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REFERENCE: R-4463A

PROJECT: 35601

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+25.49 - 131+46.40	4-13	16-20
-Y-	14+40.00 - 48+25.00	4, 14-15	21-23
-Y1-	10+00.00 - 12+75.00	14	24
-Y2-	10+00.00 - 12+00.00	5	24
-Y3-	10+50.00 - 12+25.07	6	24
-Y4-	10+00.00 - 11+75.00	6	24
-DR1-	10+50.00 - 13+57.04	4	25
-DR2-	10+00.00 - 13+16.23	4	25

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	13+00	26
-L-	20+00 - 23+00	27-29
-L-	24+50 - 44+00	30-38
-L-	52+50 - 89+00	39-61
-L-	124+00	62
-Y-	32+50 - 33+50	63
-Y-	35+50 - 37+50	64-65
-Y-	38+50	66
-Y-	40+00	67
-Y-	42+00	68
-Y-	43+50 - 45+00	69-70

BORE LOG

LINE	STATION	SHEETS
-Y-	24+50	71

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *CRAVEN*

PROJECT DESCRIPTION *NC 43 CONNECTOR FROM US 70 TO US 17 BUSINESS*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4463A	1	71

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.

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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

CATLIN INC.

M. JOHNSON

J. K. CRENSHAW

N. HARMON

INVESTIGATED BY *C. SWAFFORD*

DRAWN BY *T. LYNN*

CHECKED BY *J. K. CRENSHAW*

SUBMITTED BY *P. ROGERS*

DATE *NOVEMBER 2019*

HDR Engineering, Inc. of the Carolinas
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NORTH CAROLINA PROFESSIONAL SEAL 038206 ENGINEER KENNETH R. BUSSEY, JR.

Kenneth R. Bussey, Jr. 11/20/2019
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
MATERIAL PASSING #40 LL	—		—	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PI	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
GRAIN SIZE IN.: 12 | 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [X] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _____
- [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

ELEVATION: FEET

NOTES:

BORING AND GROUND SURFACE ELEVATIONS OBTAINED FROM 'R4463A_ls_merged_tin.tin' FILE DATED 11/28/2018

FIAD - FILLED IMMEDIATELY AFTER DRILLING

PAVEMENT / ABC STONE

DATE: 8-15-14

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09/08/99

TIP PROJECT: R-4463A

CONTRACT: C204421

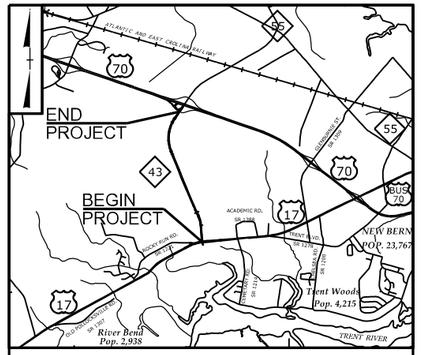
REVISIONS

11/2019: PSH 05 PARCEL OWNER NAME CHANGE; PARCEL 32

PENTABLE: $PENTBLS$
TIME: $TIME$

PLOT DRIVER: $PLTDRVS$
USER: $USER$
FILE: $FILE$
DATE: $DATE$

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CRAVEN COUNTY

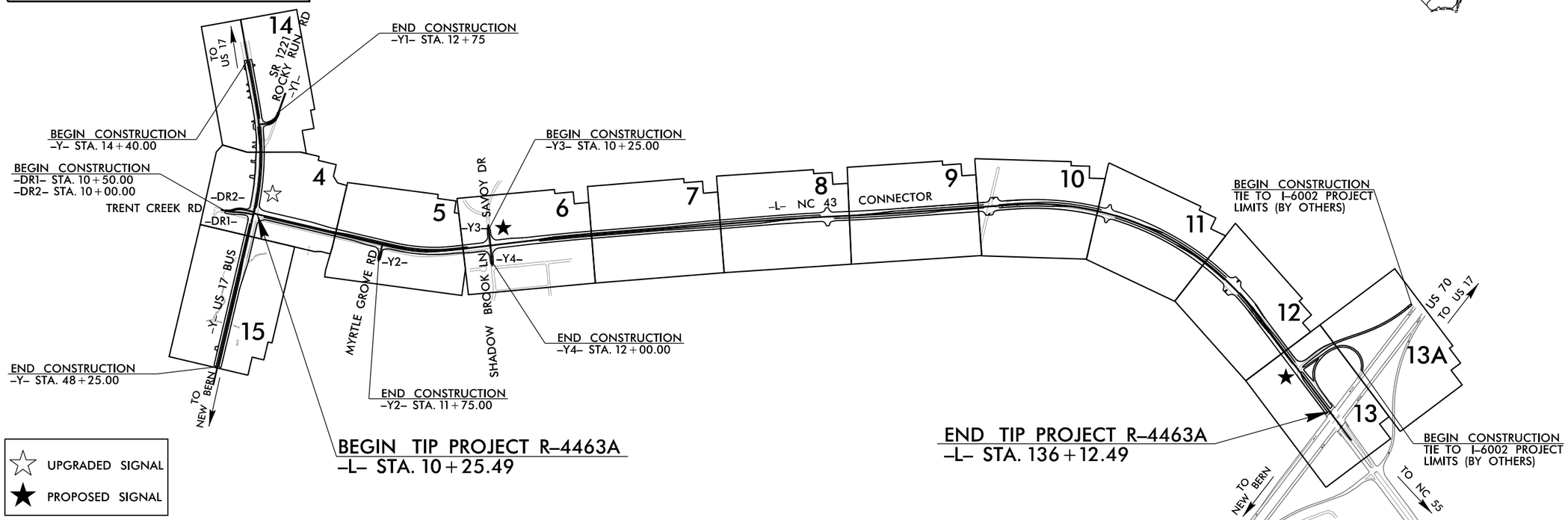
LOCATION: NC 43 CONNECTOR FROM US 17 BUSINESS TO US 70

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNALS, & CULVERT

NAD 83/ NSRS 2011

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4463A	3	71

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35601.1.1		PE
35601.2.1		ROW/UTIL
35601.3.1		CONSTRUCTION



NOTES:
THIS PROJECT HAS PARTIALLY CONTROLLED ACCESS WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2040 = 39,100
K = 10 %
D = 55 %
T = 6 % *
V = 60 MPH
(* TTST 4% + DUAL 2%)
FUNC CLASS = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-4463A = 2.384 MILES
TOTAL LENGTH TIP PROJECT R-4463A = 2.384 MILES

NCDOT CONTACT: HON YEUNG
DIVISION 2 - PROJECT ENGINEER

Prepared for the North Carolina Department of Transportation in the office of:

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 18, 2019

LETTING DATE:
FEBRUARY 18, 2020

PHILLIP E. ROGERS, PE
PROJECT ENGINEER

ALEXANDER D. SNIDER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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November 14, 2019

STATE PROJECT: 35601.1.R2

TIP NUMBER: R-4463A

COUNTY: Craven

DESCRIPTION: NC 43 Connector from US 70 to US 17 Business

SUBJECT: Geotechnical Roadway Inventory report

PROJECT DESCRIPTION

The R-4463A project is designed to improve traffic flow and ease congestion in the Town of New Bern, NC. The project consists of widening a portion of existing Trent Creek Road and connecting Trent Creek Road to NC 43. The project length is approximately 2.3 miles along NC 43 (-L-).

The field investigation was conducted in January and February of 2019 using a track mounted CME-55 with an automatic hammer. Standard Penetration Tests (SPT) were performed at selected locations. Borings were advanced with mud rotary equipment and hand augers. Representative soil samples were collected and forwarded to an NCDOT M&T approved testing facility for soil quality analysis, moisture content, and AASHTO classification.

The following alignments were investigated

Line	Station			Length (ft)
-L-	10+25	to	131+46	12,121
-Y-	14+40	to	48+25	3,385
-Y1-	10+00	to	12+75	275
-Y2-	10+00	to	12+00	200
-Y3-	10+50	to	12+25	175
-Y4-	10+00	to	11+75	175
-DR1-	10+50	to	13+57	307
-DR2-	10+00	to	13+16	316
			Total =	16,954 (~3.21 miles)

PHYSIOGRAPHY AND GEOLOGY

Physiography and Geology

The project is located in the Coastal Plain Physiographic Province. Geologically, it is located in an area mapped as Tertiary Age deposits of the Yorktown Formation described as fossiliferous clay with varying amounts of fine grained sand. The topography is flat and the drainage from the area is very poor.

Soil Properties

Soils encountered along the project corridor are divided into two categories based on origin: Roadway Embankment soils, Alluvial soils, and Undivided Coastal Plain soils.

Roadway embankment soils are present in borings advanced on the shoulders of the existing roadways and consist of very loose to loose, fine to coarse sand, silty sand and clayey sand (A-2-6, A-2-4, A-3), as well as very soft to medium stiff, silty clay and clay (A-7-5, A-6) with some gravel were encountered throughout the project corridor. Roadway embankment soils ranged in thickness from less than one foot thick to approximately 6 feet thick.

Alluvial soils were encountered at the culvert location along US 17 Business, along Trent Creek Road, and at currently undeveloped portions of the project corridor. These soils were comprised of loose sand (A-2-4) and silty or sandy clay (A-6, A-7-6) with trace to moderate organics. Where tested, granular, alluvial soils were found to be non-plastic to 4, organic and moisture contents ranged from 1.8% to 9.3% and 33% to 46%, respectively.

Undivided Coastal Plain soils were encountered at most locations throughout the project corridor. These soils were comprised of very loose to medium dense sand, silty sand and clayey sand (A-2-6, A-2-7, A-2-4, A-3), and very soft to stiff silt, clay, and sandy clay (A-4, A-6, A-7-6). Within the cohesive soils, plasticity indices and moisture contents ranged from 9 to 15 and 22% to 42% respectively.

Ground Water

Groundwater was encountered from the ground surface to 5.9 feet below ground. Some of the hand auger borings were dry after being left open for 24 hours. Due to safety concerns, some of the borings had to be backfilled immediately after completion and no 24 hour water level could be obtained. Groundwater was encountered at elevations ranging from 38 feet to 19 feet.

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(919) 232-6600

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Areas of Special Geotechnical Interest

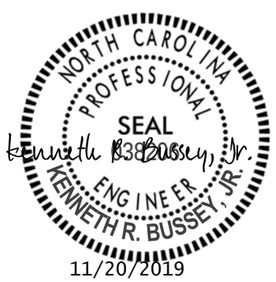
Ponds: Two ponds are located within close proximity to the right of way on this project at the following locations:

Line	Station (±)	Offset
-L-	29+00 – 34+50	LT
-L-	36+85 – 39+35	LT

Organic Soils: Materials containing moderate or higher organic content were encountered at the following locations:

Line	Station (±)	Offset
-L-	20+25 – 57+00	LT to RT
-L-	64+25 – 66+75	LT to RT
-L-	71+50 – 88+90	LT to RT

Sincerely,
HDR ENGINEERING, INC., OF THE CAROLINAS



Kenneth R. Bussey, Jr.

11/20/2019

Kenneth R. Bussey, Jr., PE
Senior Geotechnical Engineer

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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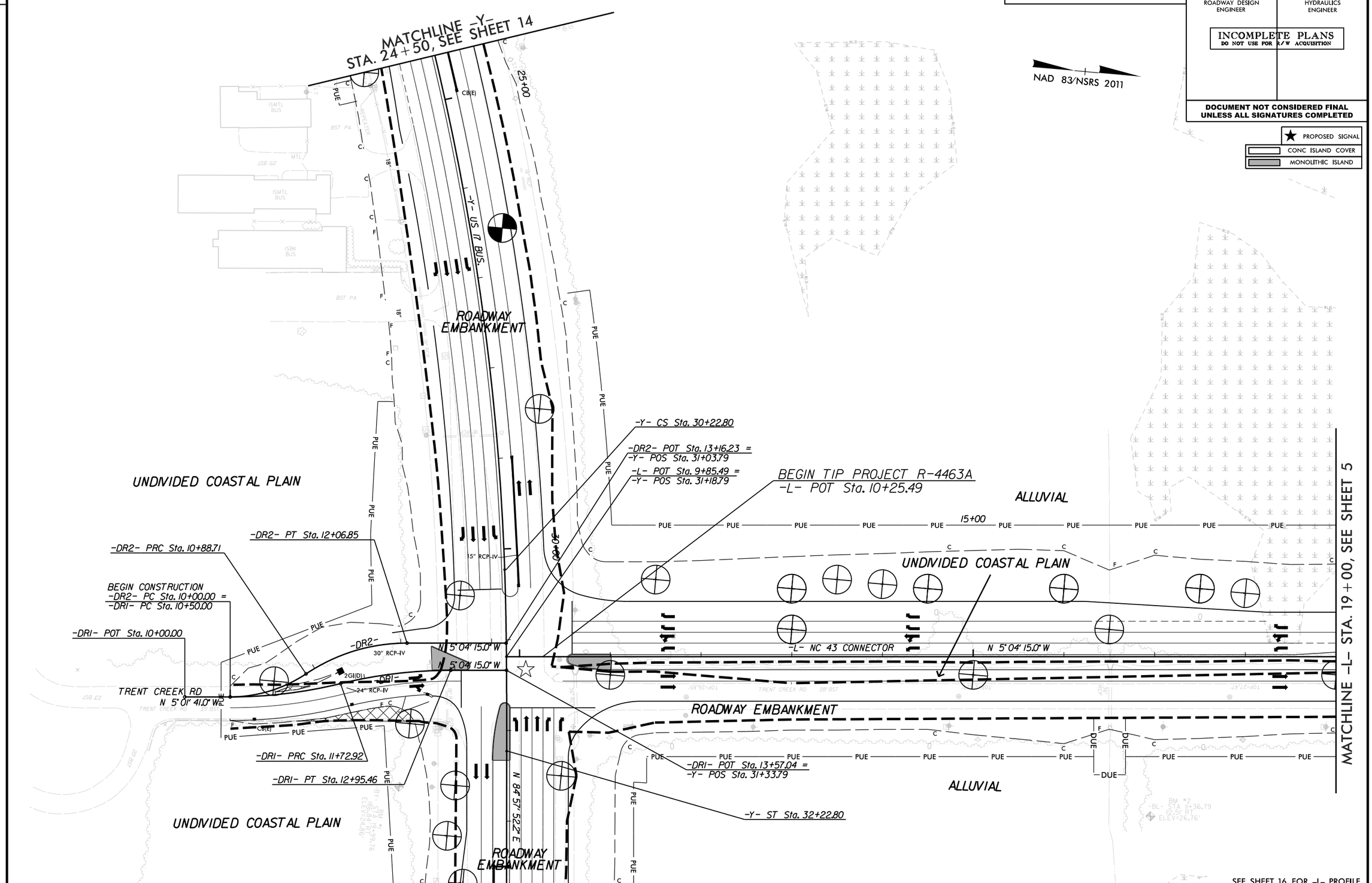
★ PROPOSED SIGNAL
CONC ISLAND COVER
MONOLITHIC ISLAND

NAD 83/NSRS 2011



SEE SHEET 16 FOR -L- PROFILE
SEE SHEETS 22 AND 23 FOR -Y- PROFILE
SEE SHEET 25 FOR -DRI- PROFILE
SEE SHEET 25 FOR -DR2- PROFILE

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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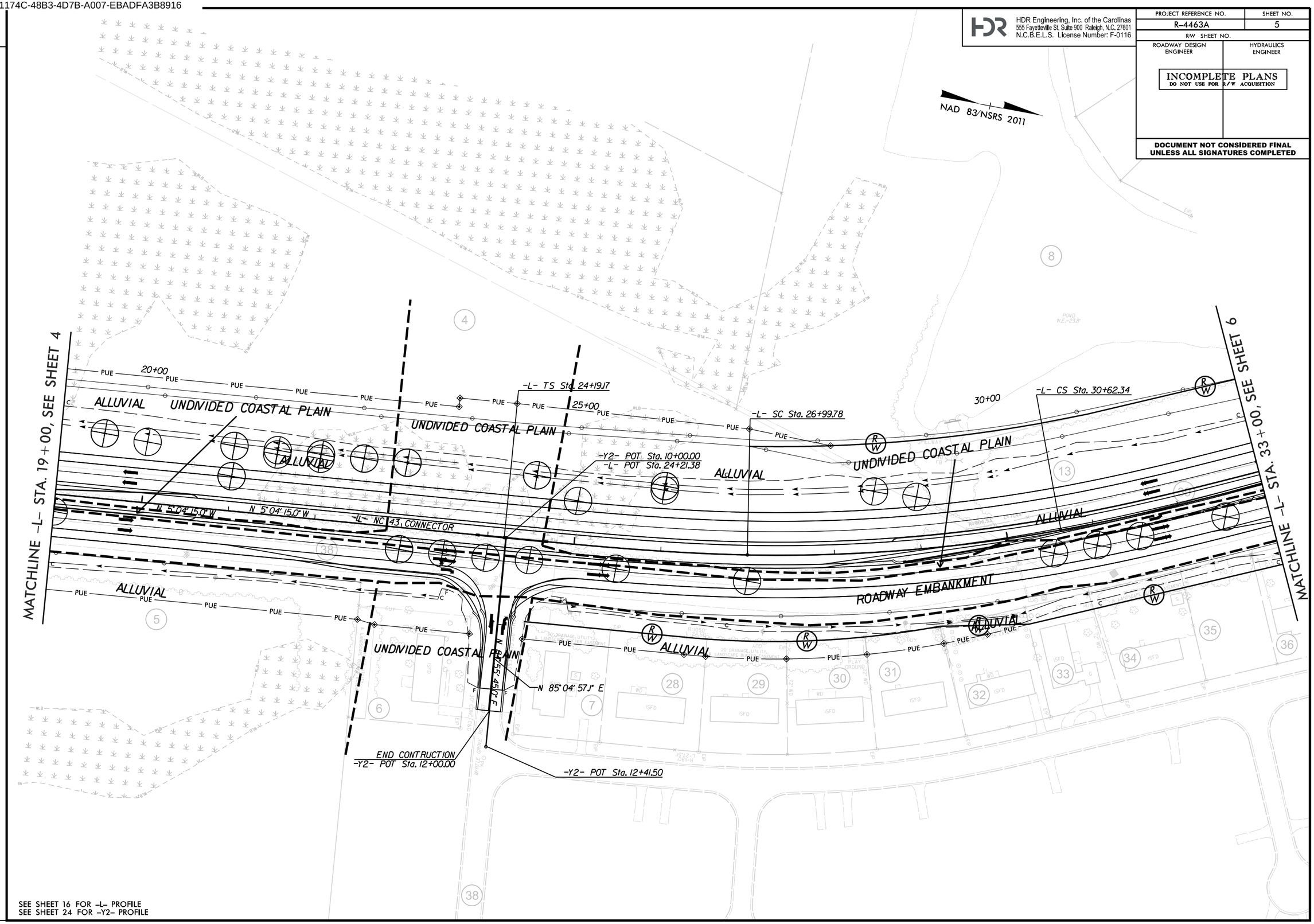

SEE SHEET 16 FOR -L- PROFILE
SEE SHEET 24 FOR -Y2- PROFILE

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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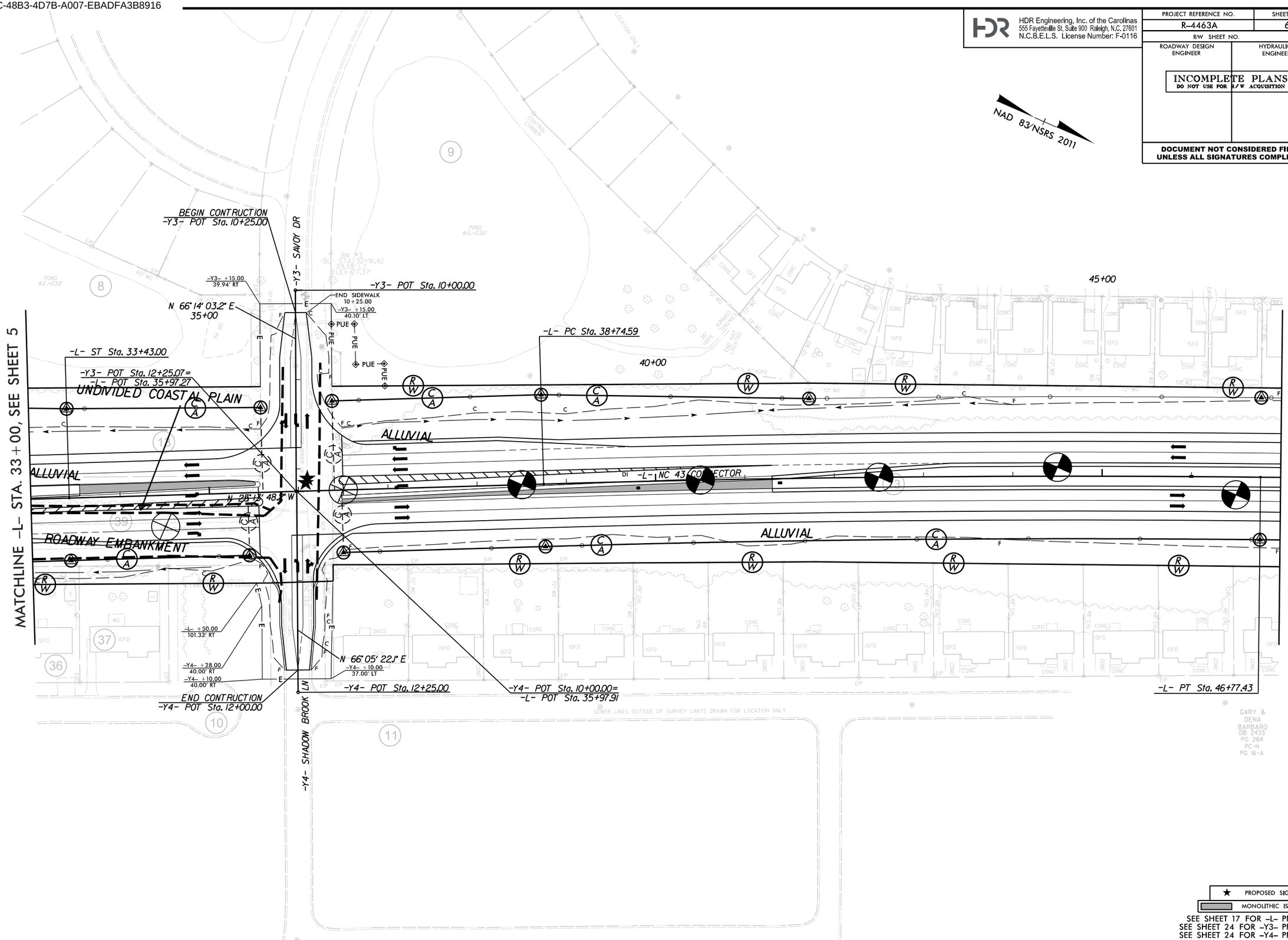

★ PROPOSED SIGNAL
MONOLITHIC ISLAND

SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 24 FOR -Y3- PROFILE
SEE SHEET 24 FOR -Y4- PROFILE

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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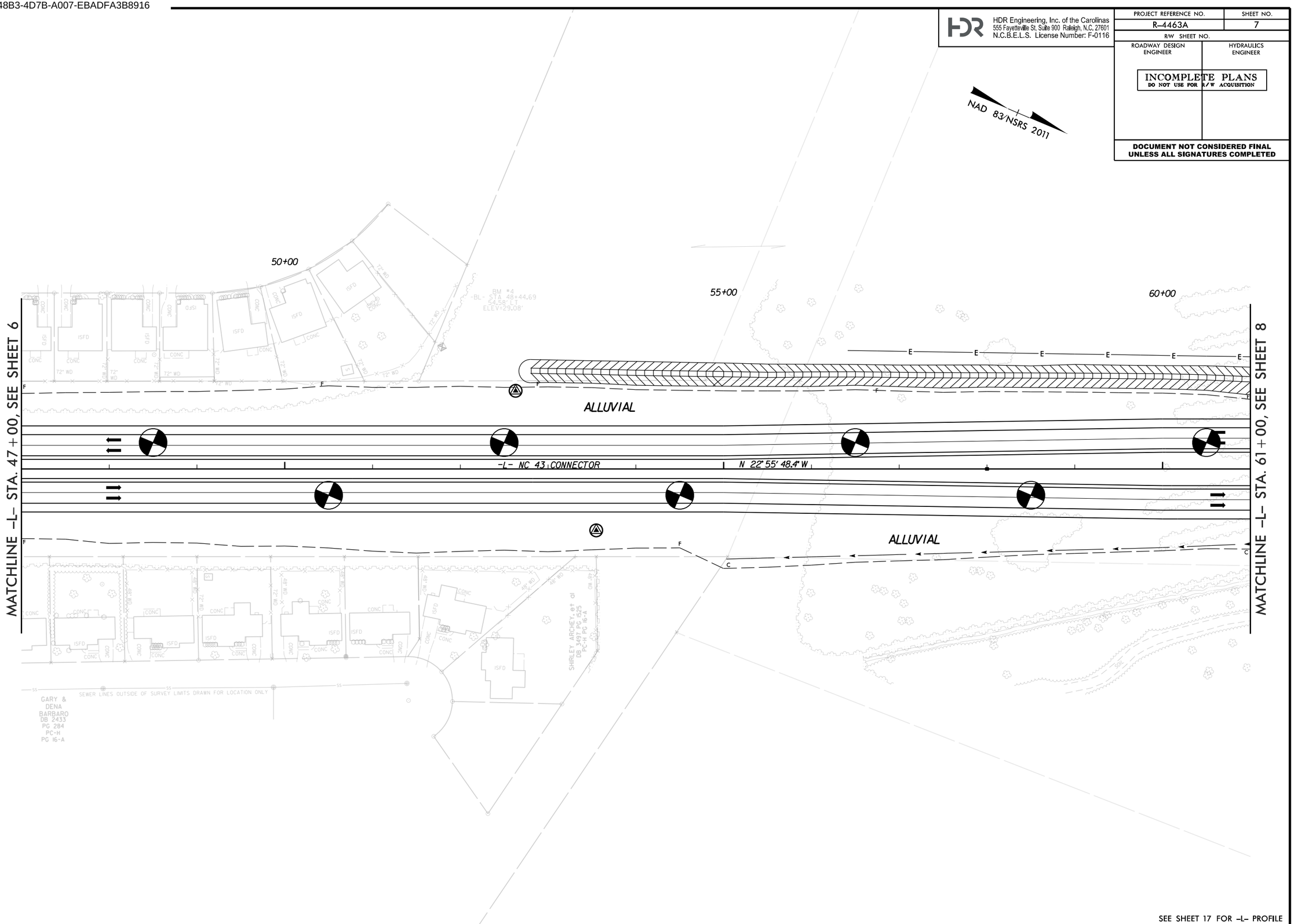

SEE SHEET 17 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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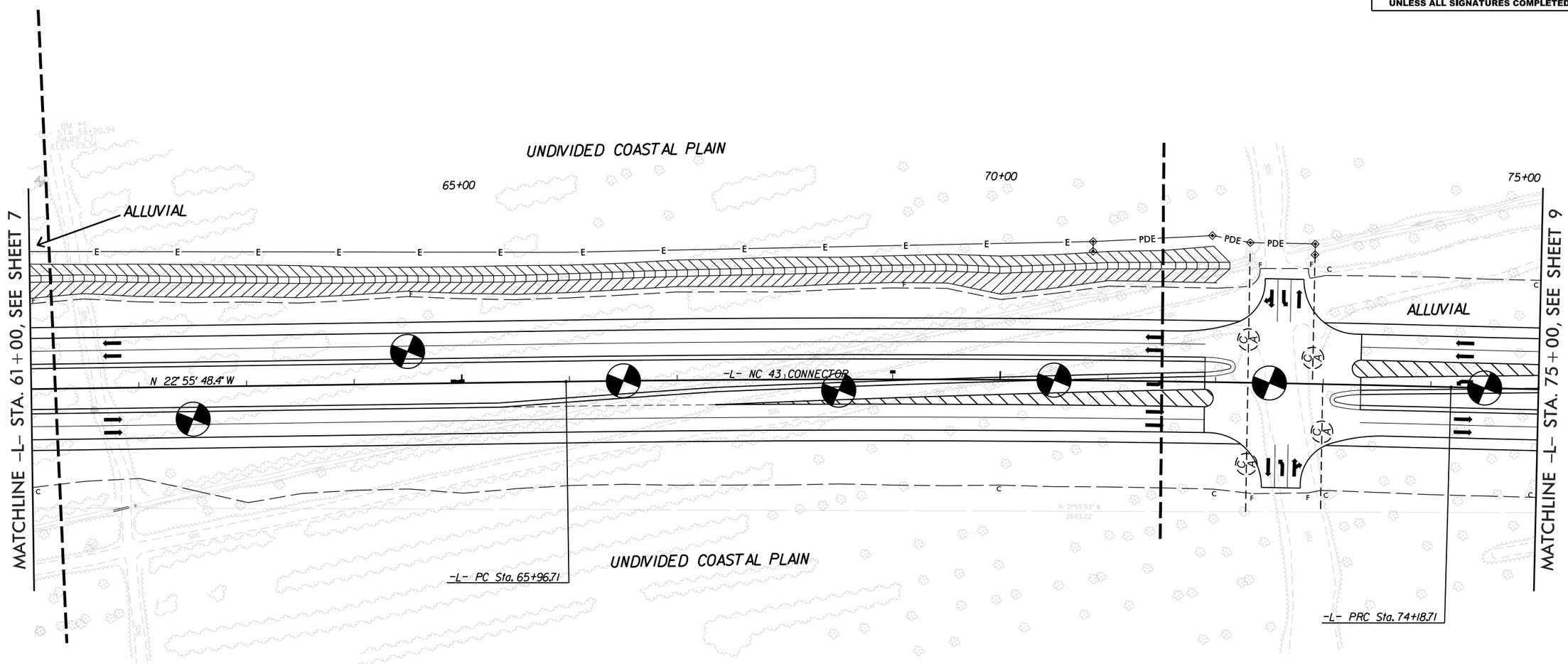

MONOLITHIC ISLAND

SEE SHEET 18 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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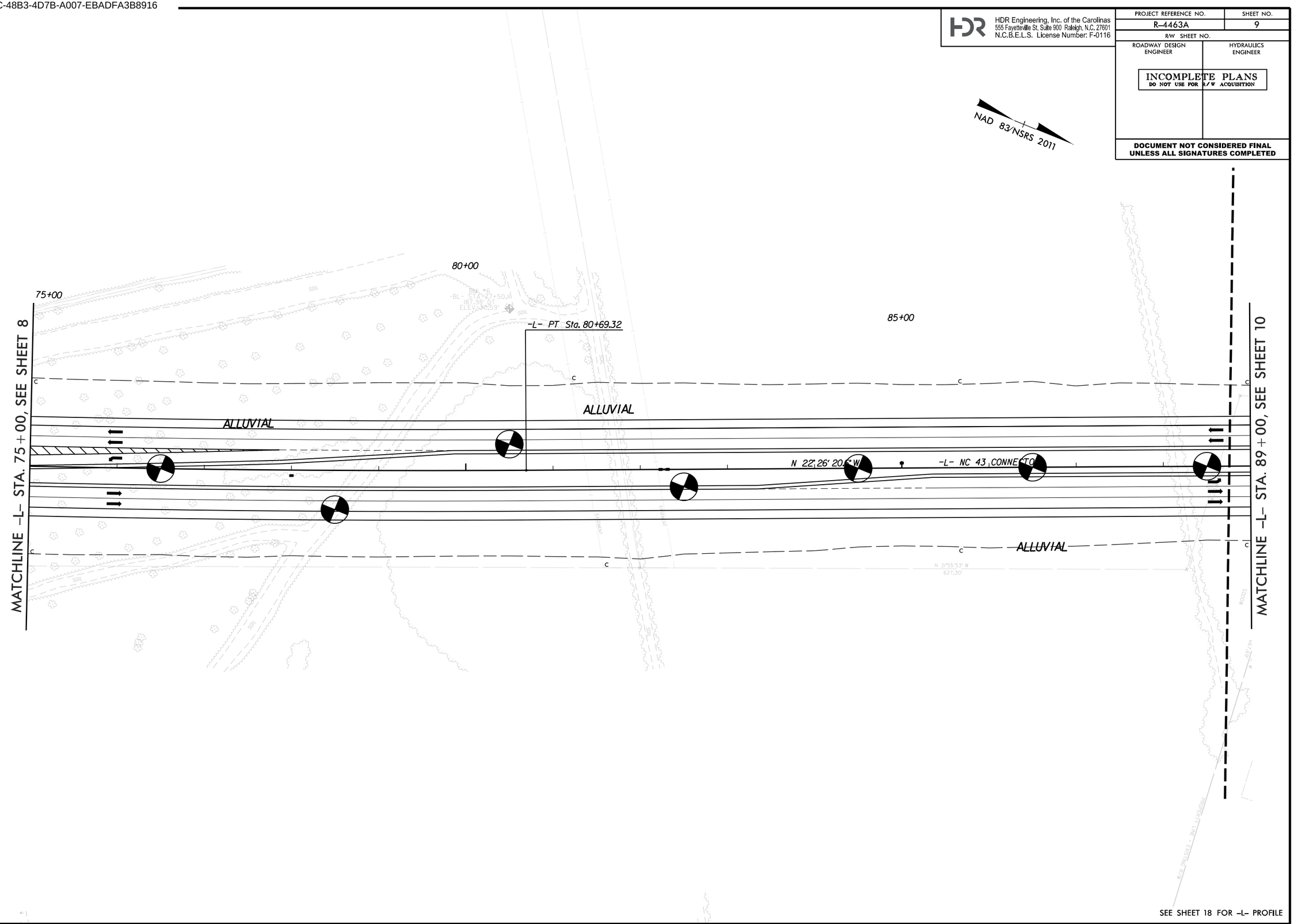

