STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5878	1	35

REFERENCE: U-5878

PROJECT: 44694

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	11+80 - 31+94	4-5	6
-Y2-	11+60 - 12+86	5	6
-Y3-	11+13 - 14+16	5	-

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	11+50 - 32+00	7-32
-Y2-	11+50 - 12+50	33
-Y3-	11+00 - 14+00	34-35

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *ONSLOW*

PROJECT DESCRIPTION *EXTENSION OF COMMERCE ROAD FROM FAIRWAY ROAD TO PINEY GREEN ROAD (SR 1406) AT COUNTRY CLUB DRIVE*

INVENTORY

CAUTION NOTICE

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

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

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

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

PERSONNEL

J.K. CRENSHAW

CATLIN INC.

INVESTIGATED BY *J.K. CRENSHAW*

DRAWN BY *J.K. CRENSHAW*

CHECKED BY *B.D. KEANEY*

SUBMITTED BY *B.D. KEANEY*

DATE *JANUARY 2018*

NORTH CAROLINA LICENSED SEAL 2504 GEOLOGIST JARED K. CRENSHAW

DocuSigned by:
Jared Crenshaw 1/17/2018
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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-5878	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	—	6 MX	—	NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0	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
	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
PLASTIC RANGE (PI): LL — LIQUID LIMIT		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] 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: SEE NOTES BELOW

ELEVATION: _____ FEET

NOTES:

BL-3 ELEV=30.55' - USED AS A SURVEY REFERENCE FOR CULV1_LT AND CULV1_RT

BL-5 ELEV=32.39' - USED AS A SURVEY REFERENCE FOR CULV2_LT AND CULV2_RT

ALL OTHER BORING ELEVATIONS AND GROUND ELEVATIONS OBTAINED FROM 'U5878_ls_tin.tin' DATED 5/2/2017

FIAD - FILLED IMMEDIATELY AFTER DRILLING

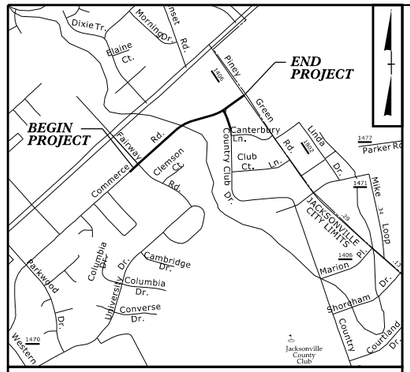
DATE: 8-15-14

09/08/09

TIP PROJECT: U-5878

CONTRACT: DC0185

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



VICINITY MAP N.T.S.

25% PRELIMINARY DESIGN

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ONSLOW COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5878	3	35

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44694.1.1	N/A	P.E.

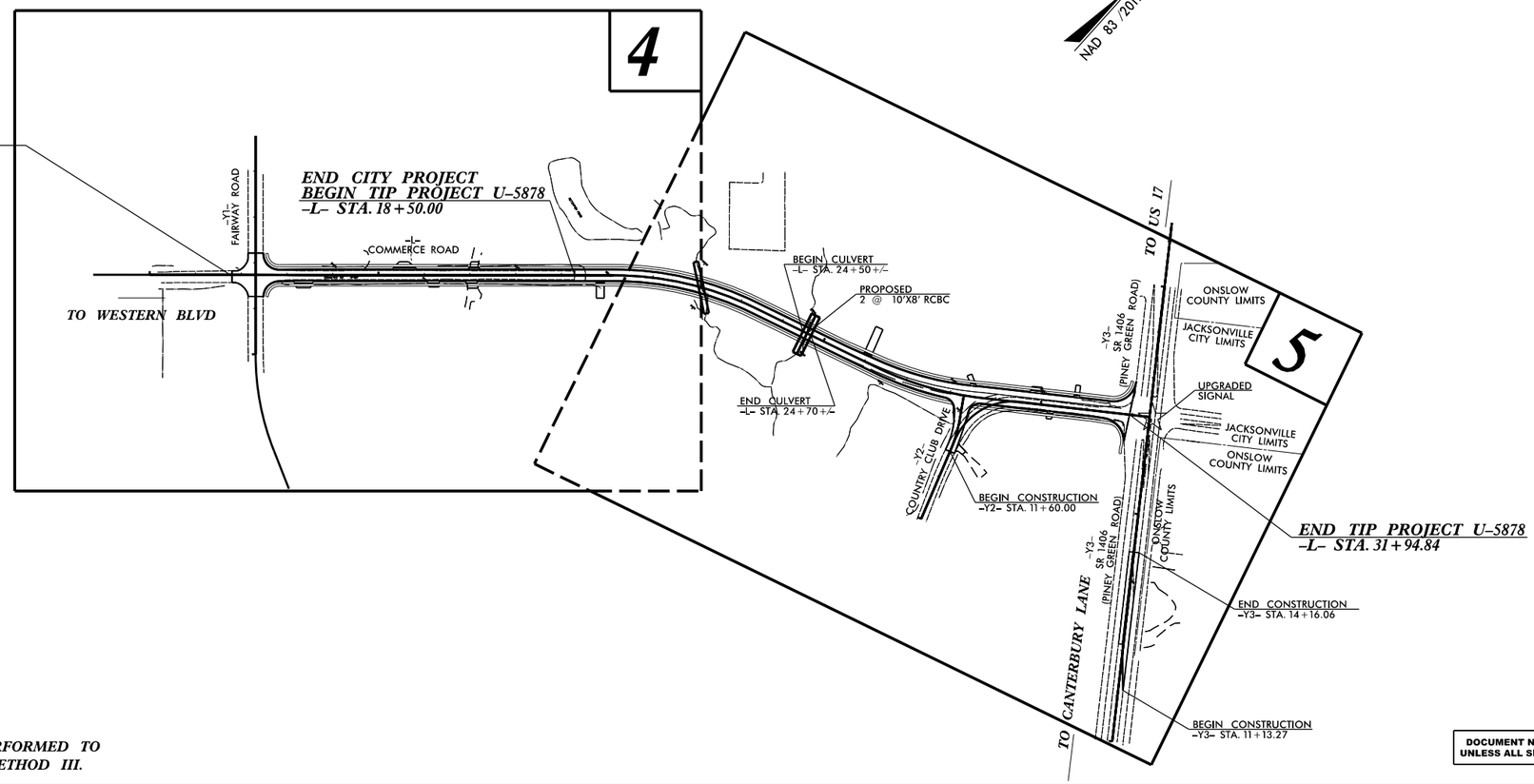
PRELIMINARY ROADWAY PLANS

SUBMITTED: 07-20-17

SUBMITTAL #3

LOCATION: EXTENSION OF COMMERCE ROAD FROM FAIRWAY ROAD TO PINEY GREEN ROAD (SR 1406) AT COUNTRY CLUB DRIVE

TYPE OF WORK: GRADING, PAVING, DRAINAGE & CULVERTS



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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2021 = 1,900
ADT 2041 = 7,900
K = 9
T = 4%
V = 30 MPH

* TTST=1%, DUALS=3%

FUNC. CLASSIFICATION: MAJOR COLLECTOR

PROJECT LENGTH

LENGTH OF CITY PROJECT = 0.127 MILES

LENGTH OF ROADWAY TIP PROJECT U-5878 = 0.251 MILES

LENGTH OF STRUCTURE TIP PROJECT U-5878 = 0.004 MILES

TOTAL LENGTH OF TIP PROJECT U-5878 = 0.255 MILES

NCDOT CONTACT: MICHAEL BASS
NCDOT DIVISION 3

PLANS PREPARED FOR THE NCDOT BY:
STV ENGINEERS, INC.
1500 Perimeter Park Dr., Suite. 120, Morrisville, NC 27560
NC License Number F-0991

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: February 11, 2019

LETTING DATE: February 16, 2021

JOHN N. JOHNSON, PE
PROJECT ENGINEER

PATRICK A. LIVINGSTON, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

12/20/2017
...\PlanProf\U5878_geo_TSH.dgn
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December 20, 2017

STATE PROJECT: 44694.1.1

TIP NUMBER: U-5878

COUNTY: Onslow

DESCRIPTION: Extension of Commerce Road from Fairway Road to Piney Green Road (SR 1406) at Country Club Drive

SUBJECT: Geotechnical Roadway Inventory report

PROJECT DESCRIPTION

The U-5878 project is designed to improve traffic flow and ease congestion in the City of Jacksonville, NC. The project consists of extending Commerce Road to Piney Green Road. Included in this report are borings related to a roadway extension, new alignments, and two proposed culverts.

The field investigation was conducted in November of 2017 using an ATV mounted CME 550 and a track mounted CME 45B, both with automatic hammers. Standard Penetration Tests (SPT) were performed at selected locations. Borings were advanced with hollow stem augers and mud rotary equipment along the project corridor. Representative soil samples were collected and forwarded to an approved testing facility for soil quality analysis, moisture content, and AASHTO classification.

The following alignments were investigated

Line	Station			Length (ft)
-L-	11+80	to	31+94	2,015
-Y2-	11+60	to	12+86	127
-Y3-	11+13	to	14+16	303
			Total =	2,445 (±0.5 miles)

PHYSIOGRAPHY AND GEOLOGY

Physiography and Geology

The project is located in the Coastal Plain Physiographic Province. Soils in this area generally consist of sedimentary sands, clays, and silts. Topography along the project corridor is nearly flat to gently sloping. Natural ground elevations range from 24± feet above sea level at the bottom of the stream bed at –L- station 24+50 to 44± feet above sea level along the near the existing intersection at Piney Green Road.

Soil and Rock Properties

Soils encountered along the project corridor are divided into four categories based on origin: roadway embankment, alluvial, undivided coastal plain, and Belgrade Formation.

Roadway embankment soils consisting of medium dense sand and gravel (A-1-b) was encountered along the existing Commerce Road shoulders and on Piney Green Road beneath the median. Roadway embankment soils ranged in thickness from 1± to 2± feet thick.

Alluvial soils were encountered in the vicinity of the proposed culvert location near station 22+00. These soils consist of very loose to loose sand and clayey sand (A-2-4, A-2-6) and soft to stiff silty clay with little organic material (A-7-6). Alluvial soils were encountered from the ground surface to a maximum depth of 15 feet below the ground surface at the borehole location and range in elevation from 13± feet to 28± feet above sea level. Test results showed that the cohesive alluvial sediments are comprised of 10% organic matter, and range in natural moisture content from 32% to 77%. Plasticity Indices (PI) within the cohesive sediments range from 12 to 18.

