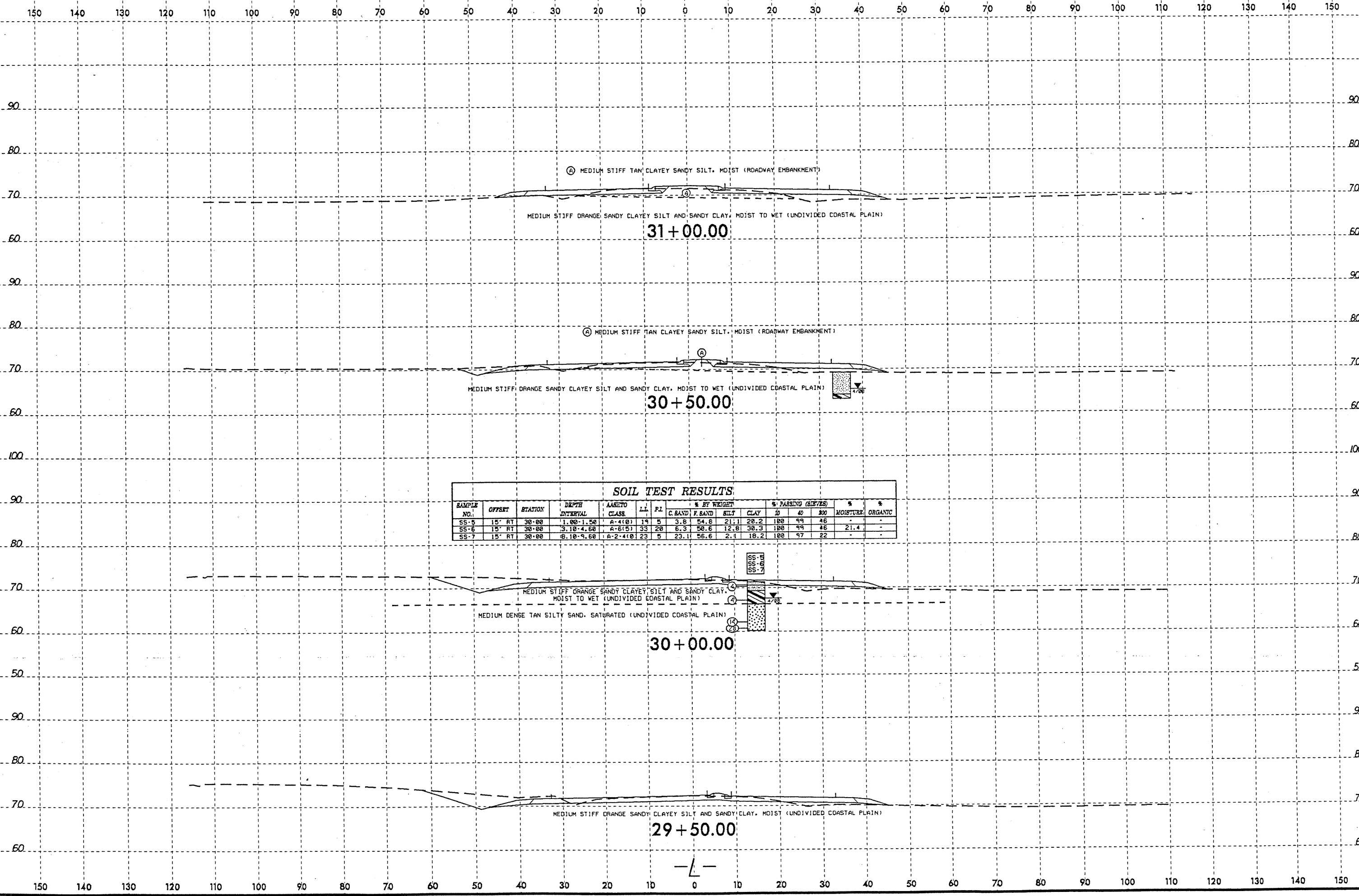
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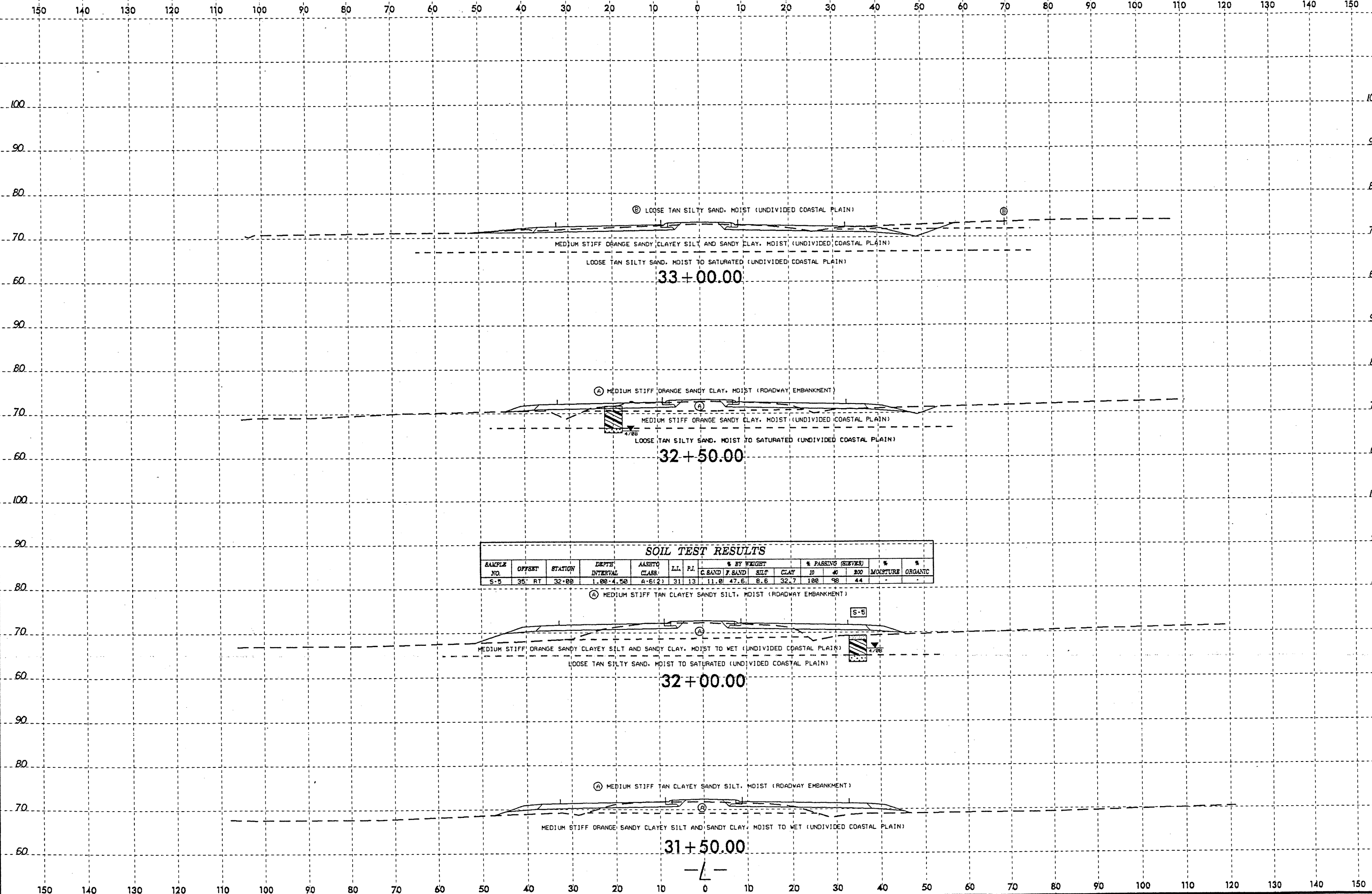
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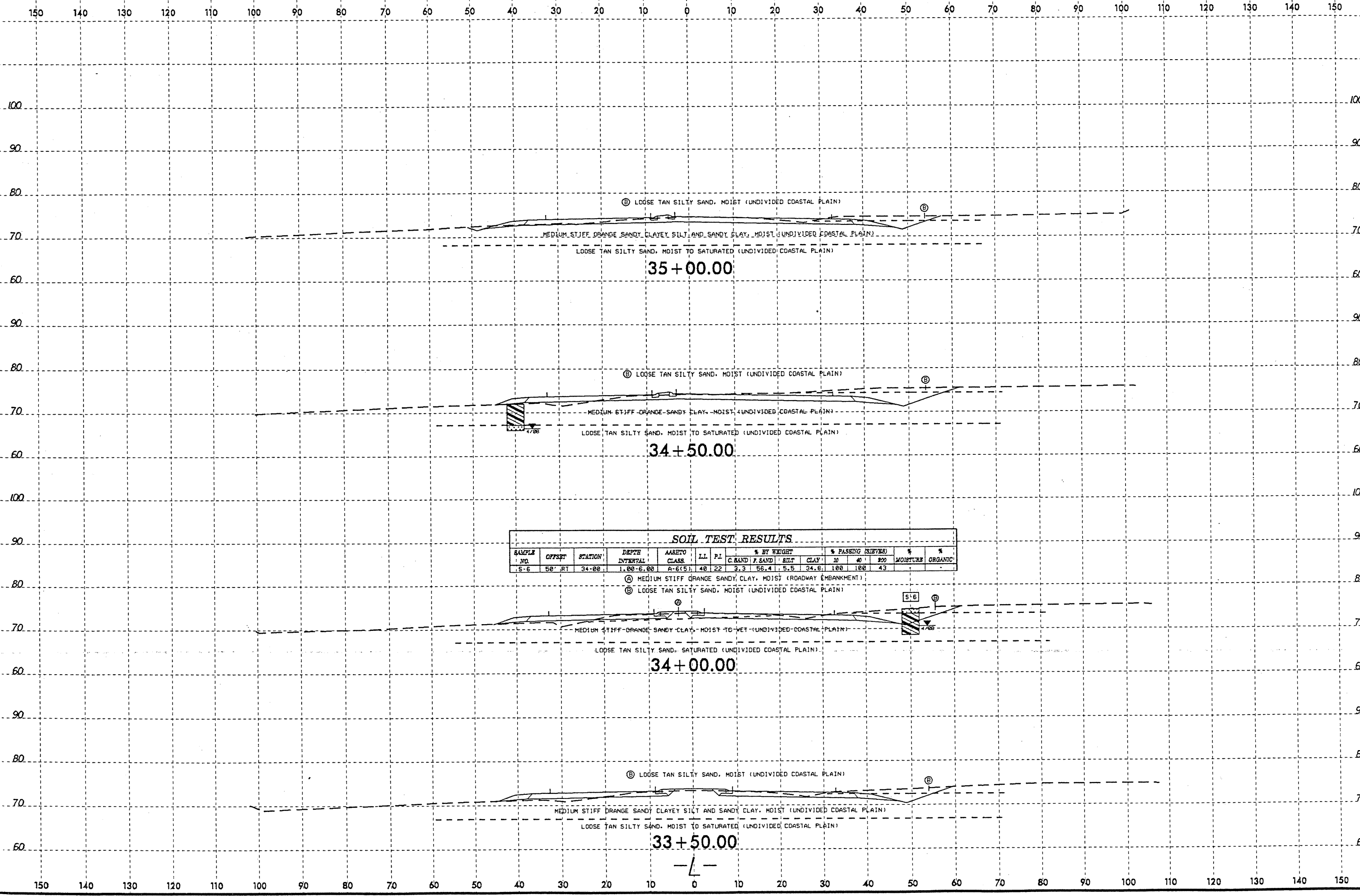




SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASTHO CLASS.	LL	PI	% BY WEIGHT				% PASSING (SIEVES)		MOISTURE	ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#200		
S-5	35' RT	32+00	1.00-4.50	A-6(2)	31	13	11.0	47.6	8.6	32.7	100	98	44	

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35+00.00

34+50.00

34+00.00

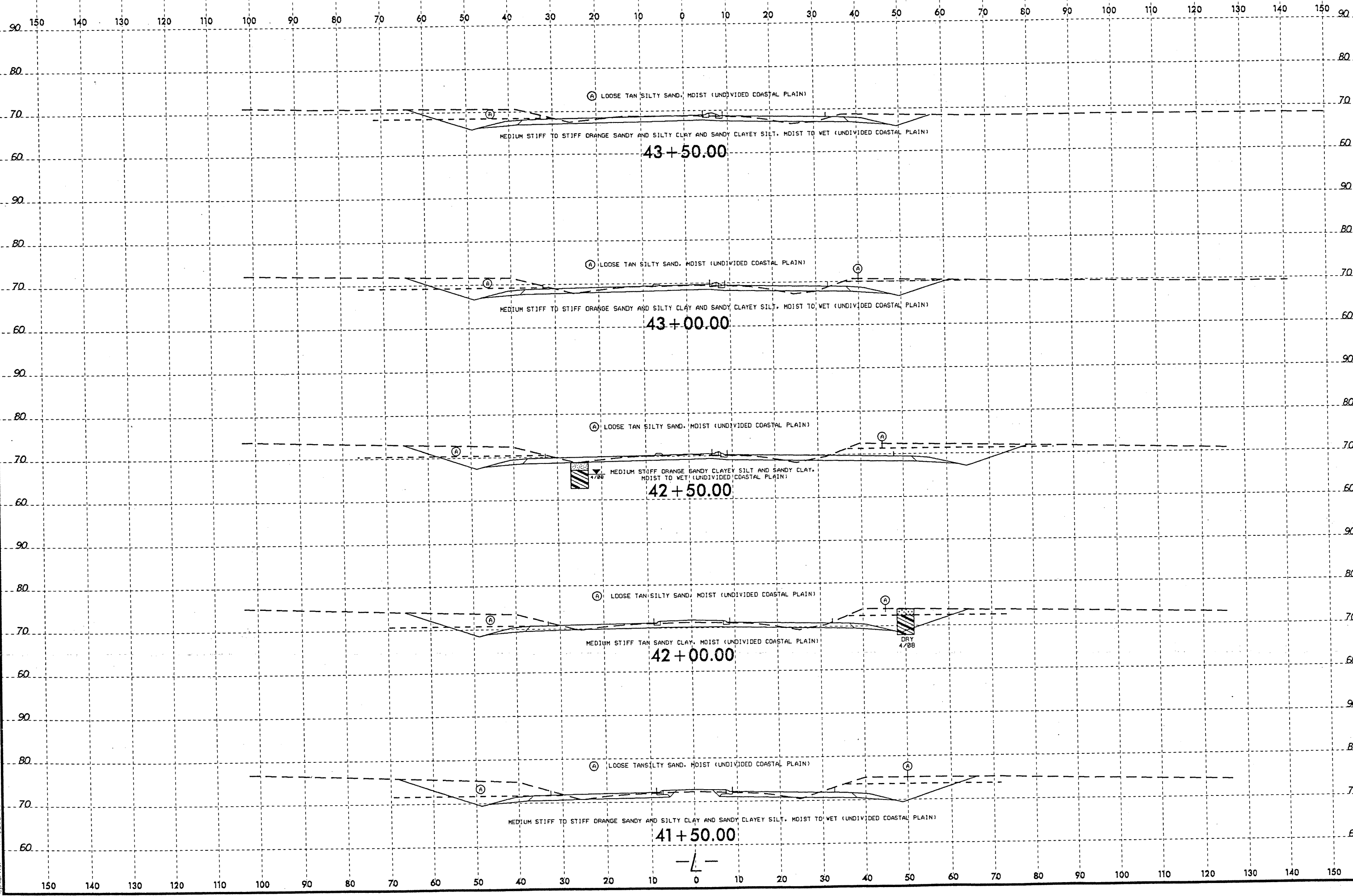
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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PI	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-6	50' RT	34+00	1.00-6.00	A-6(5)	40	22	3.3	56.4	5.5	34.8	100	100	43		