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R-4463A	10
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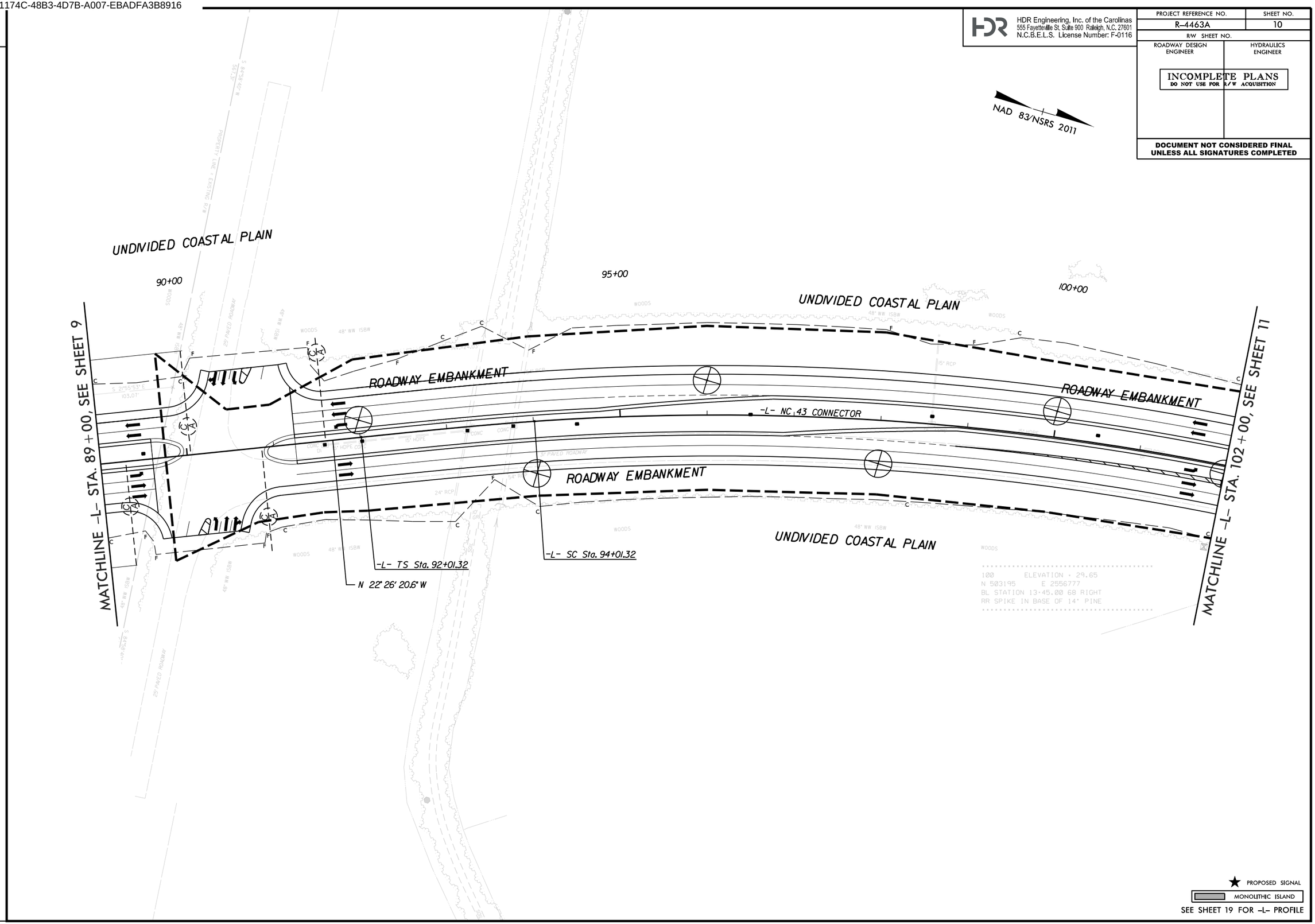

SEE SHEET 19 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	11
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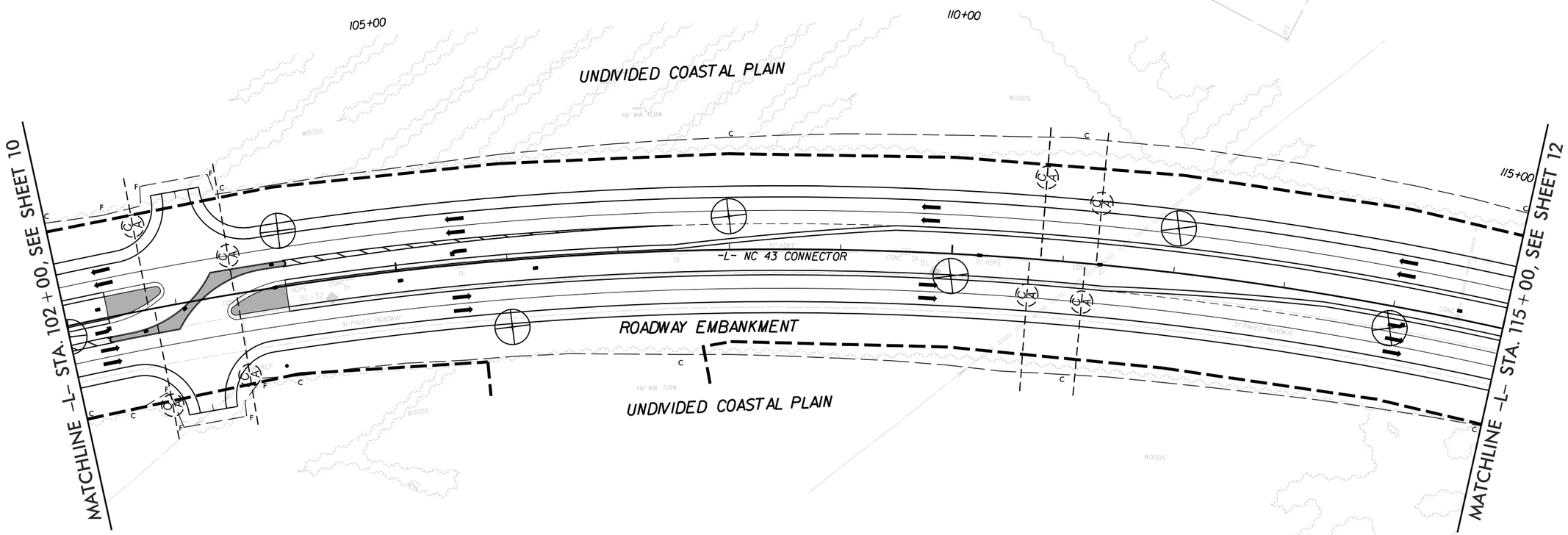

MONOLITHIC ISLAND

SEE SHEET 19 FOR -L- PROFILE

REVISIONS

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

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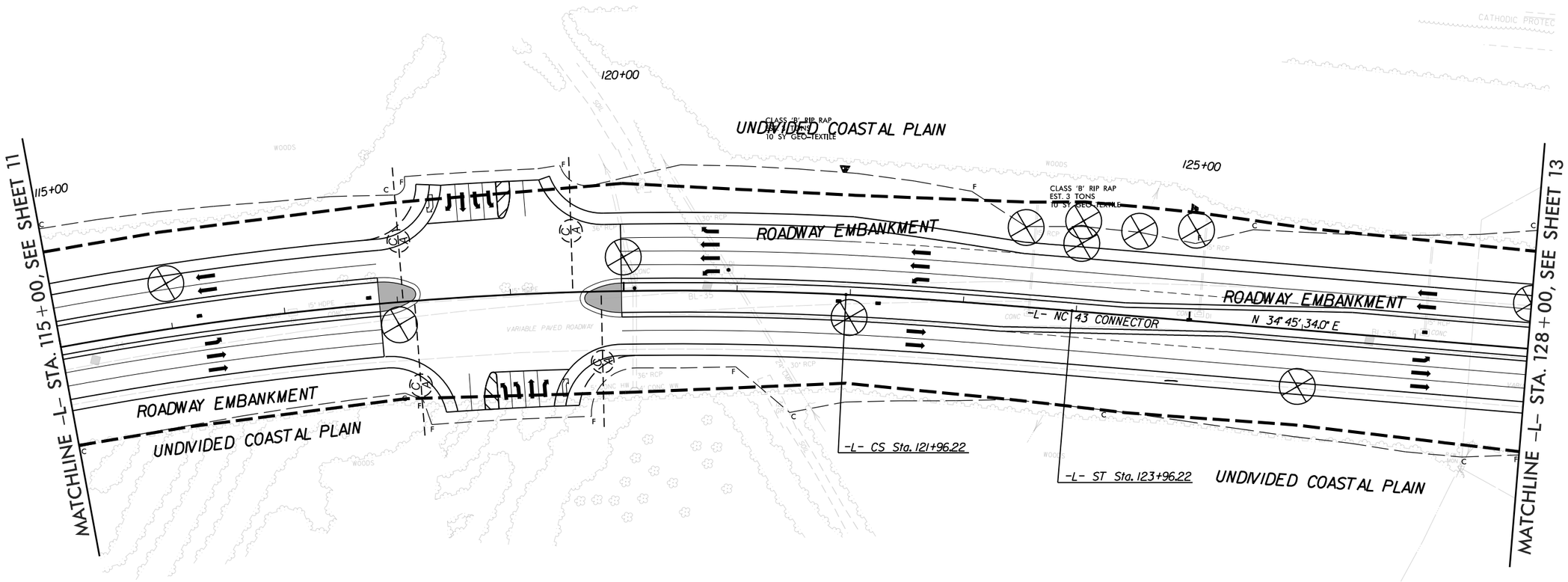

PROPOSED SIGNAL
MONOLITHIC ISLAND

SEE SHEET 20 FOR -L- PROFILE

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R-4463A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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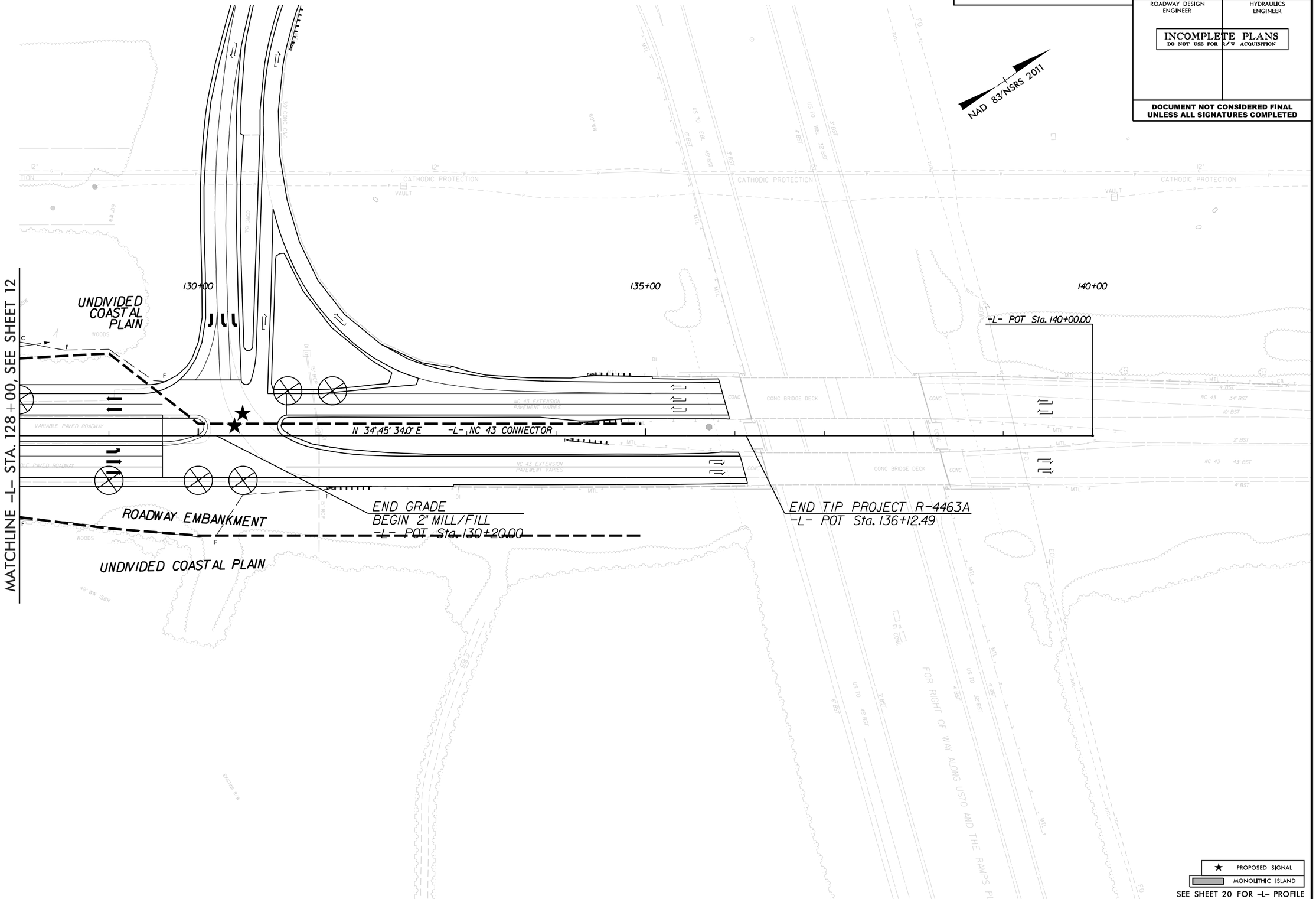

★ PROPOSED SIGNAL
MONOLITHIC ISLAND

SEE SHEET 20 FOR -L- PROFILE

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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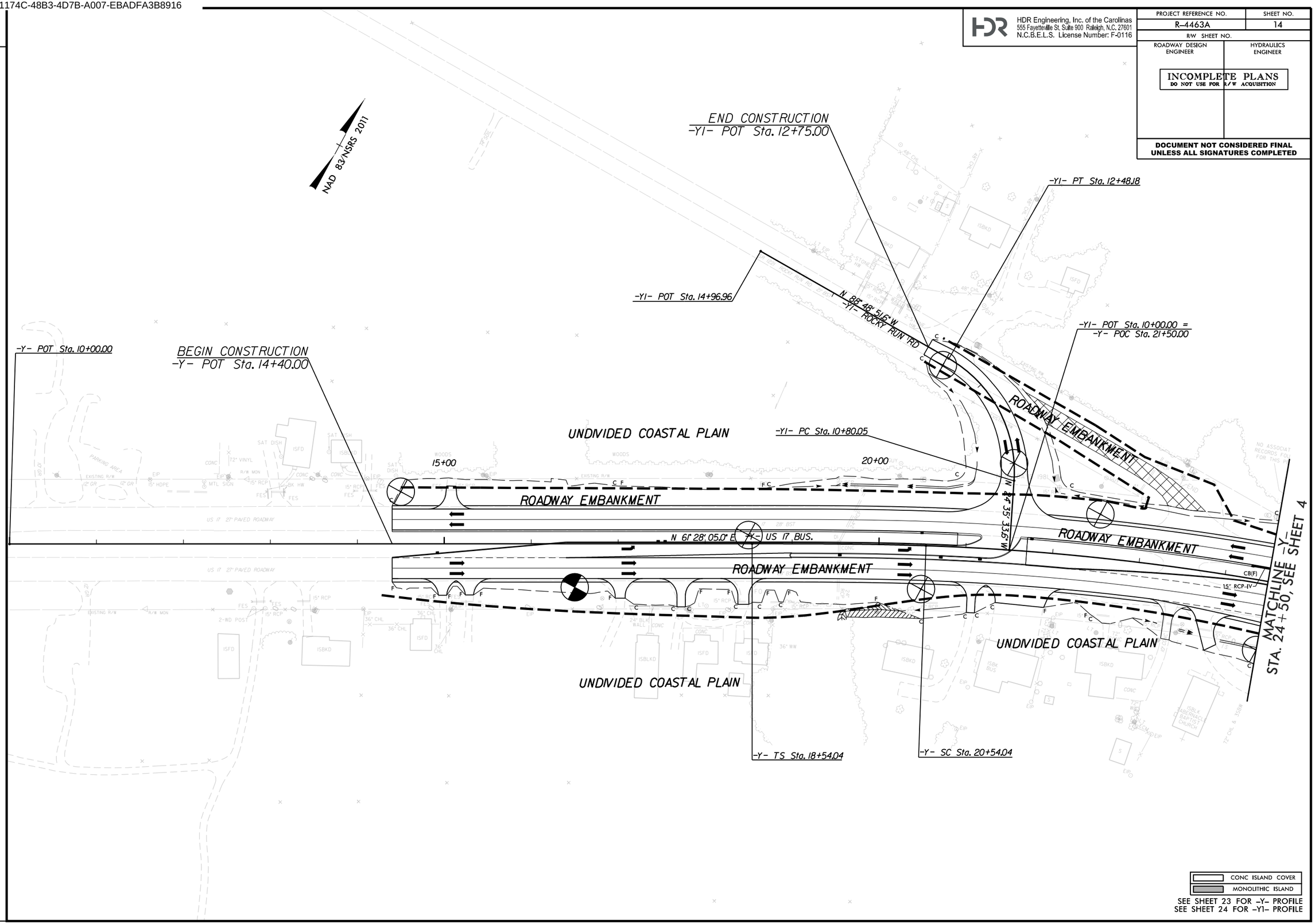

SEE SHEET 23 FOR -Y- PROFILE
SEE SHEET 24 FOR -Y1- PROFILE

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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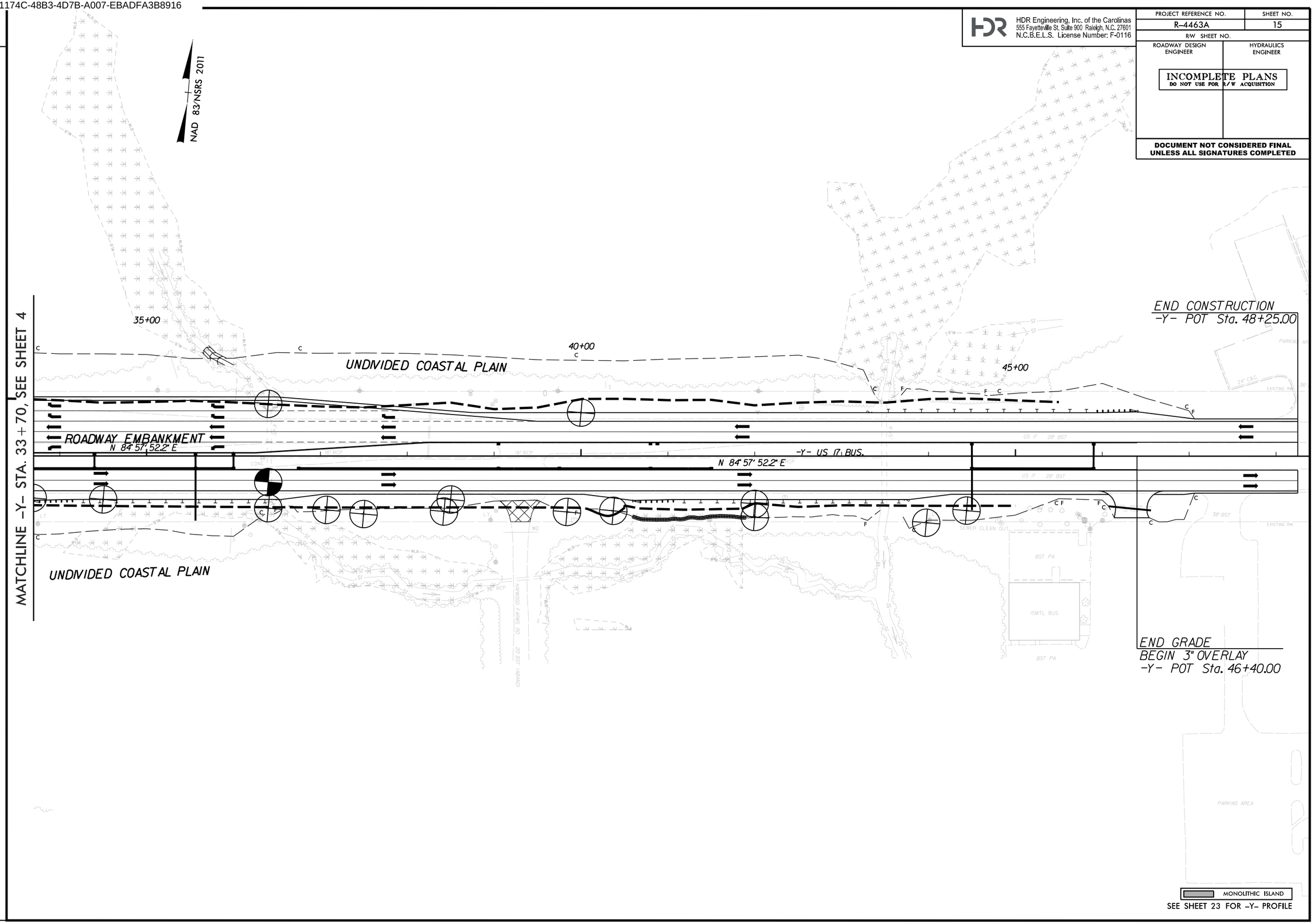

REVISIONS

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N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-4463A	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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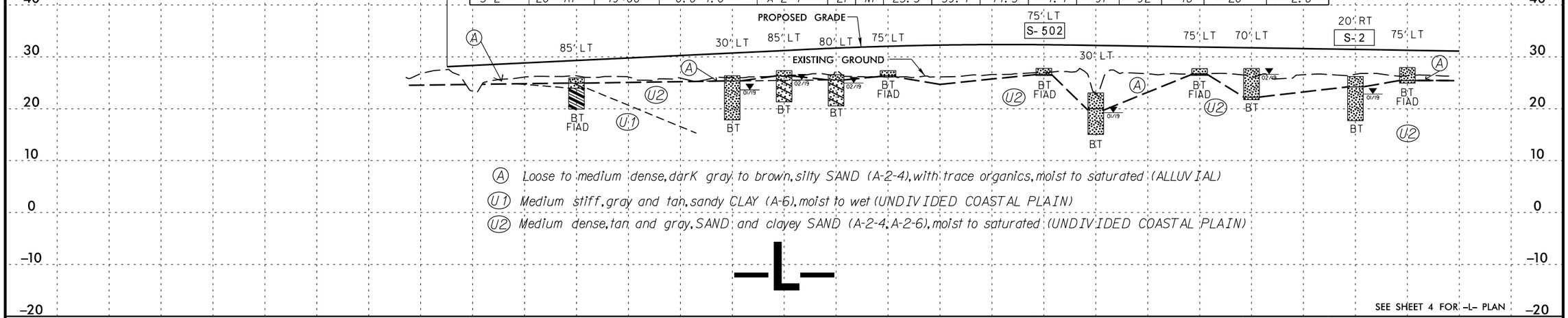
BEGIN GRADE
-L- STA. 10+25.49 =
-Y- STA. 31+19.14
(OFFSET: 12.00' LT)
EL. = 28.10'

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-502	75' LT	16+00	0.0-1.2	A-2-4	NP	NP	46.0	40.8	11.2	2.0	99	92	14	15	2.9
S-2	20' RT	19+00	0.0-1.0	A-2-4	27	NP	25.3	59.1	11.5	4.1	97	92	18	20	2.8



(A) Loose to medium dense, dark gray to brown, silty SAND (A-2-4), with trace organics, moist to saturated (ALLUVIAL)

(U1) Medium stiff, gray and tan, sandy CLAY (A-6), moist to wet (UNDIVIDED COASTAL PLAIN)

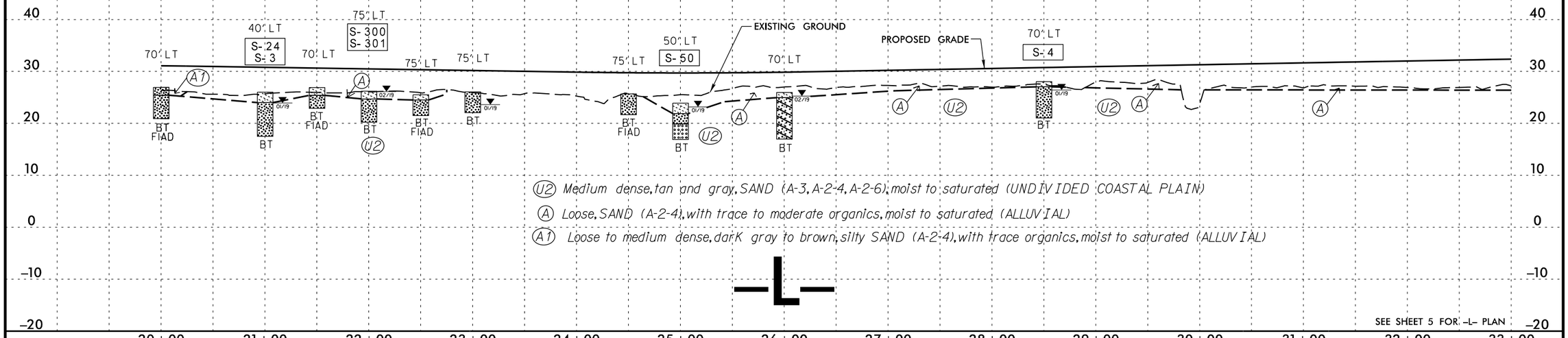
(U2) Medium dense, tan and gray, SAND and clayey SAND (A-2-4, A-2-6), moist to saturated (UNDIVIDED COASTAL PLAIN)

-L-

SEE SHEET 4 FOR -L- PLAN

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-24	40' LT	21+00	0.0-1.0	A-2-4	33	NP	24.0	51.1	21.6	3.3	100	94	26	33	8.1
S-3	40' LT	21+00	2.0-3.0	A-2-4	20	4	21.3	53.8	8.7	16.2	100	97	28	22	-
S-300	75' LT	22+00	0.0-2.0	A-2-4	NP	NP	16.8	63.9	16.2	3.1	100	98	22	11	4.9
S-301	75' LT	22+00	2.0-4.0	A-2-4	NP	NP	17.4	62.5	8.9	11.2	100	98	23	8	1.8
S-50	50' LT	25+00	0.0-1.0	A-2-4	40	NP	23.9	60.0	12.5	3.6	100	89	18	18	9.3
S-4	70' LT	28+50	1.0-2.0	A-2-4	24	4	24.4	51.9	11.2	12.5	100	93	24	21	-



(U2) Medium dense, tan and gray, SAND (A-3, A-2-4, A-2-6), moist to saturated (UNDIVIDED COASTAL PLAIN)

(A) Loose, SAND (A-2-4), with trace to moderate organics, moist to saturated (ALLUVIAL)

(A1) Loose to medium dense, dark gray to brown, silty SAND (A-2-4), with trace organics, moist to saturated (ALLUVIAL)

-L-

SEE SHEET 5 FOR -L- PLAN

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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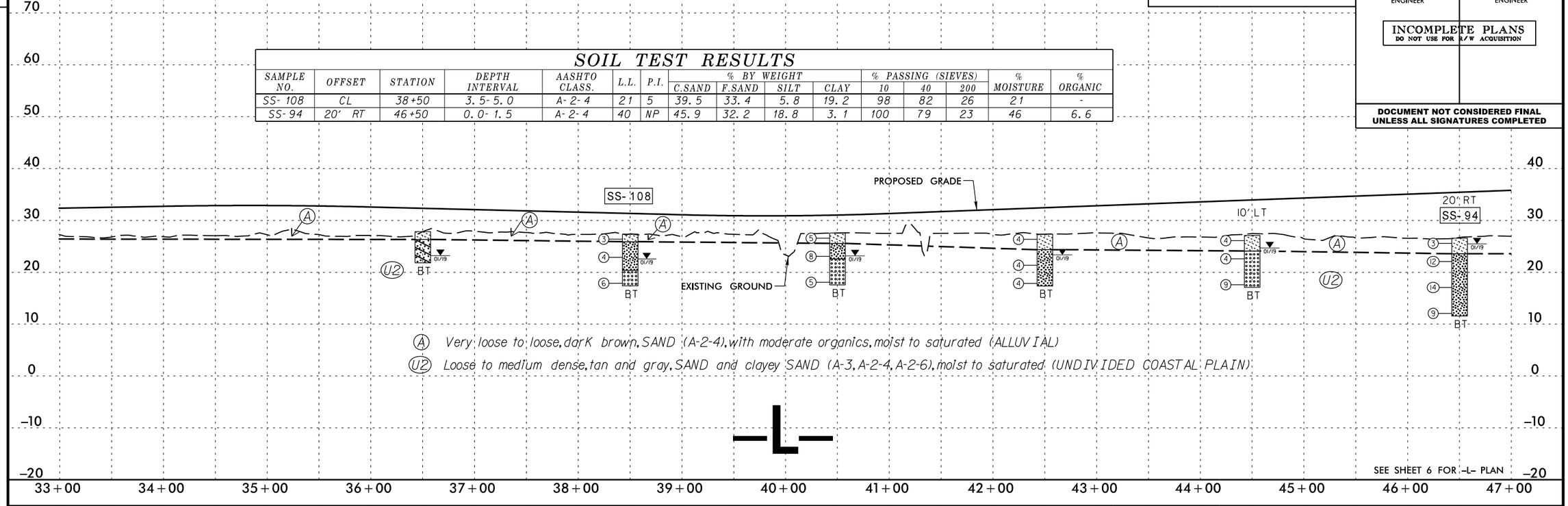
REVISIONS

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-108	CL	38+50	3.5-5.0	A-2-4	21	5	39.5	33.4	5.8	19.2	98	82	26	21	-
SS-94	20' RT	46+50	0.0-1.5	A-2-4	40	NP	45.9	32.2	18.8	3.1	100	79	23	46	6.6



A Very loose to loose, dark brown, SAND (A-2-4), with moderate organics, moist to saturated (ALLUVIAL)

U2 Loose to medium dense, tan and gray, SAND and clayey SAND (A-3, A-2-4, A-2-6), moist to saturated (UNDIVIDED COASTAL PLAIN)

SEE SHEET 6 FOR -L- PLAN

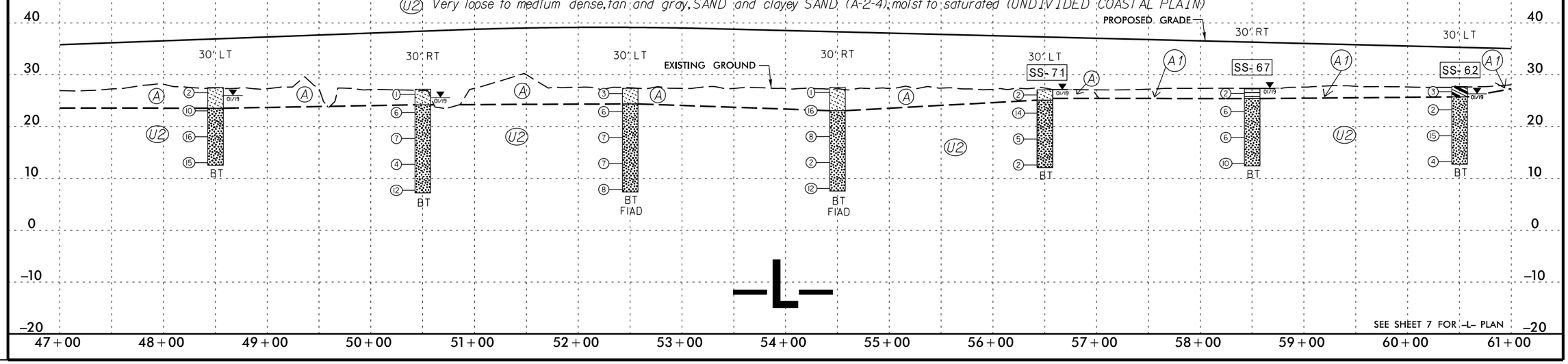
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-71	30' LT	56+50	0.0-1.5	A-2-4	NP	NP	40.9	36.4	13.5	9.2	99	80	23	35	8.4
SS-67	30' RT	58+50	0.0-1.5	A-4	36	NP	32.3	31.0	27.3	9.2	100	84	38	44	6.1
SS-62	30' LT	60+50	0.0-1.5	A-6(1)	35	12	26.8	35.9	16.1	21.2	99	87	38	24	4.7

A Very loose, tan and gray, silty SAND (A-2-4), contains little to moderate organics, moist to saturated (ALLUVIAL)

A1 Soft, tan and gray, silty SILT and CLAY (A-4, A-6), contains trace to little organics, moist to saturated (ALLUVIAL)

U2 Very loose to medium dense, tan and gray, SAND and clayey SAND (A-2-4), moist to saturated (UNDIVIDED COASTAL PLAIN)



SEE SHEET 7 FOR -L- PLAN

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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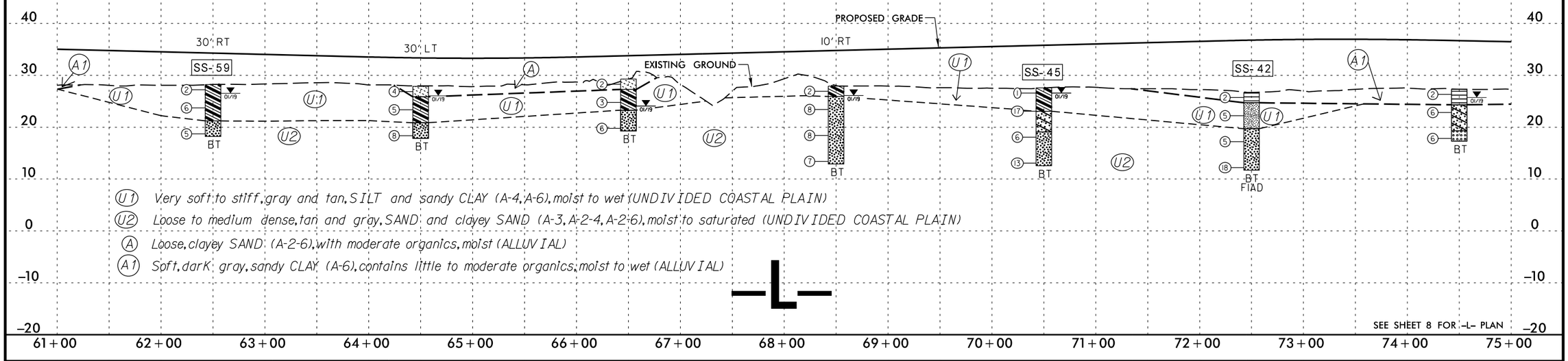
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-59	30' RT	62+50	0.0-1.5	A-6(3)	36	15	22.1	35.3	12.8	29.7	100	91	43	20	-
SS-45	CL	70+50	0.0-1.5	A-6 (3)	34	15	21.5	34.0	9.9	34.5	100	92	46	25	-
SS-42	CL	72+50	3.5-5.0	A-4 (0)	22	4	15.5	40.2	15.0	29.3	100	96	48	28	-



U1 Very soft to stiff, gray and tan, SILT and sandy CLAY (A-4, A-6), moist to wet (UNDIVIDED COASTAL PLAIN)

U2 Loose to medium dense, tan and gray, SAND and clayey SAND (A-3, A-2-4, A-2-6), moist to saturated (UNDIVIDED COASTAL PLAIN)

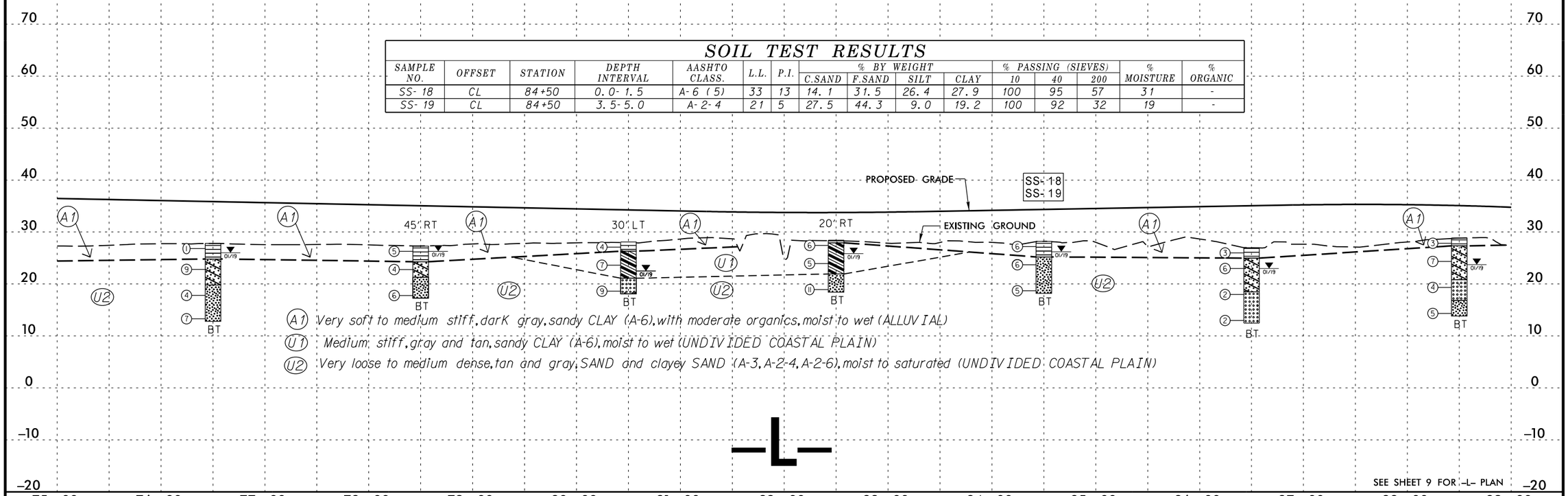
A Loose, clayey SAND (A-2-6), with moderate organics, moist (ALLUVIAL)