Undivided coastal plain (UCP) sediments were encountered throughout the project corridor at the surface and beneath roadway embankment and alluvial soils. These sediments were at least 6 feet thick where encountered, and are comprised of very loose to medium dense sand and clayey sand (A-2-6, A-2-4, A-3) and soft to medium stiff silt, clay, and sandy clay (A-4, A-6, A-7-6). The cohesive sediments ranged natural in moisture from 11% to 25%. Plasticity Indices ranged from 3 to 25.

Coastal Plain sediments from the Belgrade Formation were encountered beneath the undivided coastal plain and alluvial sediments where boreholes were advanced below elevation 20± feet above sea level. These sediments are comprised of very loose to medium dense sand and clayey sand (A-2-6, A-2-4, A-3), containing cemented shell fragments at some depth intervals. Where encountered, these sediments were at least 20± feet thick.

hdrinc.com

555 Fayetteville Street, Suites 900 & 210, Raleigh, NC 27601-3034
(919) 232-6600

Ground Water

All SPT borings were left open for at least 24 hours to allow ground water levels within the borehole to equilibrate with the surrounding conditions. Ground water data were collected in November of 2017, during a time of normal precipitation. Ground water elevations generally varied with topography, and ranged in elevation from 27± feet to 37± feet above sea level. Ground water depths varied from 0.7 feet to greater than 6.0 feet below the ground surface at the borehole location.

Undisturbed Samples

An undisturbed thin wall Shelby tube sample was collected at the following location and submitted for testing. Test results show that soils at this location are saturated clayey sands (A-2-6), with a Plasticity Index of 15. Proposed construction in the vicinity of this location includes the placement of a culvert and embankment fills as high as ±13 feet.

Sample No.	Station	Depth (ft)	Test
ST-1	21+76 40’ LT	8.0-10.0	CU, Consolidated Undrained

Culvert at -L- Sta. 22+07±

Natural ground elevations in the vicinity of the proposed culvert location range from 25± feet above sea level at the bottom of the stream bed to 41± feet above sea level along existing Commerce Rd. Borings completed at the proposed culvert location show approximately 2± to 4± feet of very soft, silty and sandy clay (A-6, A-7-6), containing 10% organic material with a moisture content ranging from 32% to 77%. The alluvial clay is underlain by 8± to 12± feet of very loose to loose, gray, alluvial sand and clayey sand (A-2-4, A-2-6) containing trace organic materials. Soils belonging to the Belgrade Formation were observed beneath the alluvial soils at elevations ranging from 13± to 18± feet above sea level. These very loose to very dense sands (A-2-4, A-3) were at least 20 feet thick and are assumed to extend below the elevations at which the borings were terminated.

Culvert at -L- Sta. 24+60±

Natural ground elevations in the vicinity of the proposed culvert at this location range from 24± feet at the bottom of the stream bed to 40± feet above sea level in the residential area east of the proposed culvert location. Borings at the proposed culvert location were advanced into Undivided Coastal Plain sediments consisting of loose clayey sands (A-2-6), and medium stiff clays (A-6) at the surface. There is assumed to be alluvial sediments within the stream channel, but none were encountered on the adjacent stream banks at CULV2_LT. At CULV2_RT the boring was advanced through 4± feet of medium stiff silty clay (A-7-6). The Undivided Coastal Plain and alluvial sediments are underlain by very loose to dense sands (A-2-4, A-3, A-1-b) belonging to the Belgrade Formation. The top of the Belgrade Formation was observed at elevations ranging from 20± to 22± feet above sea level. These soils were at least 30± feet thick and are assumed to extend below the elevations at which the borings were terminated.

Areas of Special Geotechnical Interest

The following sections contain cohesive soils which have the potential to cause embankment and or subgrade issues during construction. Soils with Plasticity Indices higher than 15 were encountered in the following sections

Alignment	Begin Station	End Station
-L-	11+80	19+75
-L-	21+00	22+20
-L-	24+50	24+70
-L-	25+72	31+94

Alluvial soils were encountered in the following sections.

Alignment	Station	End Station
-L-	21+00	22+41
-L-	24+49	24+72

Ponds occur in the following area within or near the proposed right of way.

Alignment	Station	Offset
-L-	20+00	±80’ LT

Perennial streams were encountered at the locations below.

Alignment	Station	Offset
-L-	22+08	CL
-L-	24+56	CL

Sincerely,
HDR ENGINEERING, INC.

Jared K. Crenshaw, L.G.
Professional Geologist

Brian Keaney, P.E.
Project Manager

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-5878	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV 100 Years
STV Engineers, Inc.
1500 Perimeter Park Dr.
Suite 120
Morrisville, NC 27560
NC License Number F-0991

NAD 83/2011

-Y1- POT Sta. 14+77.56

ISMTL BUS

MTL CANOPY

-L- POC Sta.12+31.33 =
-Y1- POT Sta. 11+73.69

N 41° 57' 08.1" W

-Y1-

ISBLK/FRAME BUS

15

ISMTL BUS

UNDIVIDED COASTAL PLAIN

IS BLK/ FRAME BUS

-L- PT Sta. 13+57.59

MTL LOADING DOCKS

20

RETENTION POND

IS ALLUVIAL

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

N 48° 03' 12.2" E

-L- PC Sta. 11+80.04

N 48° 02' 15.6" E

-L-

-L- POT Sta. 10+00.00

-L- PRC Sta. 12+67.78

ISMTL BUS

ISMTL BUS

ISFD

B

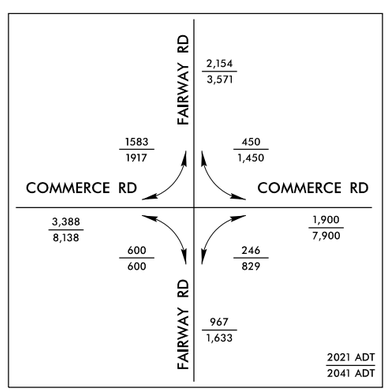
E

-L- PC Sta. 20+14.36

-Y1- POT Sta. 10+00.00

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN



SEE SHEET 6 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
U-5878	5

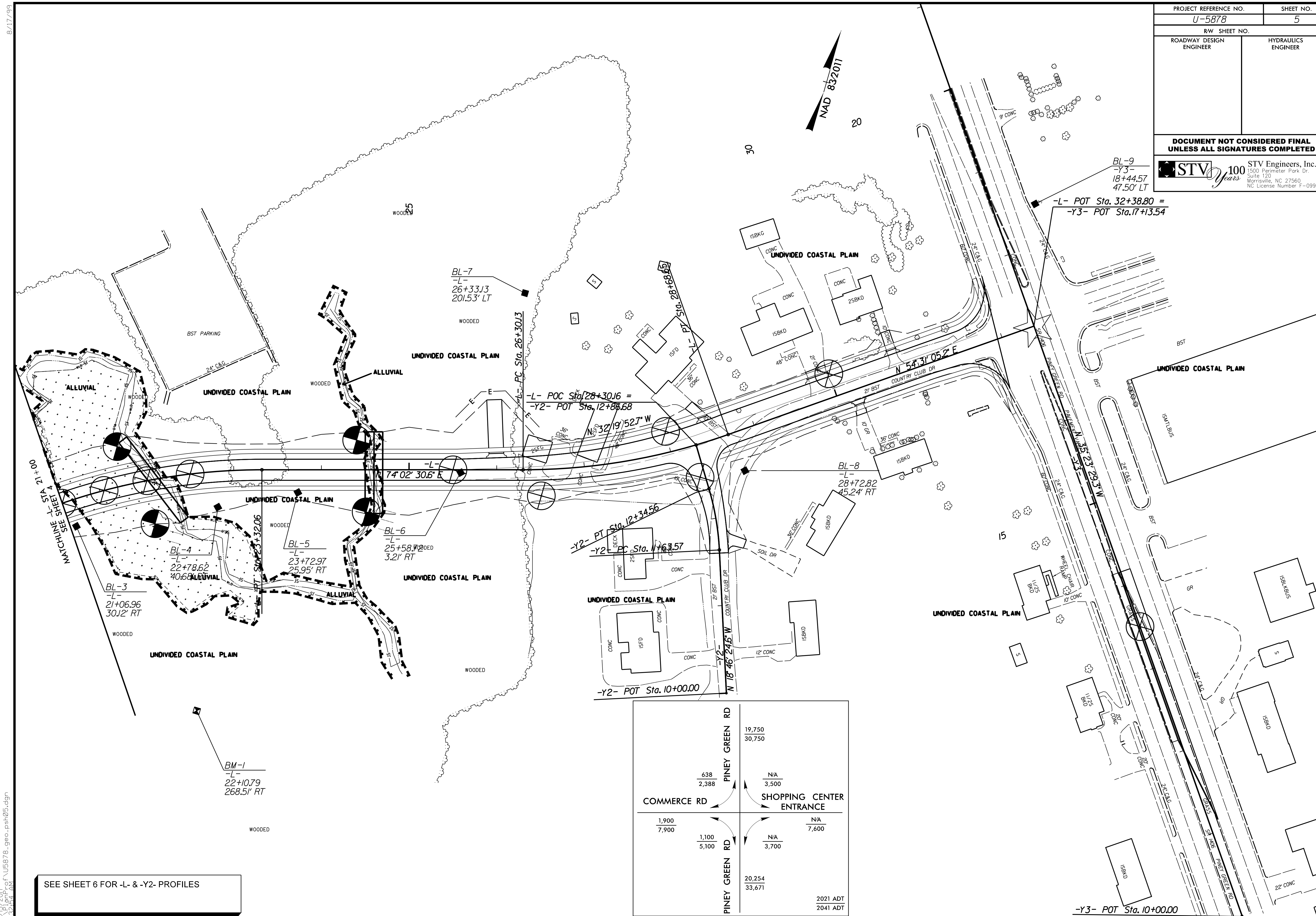
R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV Engineers, Inc.
1500 Perimeter Park Dr.
Suite 120
Morrisville, NC 27560
NC License Number F-0991