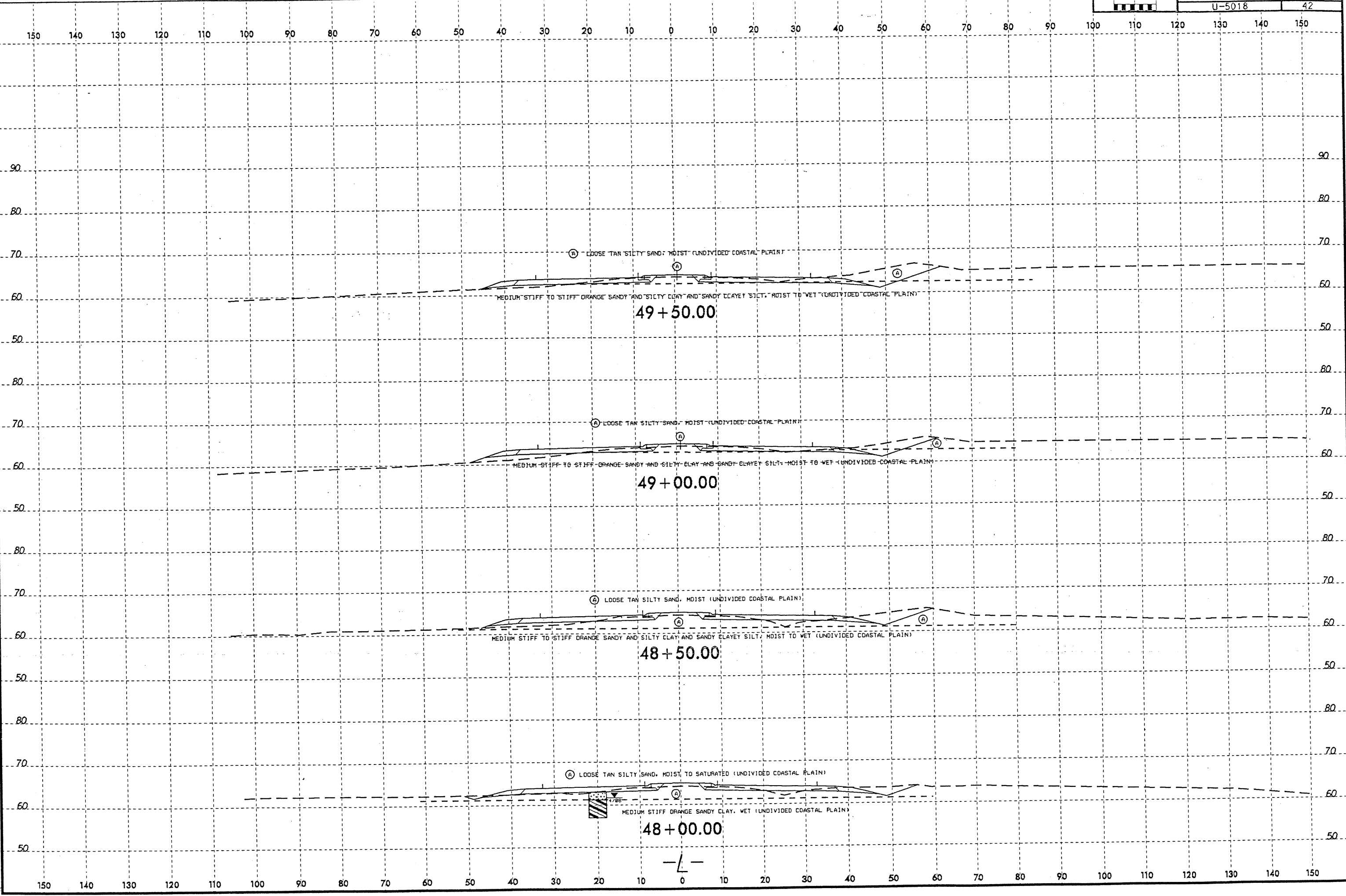
- Ⓐ MEDIUM STIFF ORANGE SANDY CLAY, MOIST (ROADWAY EMBANKMENT)
- Ⓑ LOOSE TAN SILTY SAND, MOIST (UNDIVIDED COASTAL PLAIN)