A1 Soft, dark gray, sandy CLAY (A-6), contains little to moderate organics, moist to wet (ALLUVIAL)

SEE SHEET 8 FOR -L- PLAN

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-18	CL	84+50	0.0-1.5	A-6 (5)	33	13	14.1	31.5	26.4	27.9	100	95	57	31	-
SS-19	CL	84+50	3.5-5.0	A-2-4	21	5	27.5	44.3	9.0	19.2	100	92	32	19	-



A1 Very soft to medium stiff, dark gray, sandy CLAY (A-6), with moderate organics, moist to wet (ALLUVIAL)

U1 Medium stiff, gray and tan, sandy CLAY (A-6), moist to wet (UNDIVIDED COASTAL PLAIN)

U2 Very loose to medium dense, tan and gray, SAND and clayey SAND (A-3, A-2-4, A-2-6), moist to saturated (UNDIVIDED COASTAL PLAIN)

SEE SHEET 9 FOR -L- PLAN

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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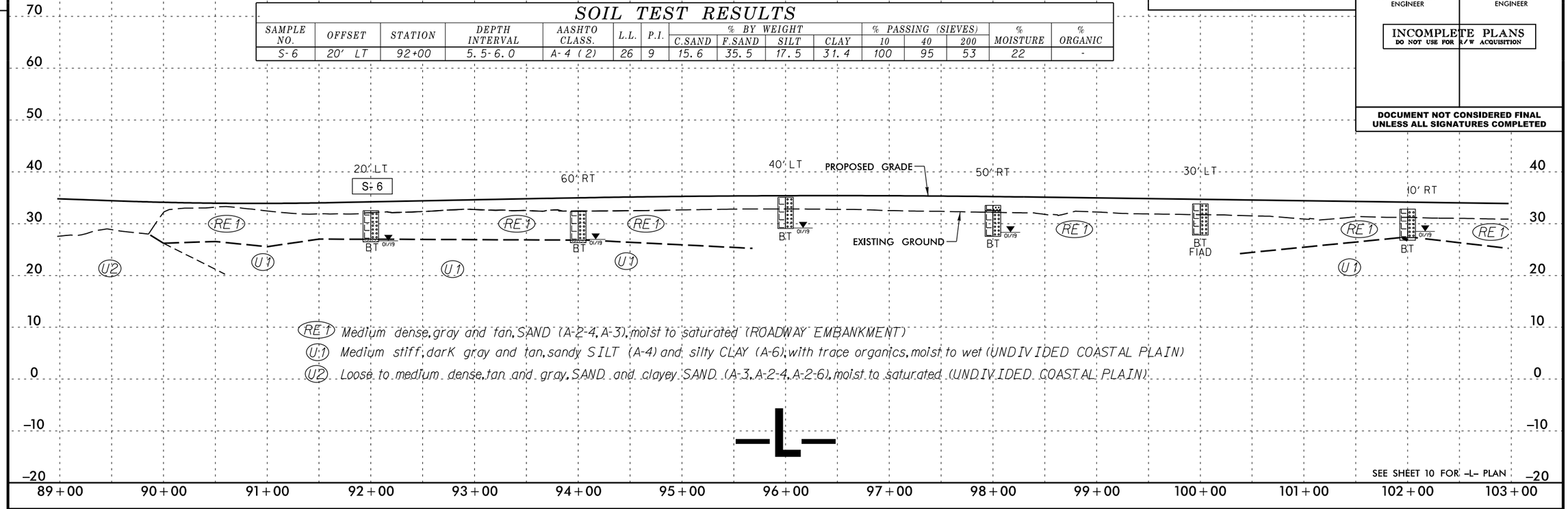
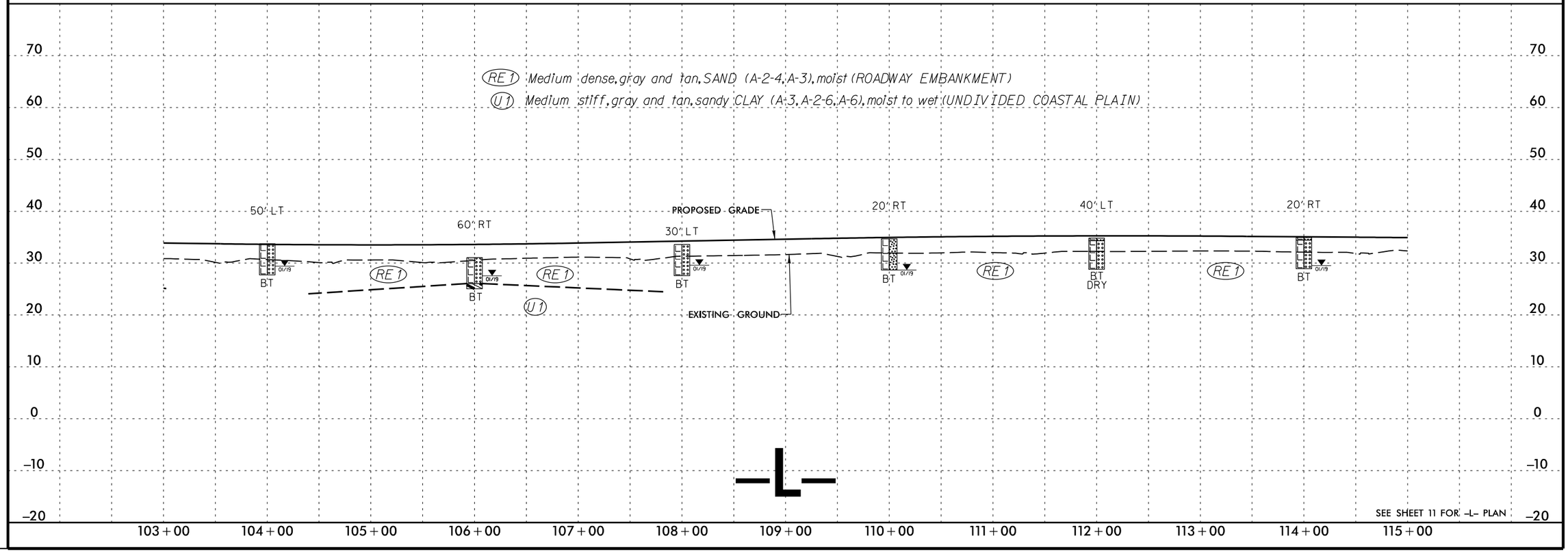
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-6	20' LT	92+00	5.5-6.0	A-4 (2)	26	9	15.6	35.5	17.5	31.4	100	95	53	22	-





REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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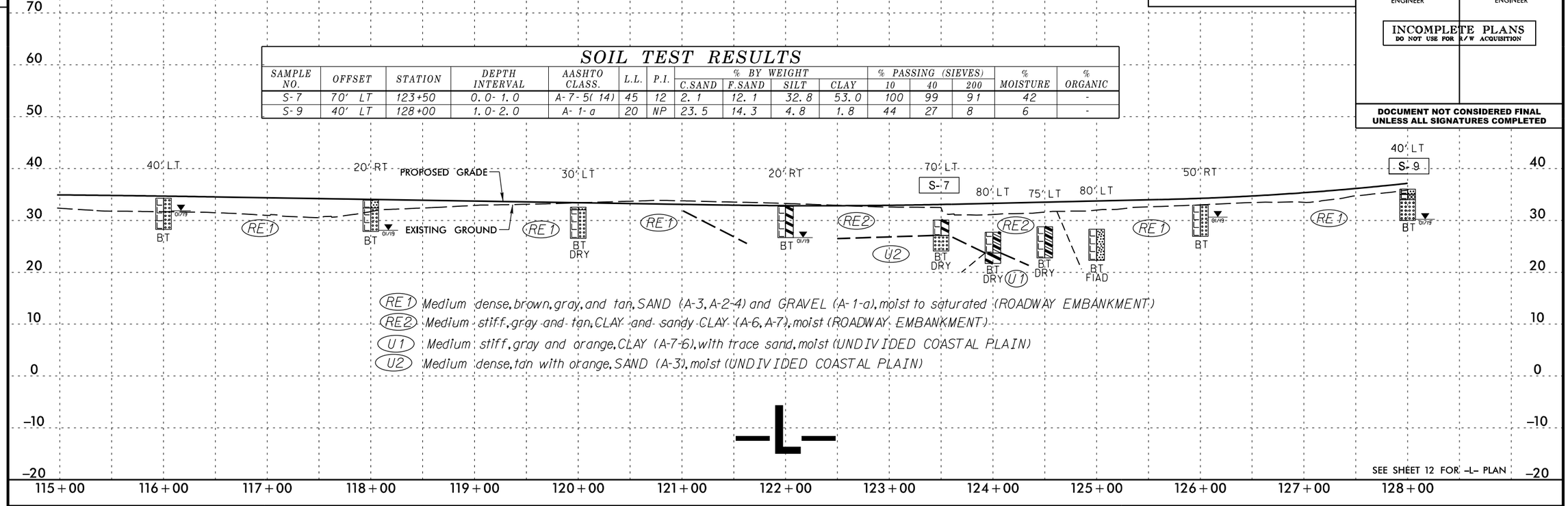
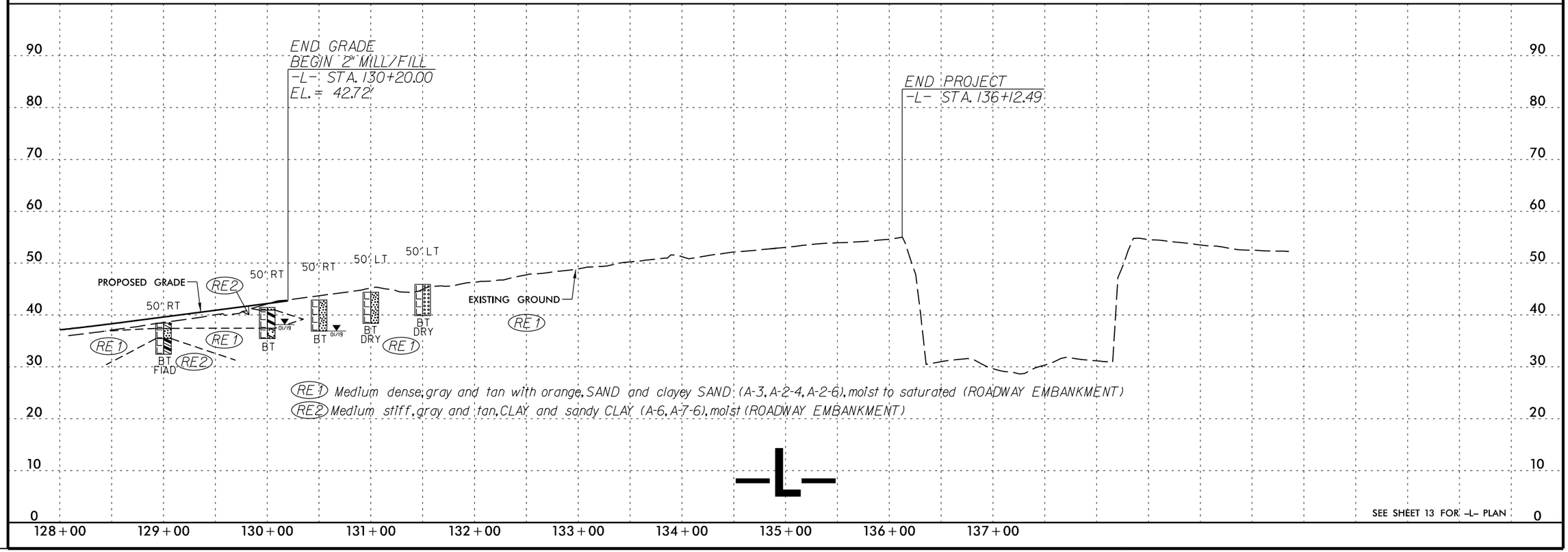
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-7	70' LT	123+50	0.0-1.0	A-7-5(14)	45	12	2.1	12.1	32.8	53.0	100	99	91	42	-
S-9	40' LT	128+00	1.0-2.0	A-1-a	20	NP	23.5	14.3	4.8	1.8	44	27	8	6	-



RE1 Medium dense, brown, gray, and tan, SAND (A-3, A-2-4) and GRAVEL (A-1-a), moist to saturated (ROADWAY EMBANKMENT)
RE2 Medium stiff, gray and tan, CLAY and sandy CLAY (A-6, A-7), moist (ROADWAY EMBANKMENT)
U1 Medium stiff, gray and orange, CLAY (A-7-6), with trace sand, moist (UNDIVIDED COASTAL PLAIN)
U2 Medium dense, tan with orange, SAND (A-3), moist (UNDIVIDED COASTAL PLAIN)



RE1 Medium dense, gray and tan with orange, SAND and clayey SAND (A-3, A-2-4, A-2-6), moist to saturated (ROADWAY EMBANKMENT)
RE2 Medium stiff, gray and tan, CLAY and sandy CLAY (A-6, A-7-6), moist (ROADWAY EMBANKMENT)

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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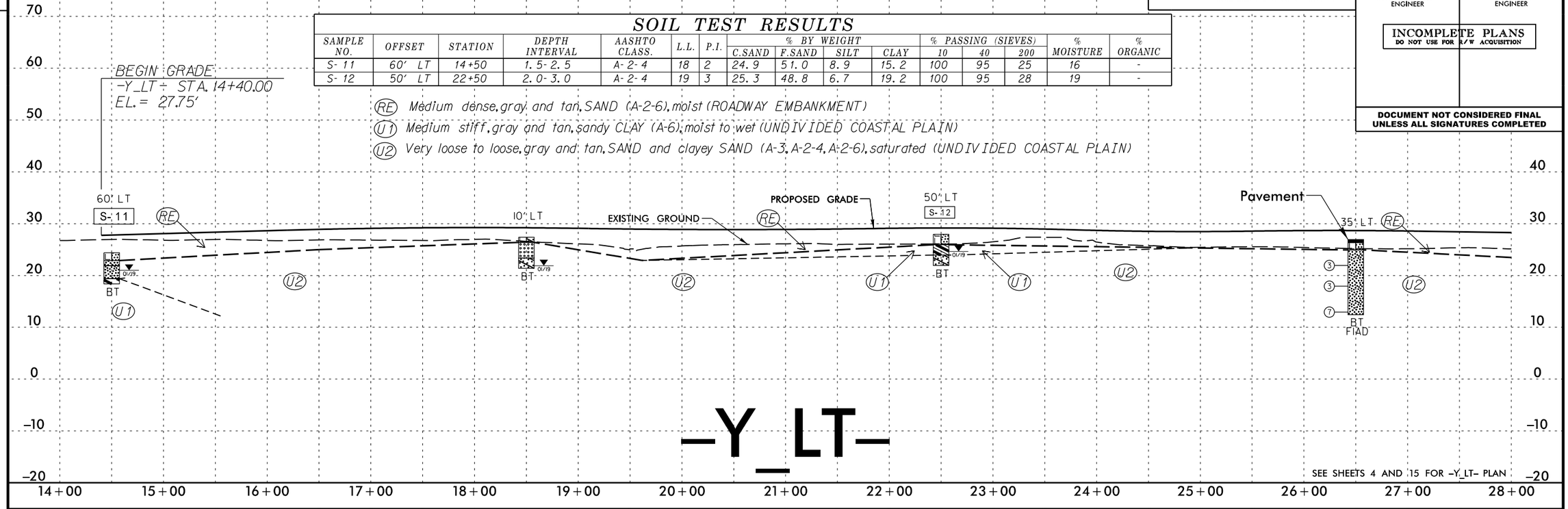
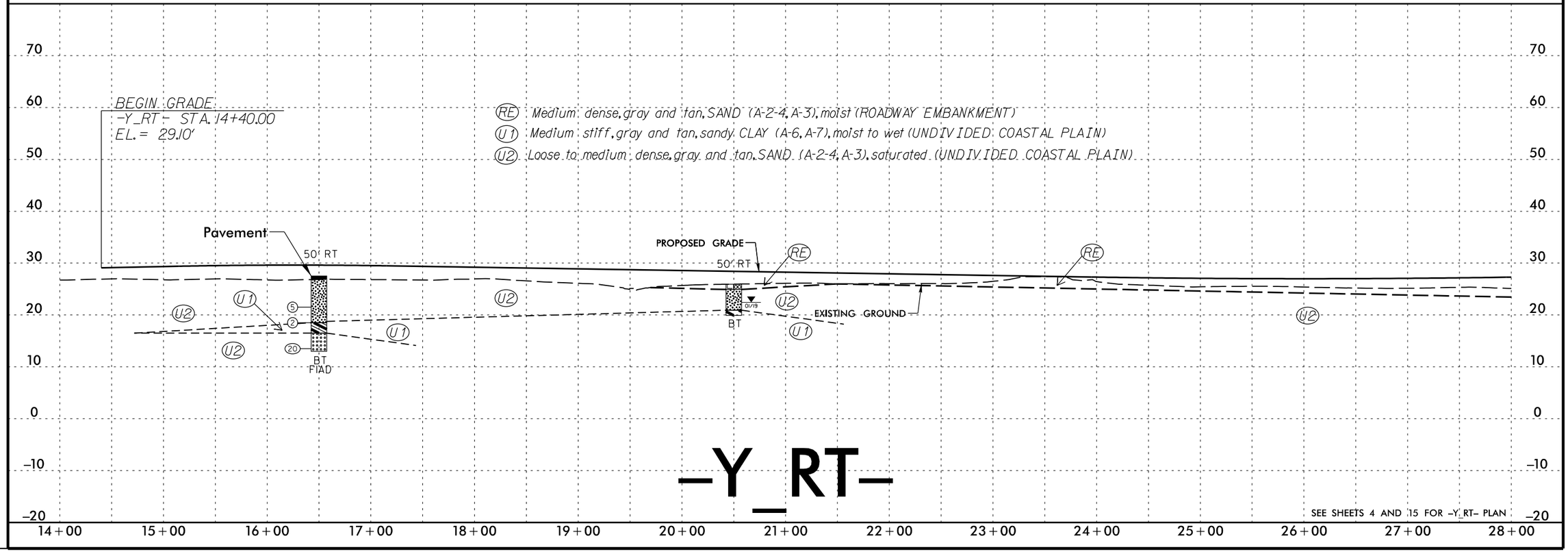
SOIL TEST RESULTS

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-11	60' LT	14+50	1.5-2.5	A-2-4	18	2	24.9	51.0	8.9	15.2	100	95	25	16	-
S-12	50' LT	22+50	2.0-3.0	A-2-4	19	3	25.3	48.8	6.7	19.2	100	95	28	19	-





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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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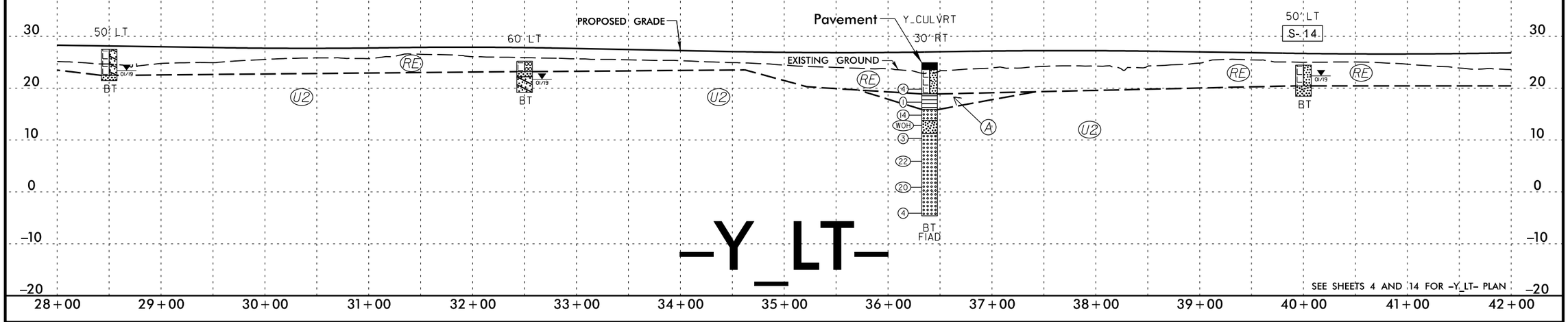
SOIL TEST RESULTS

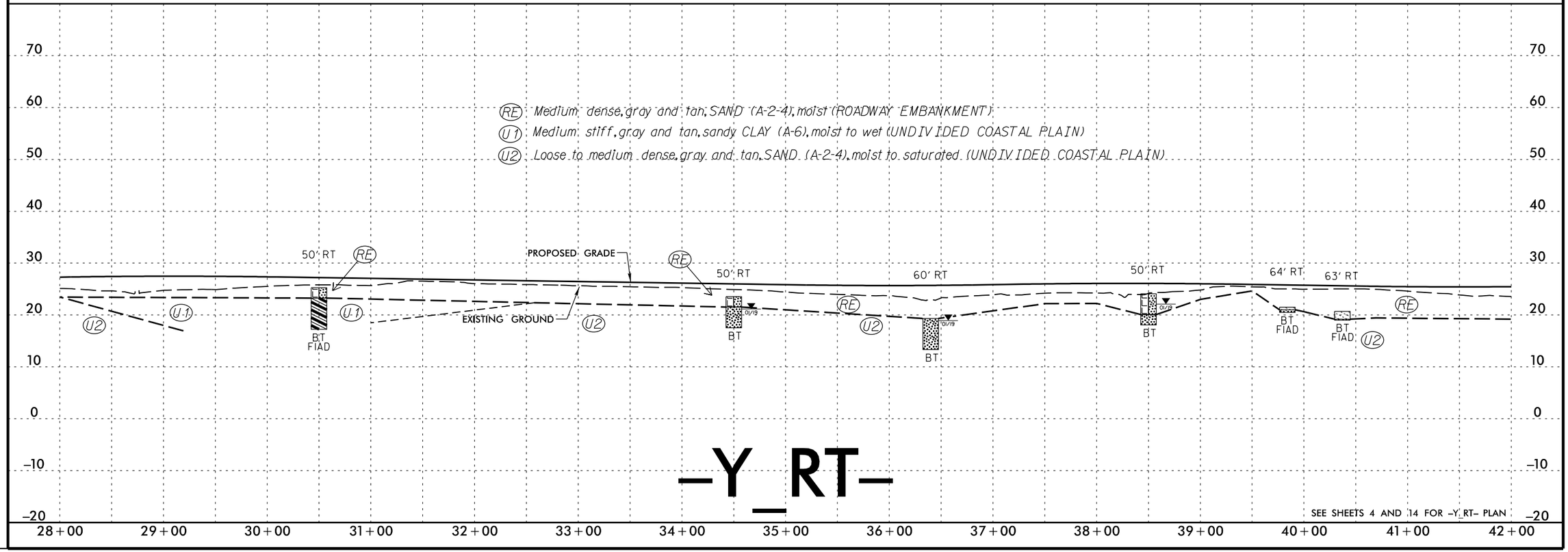
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-14	50' LT	40+00	2.0-3.0	A-2-4	22	6	21.9	54.0	12.0	12.1	100	93	27	18	-

(RE) Medium dense, gray and tan, SAND (A-2-4, A-2-6, A-1-b), moist to saturated (ROADWAY EMBANKMENT)
(U2) Medium dense, gray and tan, SAND (A-2-4, A-3), saturated (UNDIVIDED COASTAL PLAIN)
(A) Very soft, gray SILT (A-4), contains little organics, moist to wet (ALLUVIAL)



-Y_LT-

SEE SHEETS 4 AND 14 FOR -Y_LT- PLAN



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SEE SHEETS 4 AND 14 FOR -Y_RT- PLAN

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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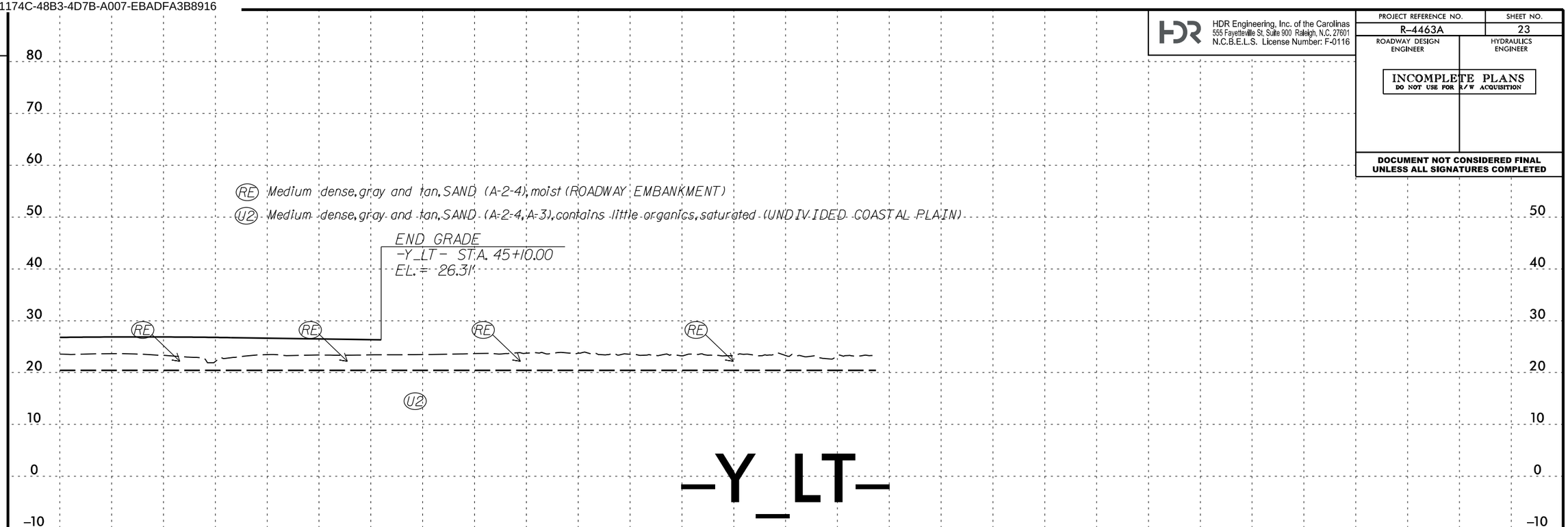

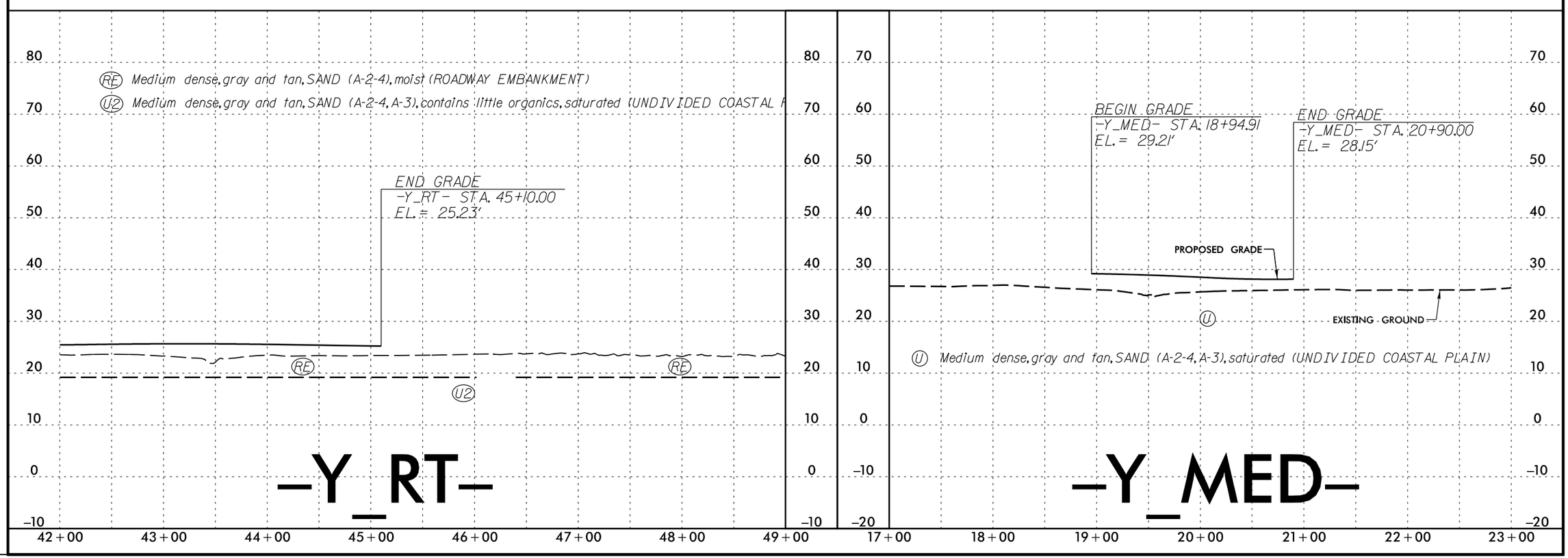

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PROJECT REFERENCE NO.	SHEET NO.
R-4463A	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

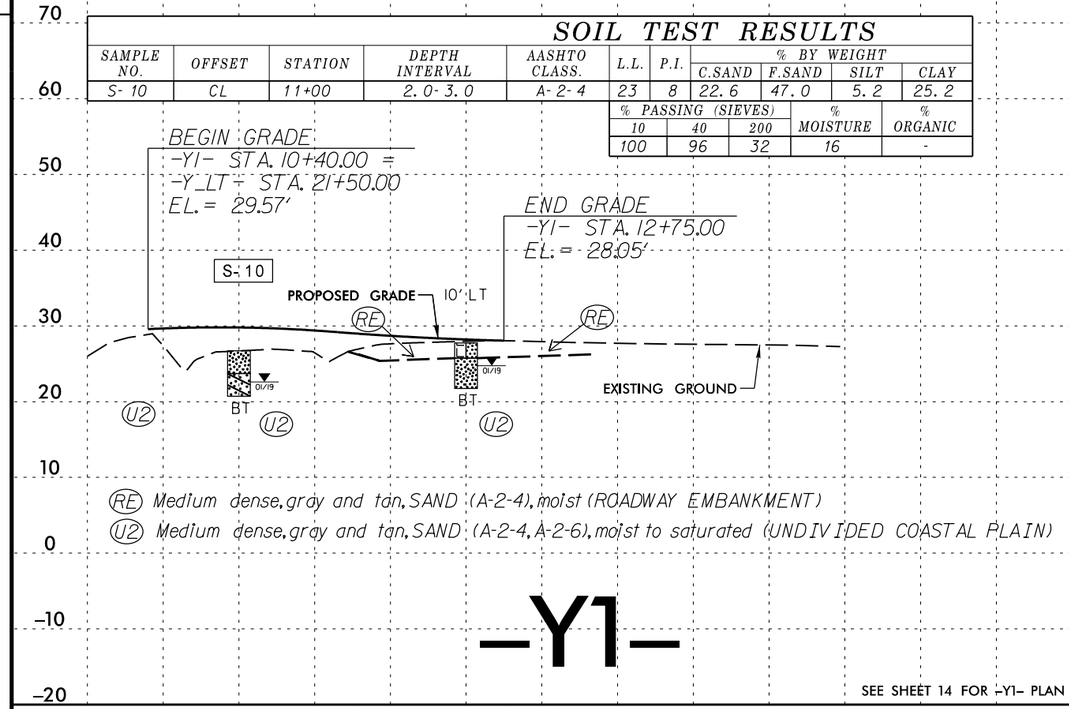
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

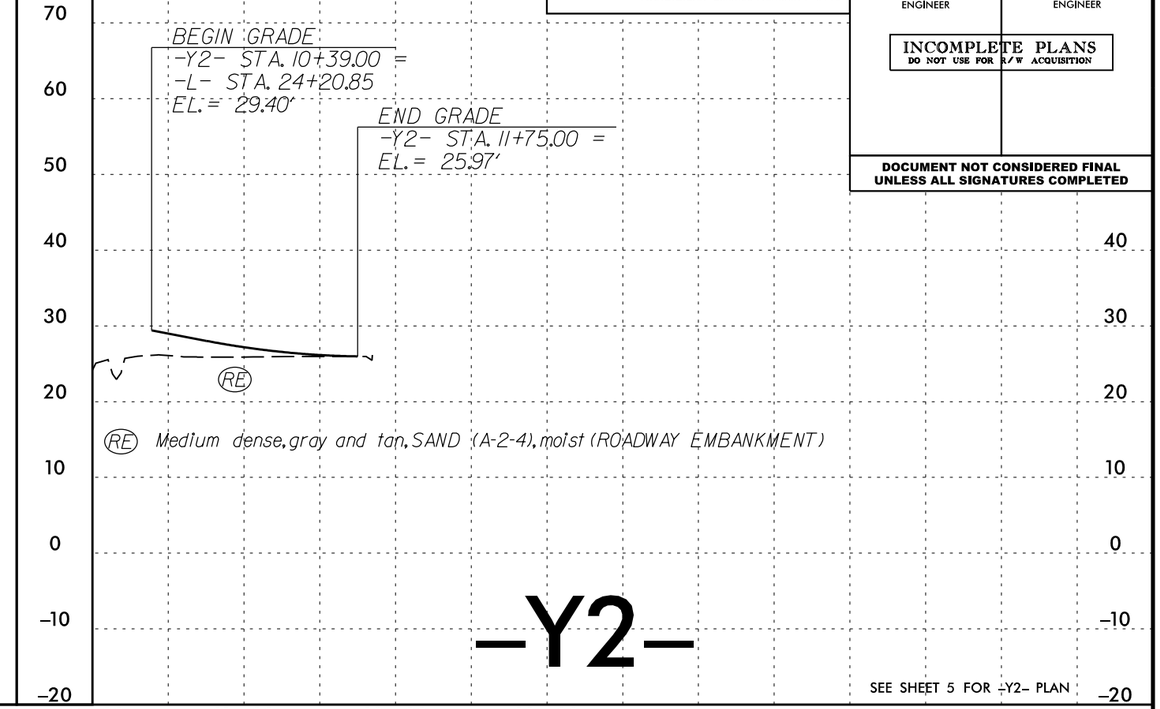
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