NAD 83/2011
BL-9
-Y3-
18+44.57
47.50' LT
-L- POT Sta. 32+38.80 =
-Y3- POT Sta.17+13.54
BL-7
-L-
26+33.13
201.53' LT
-L- PC Sta. 26+30.13
-L- POC Sta. 28+30.16 =
-Y2- POT Sta. 12+86.68
-L- PT Sta. 28+68.65
N 32°19' 52.7" W
N 54°31' 05.2" E
N 74°02' 30.6" E
N 35°23' 29.3" W
N 18°46' 24.6" W
BL-8
-L-
28+72.82
45.24' RT
BL-6
-L-
25+58.72
3.21' RT
BL-5
-L-
23+72.97
25.95' RT
BL-4
-L-
22+78.62
40.68' RT
BL-3
-L-
21+06.96
30.12' RT
-L- PT Sta. 23+32.06
-Y2- PT Sta. 12+34.56
-Y2- PC Sta. 11+63.57
-Y2- POT Sta. 10+00.00
-Y3- POT Sta. 10+00.00
MATCHLINE -L- STA 21+00
SEE SHEET 4
BM-1
-L-
22+10.79
268.51' RT
UNDIVIDED COASTAL PLAIN
ALLUVIAL
WOODED
BST PARKING
COUNTRY CLUB DR
PINEY GREEN RD
SOIL DR
PINEY GREEN RD
COMMERCE RD
SHOPPING CENTER ENTRANCE
19,750
30,750
638
2,388
N/A
3,500
1,900
7,900
N/A
7,600
1,100
5,100
N/A
3,700
20,254
33,671
2021 ADT
2041 ADT

SEE SHEET 6 FOR -L- & -Y2- PROFILES

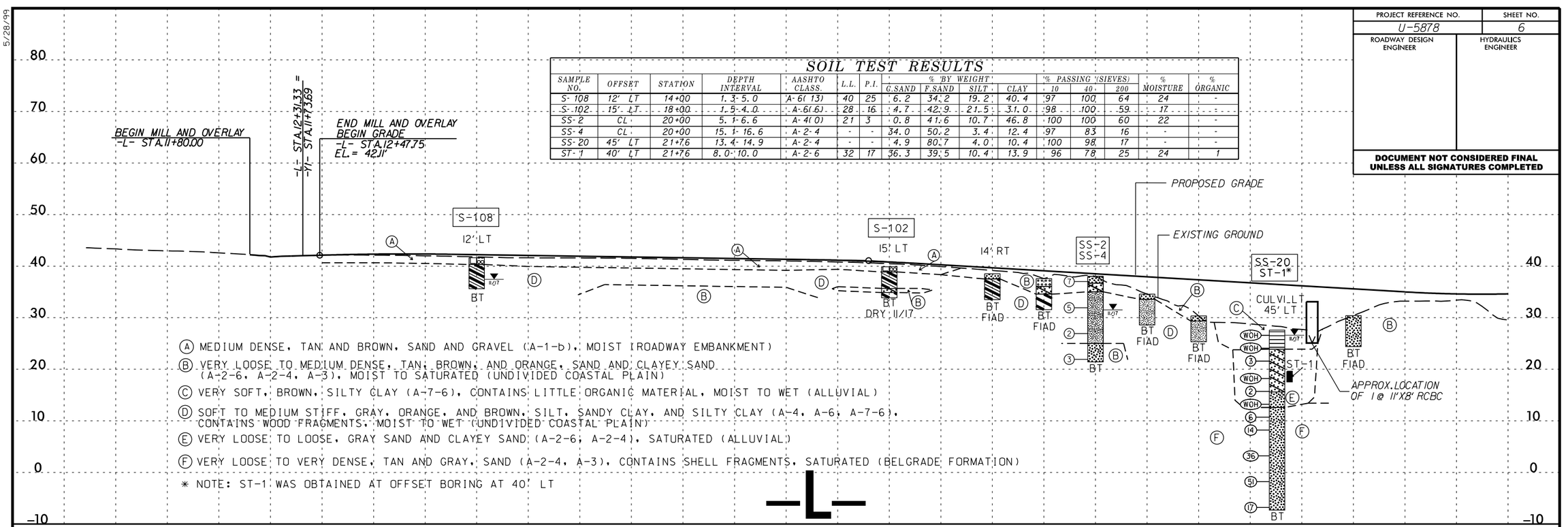
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
U-5878	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

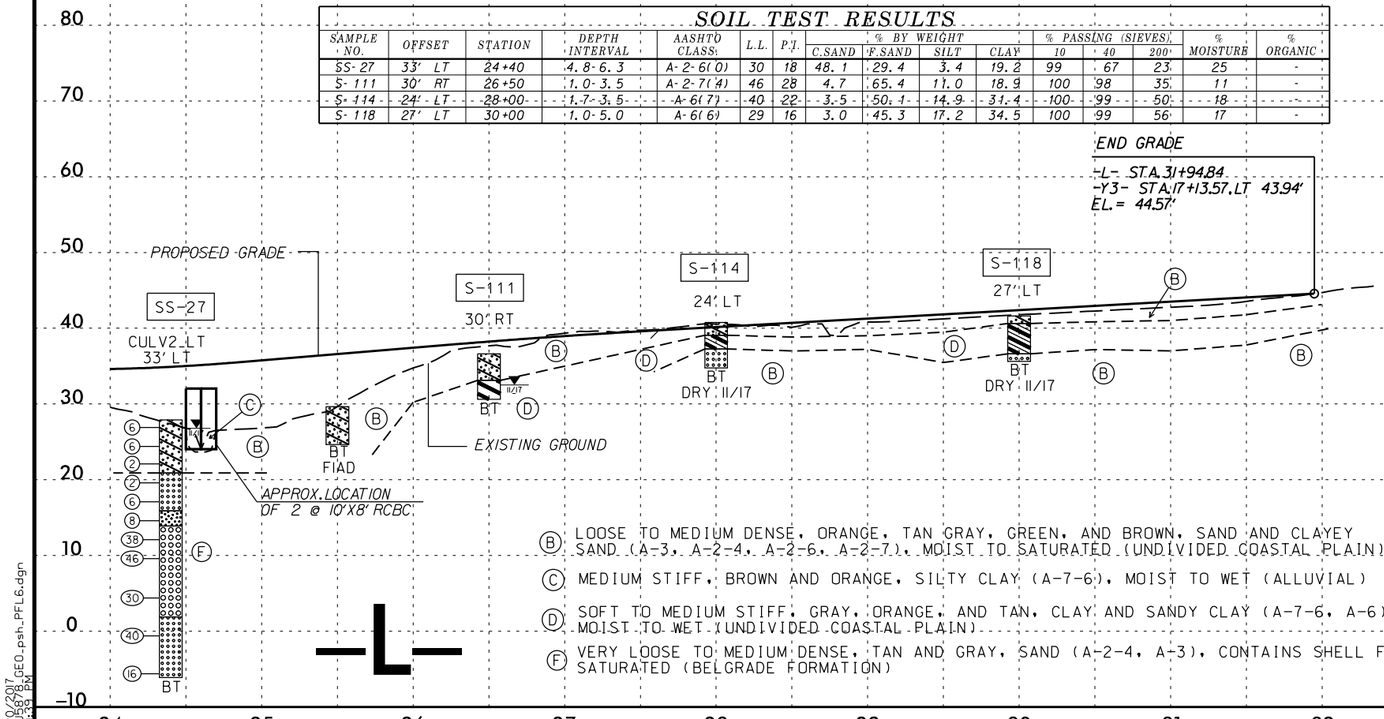
SOIL TEST RESULTS

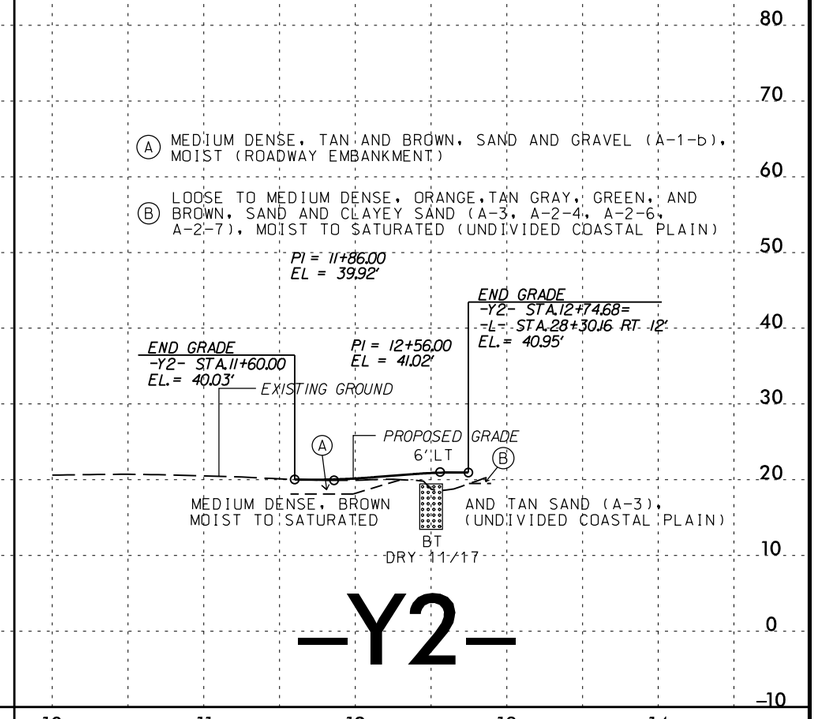
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
S-108	12' LT	14+00	1.3-5.0	A-6(13)	40	25	6.2	34.2	19.2	40.4	97	100	64	24	-
S-102	15' LT	18+00	1.5-4.0	A-6(6)	28	16	4.7	42.9	21.5	31.0	98	100	59	17	-
SS-2	CL	20+00	5.1-6.6	A-4(0)	21	3	0.8	41.6	10.7	46.8	100	100	60	22	-
SS-4	CL	20+00	15.1-16.6	A-2-4	-	-	34.0	50.2	3.4	12.4	97	83	16	-	-
SS-20	45' LT	21+76	13.4-14.9	A-2-4	-	-	4.9	80.7	4.0	10.4	100	98	17	-	-
ST-1	40' LT	21+76	8.0-10.0	A-2-6	32	17	36.3	39.5	10.4	13.9	96	78	25	24	1