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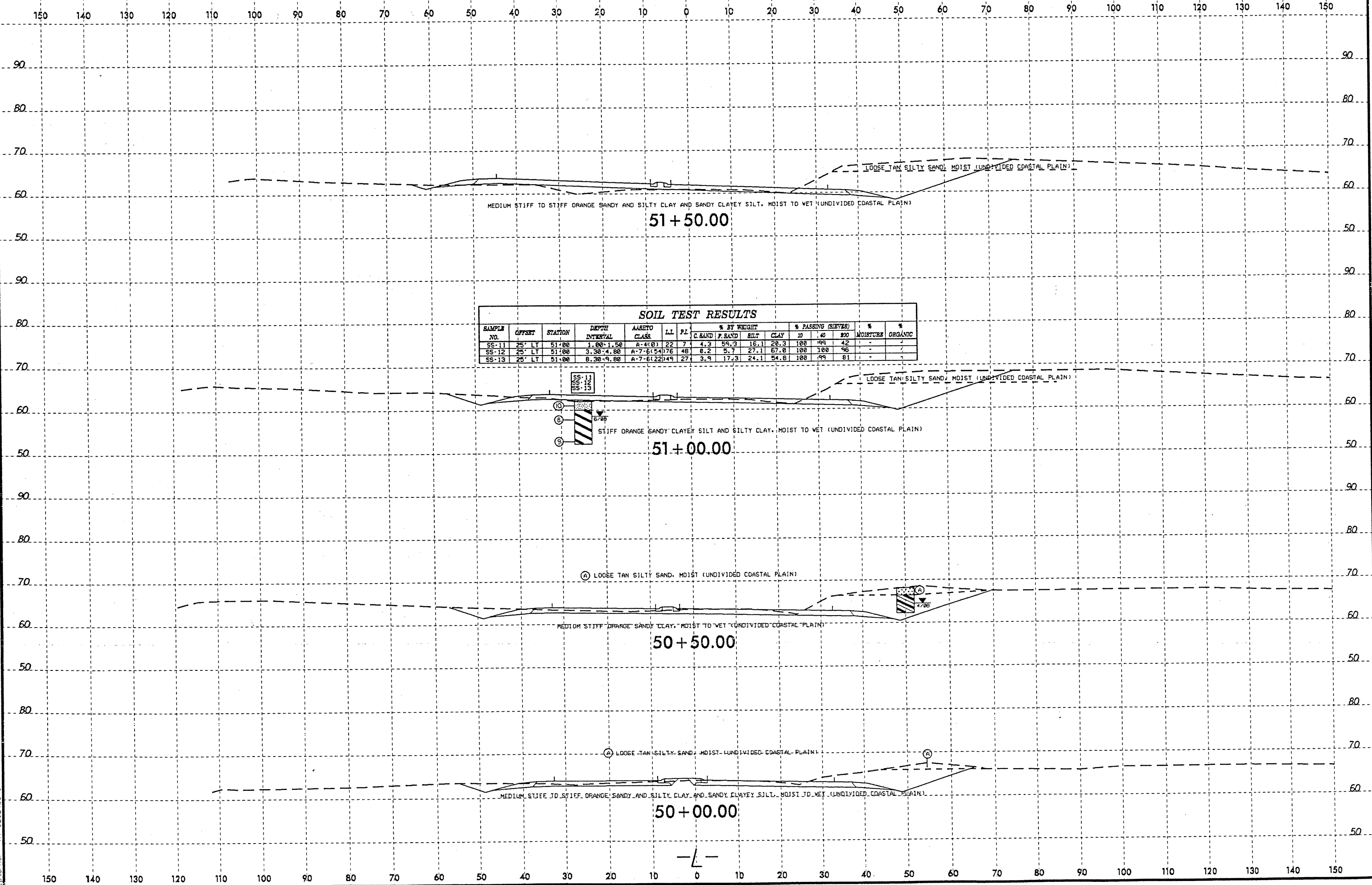


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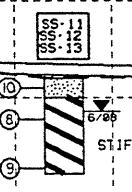
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PL	% BY WEIGHT			% PASSING (SIZES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	BLT. CLAY	#20	#40	#60			
SS-11	25' LT	51+00	1.00-1.50	A-4(0)	22	7	4.3	59.3	16.1	20.3	100	99	42	-	-
SS-12	25' LT	51+00	3.30-4.80	A-7-6(54)	176	48	6.2	5.7	27.1	67.8	100	96	-	-	-
SS-13	25' LT	51+00	8.30-9.80	A-7-6(22)	149	27	3.9	17.3	24.1	54.8	100	99	81	-	-



51+50.00

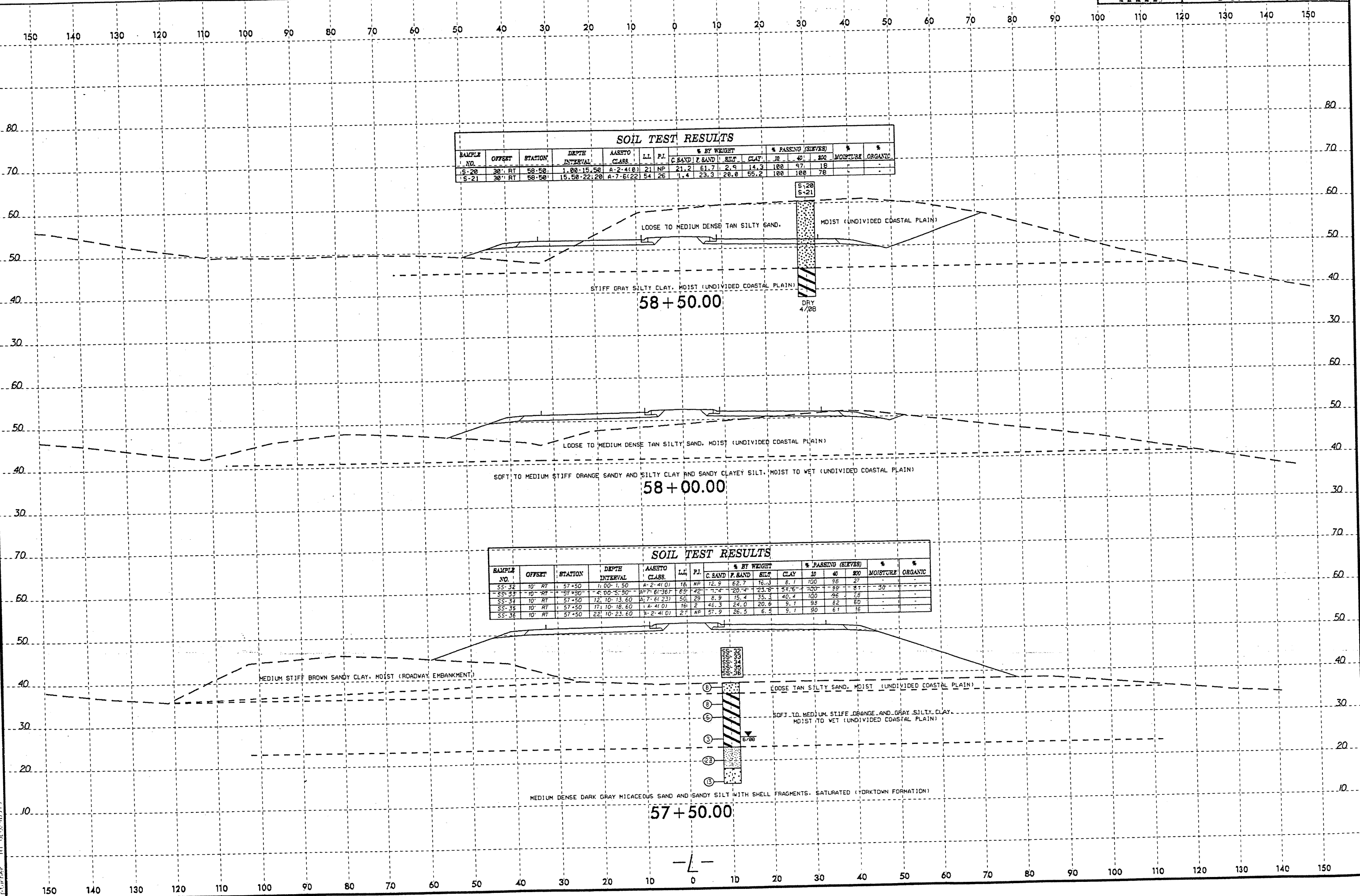
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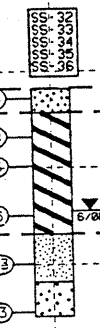
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% BY WEIGHT				% PASSING (SIEVES)		MOISTURE %	ORGANIC %
							C. SAND	F. SAND	SILT	CLAY	#10	#40		
S-20	30' RT	58+50	1.00-15.50	A-2-4(0)	21	NP	21.2	61.7	2.9	14.3	100	97	18	-
S-21	30' RT	58+50	15.50-22.20	A-7-6(22)	54	26	1.4	23.3	20.0	55.2	100	100	78	-