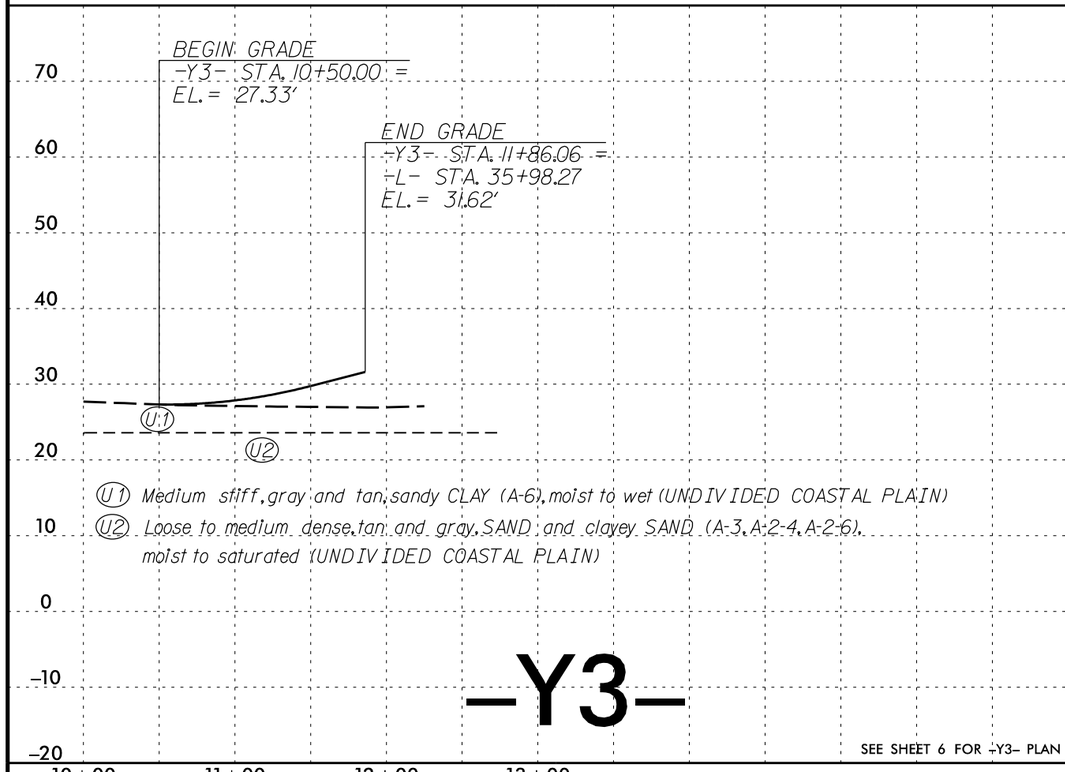
SOIL TEST RESULTS

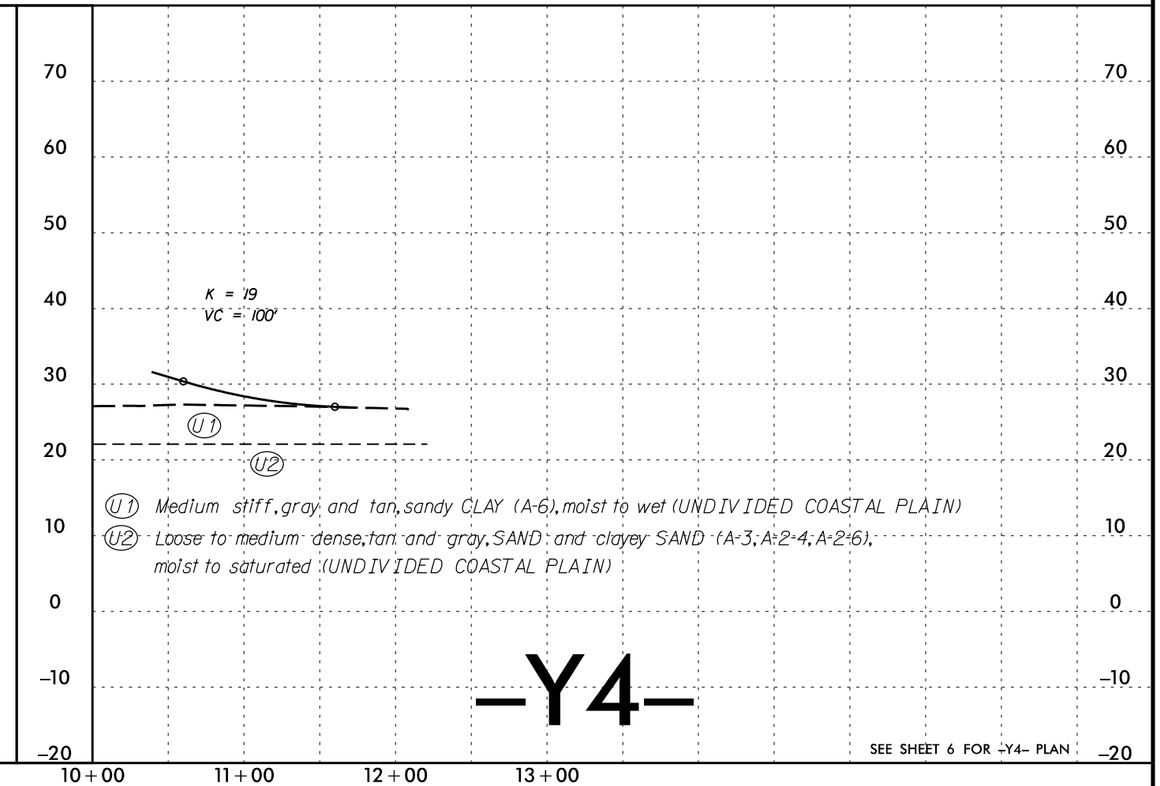
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY
S-10	CL	11+00	2.0-3.0	A-2-4	23	8	22.6	47.0	5.2	25.2

% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
100	96	32	16	-









REVISIONS

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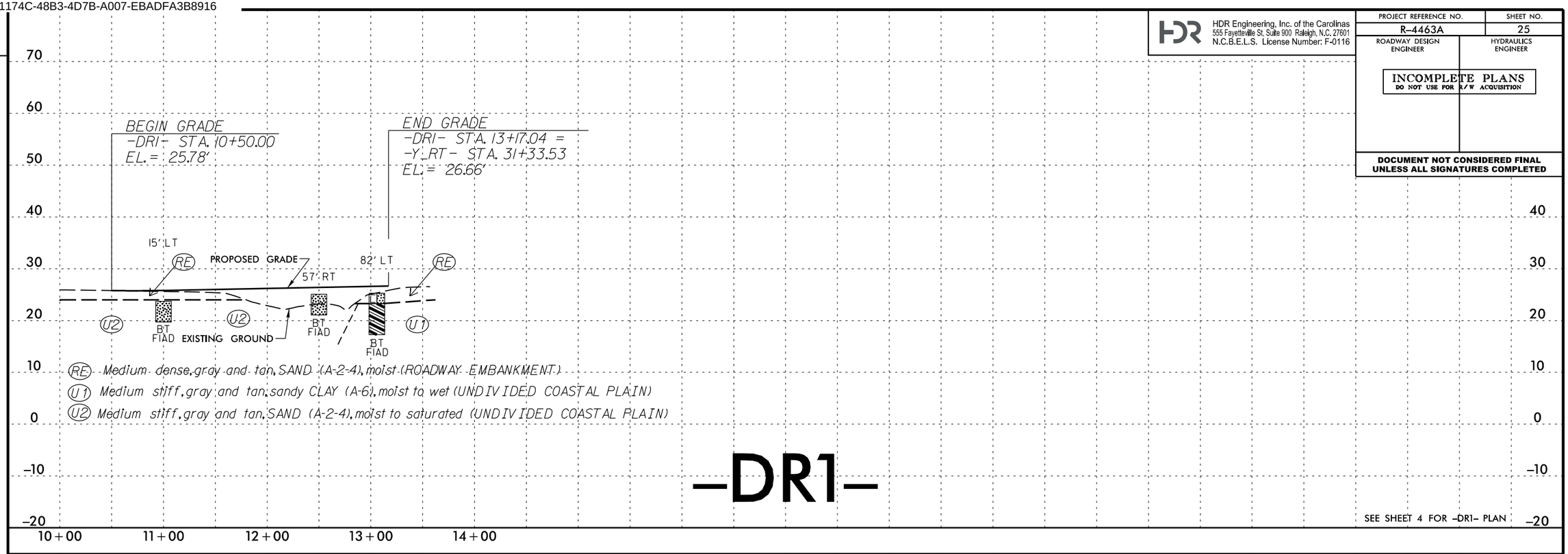
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

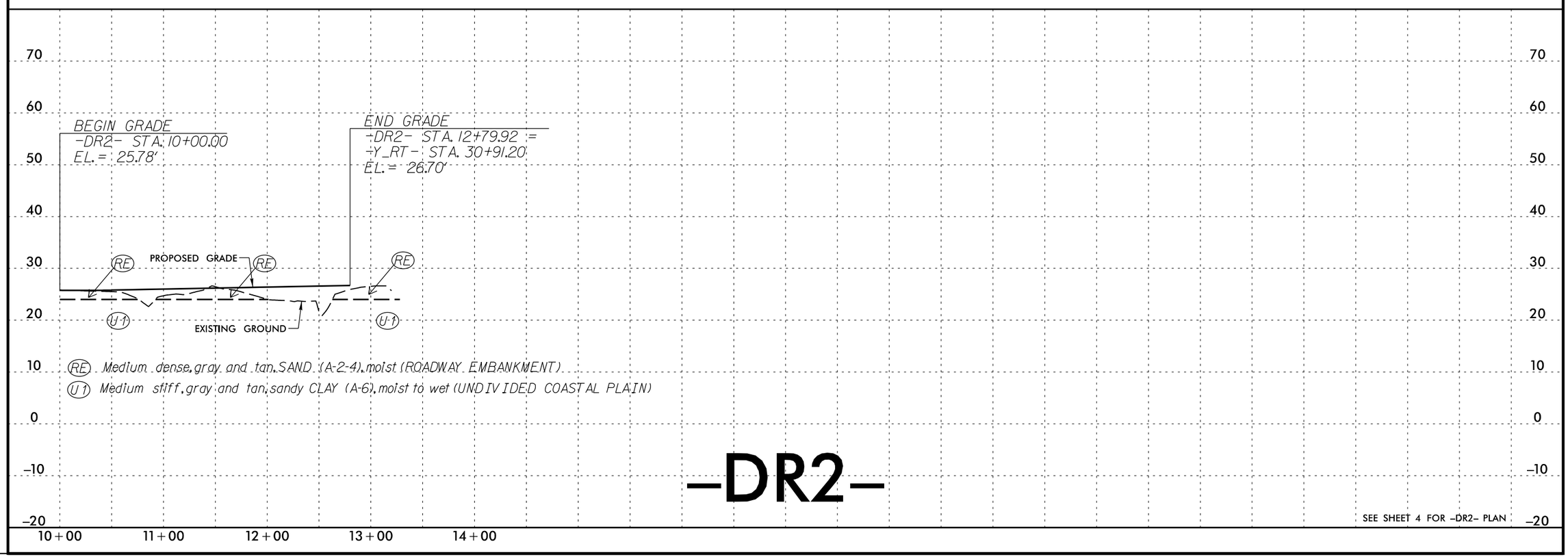
PROJECT REFERENCE NO.	SHEET NO.
R-4463A	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 4 FOR -DR1- PLAN



SEE SHEET 4 FOR -DR2- PLAN

REVISIONS

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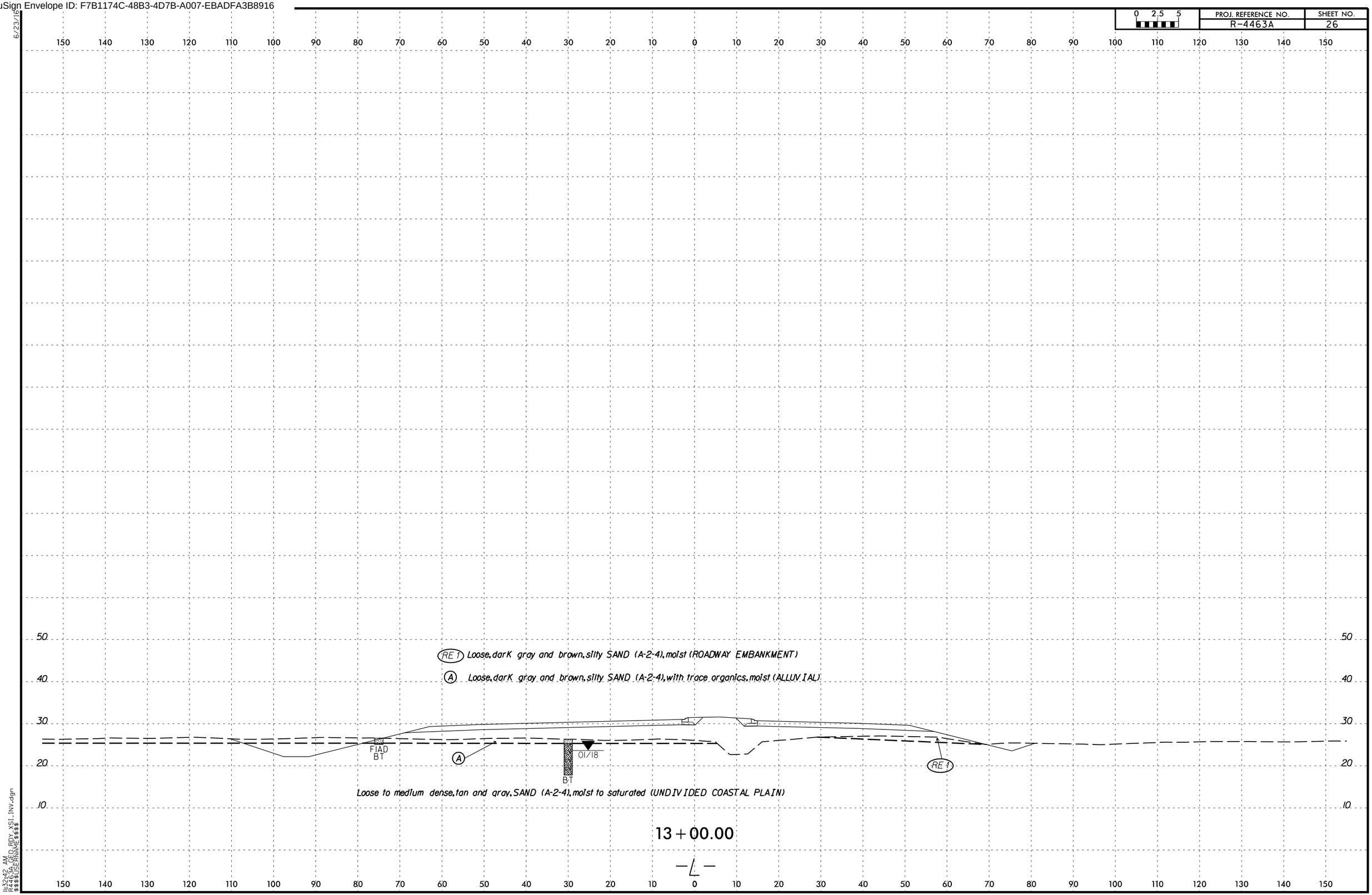

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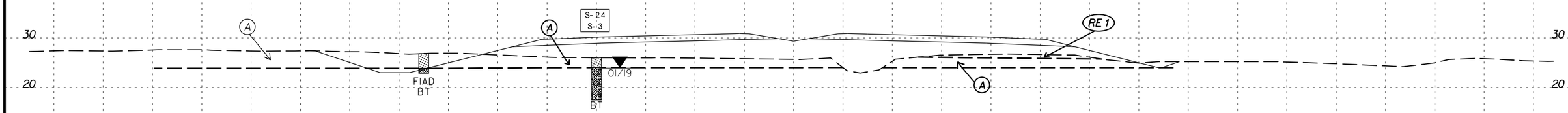
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-24	40' LT	21+00	0.0-1.0	A-2-4	33	NP	24.0	51.1	21.6	3.3	100	93	26	33	8.1
S-3	40' LT	21+00	2.0-3.0	A-2-4	20	4	21.3	53.8	8.7	16.2	100	97	28	22	-

RE 1 Loose to medium dense, gray and tan, silty SAND (A-2-4), with trace gravel, moist (ROADWAY EMBANKMENT)

A Loose, dark gray, silty SAND (A-2-4), with moderate organics, moist (ALLUVIAL)

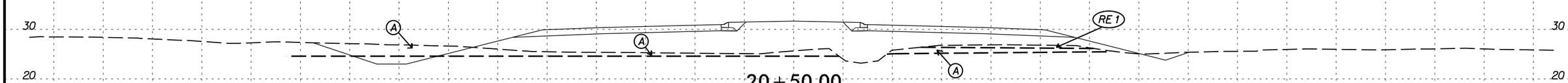


Loose to medium dense, tan with gray, SAND (A-2-4), moist to saturated (UNDIVIDED COASTAL PLAIN)

21+00.00

RE 1 Loose to medium dense, gray and tan, silty SAND (A-2-4), with trace gravel, moist (ROADWAY EMBANKMENT)

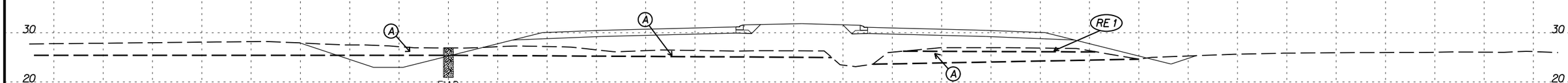
A Loose, dark gray, silty SAND (A-2-4), with moderate organics, moist (ALLUVIAL)



20+50.00

RE 1 Loose to medium dense, gray and tan, silty SAND (A-2-4), with trace gravel, moist (ROADWAY EMBANKMENT)

A Loose, dark gray, silty SAND (A-2-4), with trace organics, moist (ALLUVIAL)



Medium dense, tan and light gray, fine SAND (A-2-4), with trace clay, moist to saturated (UNDIVIDED COASTAL PLAIN)

20+00.00

—L—

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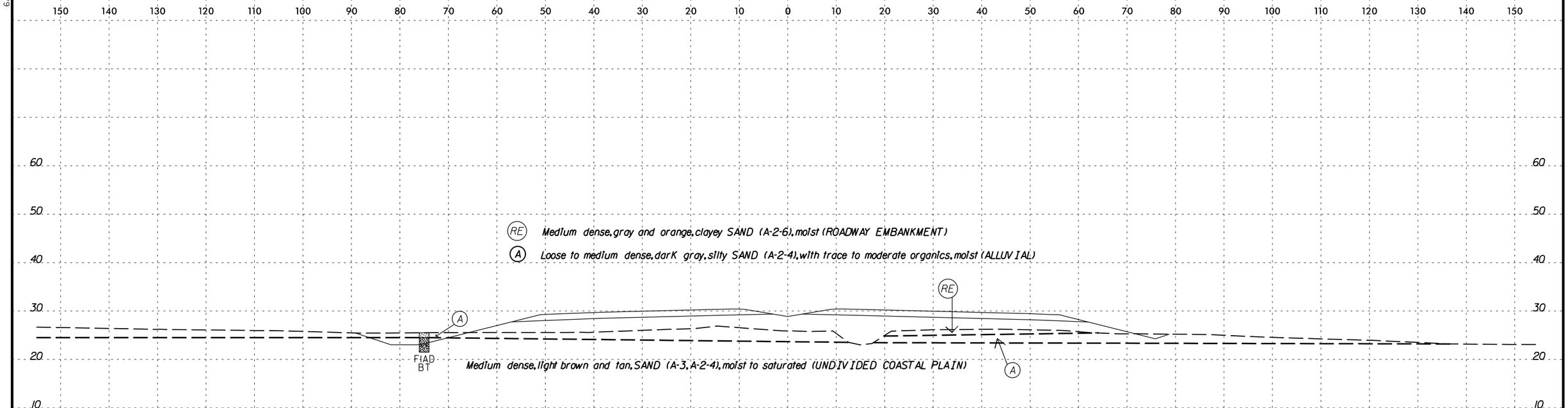
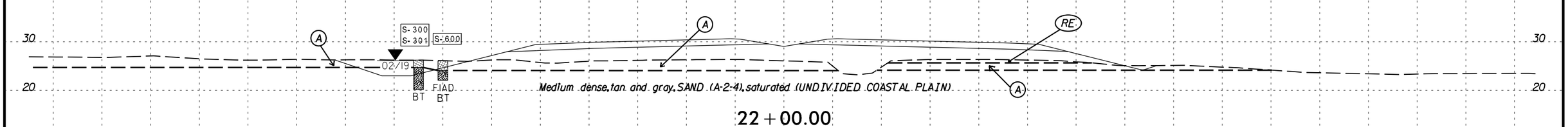
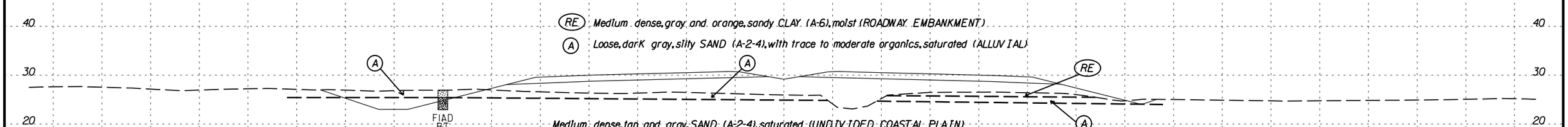


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-300	75' LT	22+00	0.0-2.0	A-2-4	NP	NP	16.8	63.9	16.2	3.1	100	98	22	11	4.9
S-301	75' LT	22+00	2.0-4.0	A-2-4	NP	NP	17.4	62.5	8.9	11.2	100	98	23	8	1.8
S-600	70' LT	22+00	0.0-1.0	A-2-4	29	2	17.6	60.0	16.0	6.4	100	97	26	42	5.3





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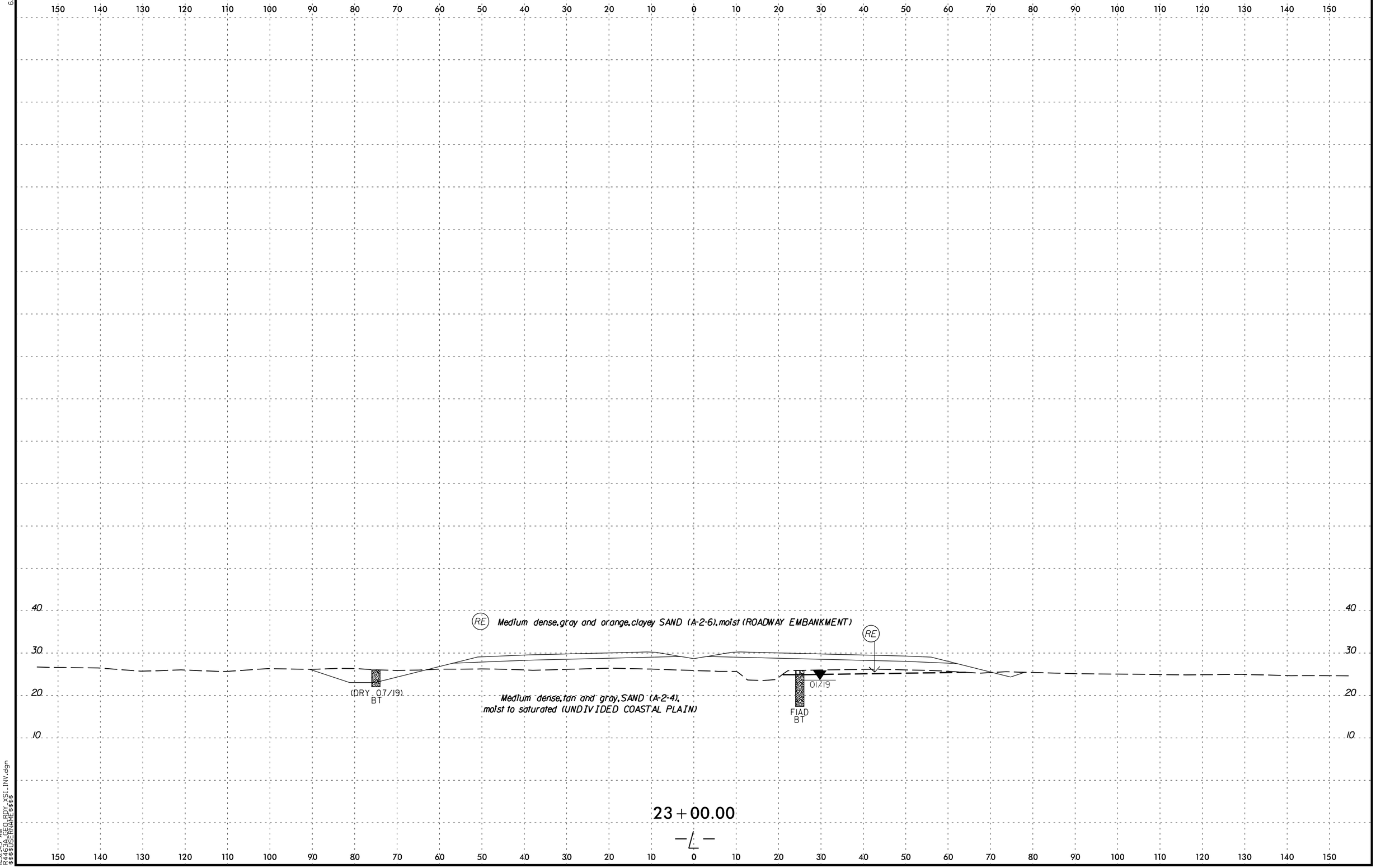
	R-4463A	29



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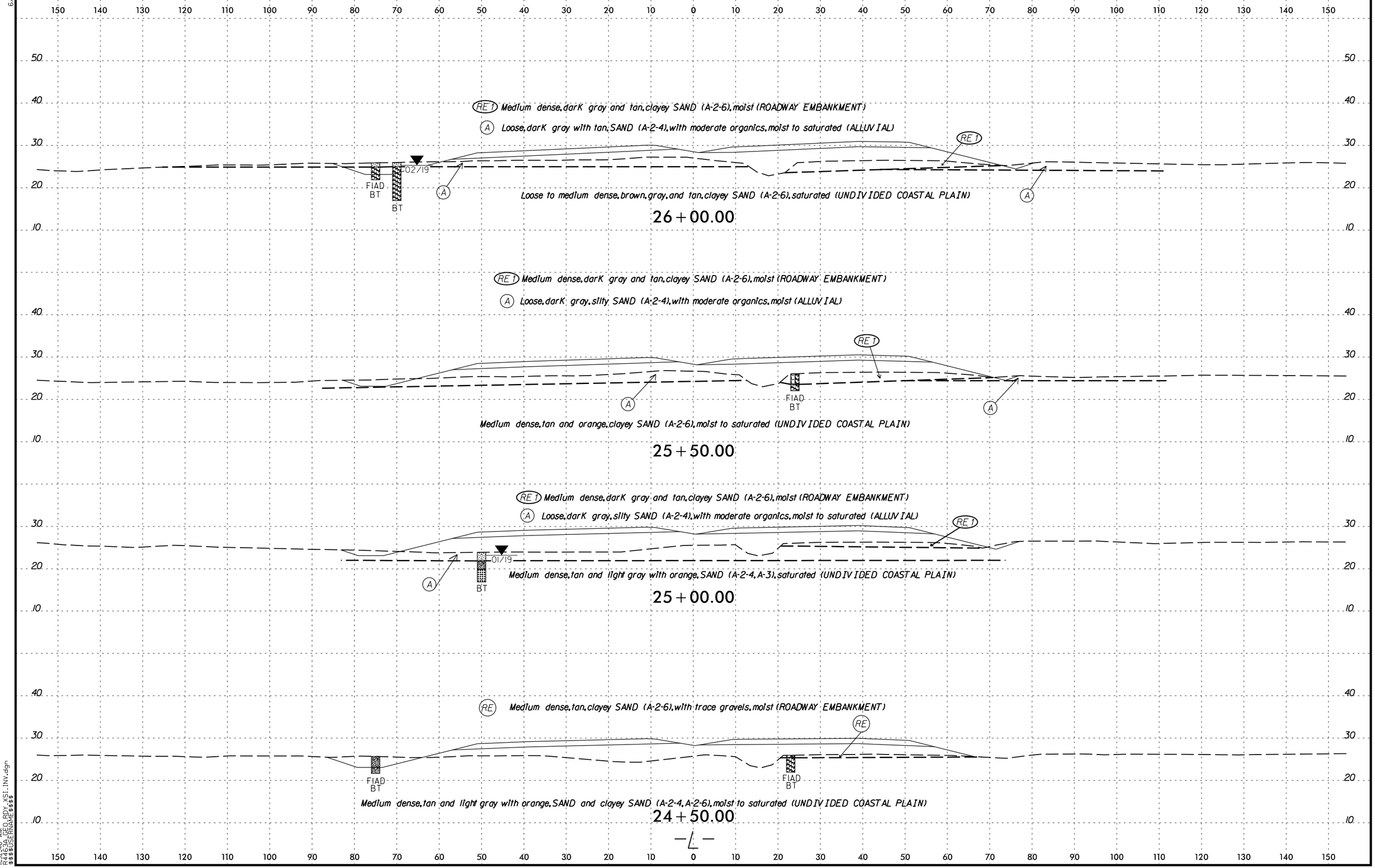

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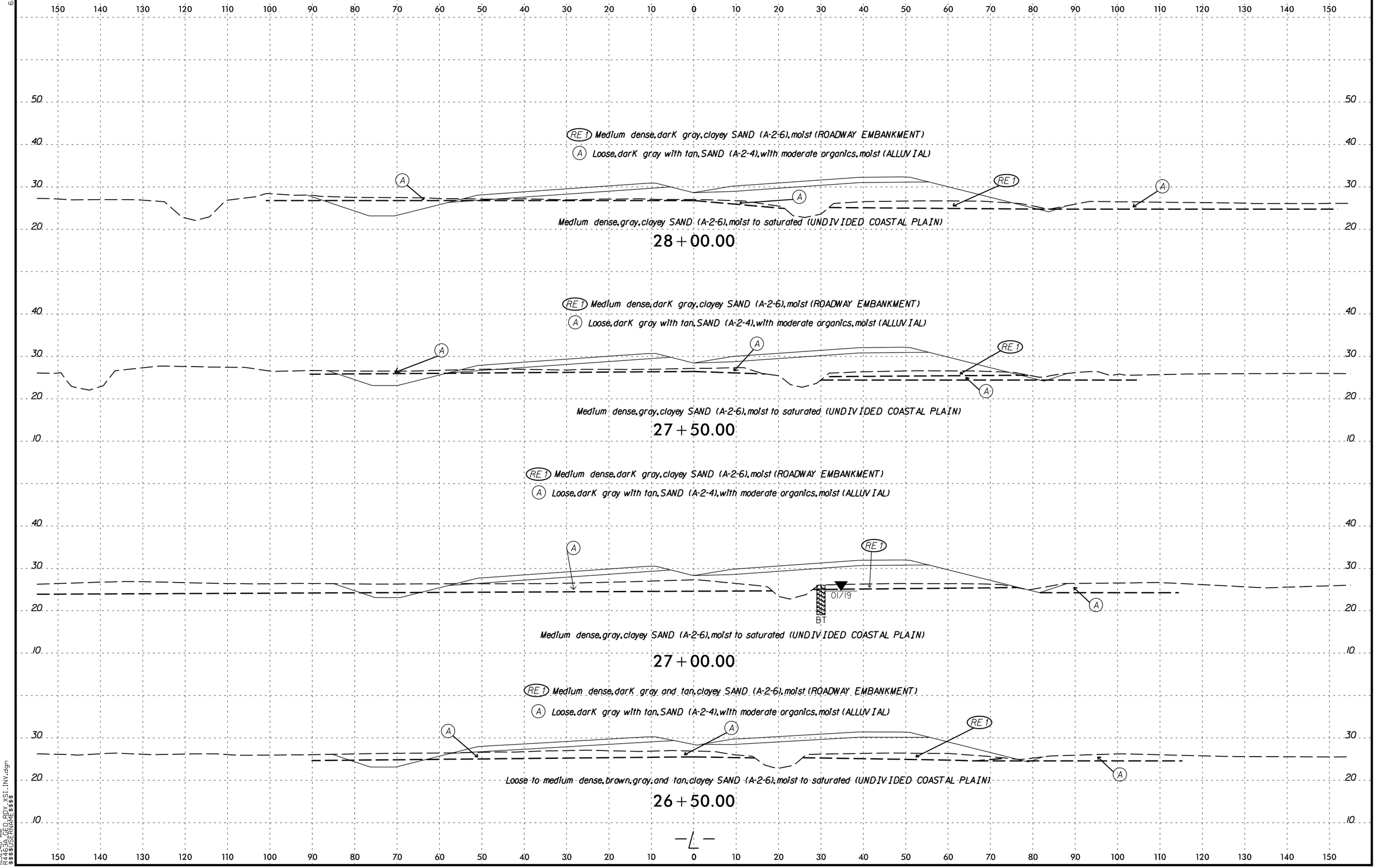

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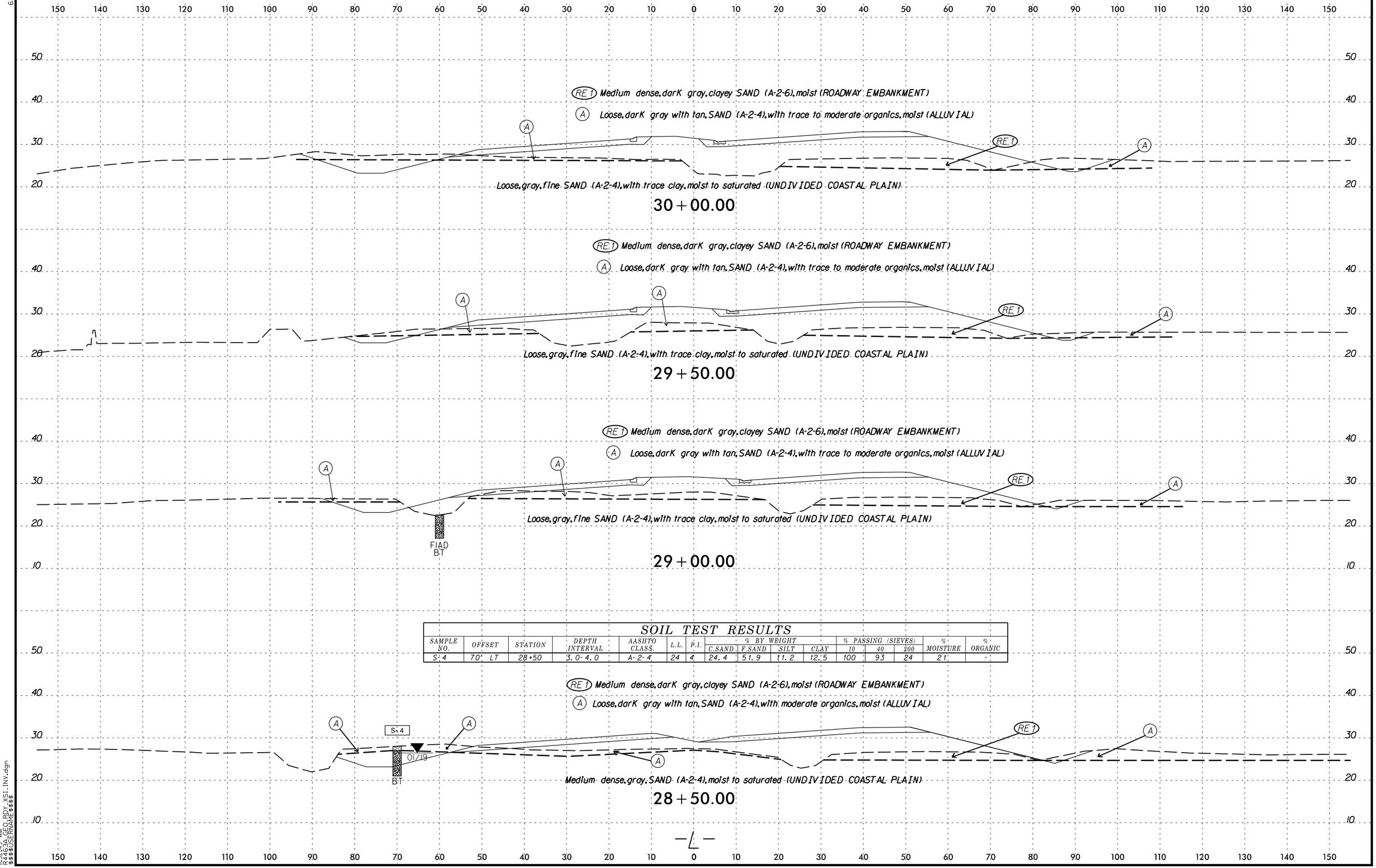