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
SS-27	33' LT	24+40	4.8-6.3	A-2-6(0)	30	18	48.1	29.4	3.4	19.2	99	67	23	25	-
S-111	30' RT	26+50	1.0-3.5	A-2-7(4)	46	28	4.7	65.4	11.0	18.9	100	98	35	11	-
S-114	24' LT	28+00	1.7-3.5	A-6(7)	40	22	3.5	50.1	14.9	31.4	100	99	50	18	-
S-118	27' LT	30+00	1.0-5.0	A-6(6)	29	16	3.0	45.3	17.2	34.5	100	99	56	17	-





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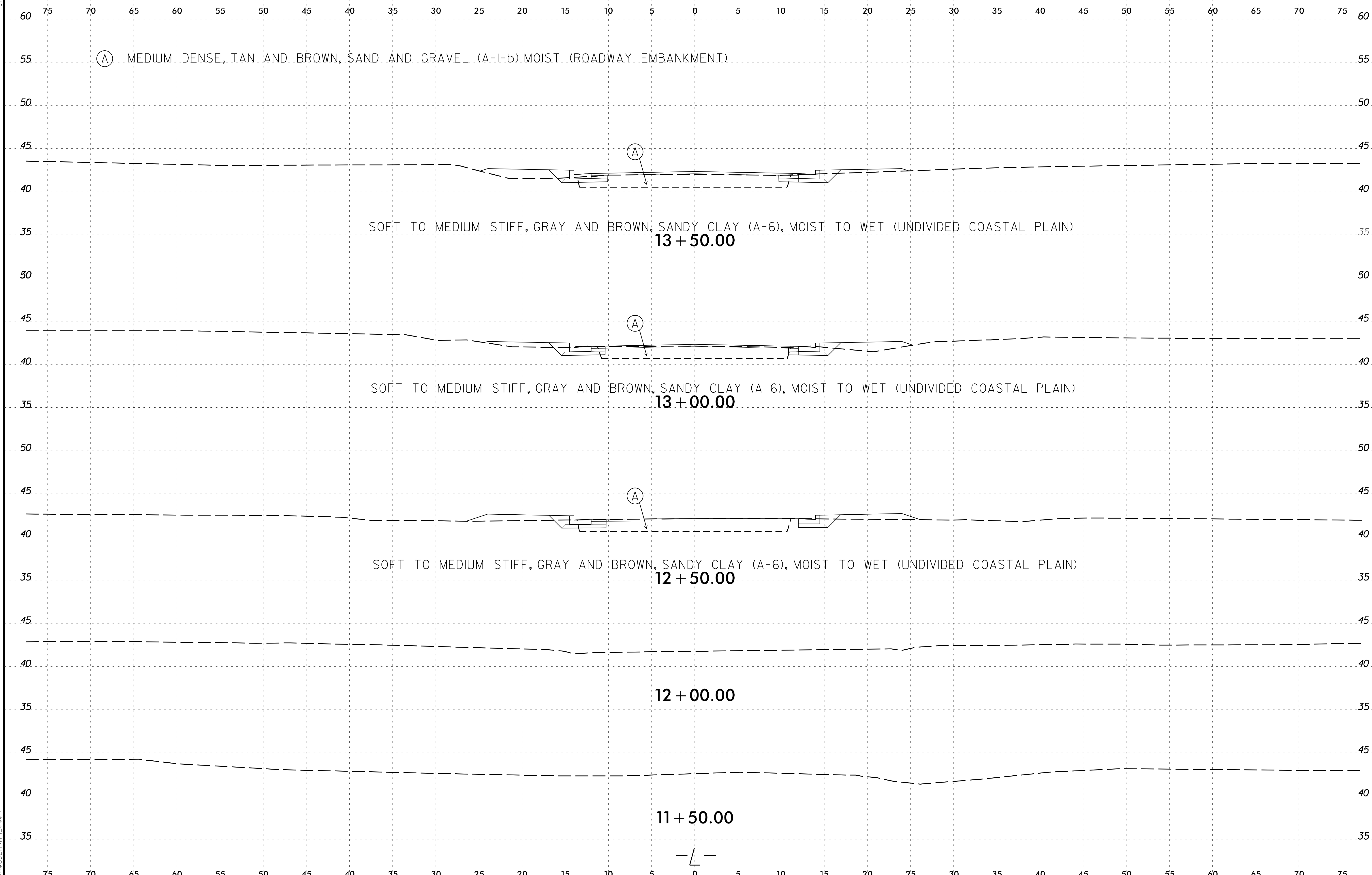

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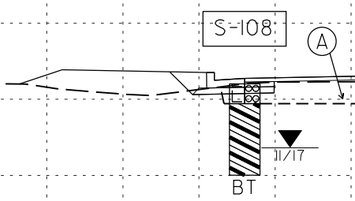
	U-5878	8

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-108	12' LT	14+00	1.3-5.0	A-6(13)	40	25	6.2	34.3	19.2	40.4	100	97	64	24	-

Ⓐ MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

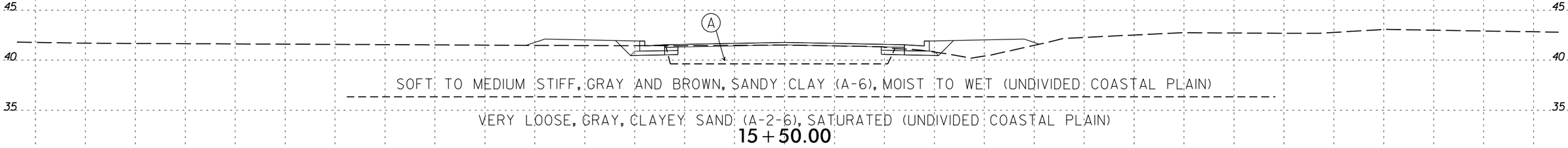


SOFT TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

14+00.00

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

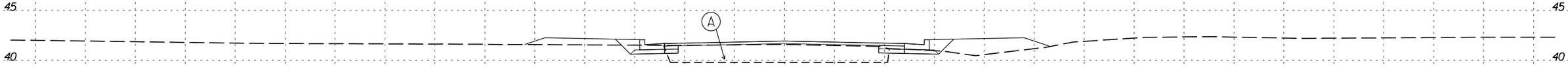
Ⓐ MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)



SOFT TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

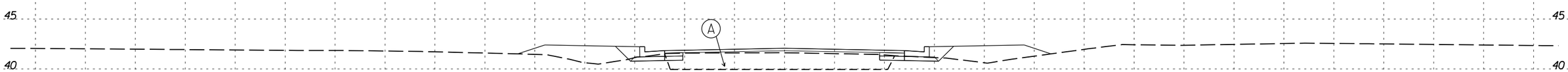
VERY LOOSE, GRAY, CLAYEY SAND (A-2-6), SATURATED (UNDIVIDED COASTAL PLAIN)

15+50.00



SOFT TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

15+00.00



SOFT TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

14+50.00

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	U-5878	10

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45
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35
30

(A) MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

(A)

SOFT TO MEDIUM STIFF, GRAY AND BROWN, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

II/17

BT

VERY LOOSE, GRAY, CLAYEY SAND (A-2-6), SATURATED (UNDIVIDED COASTAL PLAIN)

16+00.00

50
45
40
35
30

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

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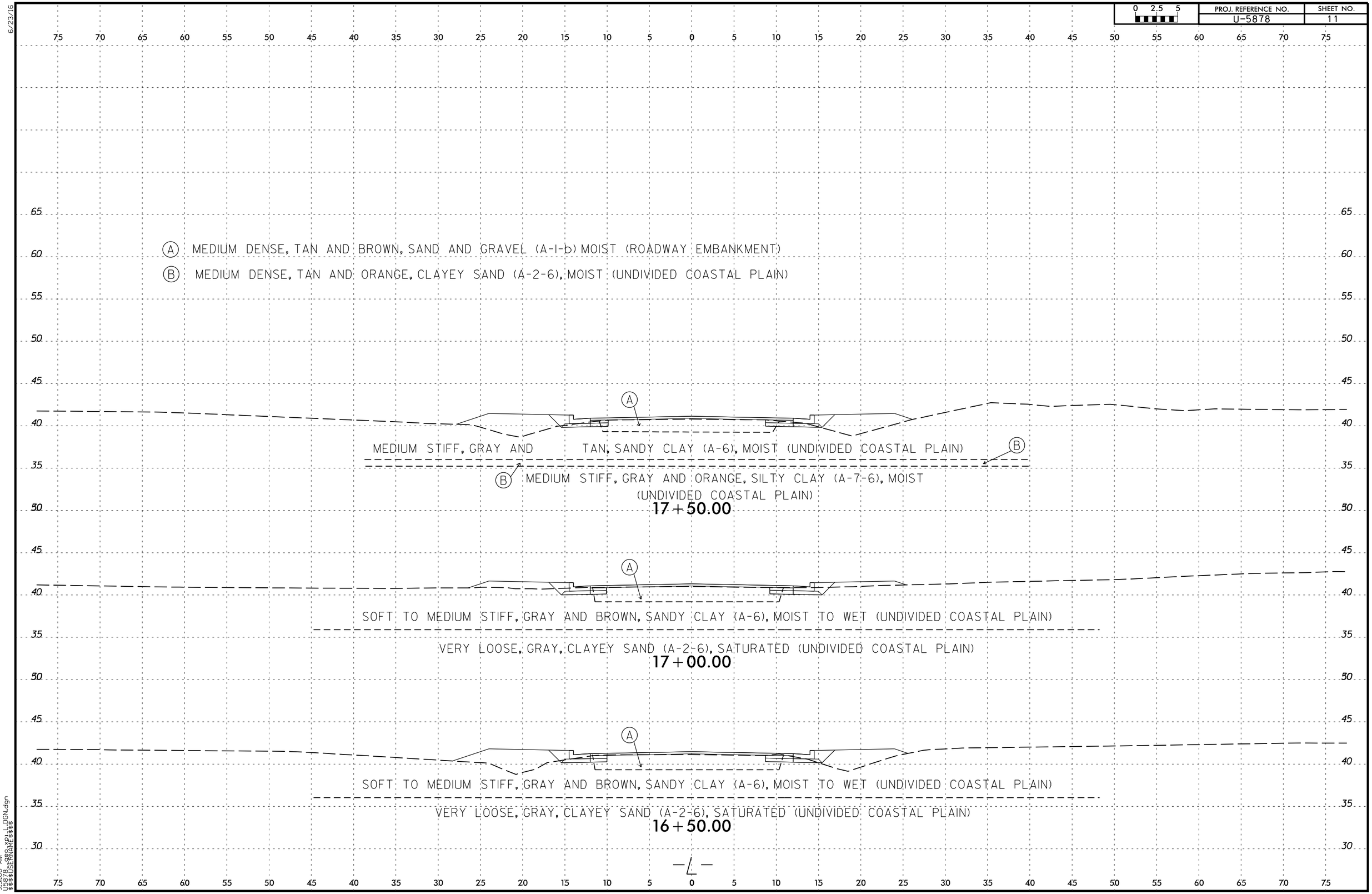
	U-5878	11