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% BY WEIGHT				% PASSING (SIEVES)		MOISTURE %	ORGANIC %
							C. SAND	F. SAND	SILT	CLAY	#10	#40		
SS-32	10' RT	57+50	11.00-11.50	A-2-4(0)	18	NP	12.9	62.7	16.3	8.7	100	98	27	-
SS-35	10' RT	57+50	4.00-5.90	A-7-6(36)	65	42	7.4	20.4	23.6	59.6	100	99	87	30
SS-34	10' RT	57+50	12.10-13.60	A-7-6(23)	50	29	8.9	15.4	35.3	40.4	100	96	79	-
SS-35	10' RT	57+50	17.10-18.60	A-4-4(0)	16	2	46.3	24.0	20.6	9.1	98	82	60	-
SS-36	10' RT	57+50	22.10-23.60	A-2-4(0)	27	NP	57.9	26.5	6.5	9.7	90	67	15	-



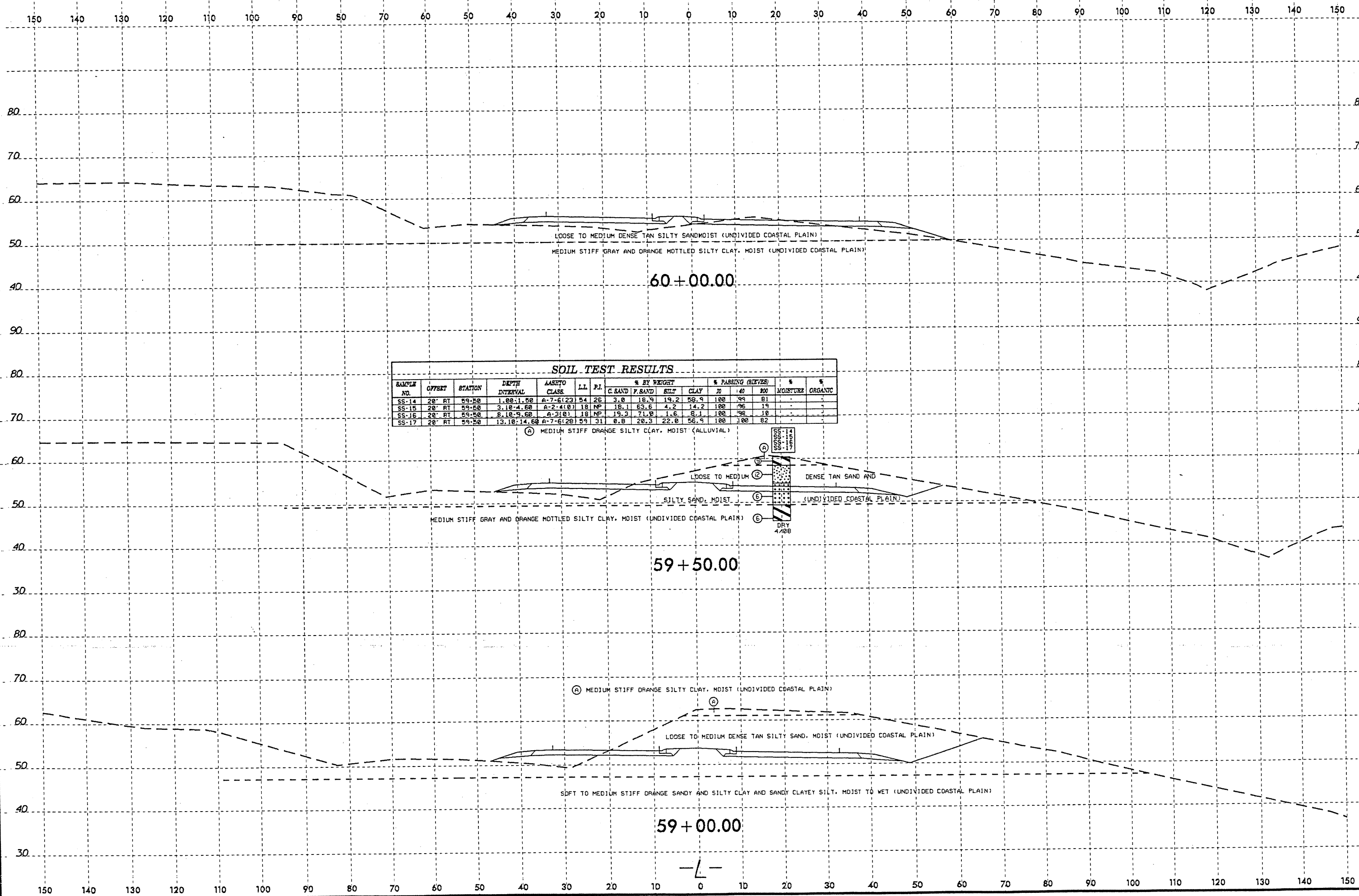
58+50.00

58+00.00

57+50.00

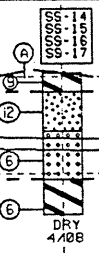
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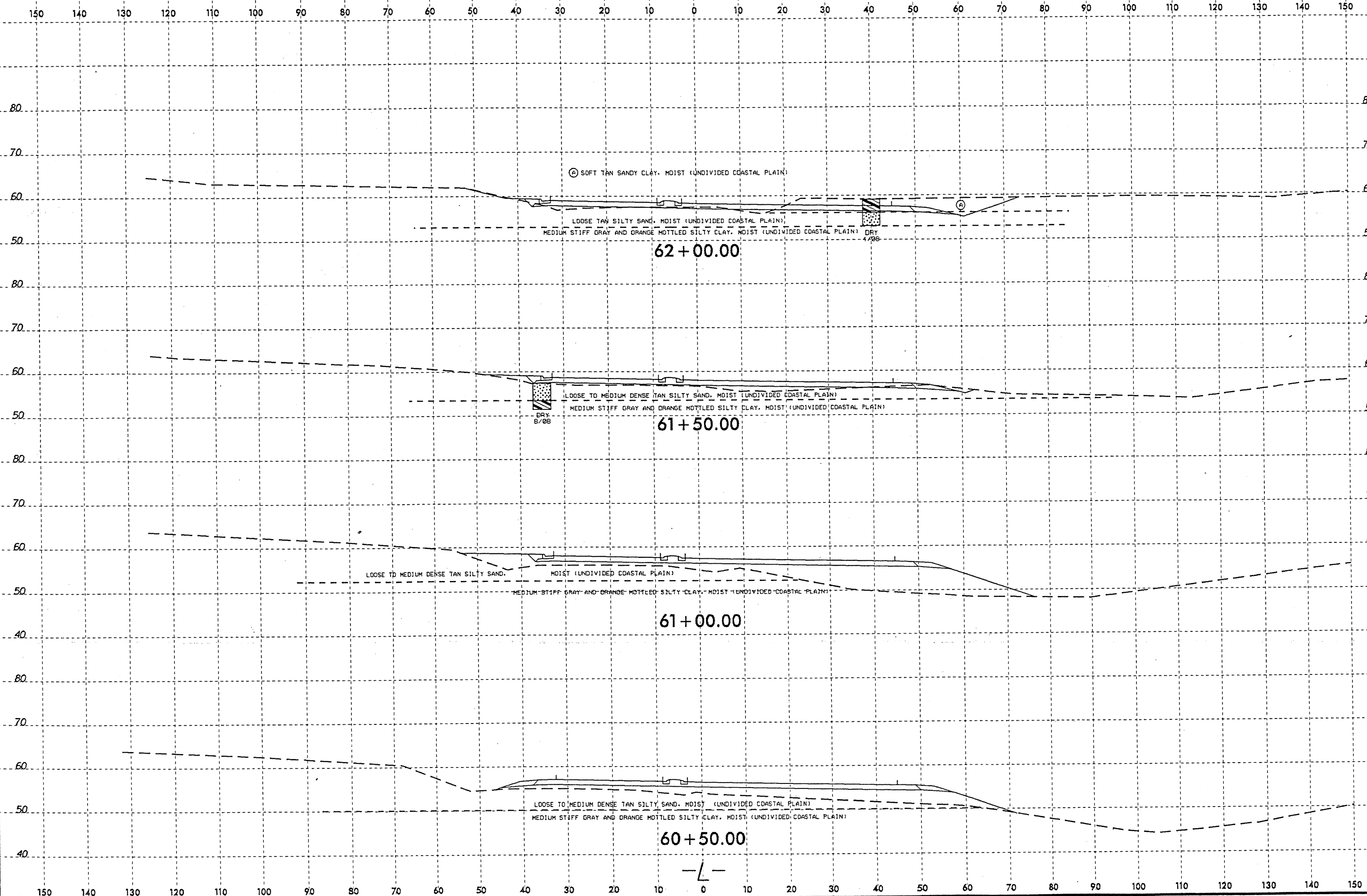