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-4	70' LT	28+50	3.0-4.0	A-2-4	24	4	24.4	51.9	11.2	12.5	100	93	24	21	-

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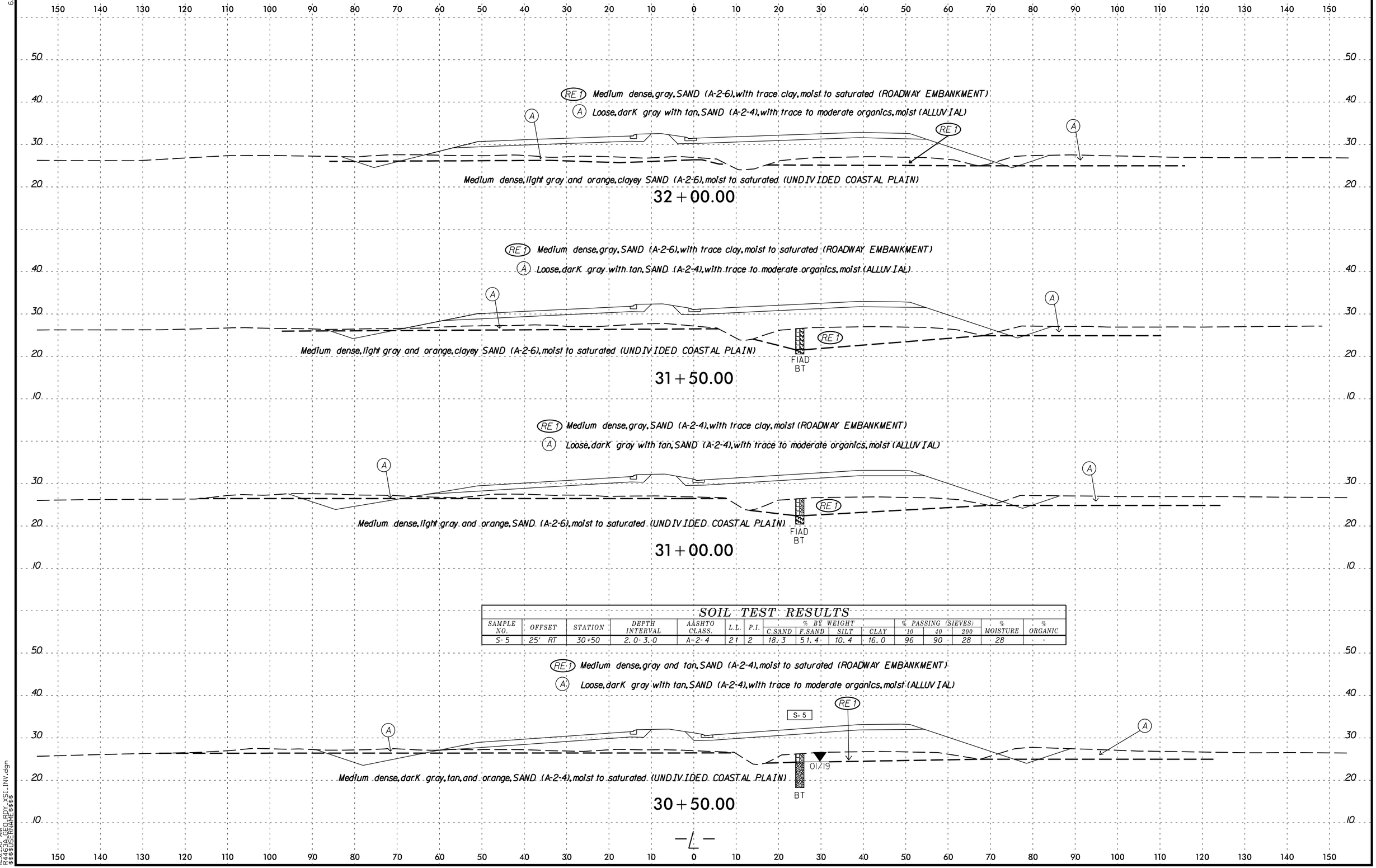

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) #10	#40	#200	% MOISTURE	% ORGANIC
S-5	25' RT	30+50	2.0-3.0	A-2-4	21	2	18.3	51.4	10.4	16.0	96	90	28	28	-

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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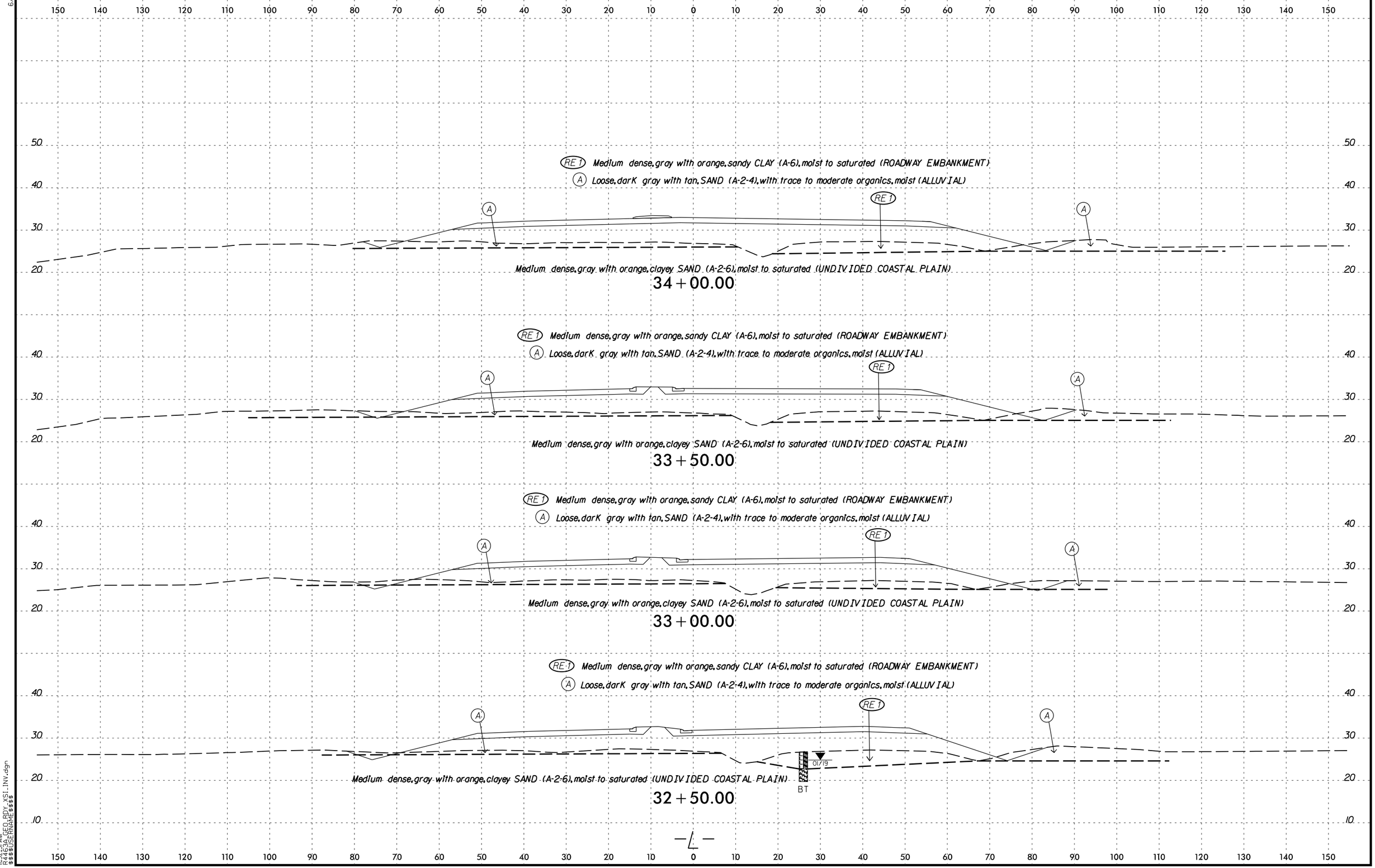

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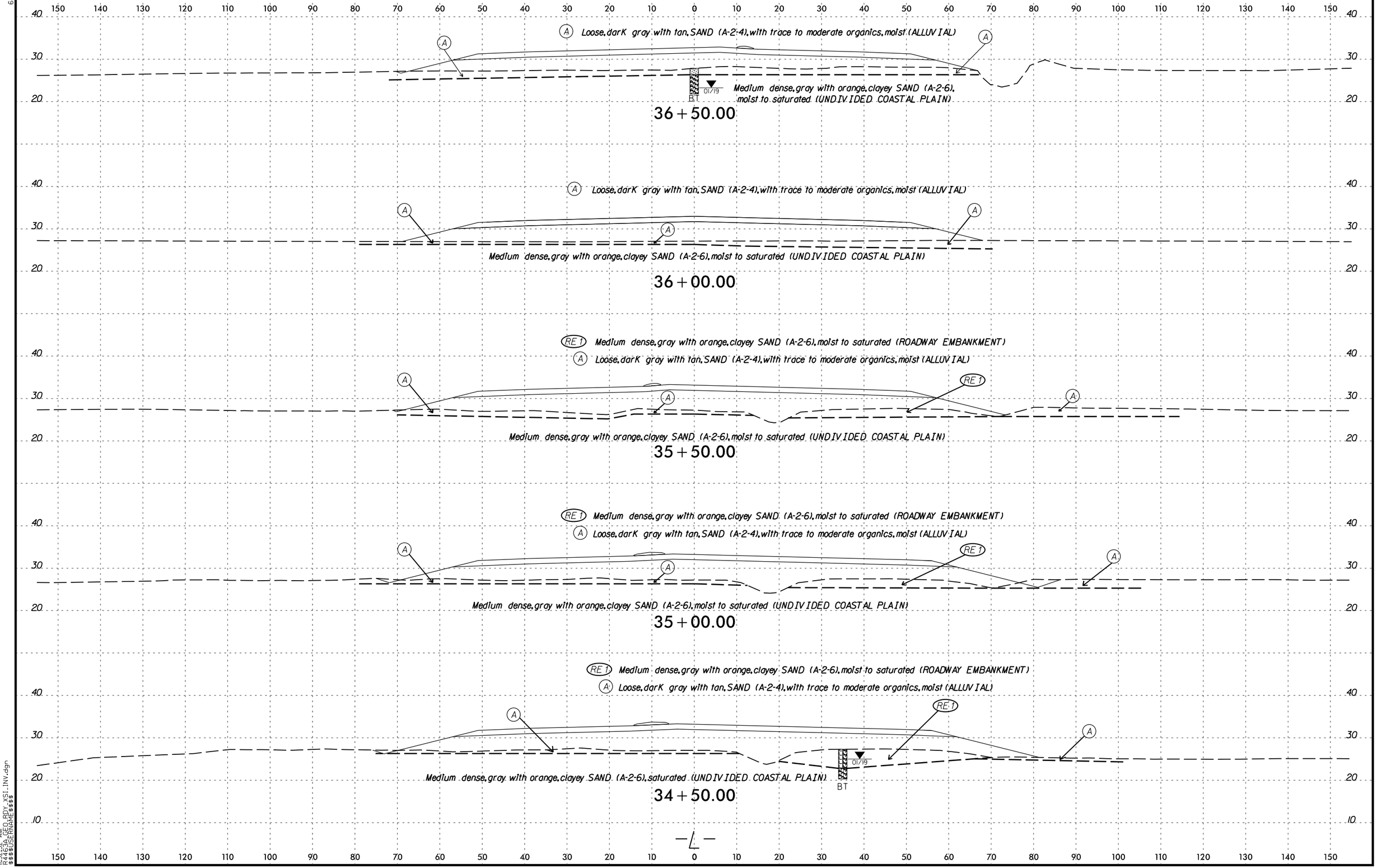

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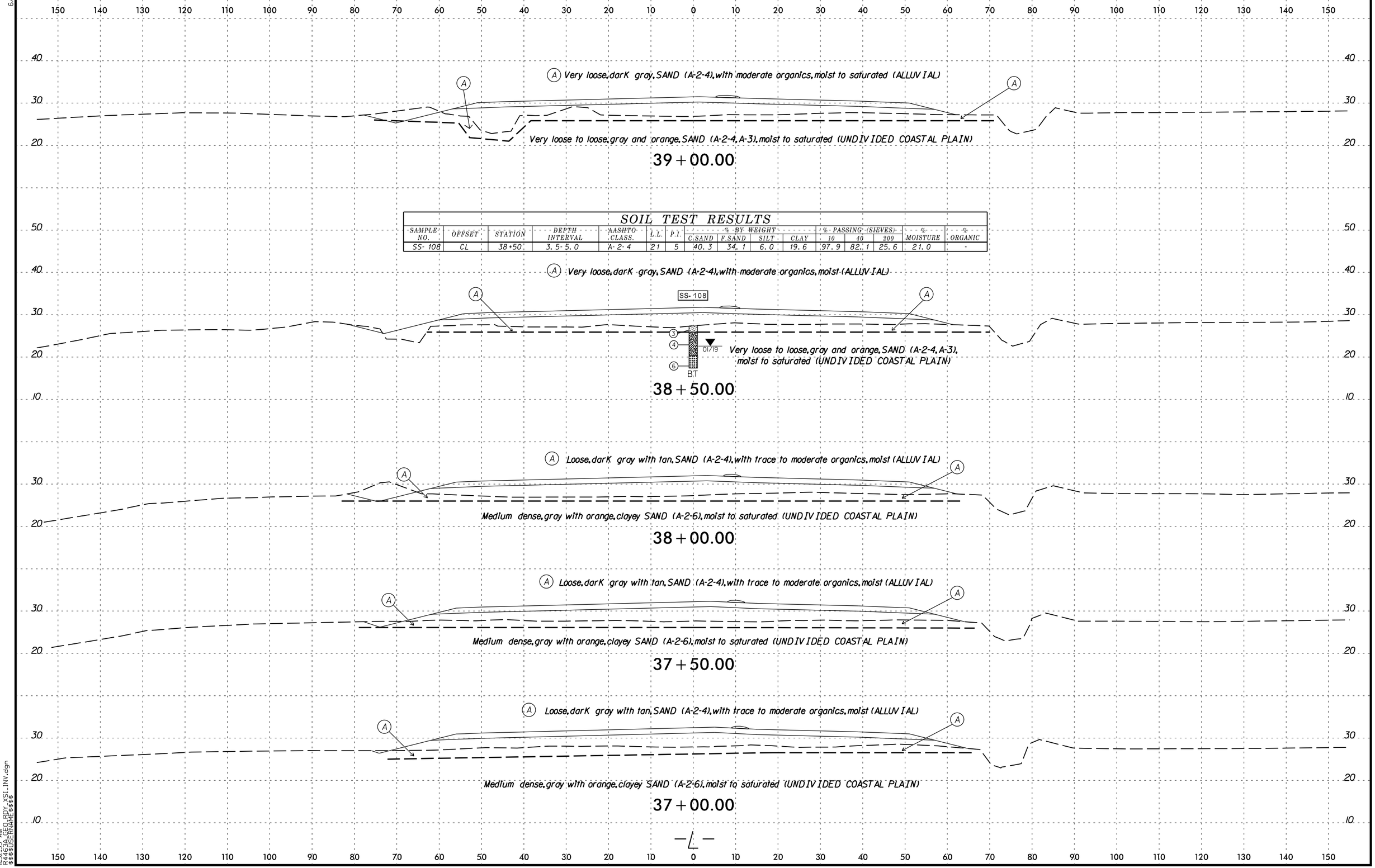

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-108	CL	38+50	3.5-5.0	A-2-4	21	5	40.3	34.1	6.0	19.6	97.9	82.1	25.6	21.0	-

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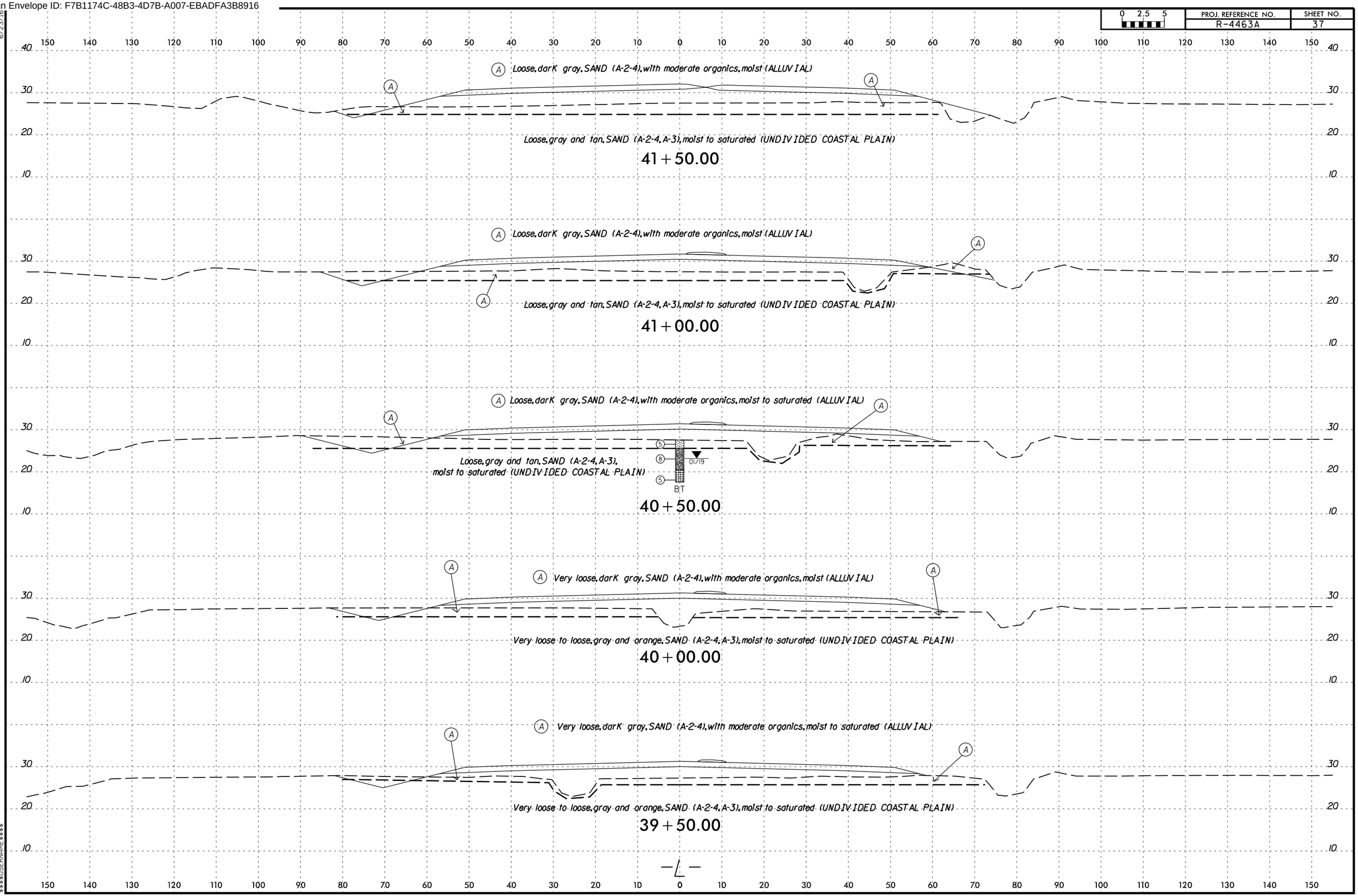

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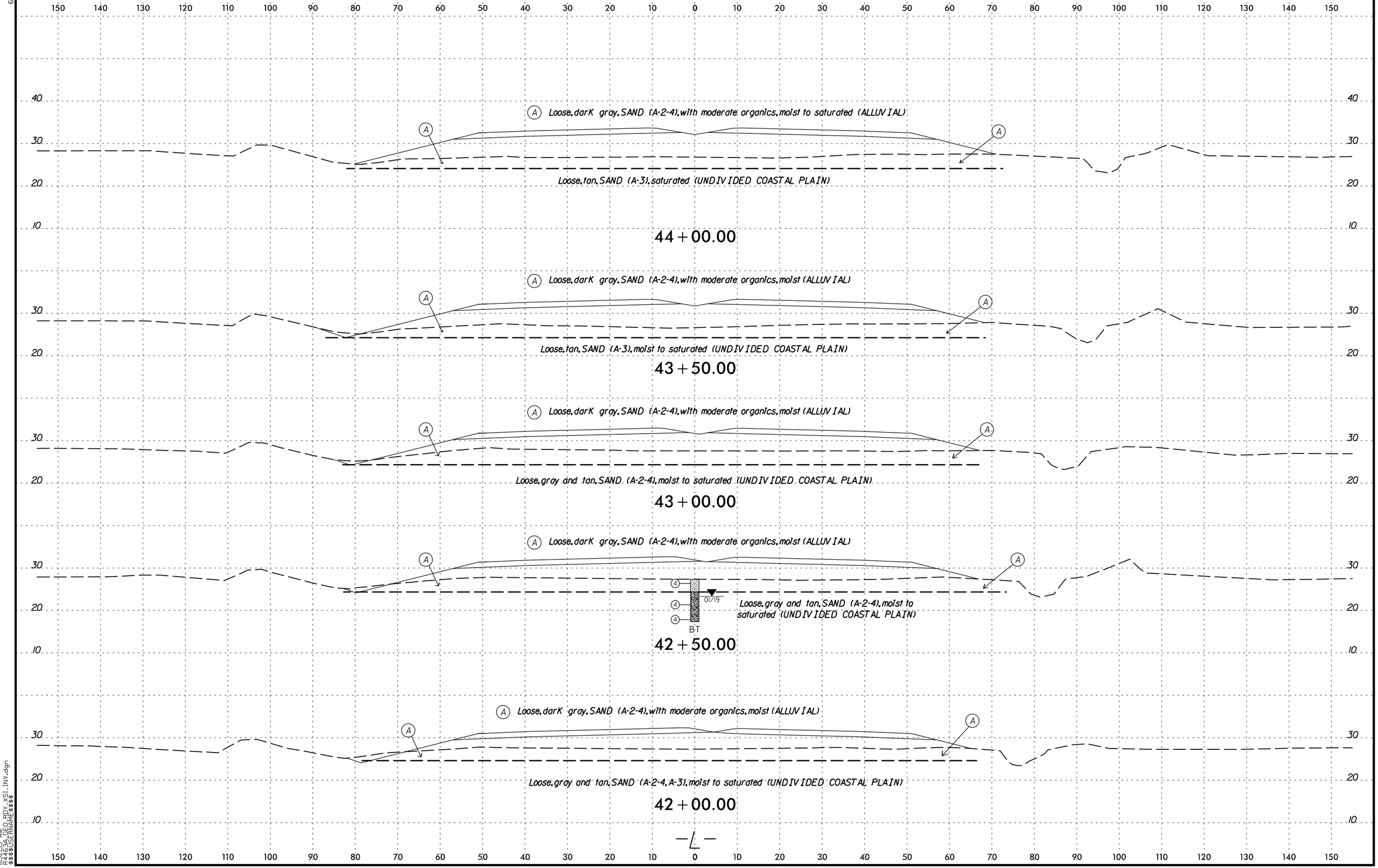

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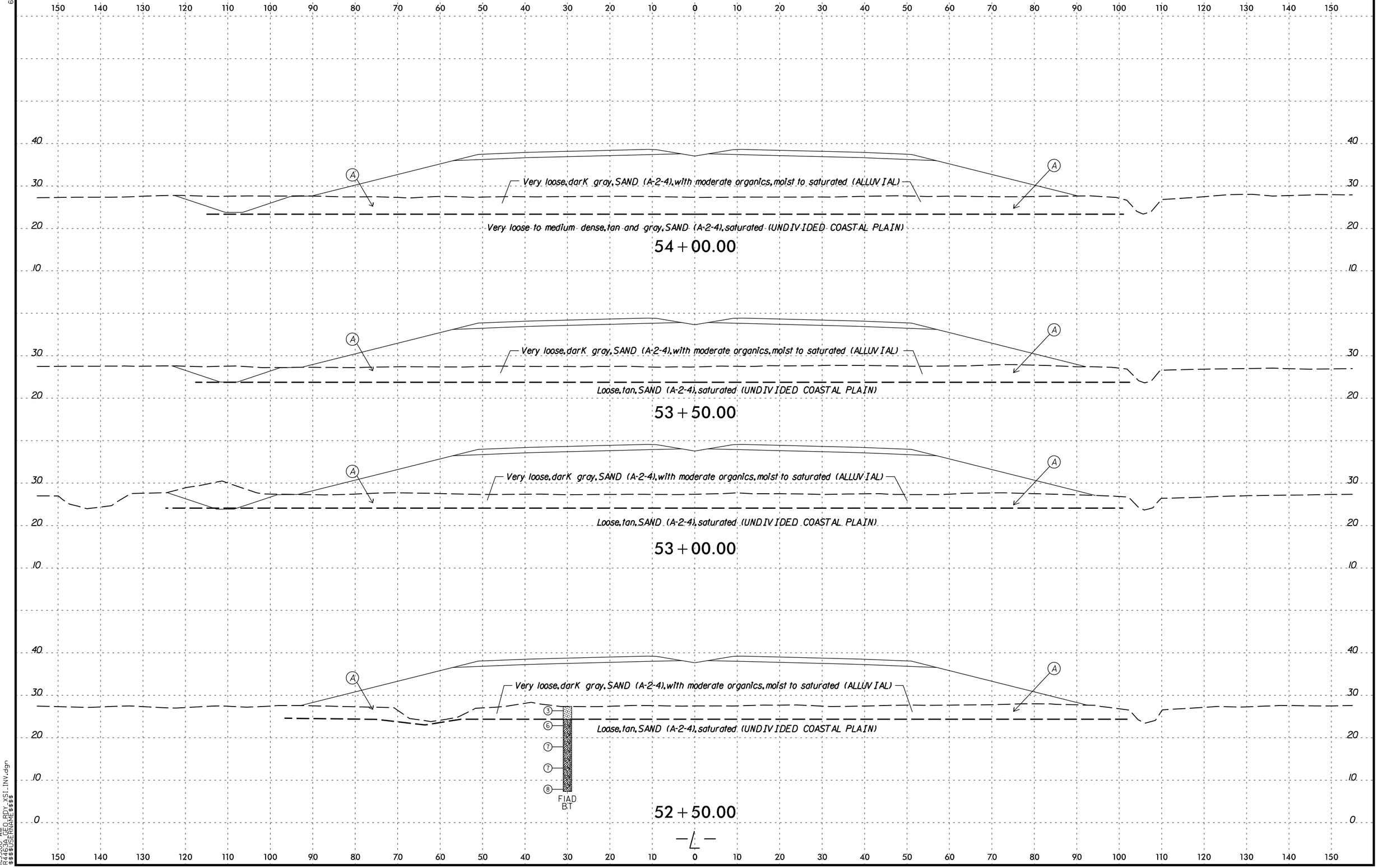

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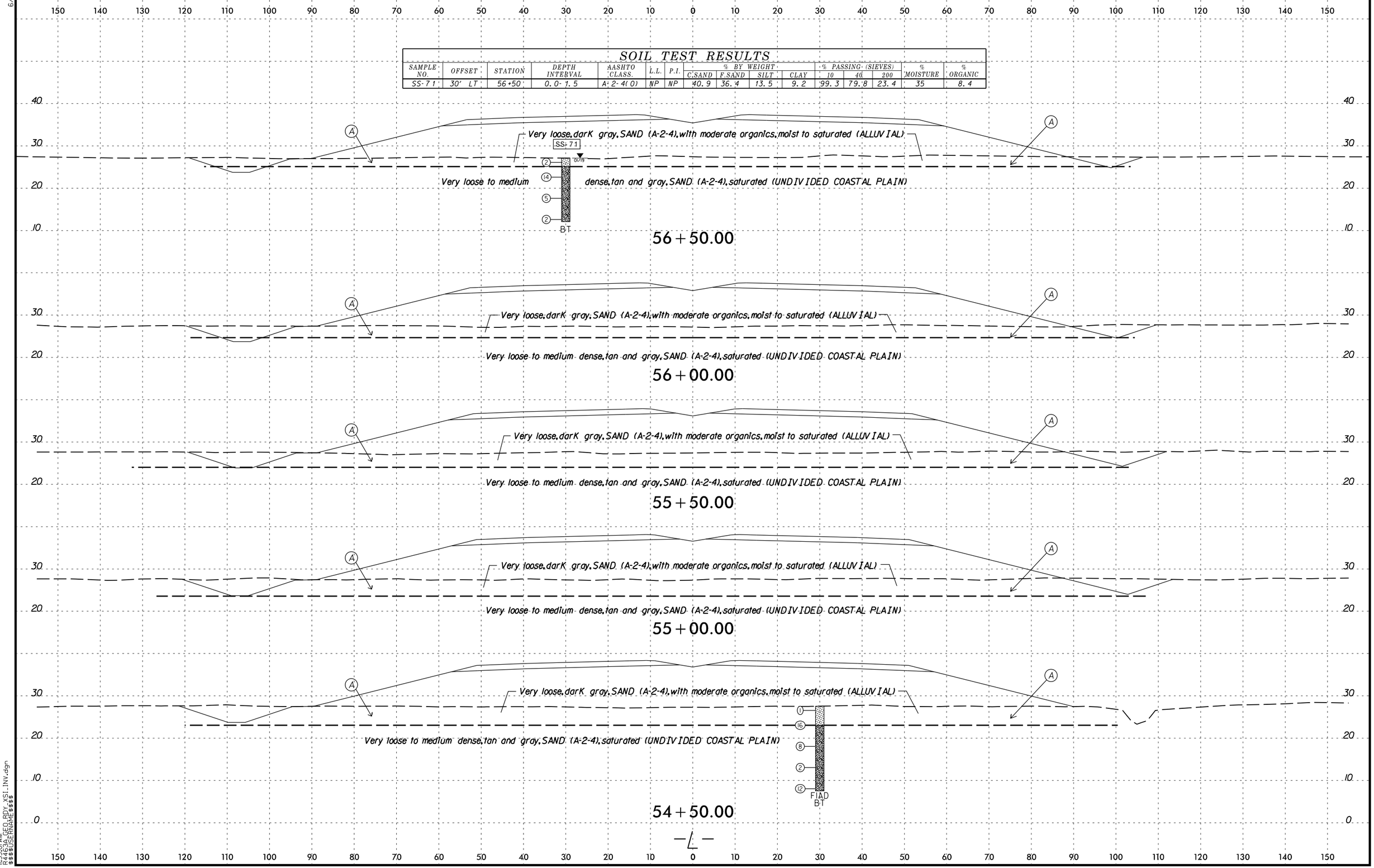
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-71	30' LT	56+50	0.0-1.5	A-2-4(0)	NP	NP	40.9	36.4	13.5	9.2	99.3	79.8	23.4	35	8.4



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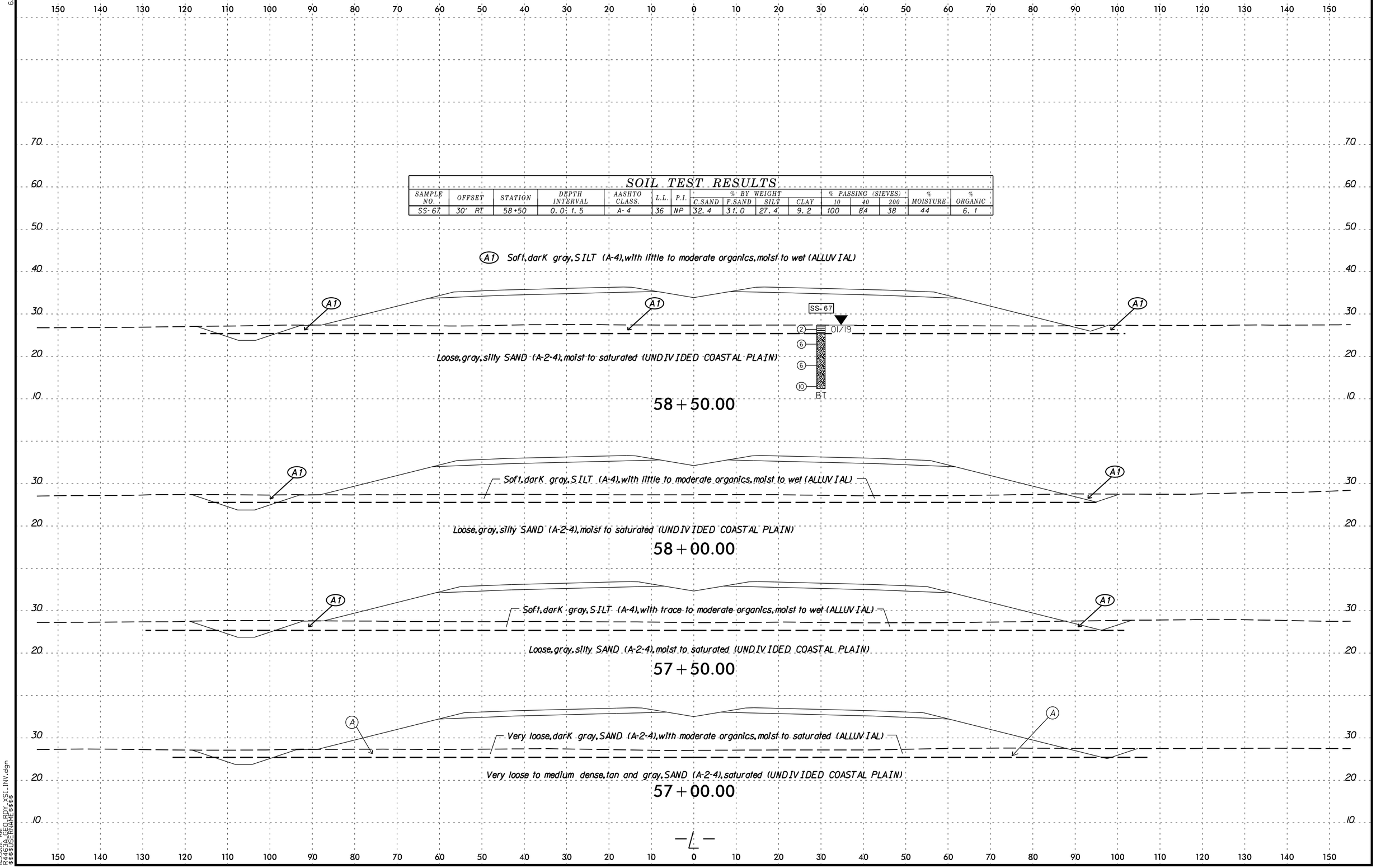
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-67	30' RT	58+50	0.0-1.5	A-4	36	NP	32.4	31.0	27.4	9.2	100	84	38	44	6.1