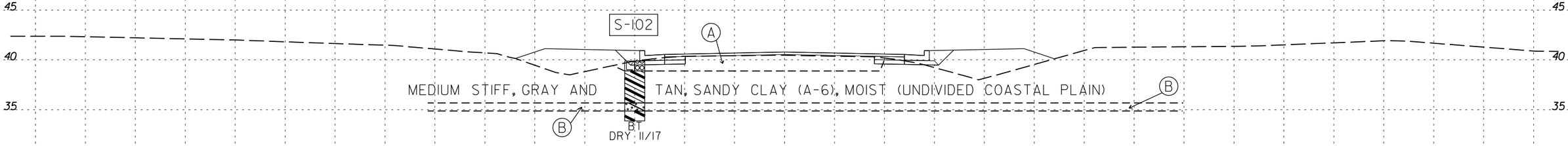


SOIL TEST RESULTS

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-102	15' LT	18+00	1.5-4.0	A-6(6)	28	16	4.7	42.9	21.5	31.0	100	98	59	17	-

(A) MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

(B) MEDIUM DENSE, TAN AND ORANGE, CLAYEY SAND (A-2-6), MOIST (UNDIVIDED COASTAL PLAIN)



18+00.00

6/23/16

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	U-5878	13

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50 45 40 35 30

Ⓐ MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

Ⓐ

MEDIUM STIFF, GRAY AND ORANGE, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

18+50.00

—L—

50 45 40 35 30

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

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6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5878	14

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50
45
40
35
30
25

(A) LOOSE, TAN SAND (A-2-4), MOIST (UNDIVIDED COASTAL PLAIN)

MEDIUM STIFF, GRAY AND ORANGE, SANDY CLAY (A-6), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

BT. FIAD

19+00.00

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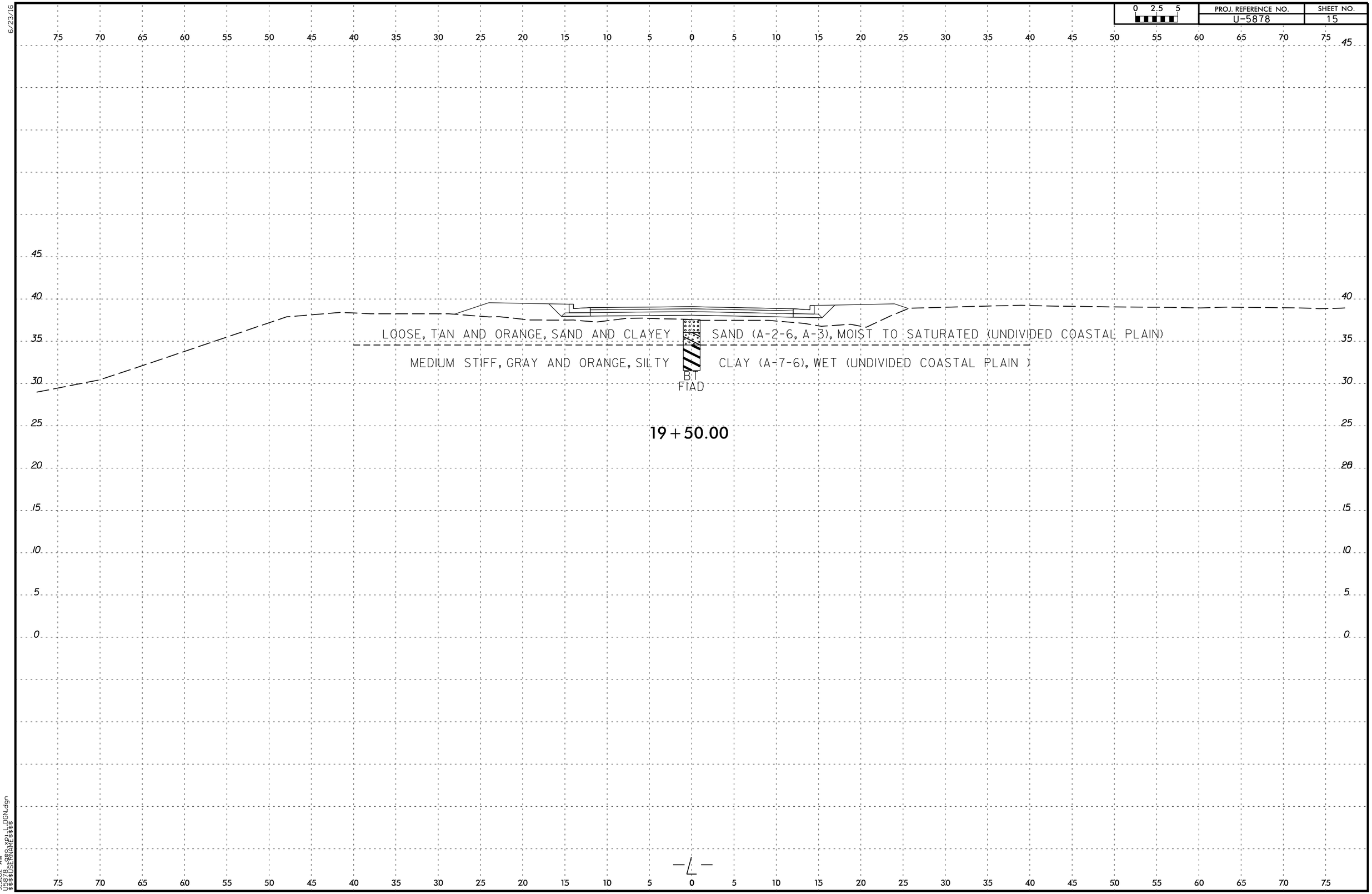
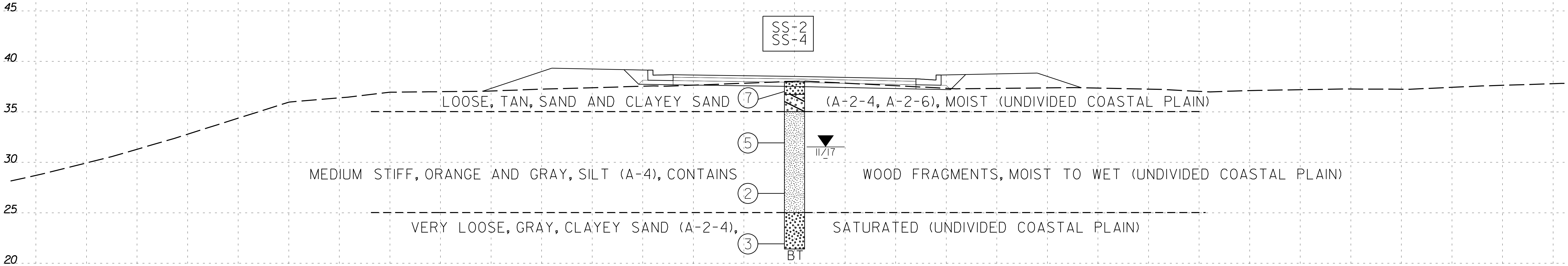


6/23/16

SOIL TEST RESULTS

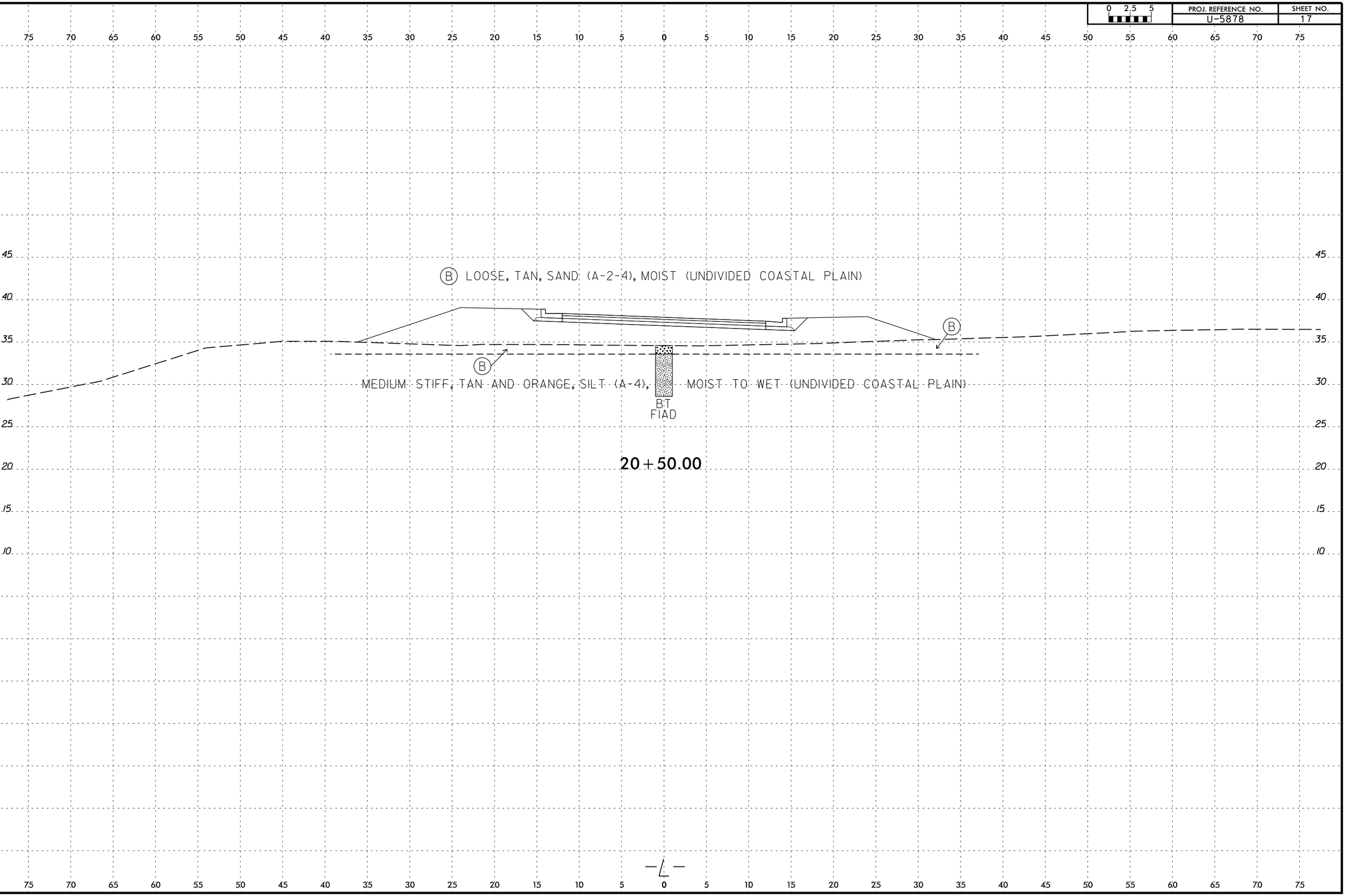
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-2	CL	20+00	5.1-6.6	A-4(0)	21	3	0.8	41.6	10.7	46.8	100	100	60	22	-
SS-4	CL	20+00	15.1-16.6	A-2-4	-	-	34.0	50.2	3.4	12.4	100	83	16	-	-