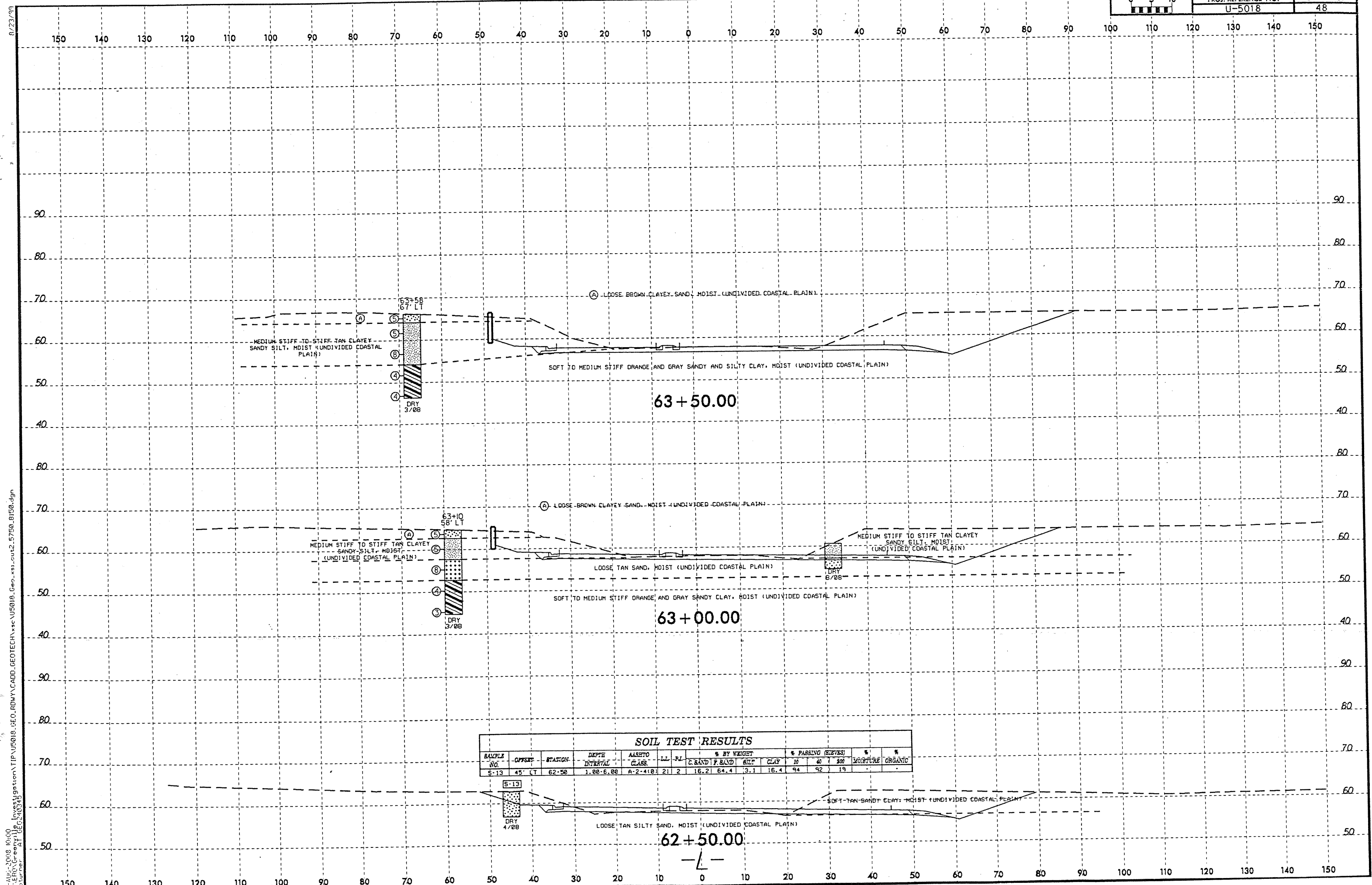
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASSTO CLASS	LL	PI	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200		
SS-14	20'	RT	59-50	A-7-6(23)	54	26	3.0	18.9	19.2	58.9	100	99	81	-	-
SS-15	20'	RT	59-50	A-2-4(0)	18	NP	18.1	63.6	4.2	14.2	100	96	19	-	-
SS-16	20'	RT	59-50	A-3(0)	18	NP	19.3	71.0	1.6	8.1	100	98	10	-	-
SS-17	20'	RT	59-50	A-7-6(28)	59	31	0.8	20.3	22.0	56.9	100	100	82	-	-