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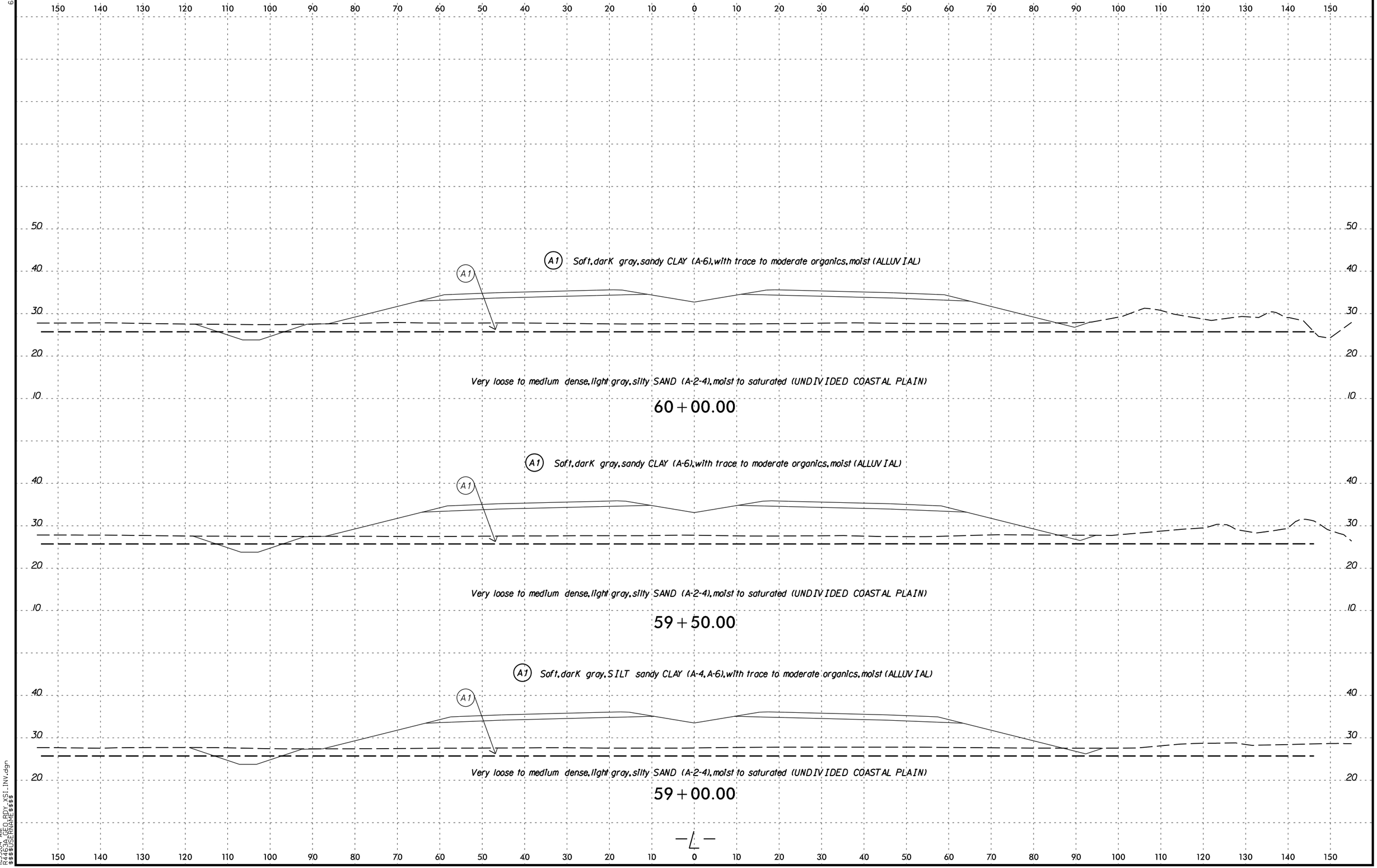

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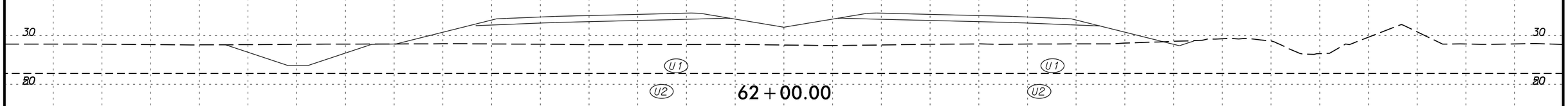
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	43

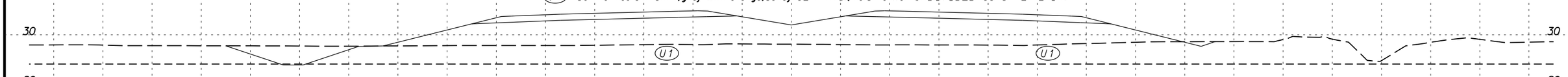
U1 Soft to medium stiff, gray with orange, sandy CLAY (A-6), moist to wet (UNDIVIDED COASTAL PLAIN)

U2 Loose, gray, silty SAND (A-2-4), saturated (UNDIVIDED COASTAL PLAIN)



62 + 00.00

U1 Soft to medium stiff, gray with orange, sandy CLAY (A-6), moist to wet (UNDIVIDED COASTAL PLAIN)

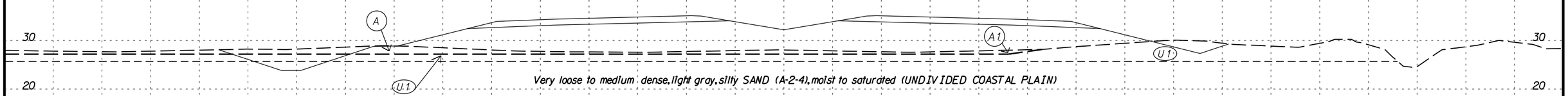


Loose, grey, silty SAND (A-2-4), saturated (UNDIVIDED COASTAL PLAIN)

61 + 50.00

A Soft, darK gray, sandy CLAY (A-6), with trace to moderate organics, moist (ALLUVIAL)

U1 Soft to medium stiff, gray with orange, sandy CLAY (A-6), moist to wet (UNDIVIDED COASTAL PLAIN)



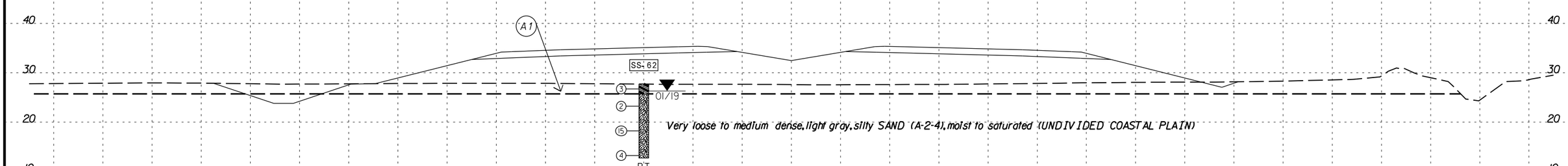
Very loose to medium dense, light gray, silty SAND (A-2-4), moist to saturated (UNDIVIDED COASTAL PLAIN)

61 + 00.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	30	200	% MOISTURE	% ORGANIC
SS-62	30' LT	60+50	0.0-1.5	A-6(1)	35	12	26.6	35.7	16.0	21.1	99	87	38	24	4.7

A1 Soft, darK gray, sandy CLAY (A-6), with trace to moderate organics, moist (ALLUVIAL)



Very loose to medium dense, light gray, silty SAND (A-2-4), moist to saturated (UNDIVIDED COASTAL PLAIN)

60 + 50.00

—L—

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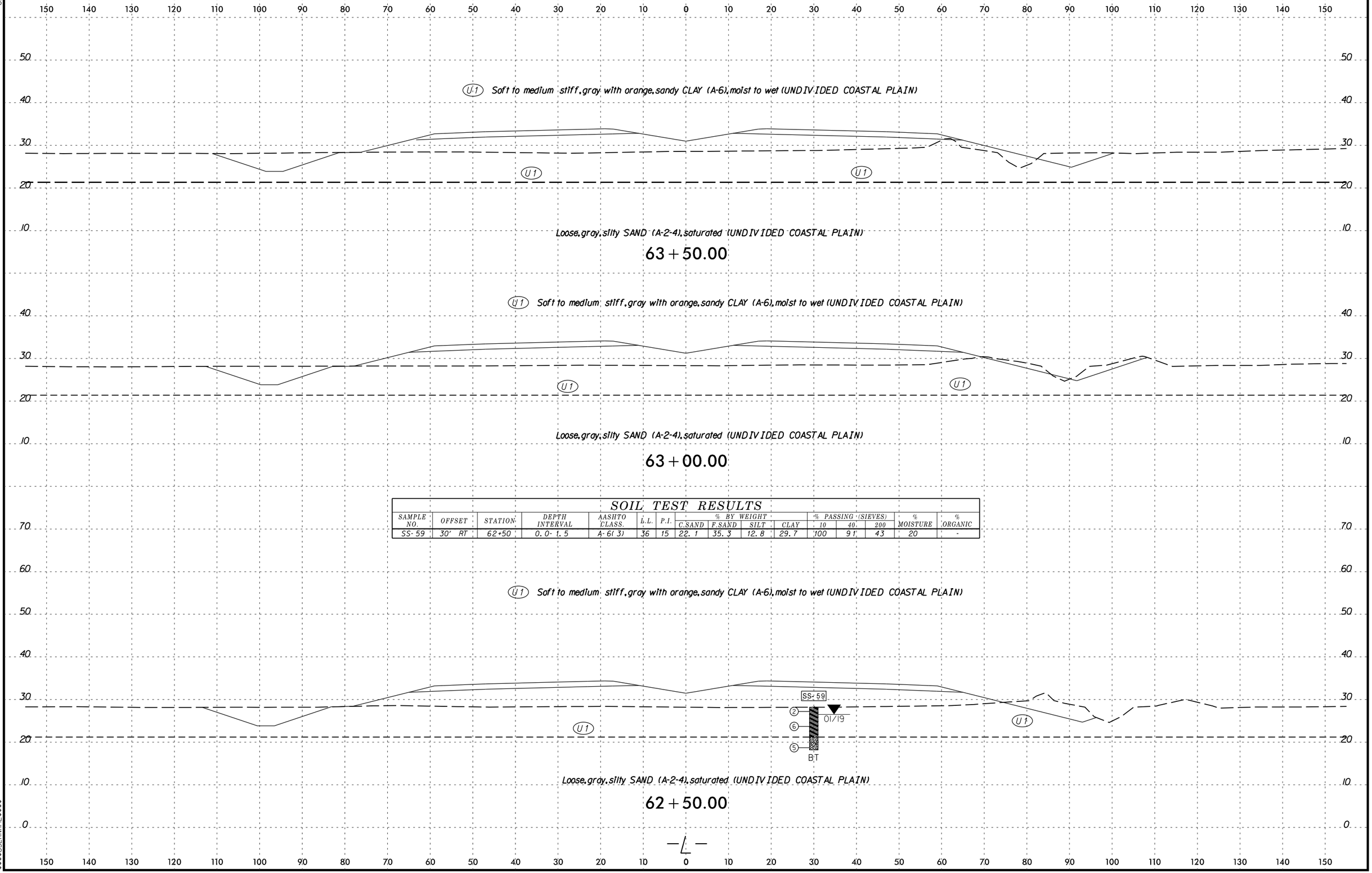
R-4463A	44

0 2.5 5



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-59	30' RT	62+50	0.0-1.5	A-6(3)	36	15	22.1	35.3	12.8	29.7	100	91	43	20	-

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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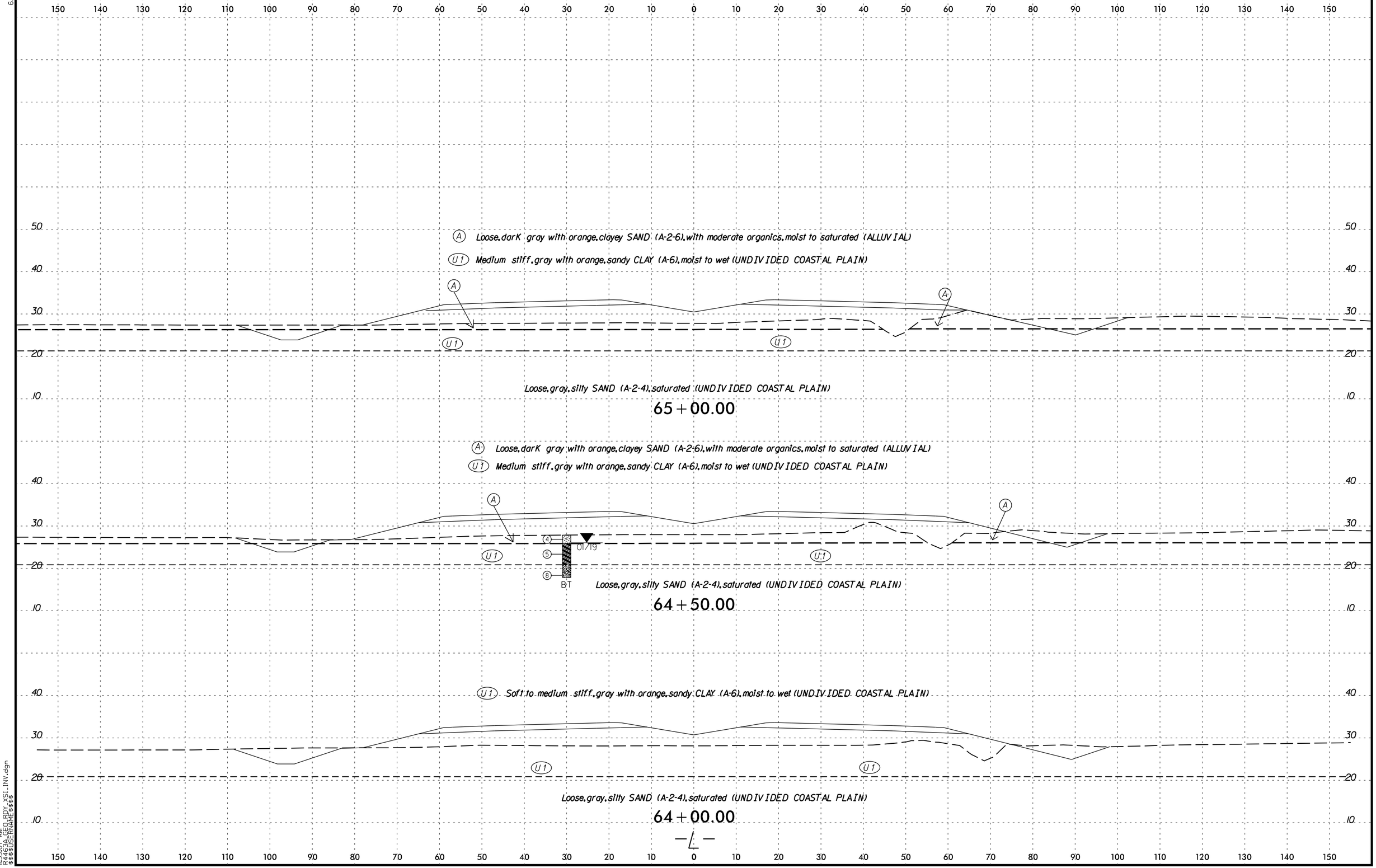

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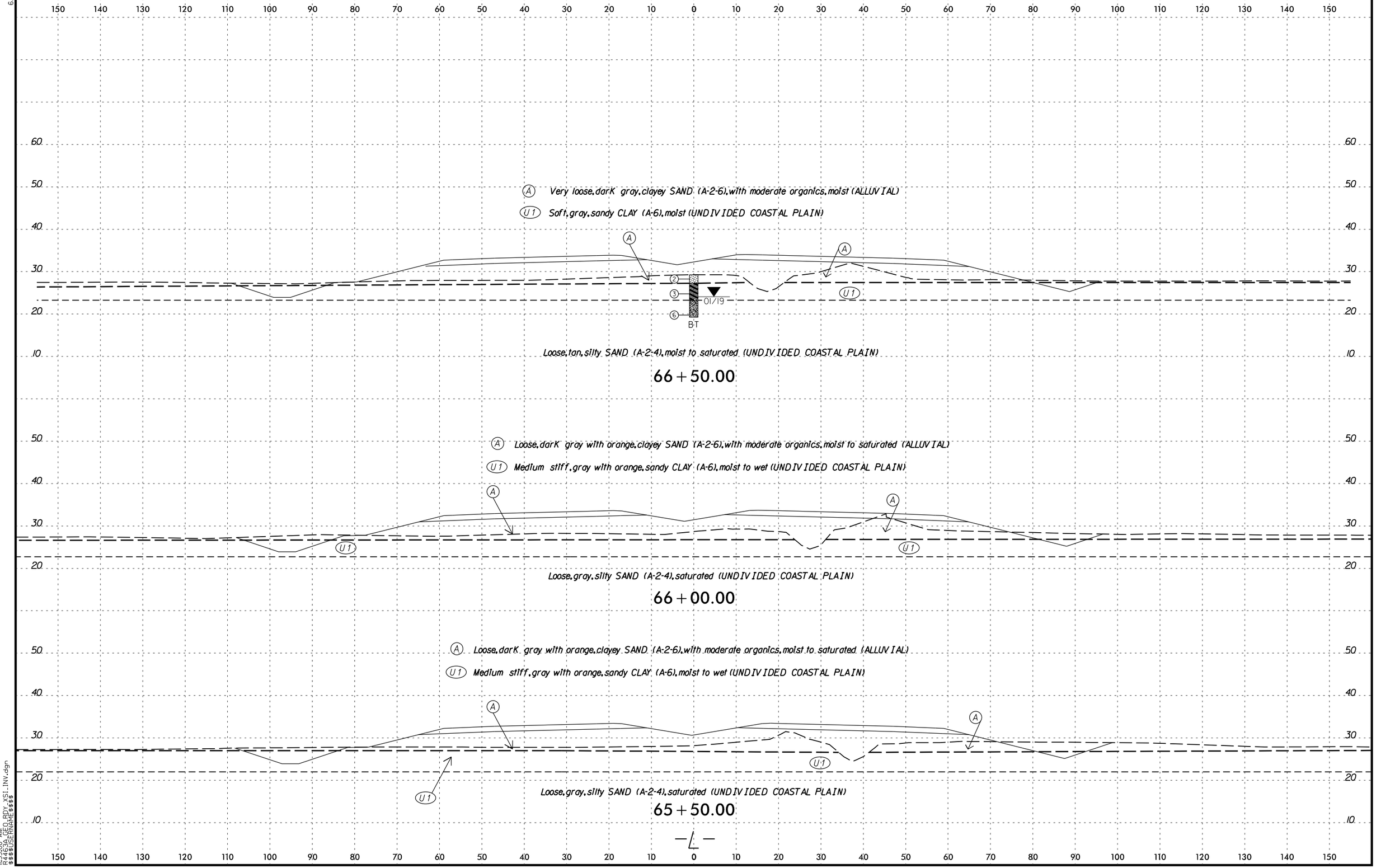
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	46



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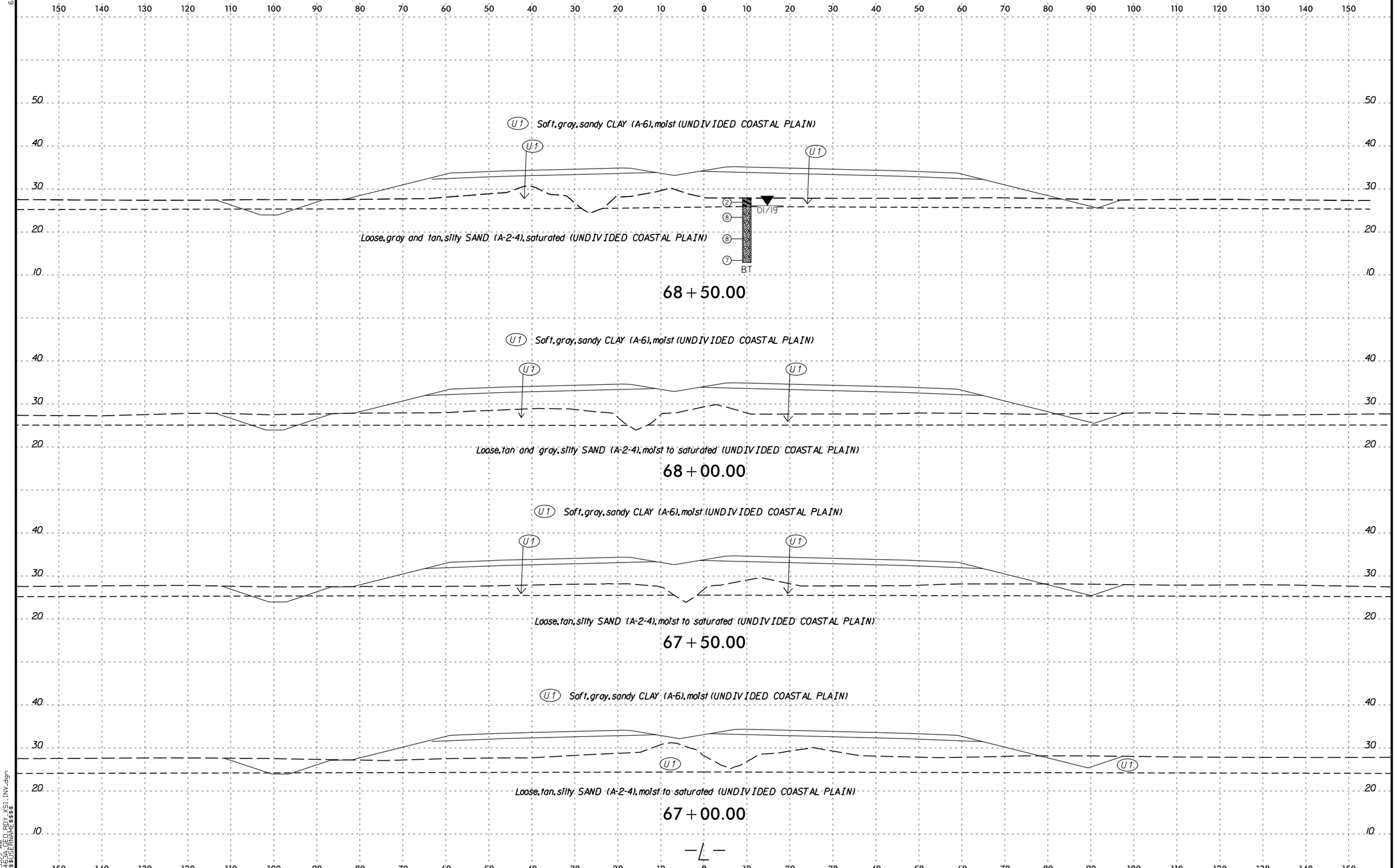
	R-4463A	47



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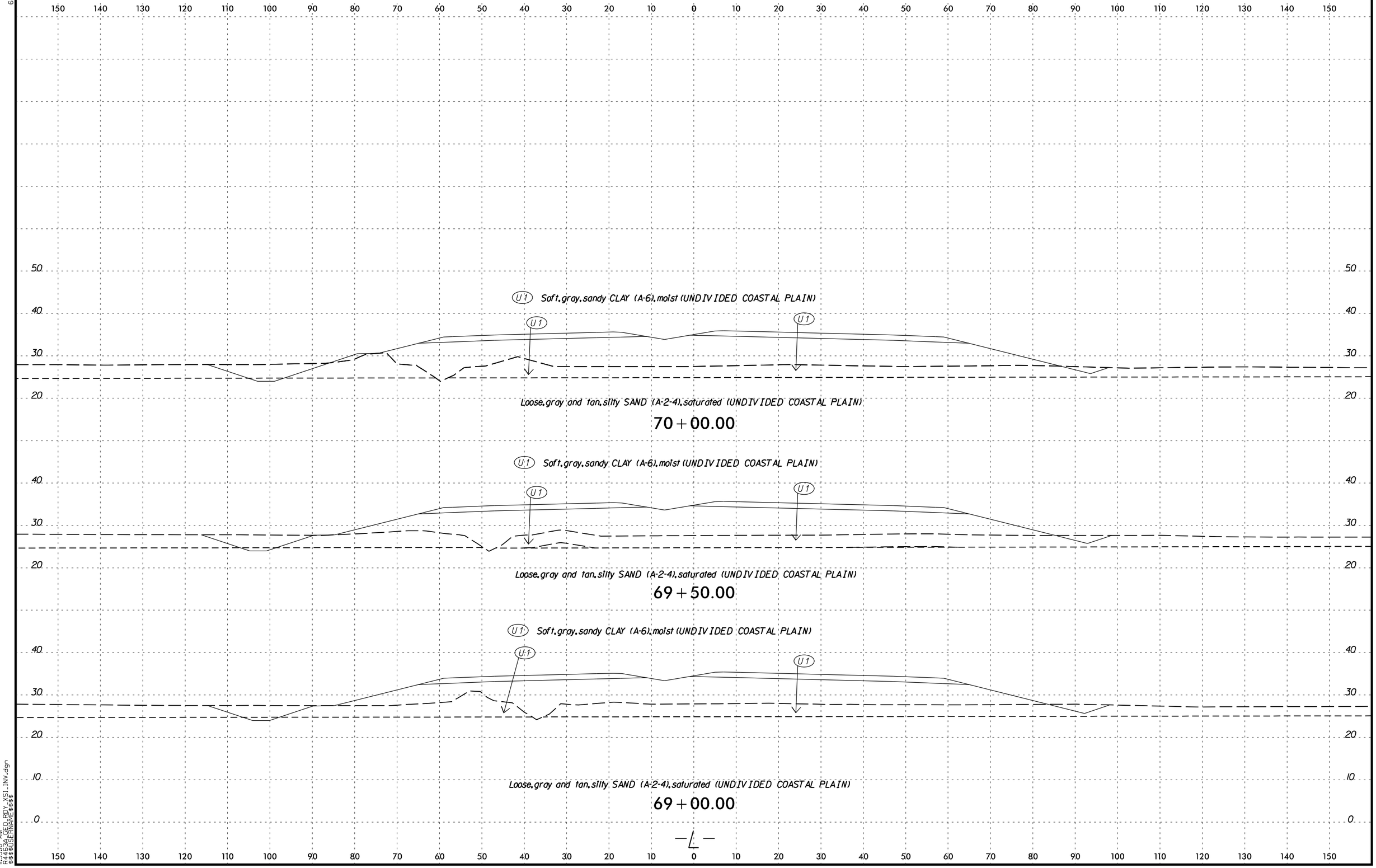

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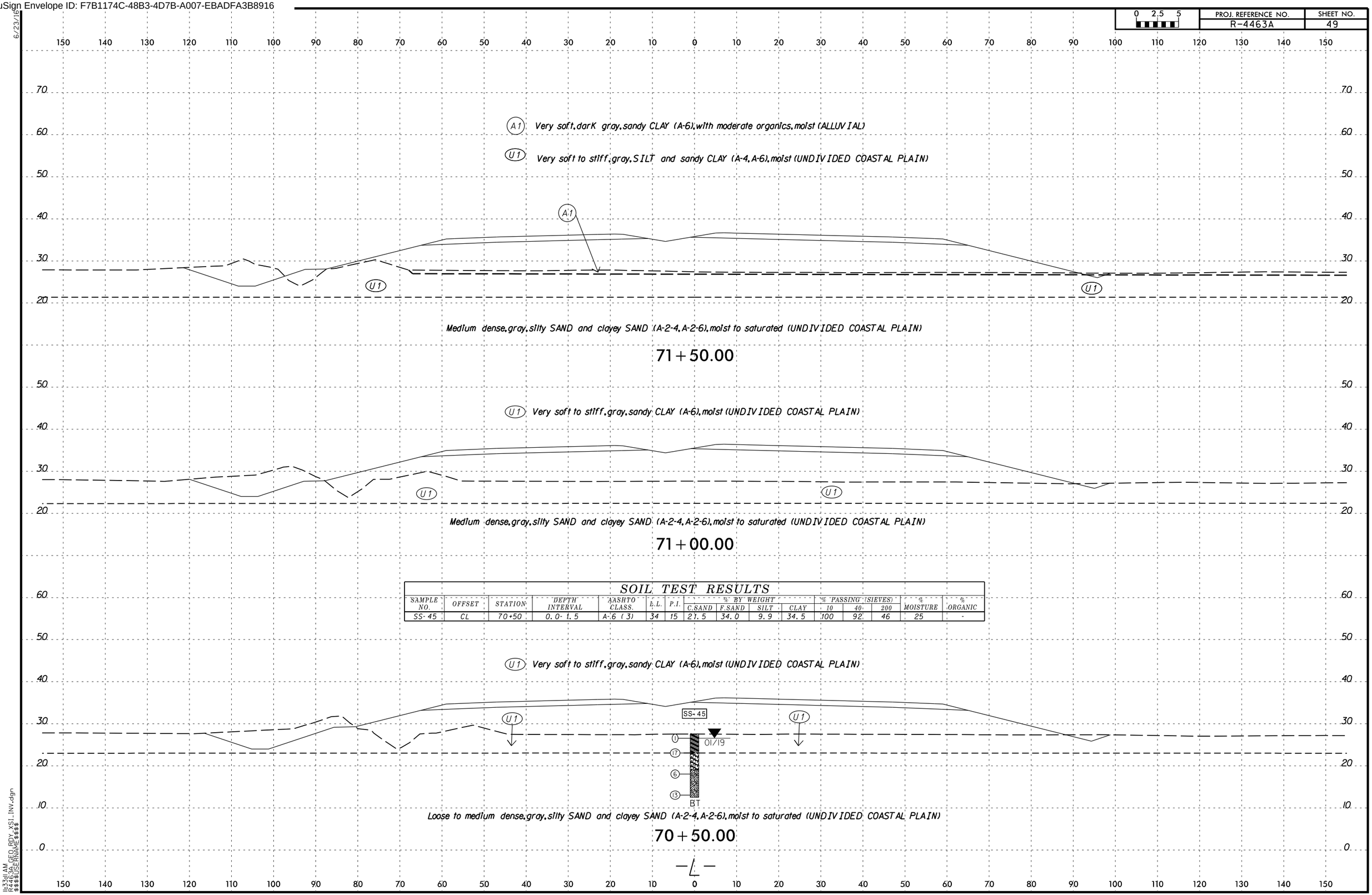

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-45	CL	70+50	0.0-1.5	A-6 (3)	34	15	21.5	34.0	9.9	34.5	100	92	46	25	-

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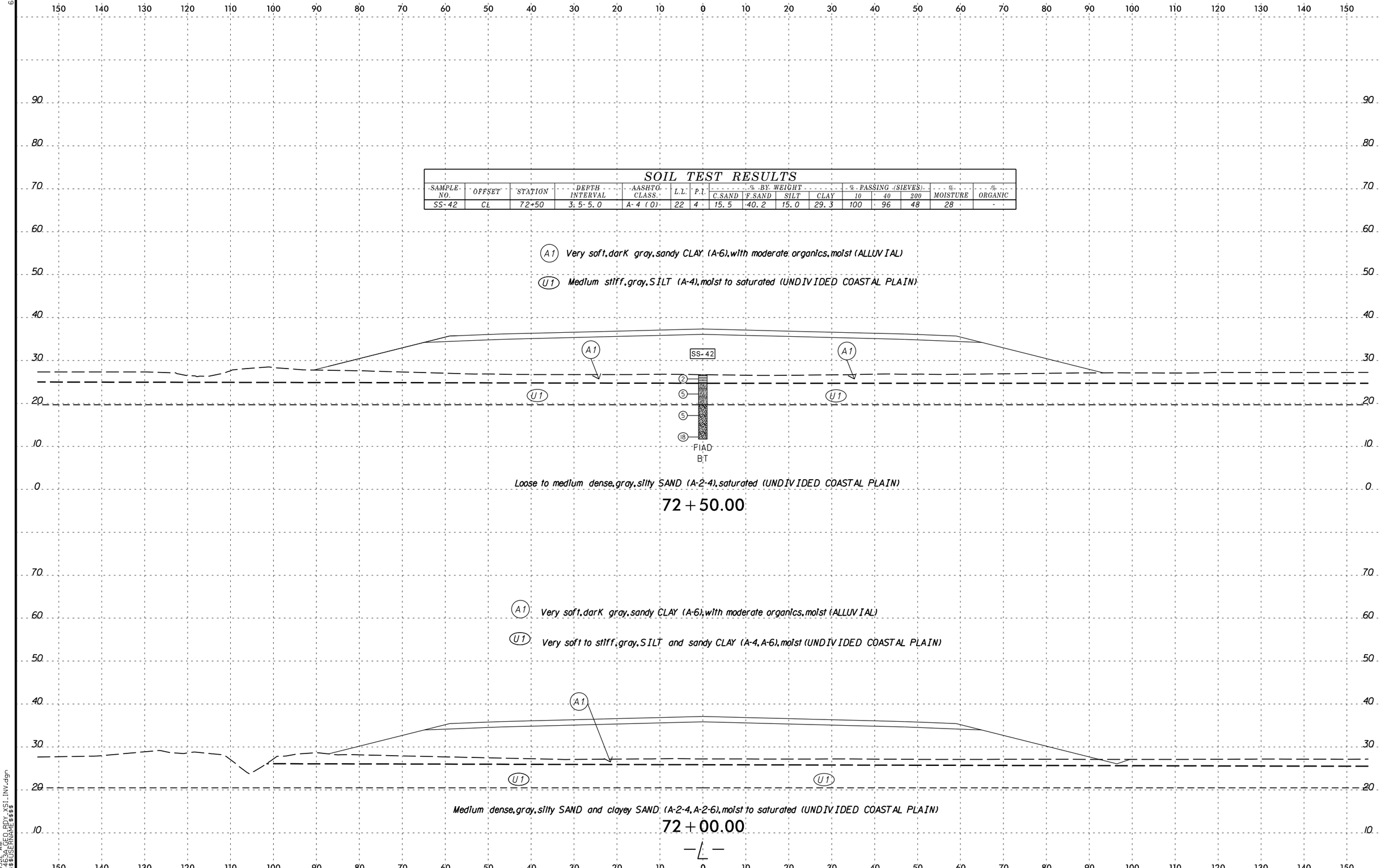
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-42	CL	72+50	3.5-5.0	A-4 (0)	22	4	15.5	40.2	15.0	29.3	100	96	48	28	-



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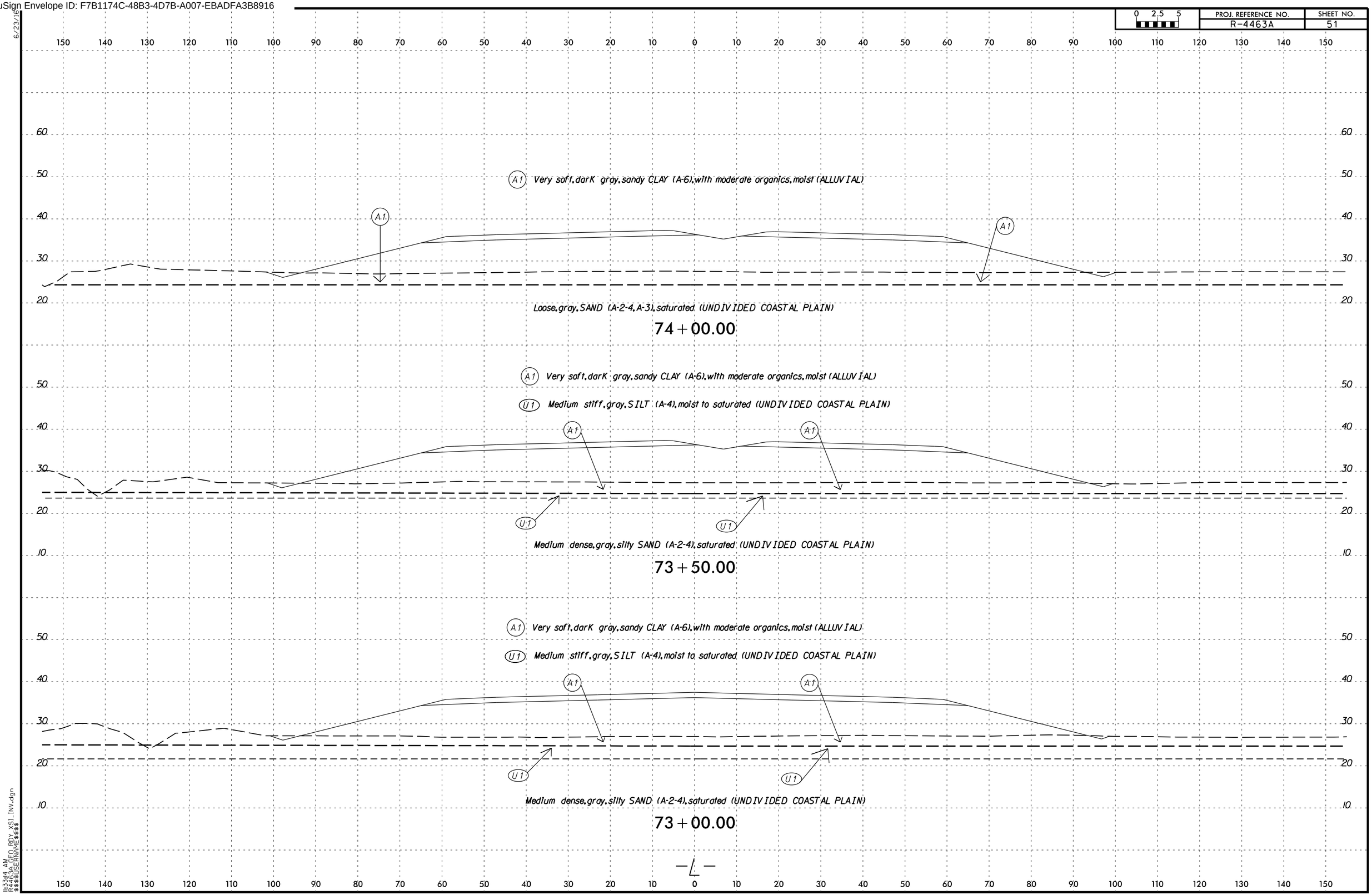