20+00.00

-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5878	17



6/23/16

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5878	18

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(B) LOOSE, TAN AND BROWN, SAND (A-2-4), MOIST (UNDIVIDED COASTAL PLAIN)

(B)

(B)

MEDIUM STIFF, GRAY AND ORANGE, SILT (A-4), MOIST TO WET (UNDIVIDED COASTAL PLAIN)

BT
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21+00.00

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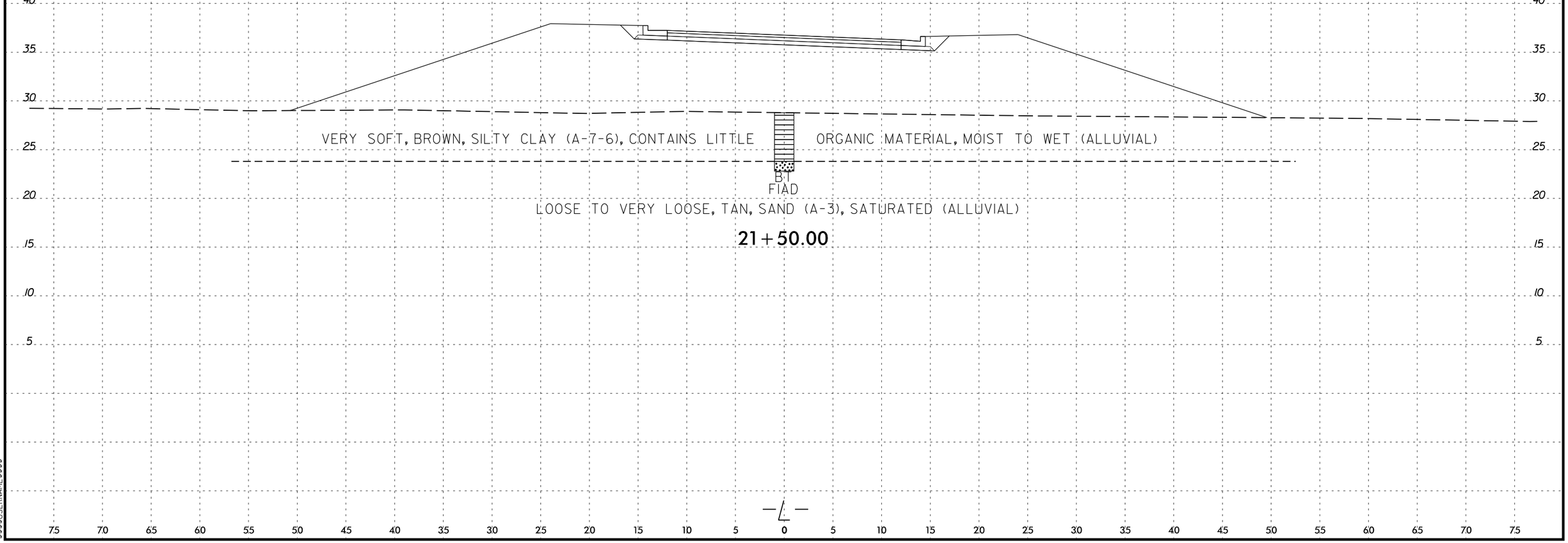

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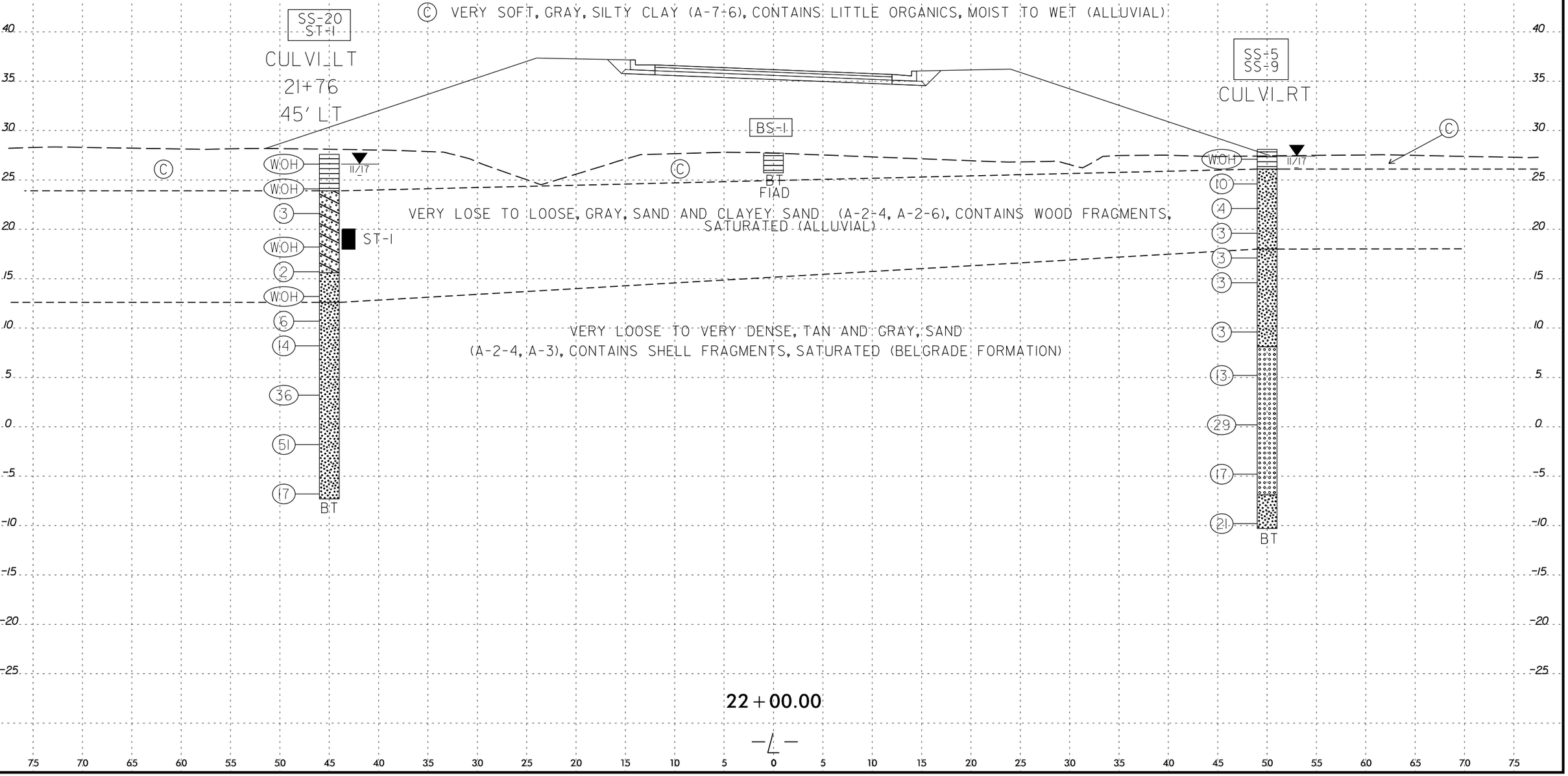
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-20	45' LT	21+76	13.4-14.9	A-2-4	-	-	4.9	80.7	4.1	10.4	100	98	17	-	-
ST-1	40' LT	21+76	8.0-10.0	A-2-6	32	17	36.3	39.5	10.4	13.9	97	78	25	24	1
BS-1	CL	22+00	1.0-2.0	A-7-6(13)	43	18	4.1	24.8	31.1	40.1	100	98	73	77	10
SS-5	50' RT	22+00	0.0-1.5	A-6(8)	29	12	1.9	19.7	53.0	25.4	100	100	84	32	-
SS-9	50' RT	22+00	10.0-11.5	A-2-4	-	-	7.8	81.3	3.8	7.1	100	97	13	-	-