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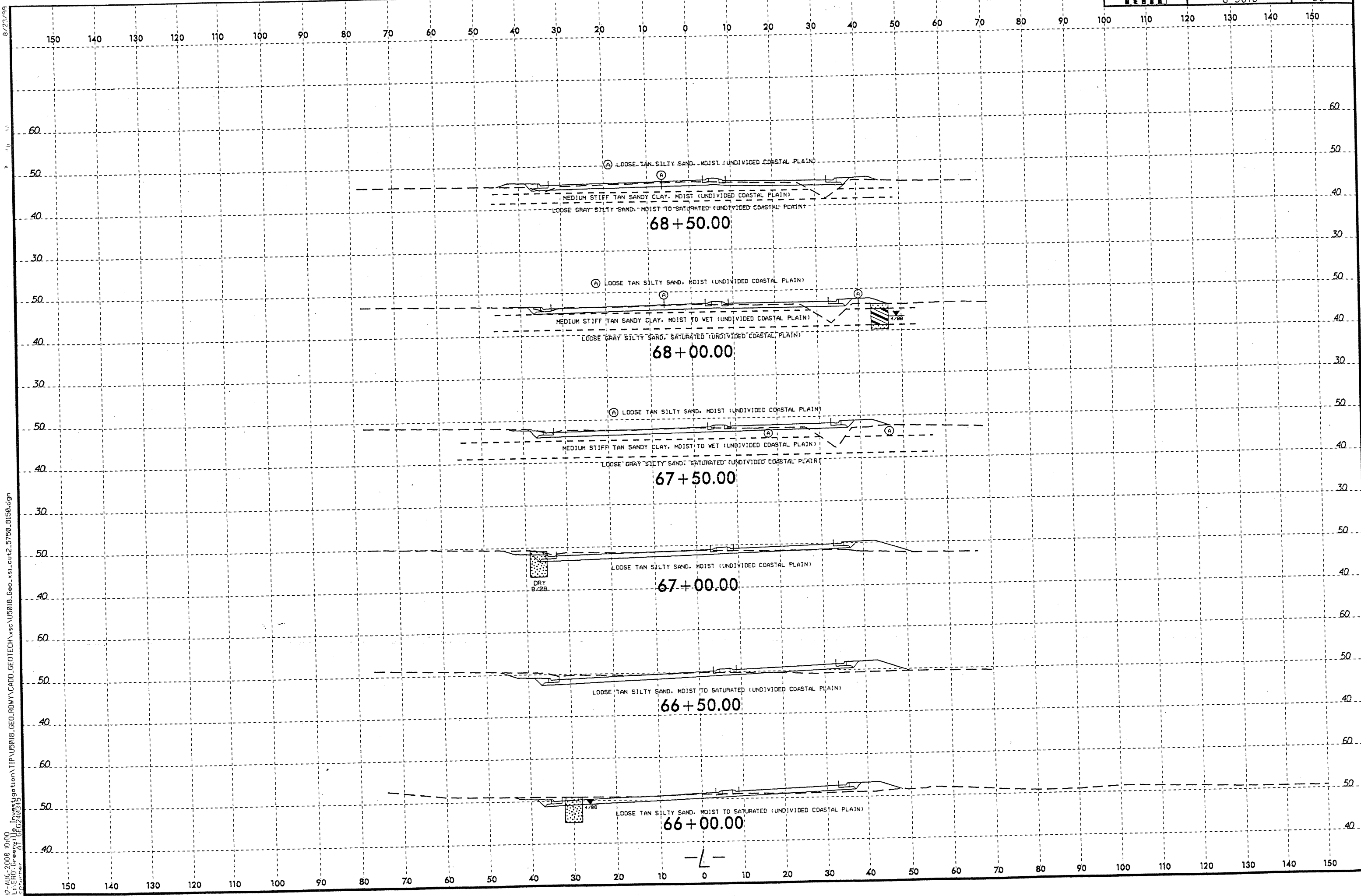
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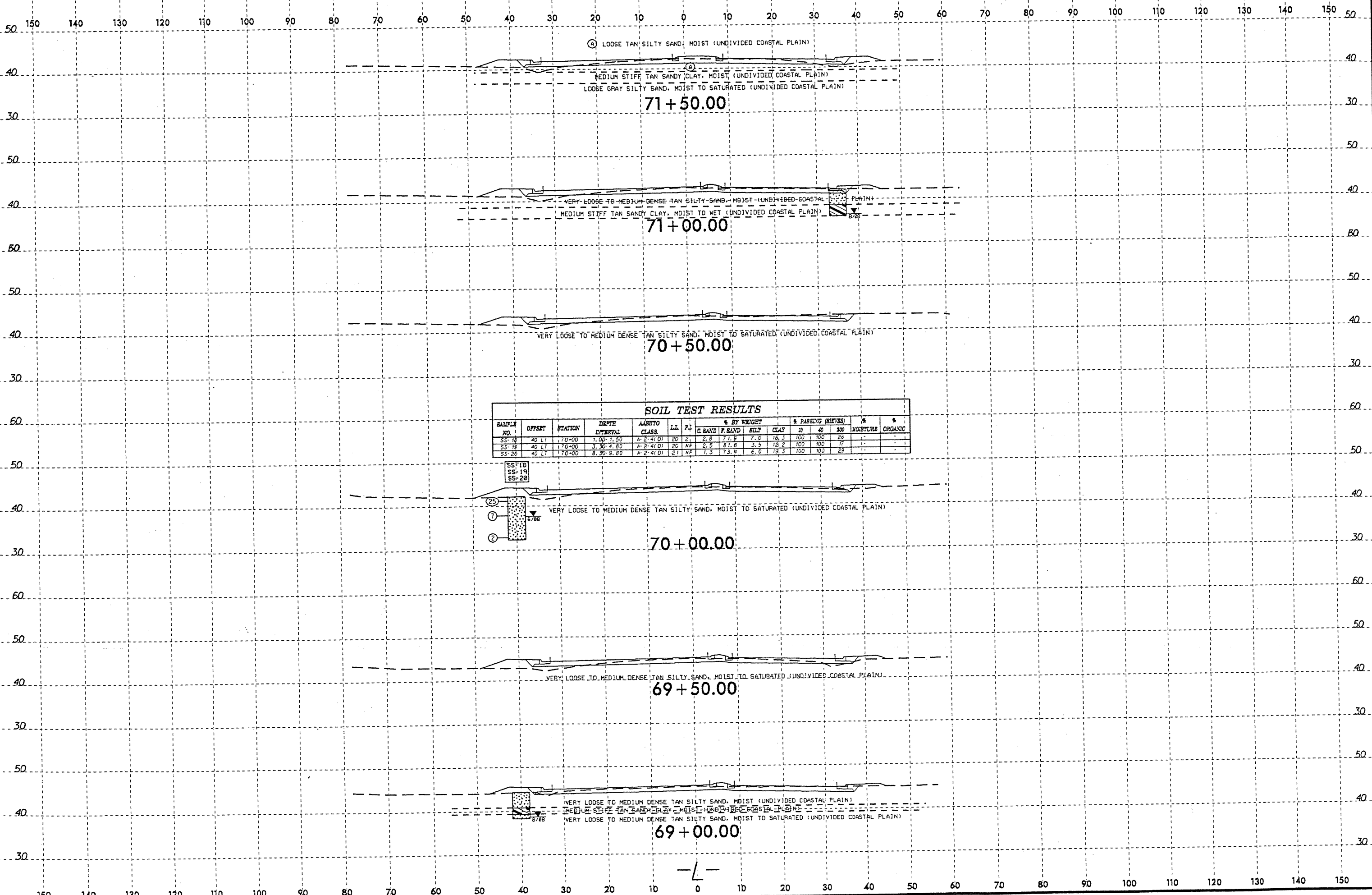
SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ALBERTO CLASS.	LL	PL	% BY WEIGHT				% PASSING (SIEVES)		% MOISTURE	% ORGANIC
							C. BAND	F. BAND	SILT	CLAY	10	40		
S-13	45' LT	62-50	1.00-6.00	A-2-4(0)	21	2	16.2	64.4	3.1	16.4	94	92	19	