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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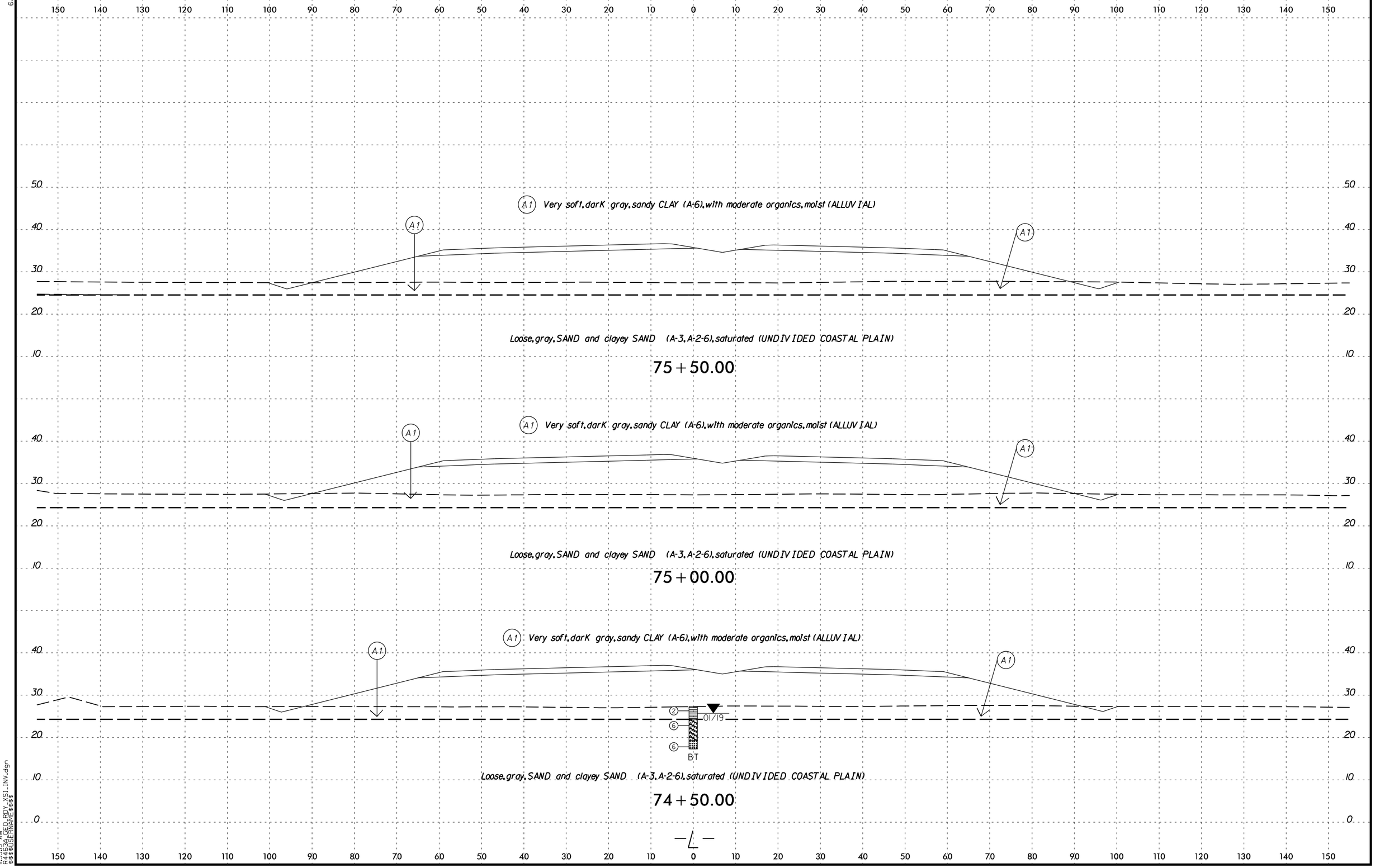

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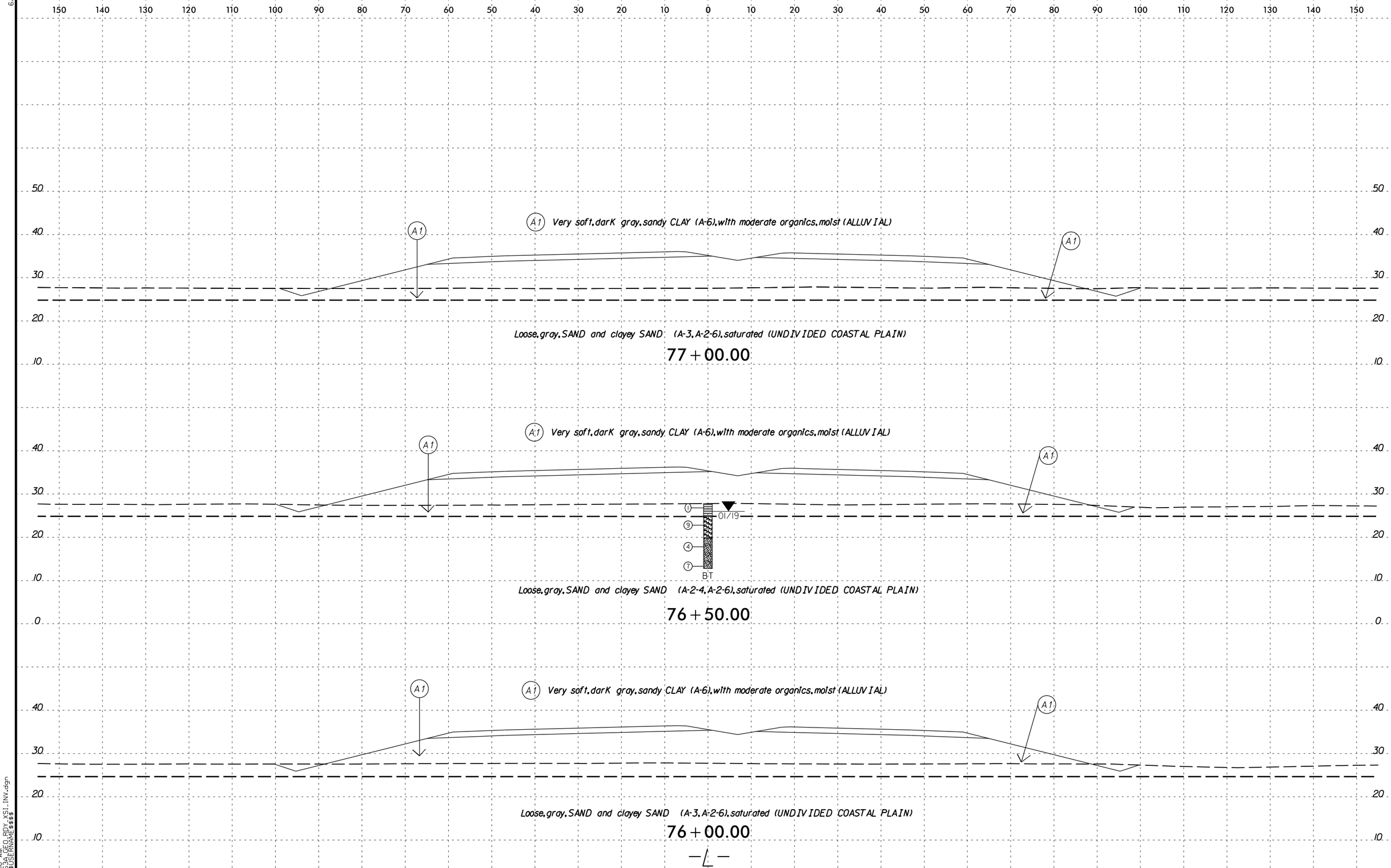

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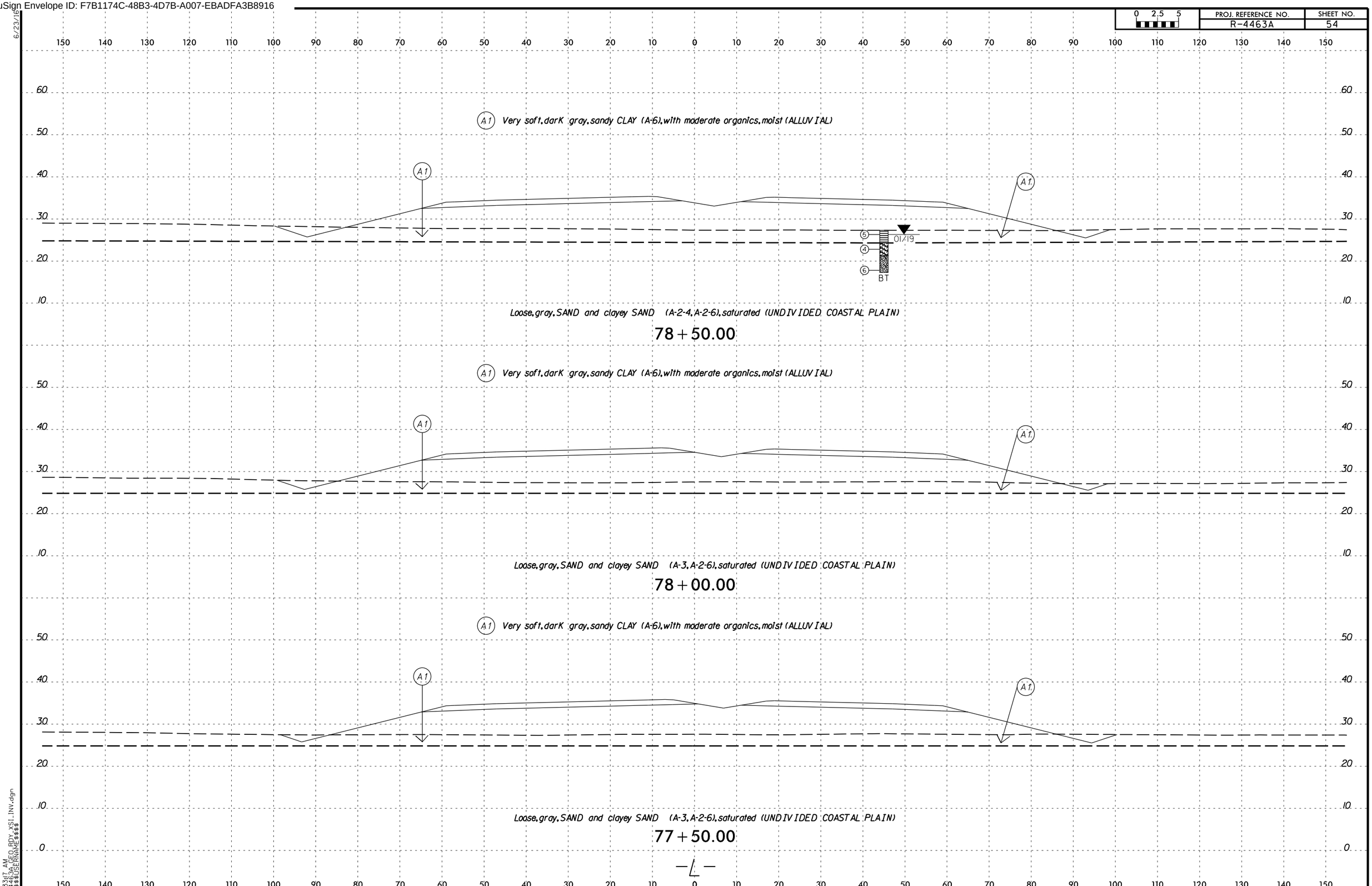

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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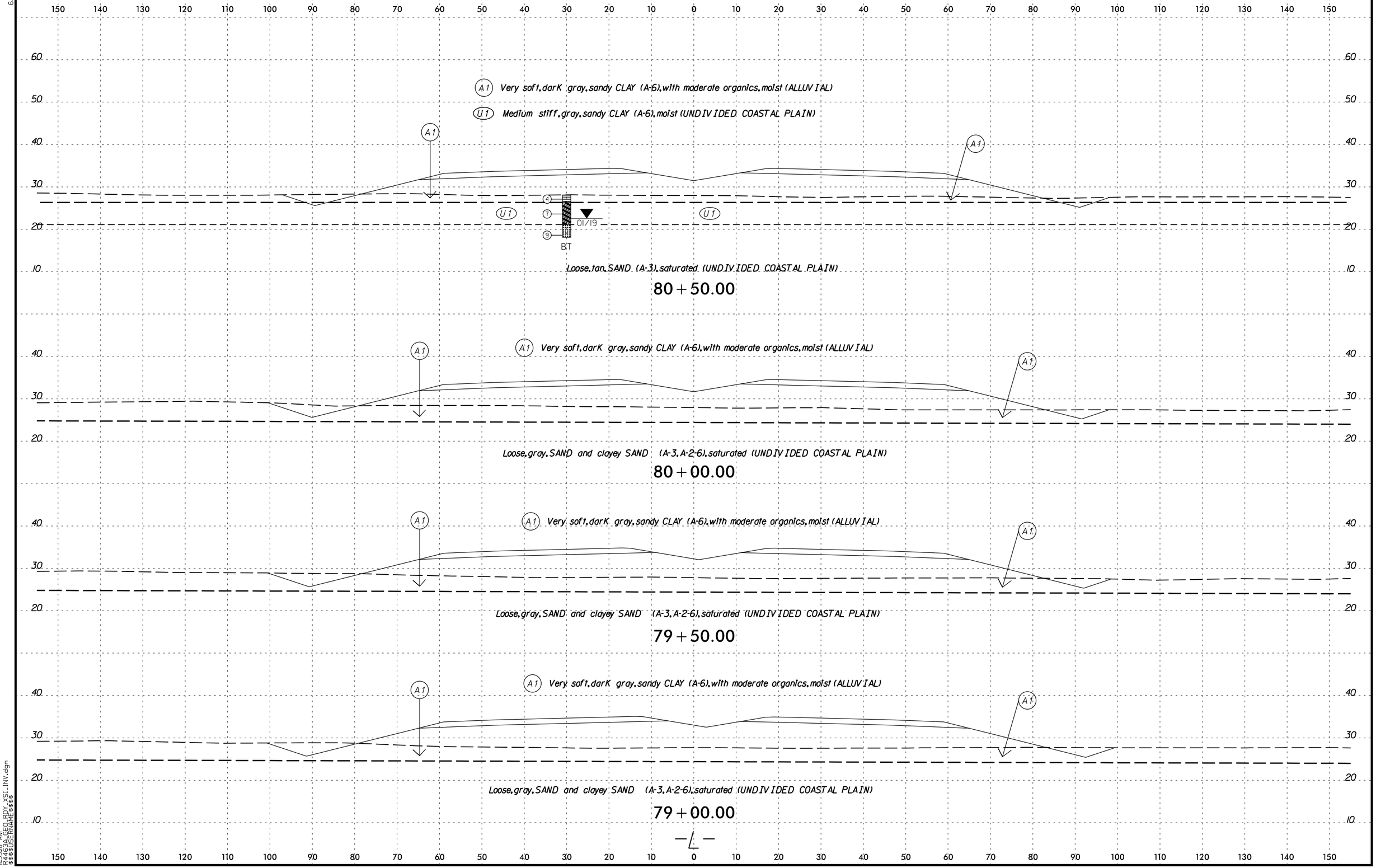

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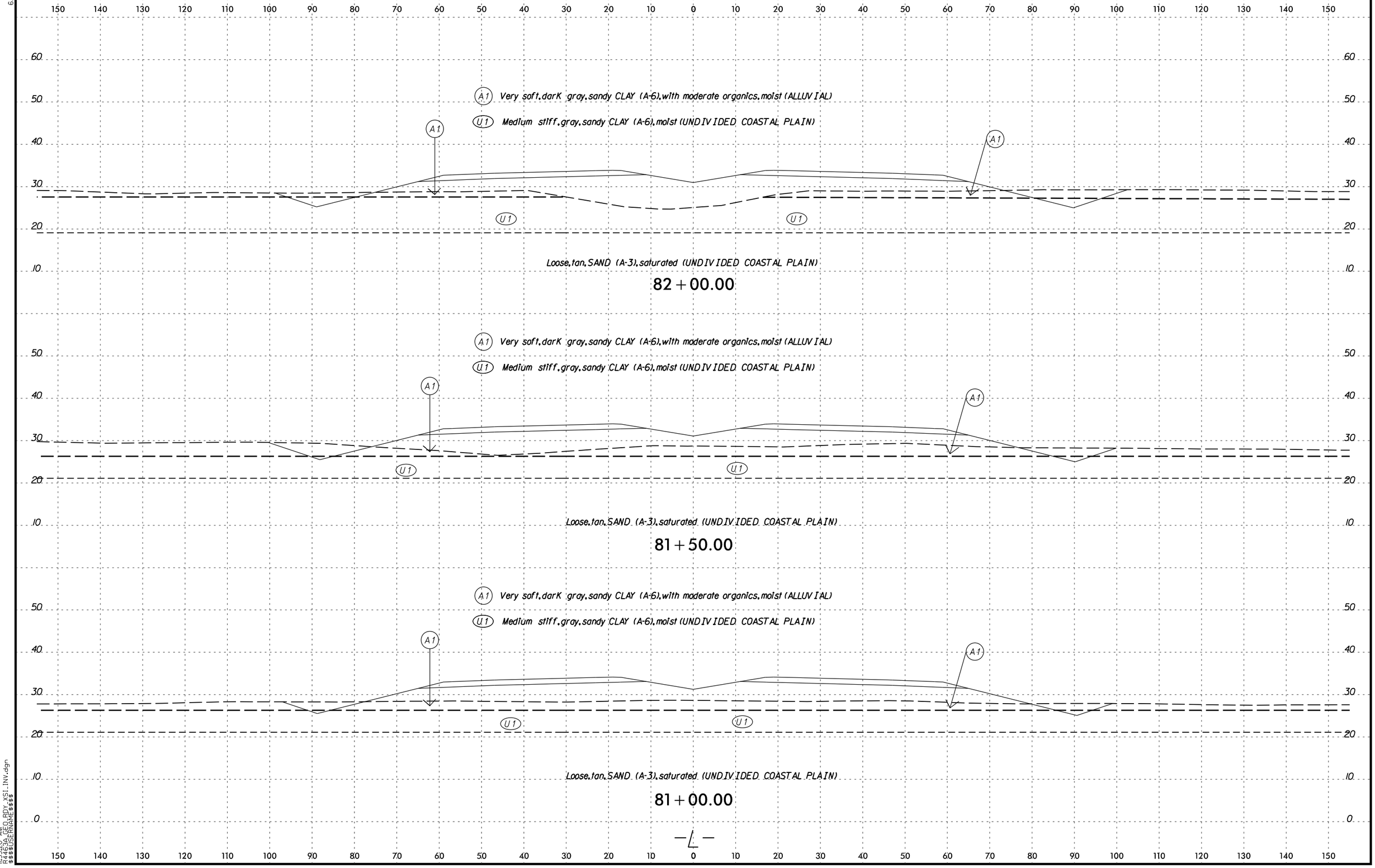
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	56



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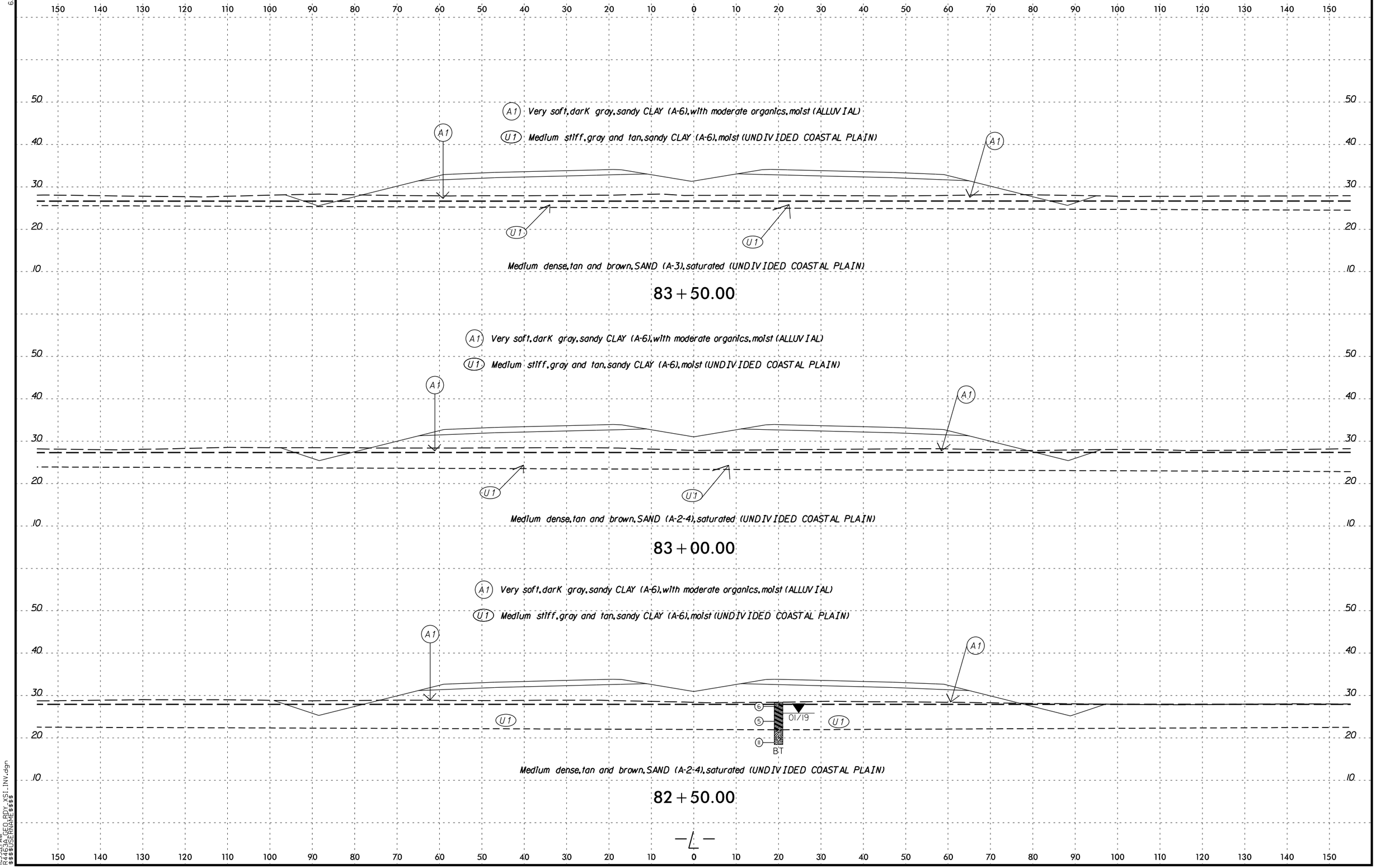
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	57



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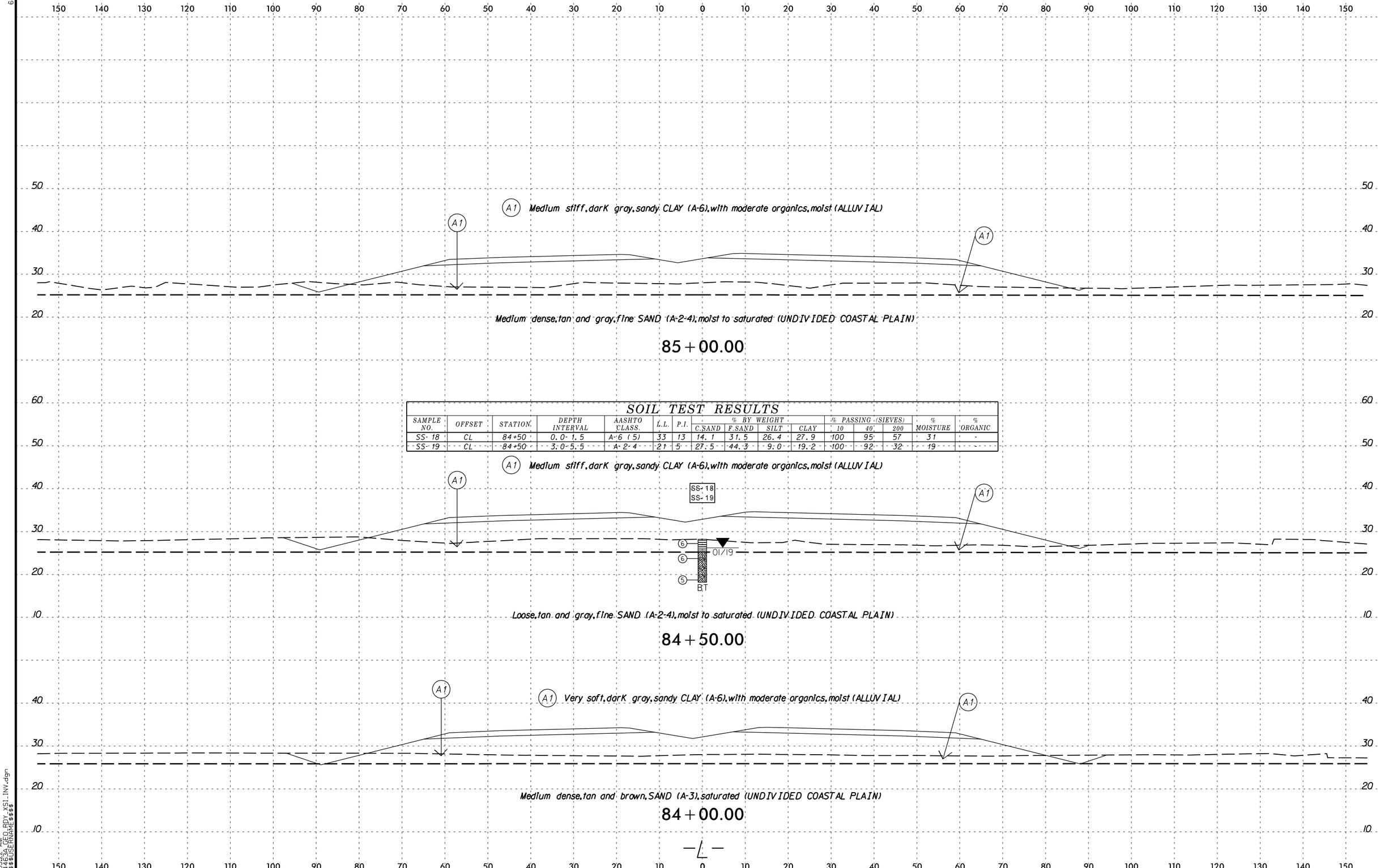

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-18	CL	84+50	0.0-1.5	A-6 (5)	33	13	14.1	31.5	26.4	27.9	100	95	57	31	-
SS-19	CL	84+50	3.0-5.5	A-2-4	21	5	27.5	44.3	9.0	19.2	100	92	32	19	-

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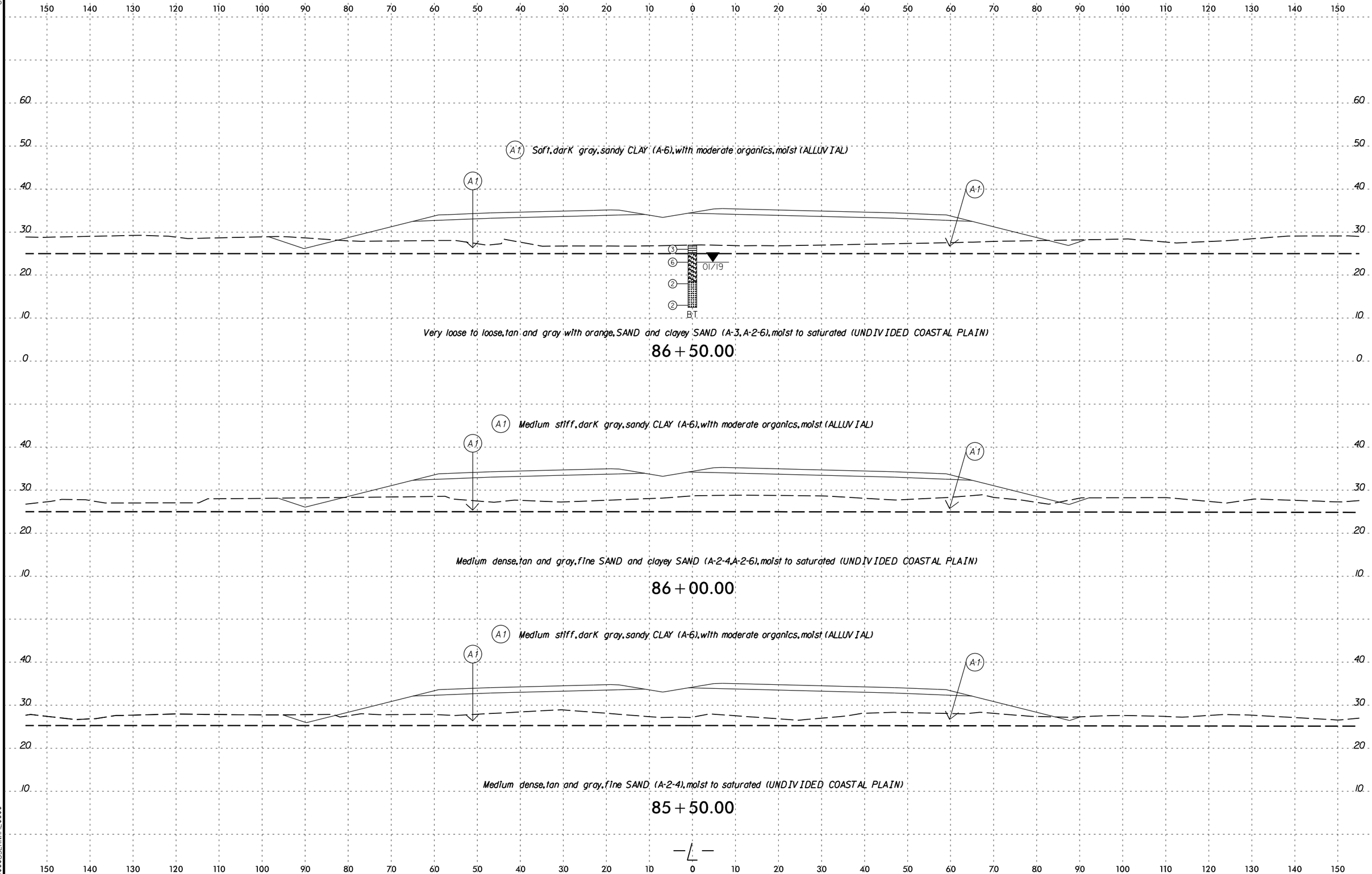
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	59



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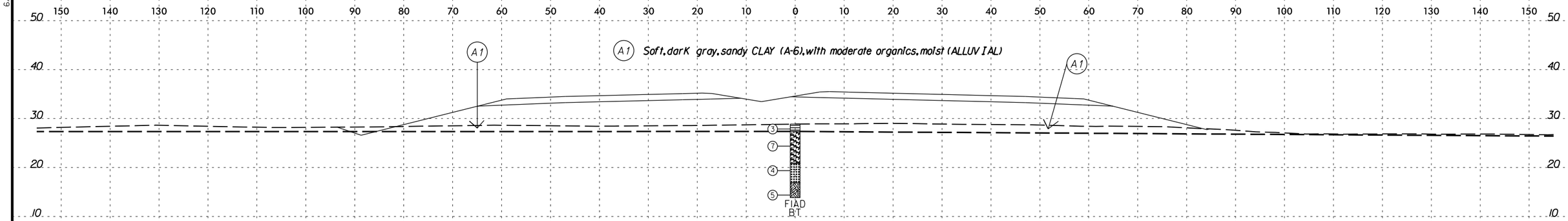
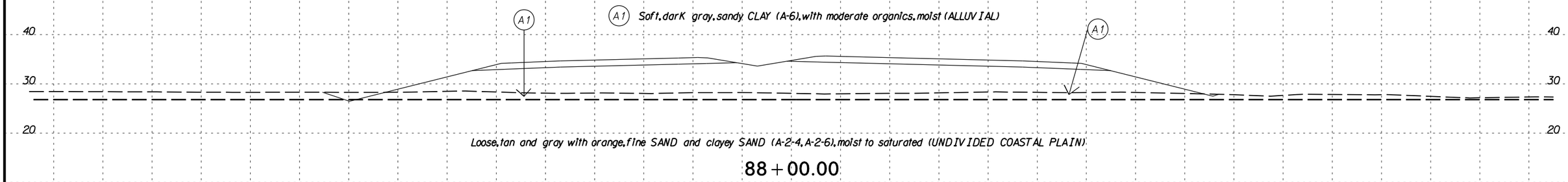
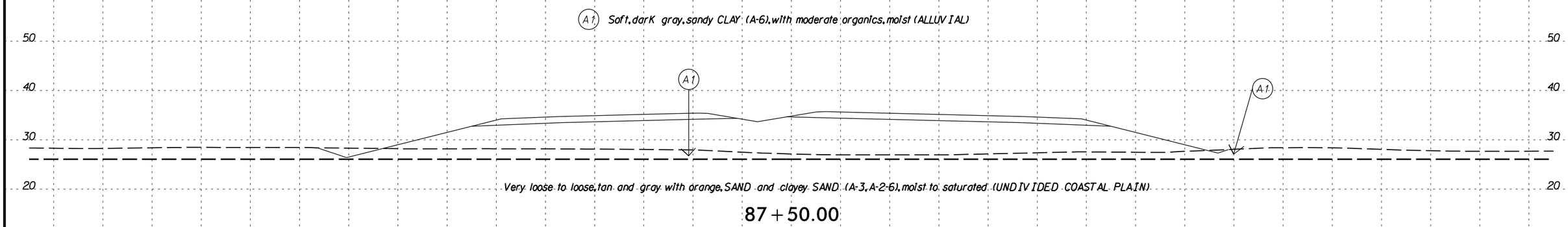
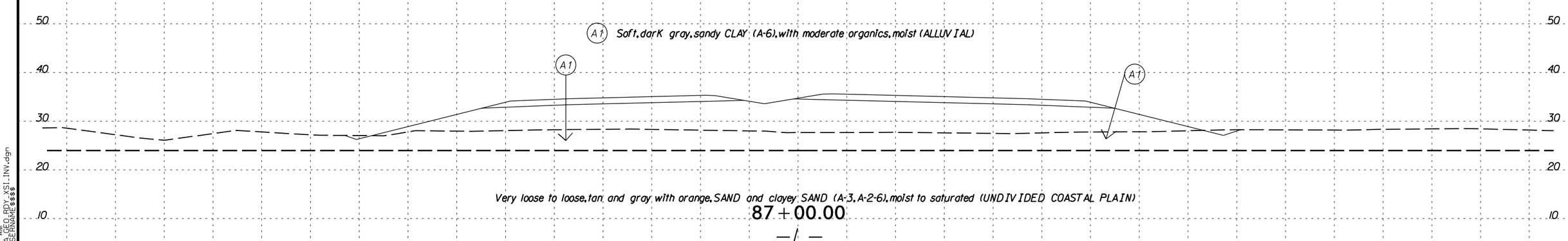
0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
R-4463A	60