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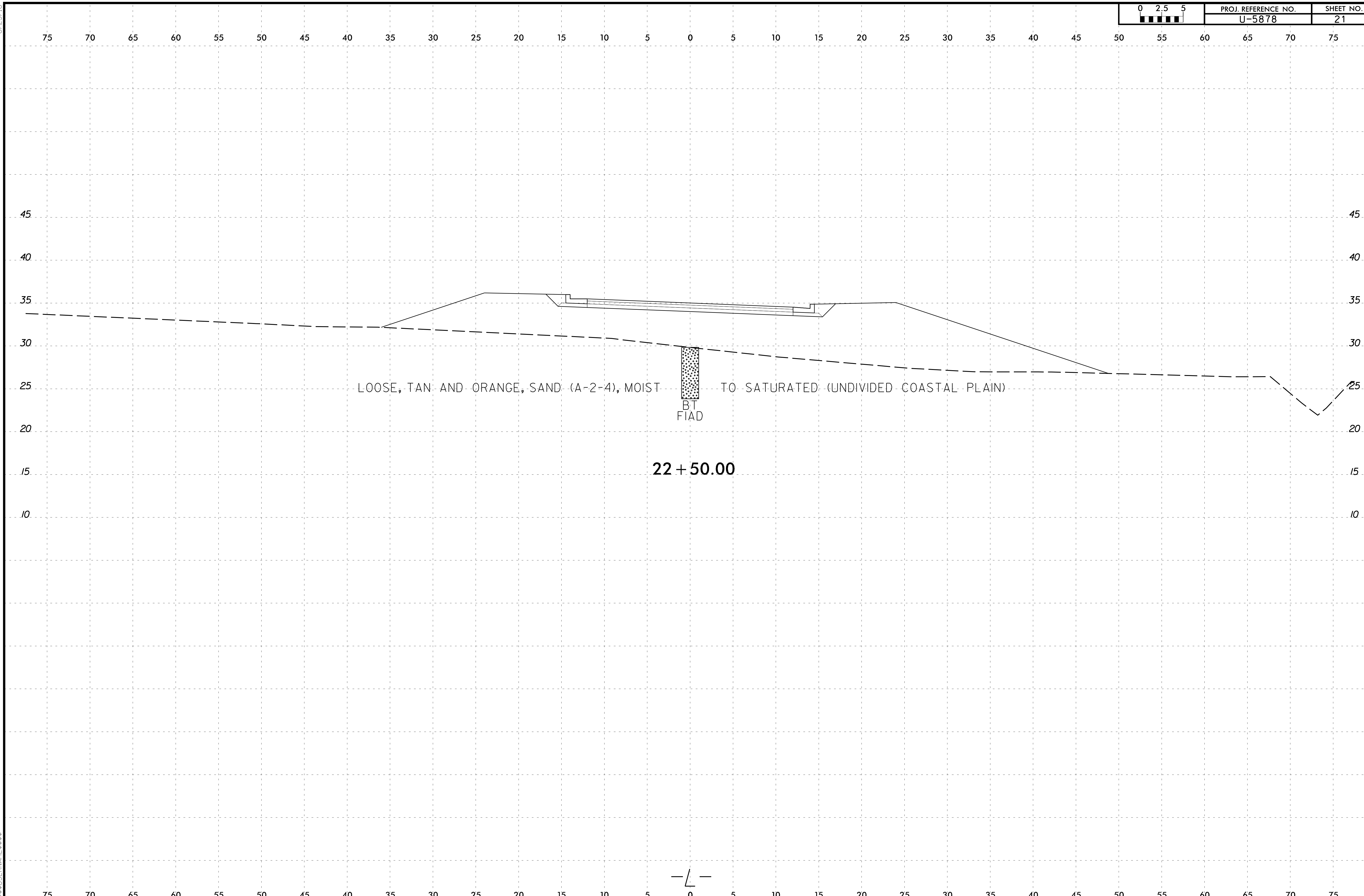

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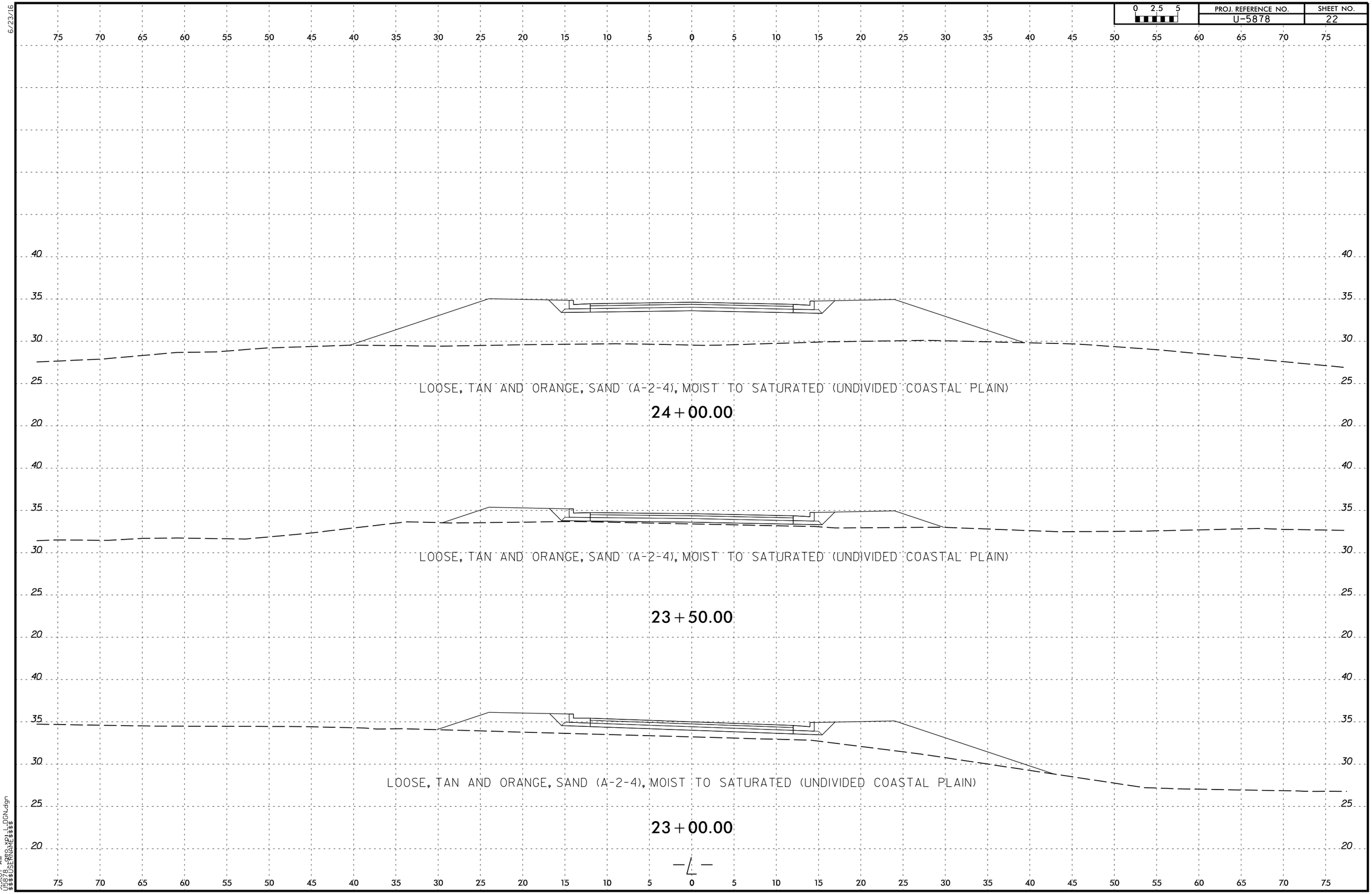

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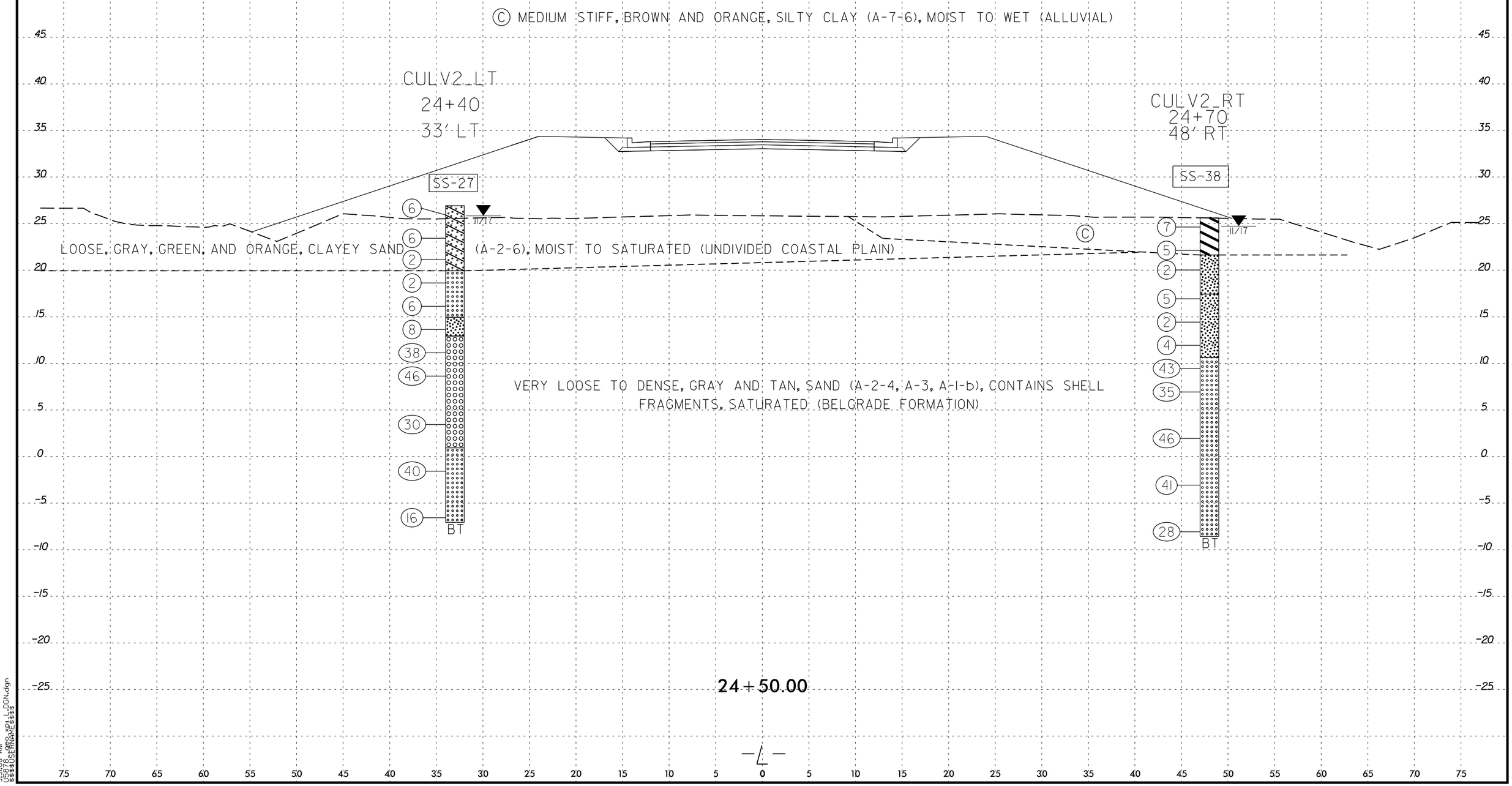
PROJ. REFERENCE NO.	SHEET NO.
U-5878	23