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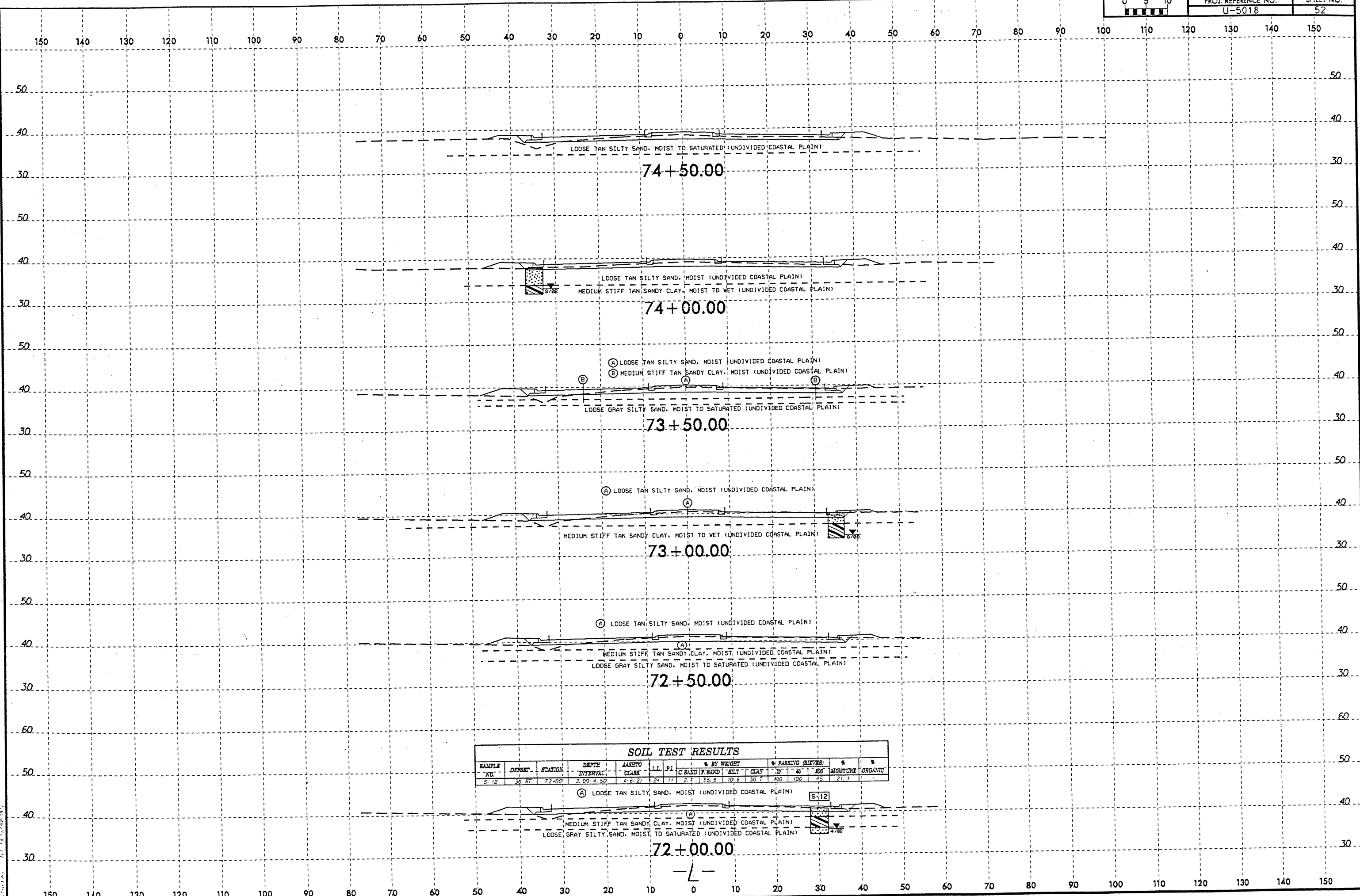


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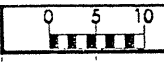


SOIL TEST RESULTS

SAMPLE NO.	DEPTH	STATION	DEPTH INTERVAL	LAYER	LL	PI	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C	F	CLAY	20	40	60		
S-12	30 FT	72+00	2.00-4.50	A-6(2)	24	11	2.7	55.8	101.8	30.7	100	100	45	21.1

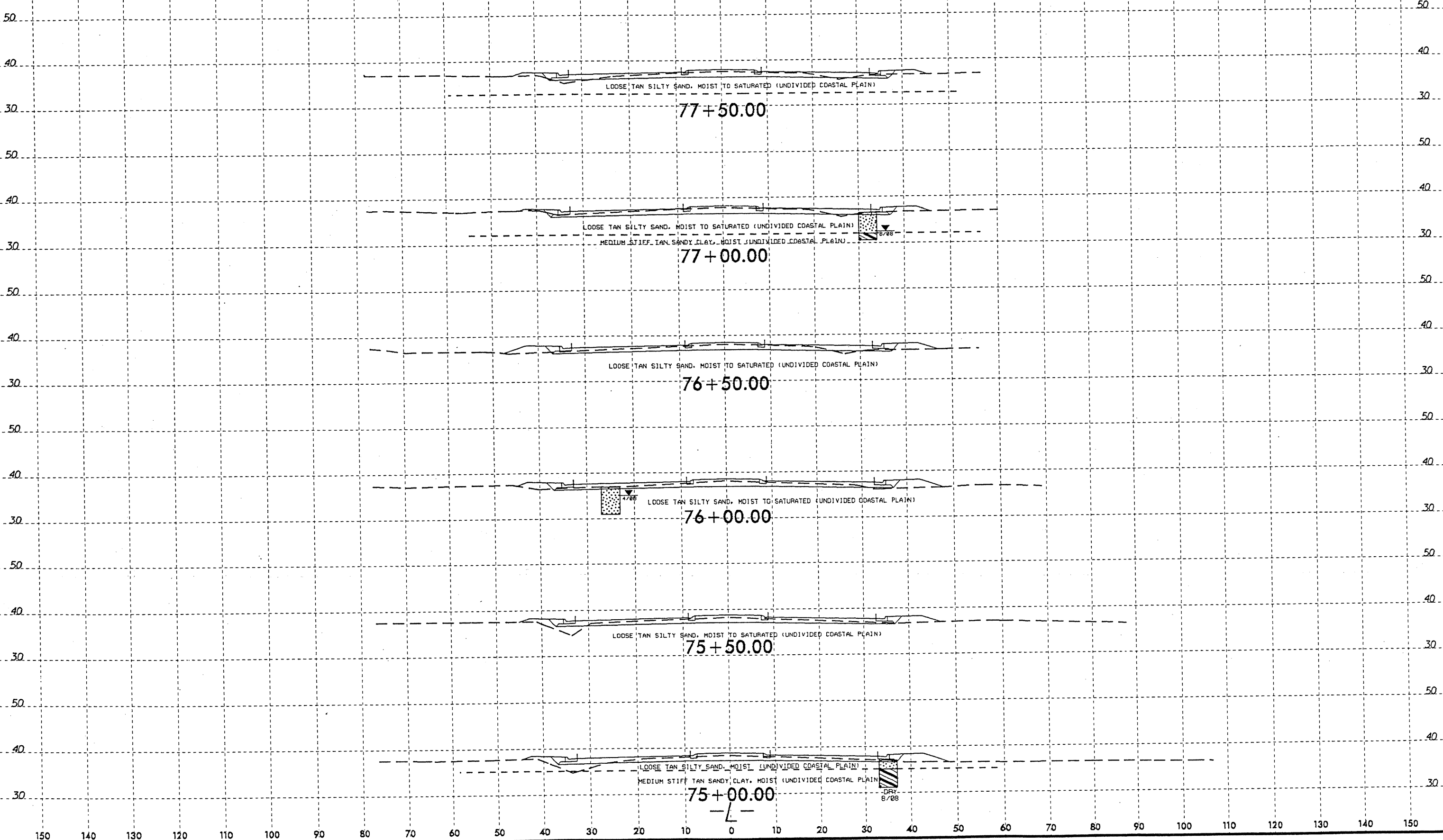
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PROJ. REFERENCE NO.	SHEET NO.
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