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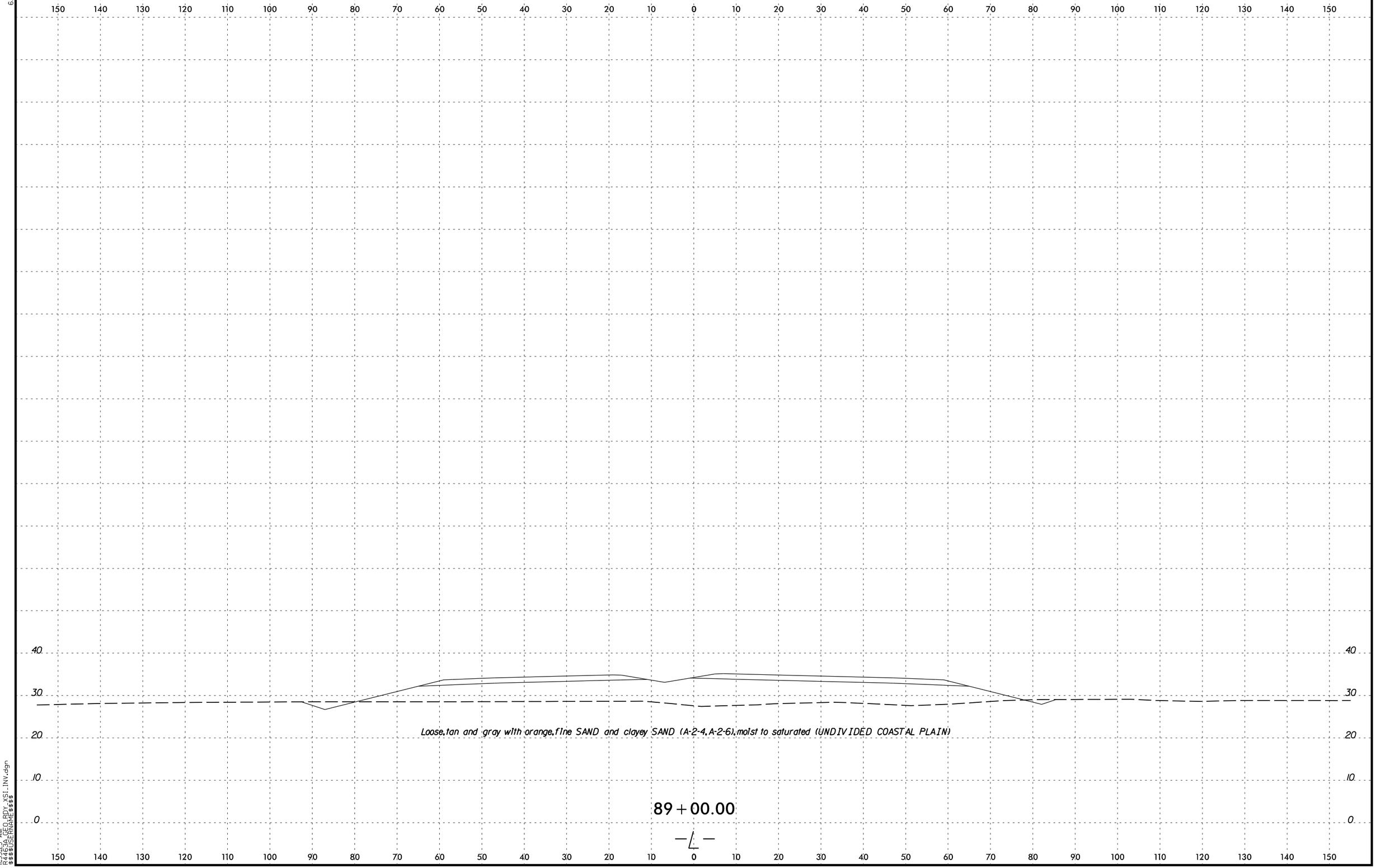
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	61



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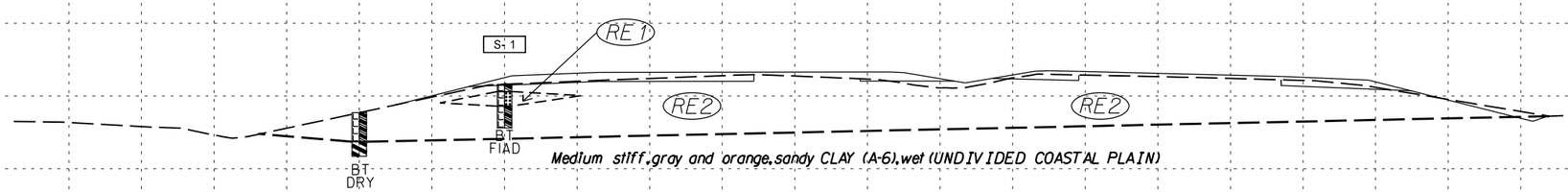
SOIL TEST RESULTS

SAMPLE NO	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-1	60' LT	124+00	0.0-1.0	A-6(7)	36	15	15.1	24.8	34.1	21.2	95	85	61	29	-



RE1 Medium dense,tan,SAND (A-3),saturated (ROADWAY EMBANKMENT)

RE2 Medium stiff,dark gray,silty CLAY (A-6),moist to wet (ROADWAY EMBANKMENT)

124+00.00

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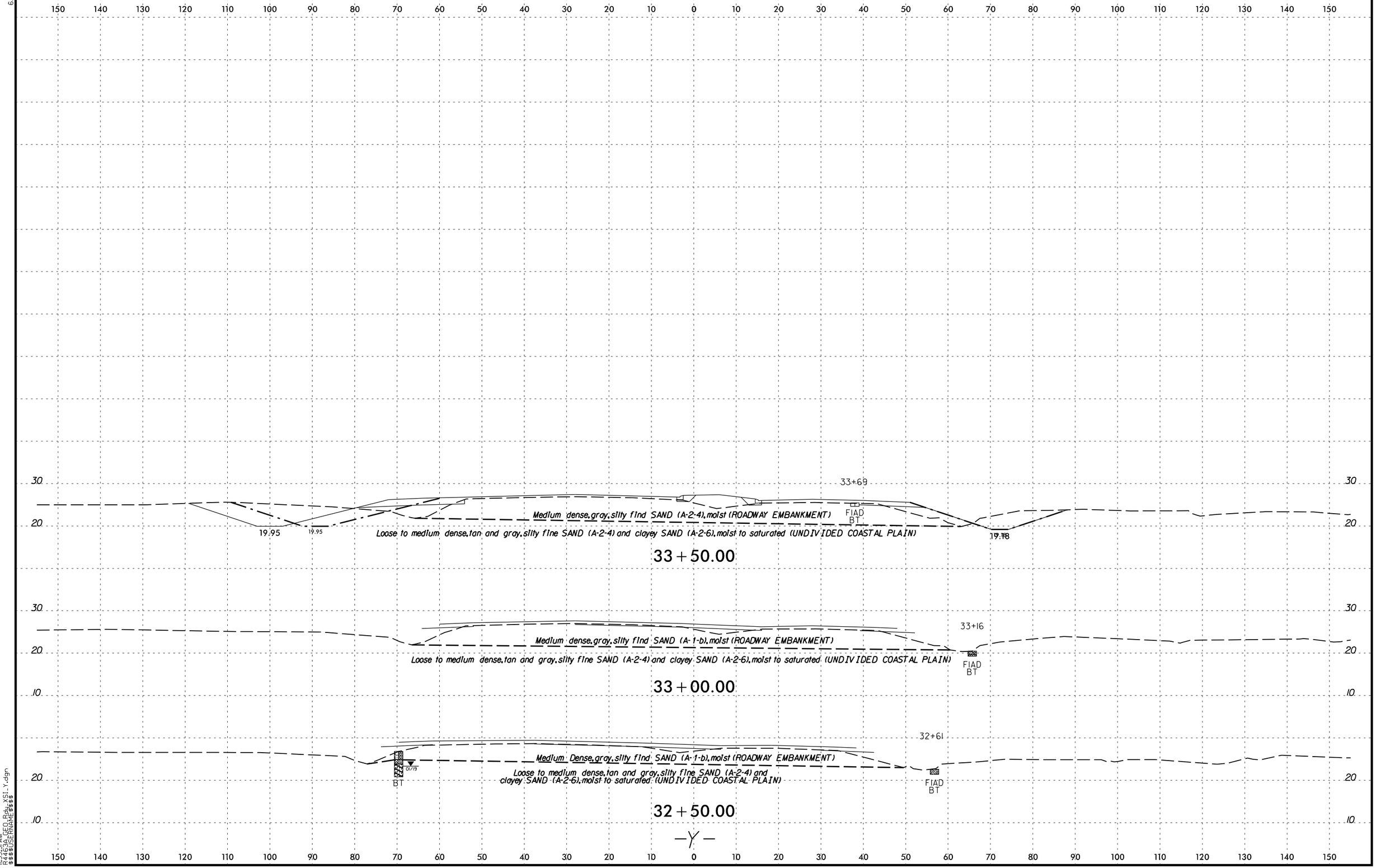
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	63



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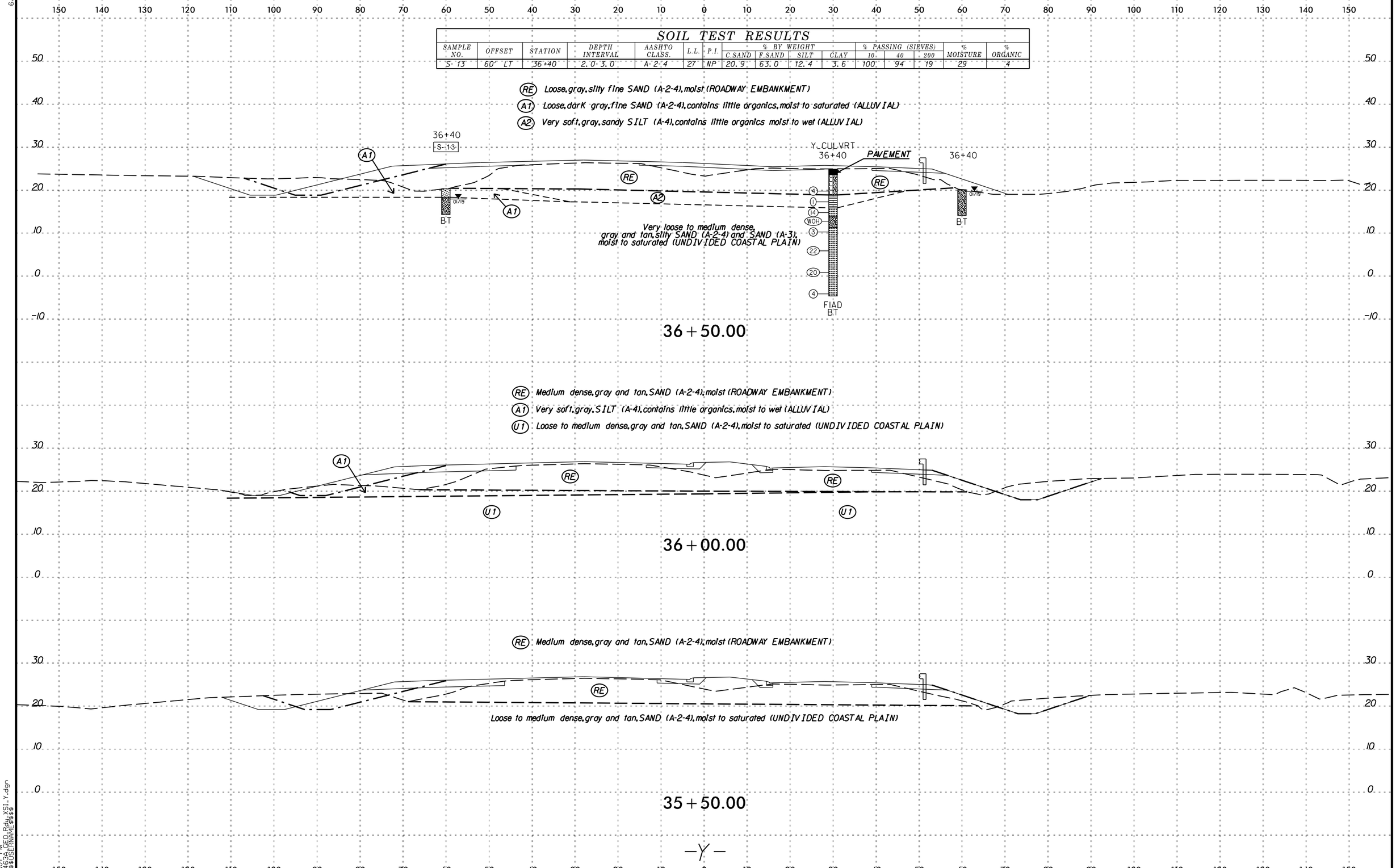
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-13	60' LT	36+40	2.0-3.0	A-2-4	27	NP	20.9	63.0	12.4	3.6	100	94	19	29	4



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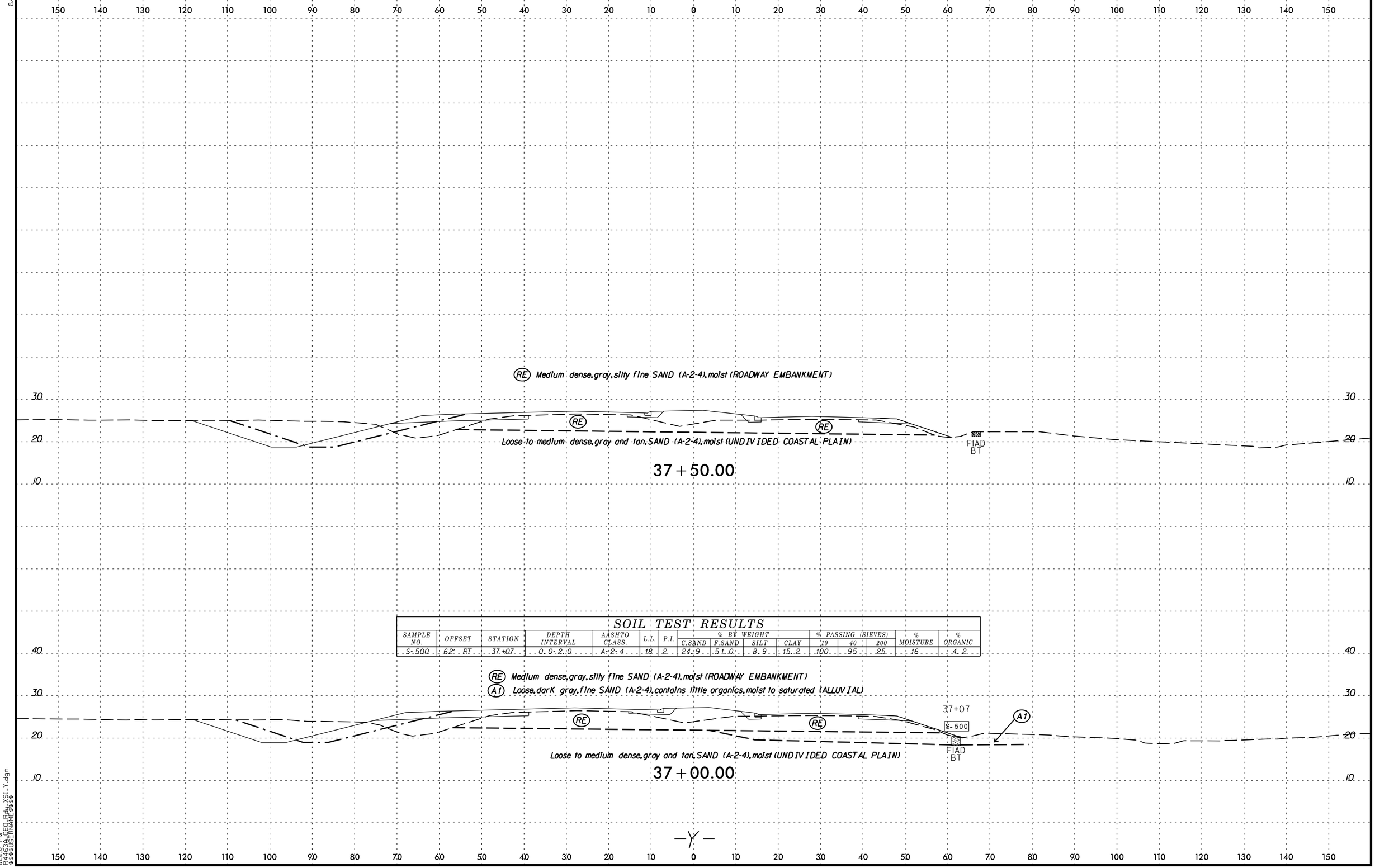

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-500	62' RT	37+07	0.0-2.0	A-2-4	18	2	24.9	51.0	8.9	15.2	100	95	25	16	4.2

RE Medium dense, gray, silty fine SAND (A-2-4), moist (ROADWAY EMBANKMENT)

A1 Loose, dark gray, fine SAND (A-2-4), contains little organics, moist to saturated (ALLUVIAL)

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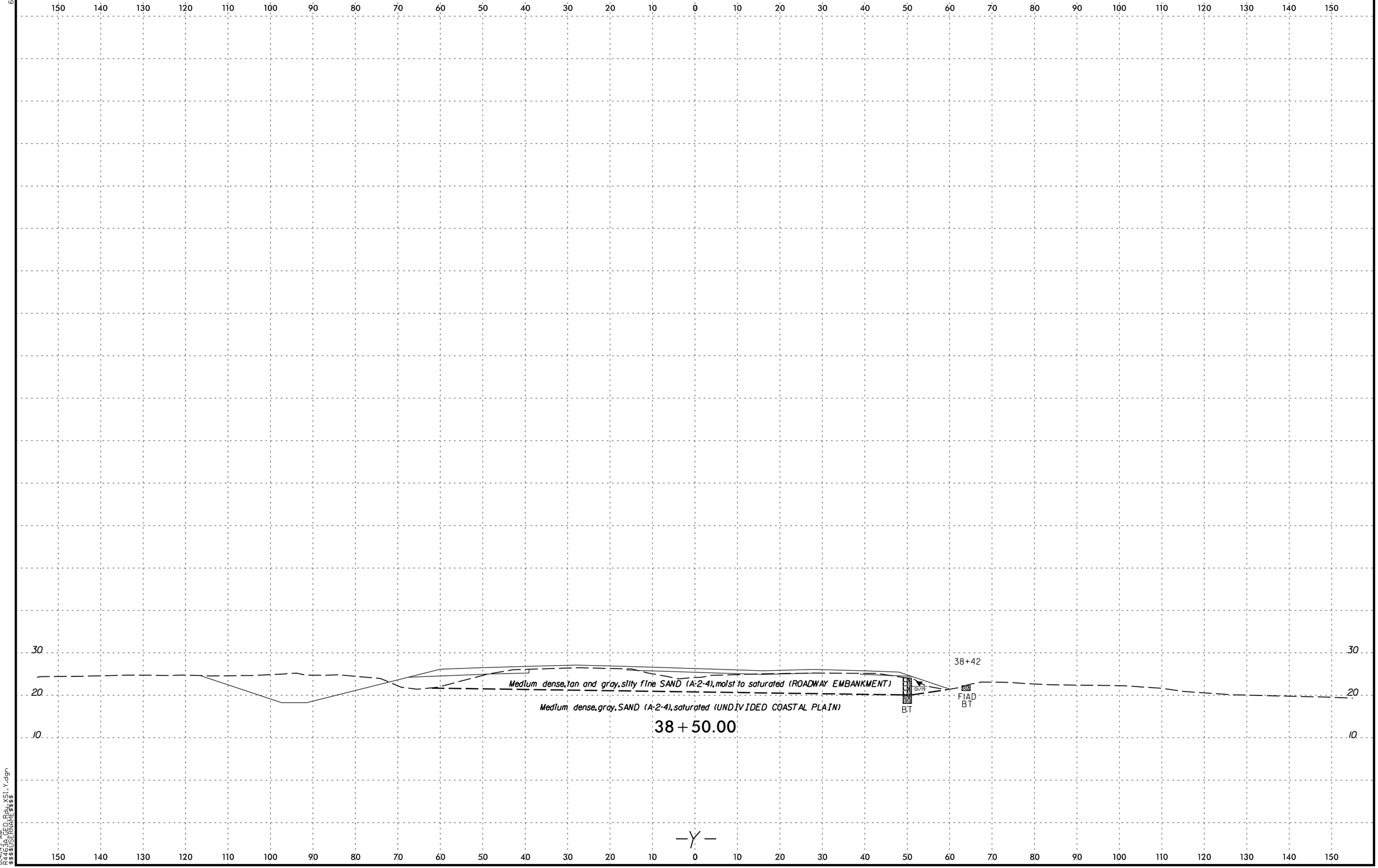
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-4463A	66



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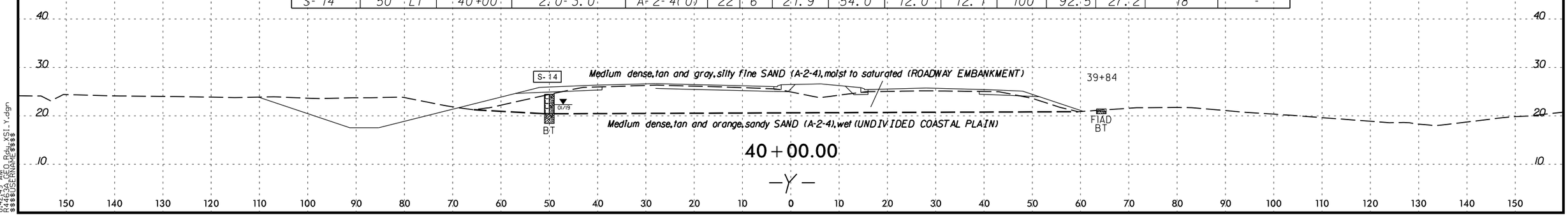
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-14	50' LT	40+00	2.0-3.0	A-2-4(0)	22	6	21.9	54.0	12.0	12.1	100	92.5	27.2	18	-



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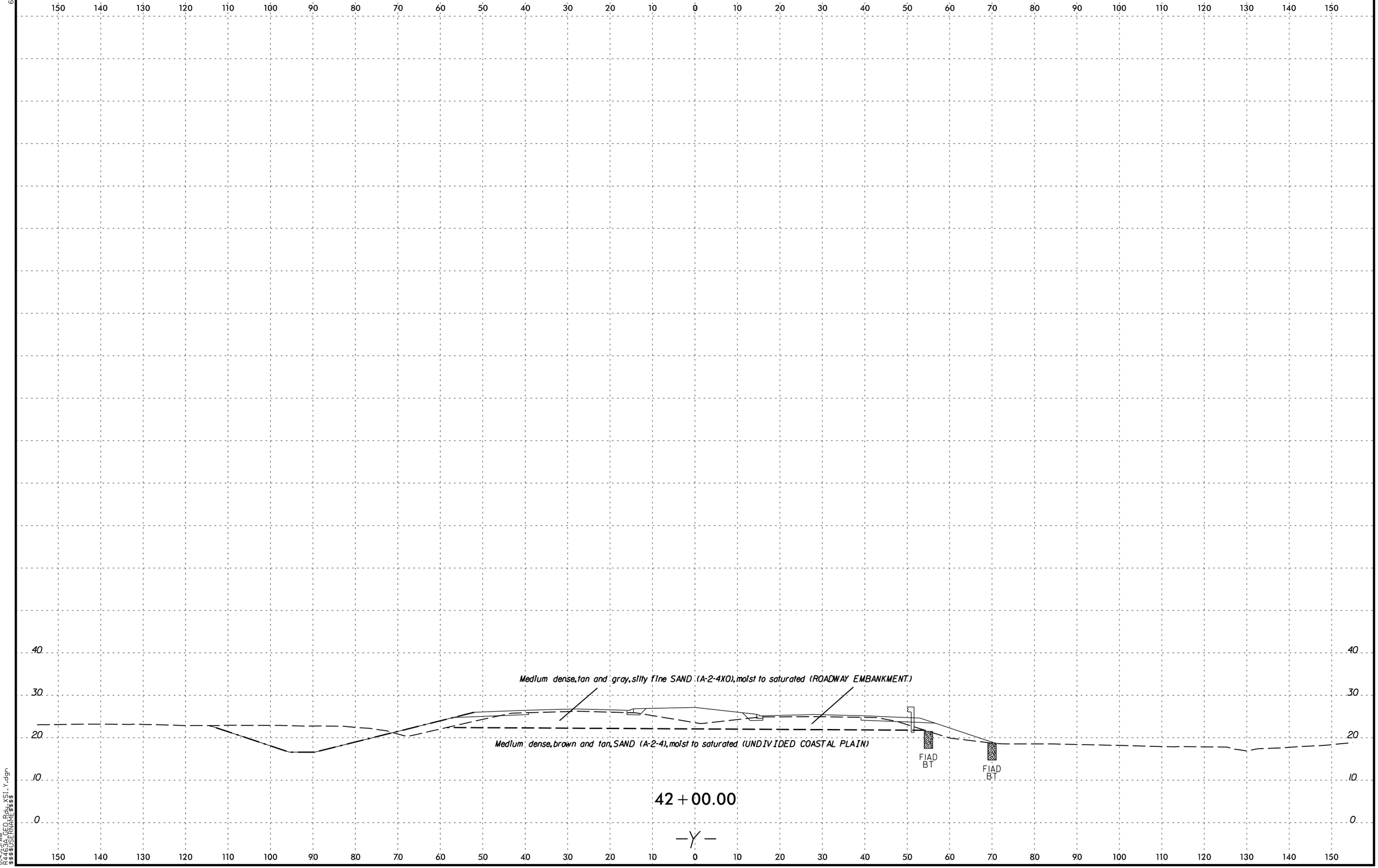
0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
R-4463A	68



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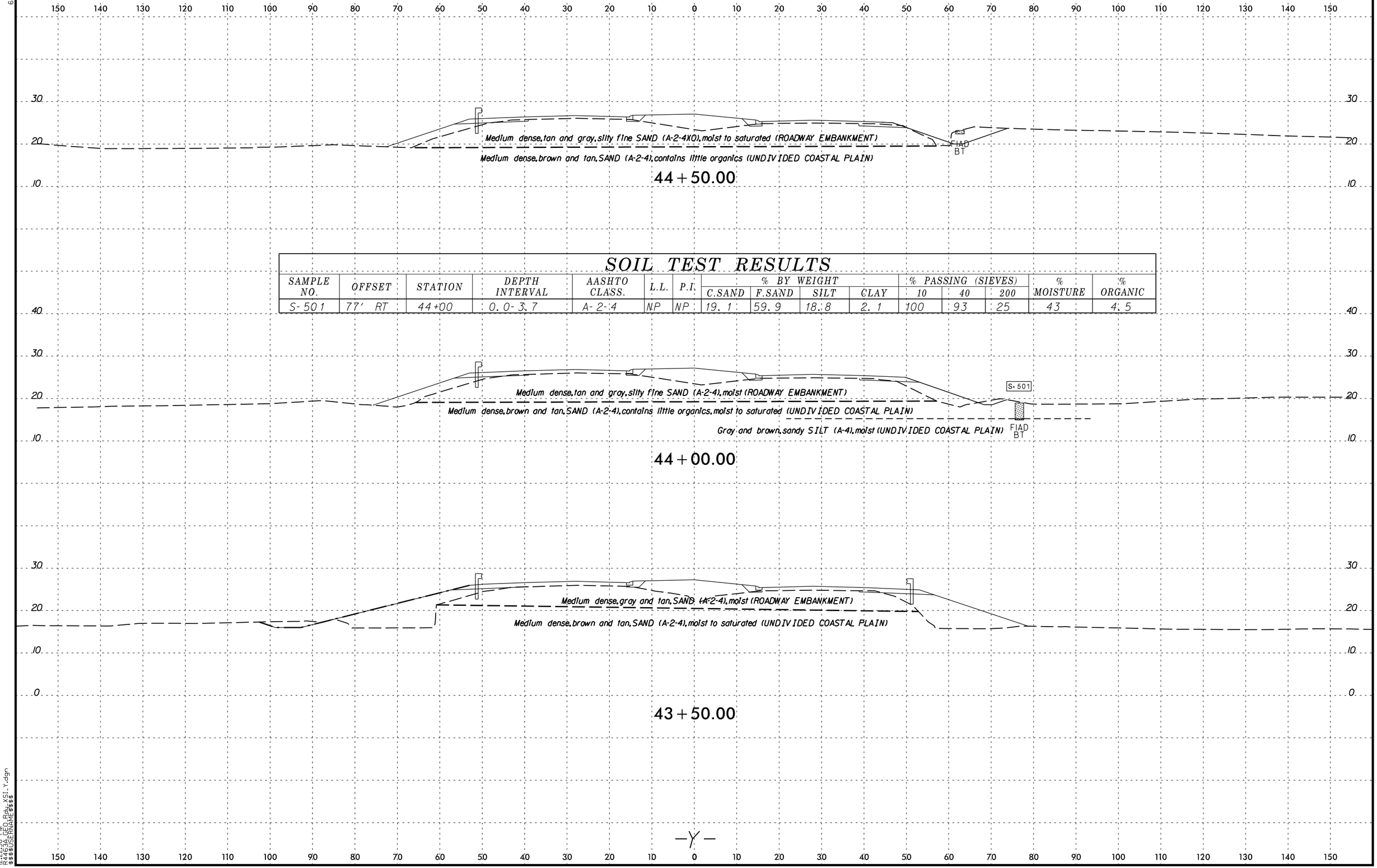

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-501	77' RT	44+00	0.0-3.7	A-2-4	NP	NP	19.1	59.9	18.8	2.1	100	93	25	43	4.5

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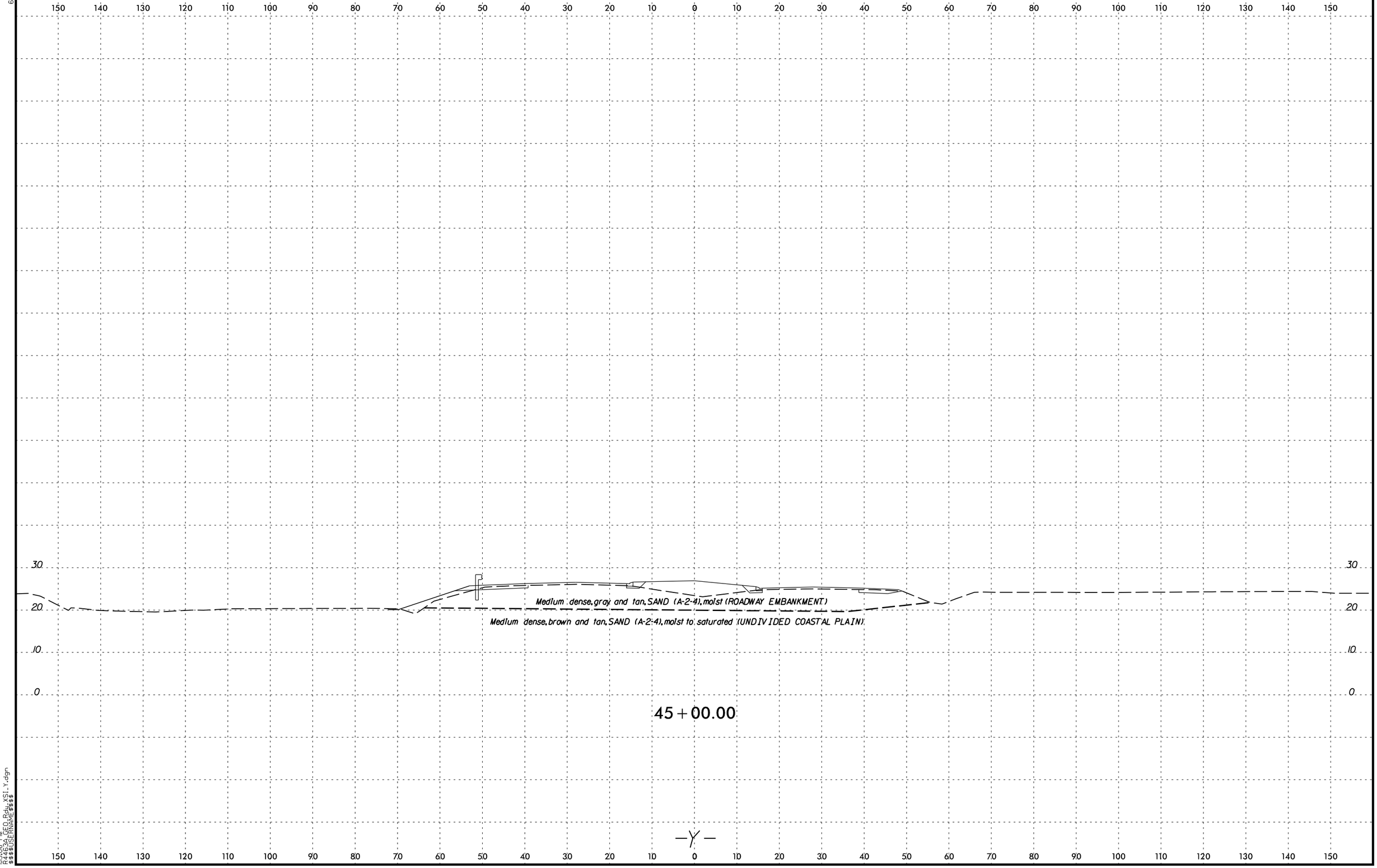
PROJ. REFERENCE NO.	SHEET NO.
R-4463A	70



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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 35601.1.1	**TIP** R-4463A	**COUNTY** CRAVEN	**GEOLOGIST** Holland, J.
SITE DESCRIPTION NC 43 Extension From US 17 to US 70			**GROUND WTR (ft)**
BORING NO. Y_2450	**STATION** 24+50	**OFFSET** 80 ft RT	**ALIGNMENT** -Y-	**0 HR.** 4.6
COLLAR ELEV. 25.9 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 494,308	**EASTING** 2,558,948	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** N/A
DRILLER Holland, J.	**START DATE** 01/09/19	**COMP. DATE** 01/09/19	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
30											
										25.9 GROUND SURFACE	0.0
25										**UNDIVIDED COASTAL PLAIN** Loose to medium dense, dark gray, silty fine SAND (A-2-4), saturated.	
20										19.9	6.0
										Boring Terminated at Elevation 19.9 ft in Undivided Coastal Plain Sand.	

NCDOT BORE DOUBLE R4463A_GEO_BORINGS.GPJ NC_DOT.GDT 11/13/19