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-27	33' LT	24+40	4.8-6.3	A-2-6(0)	30	18	48.1	29.4	3.4	19.2	99	67	23	25	-
SS-38	48' RT	24+70	4.6-6.1	A-2-4	-	-	12.5	63.7	7.7	16.2	100	98	26	-	-



6/23/16

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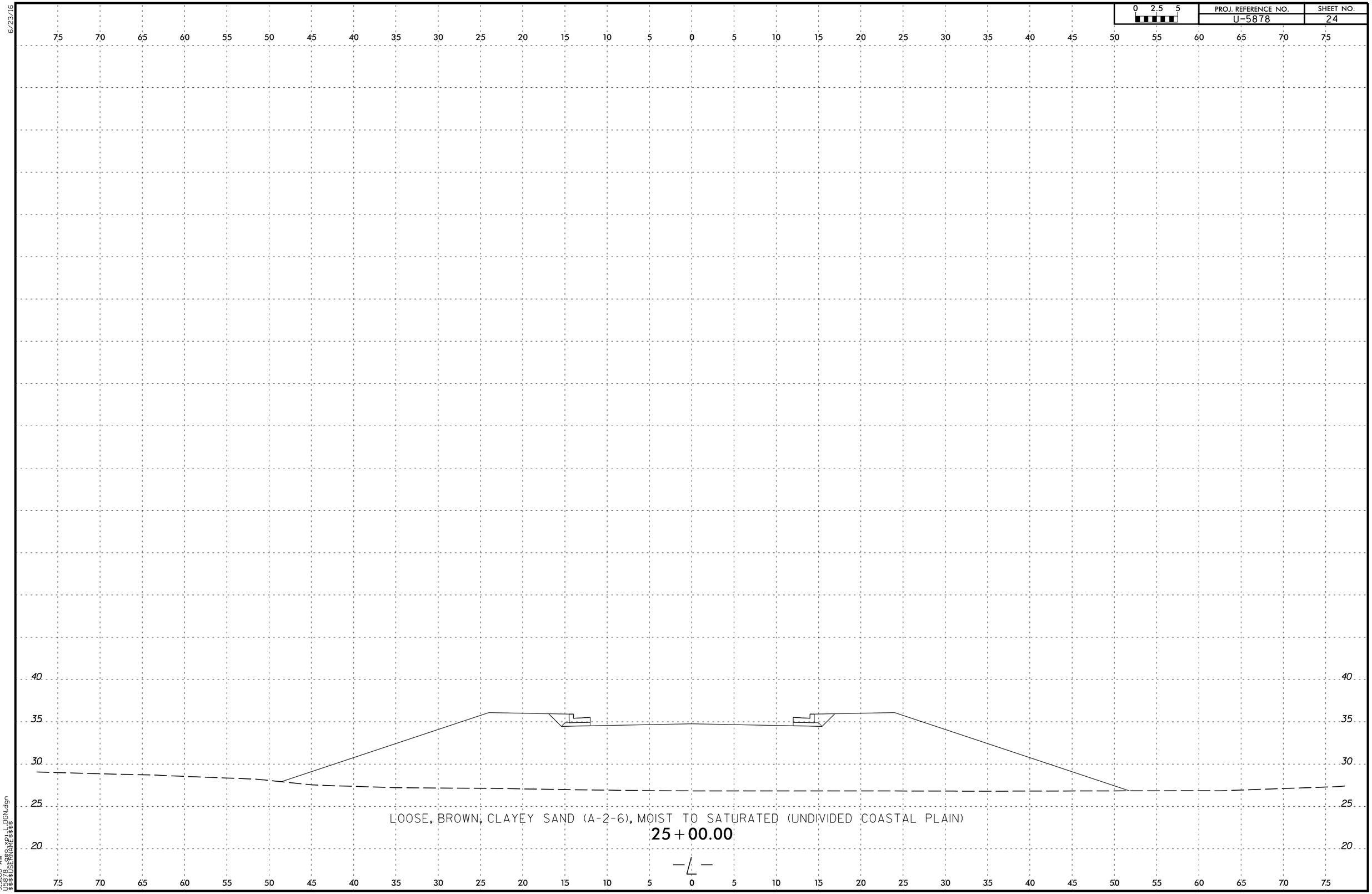

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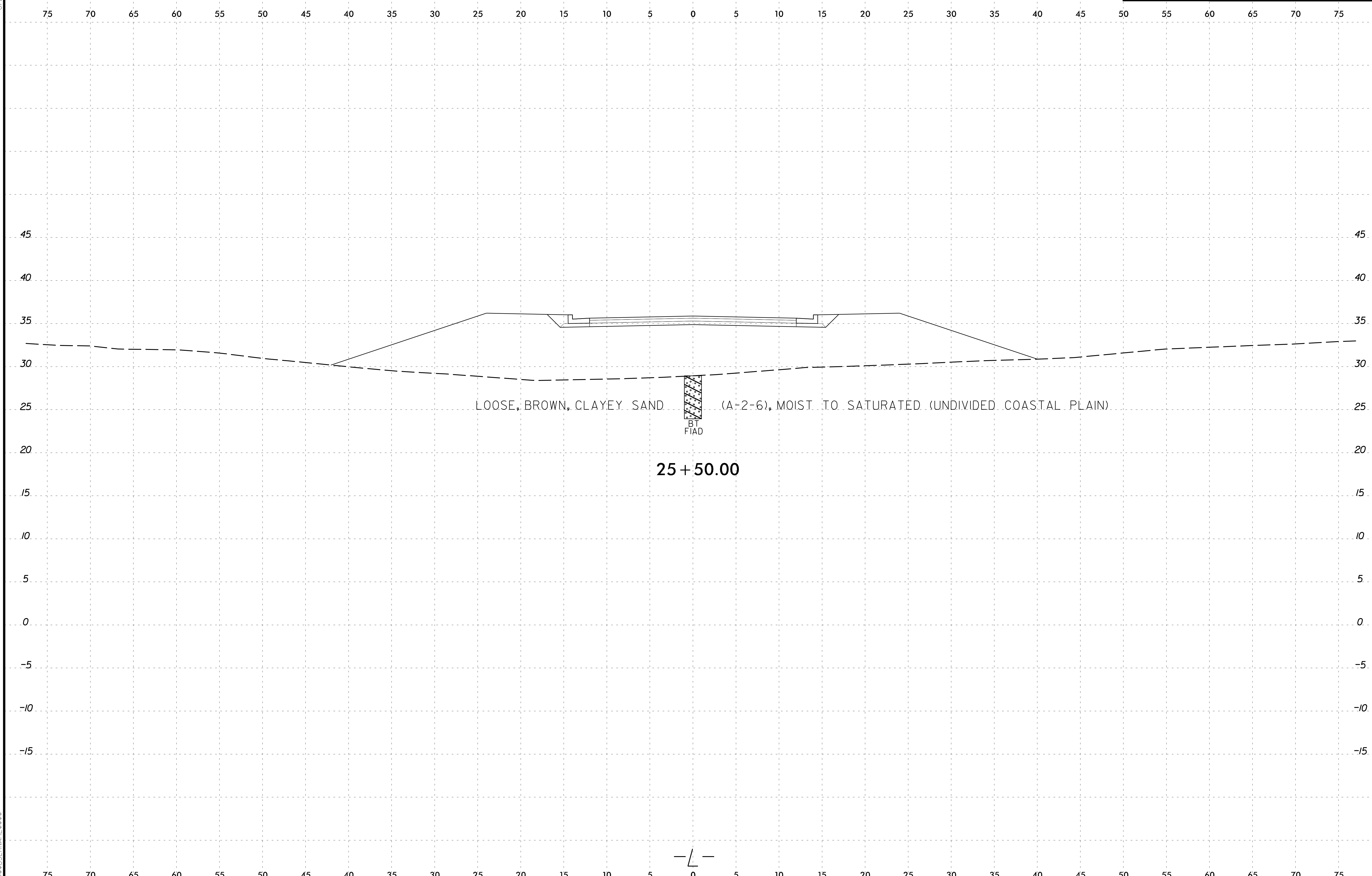
PROJ. REFERENCE NO.	SHEET NO.
U-5878	25



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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5878	26

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LOOSE, BROWN, GRAY, AND ORANGE, CLAYEY SAND (A-2-7), MOIST (UNDIVIDED COASTAL PLAIN)

MEDIUM STIFF, GRAY AND ORANGE, SILTY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

26+00.00

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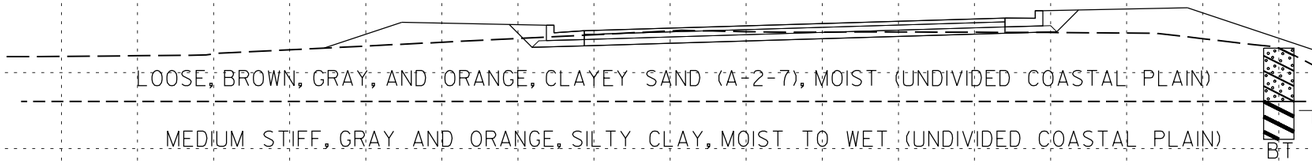
SOIL TEST RESULTS

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-111	30' RT	26+50	1.0-3.5	A-2-7(4)	46	28	4.7	65.4	11.0	18.9	100	98	35	11	-



6/23/16

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	U-5878	28

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LOOSE, BROWN, GRAY, AND ORANGE, CLAYEY SAND (A-2-7), MOIST (UNDIVIDED COASTAL PLAIN)

MEDIUM STIFF, GRAY AND ORANGE, SILTY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

27+50.00

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LOOSE, BROWN, GRAY, AND ORANGE, CLAYEY SAND (A-2-7), MOIST (UNDIVIDED COASTAL PLAIN)

MEDIUM STIFF, GRAY AND ORANGE, SILTY CLAY, MOIST TO WET (UNDIVIDED COASTAL PLAIN)

27+00.00

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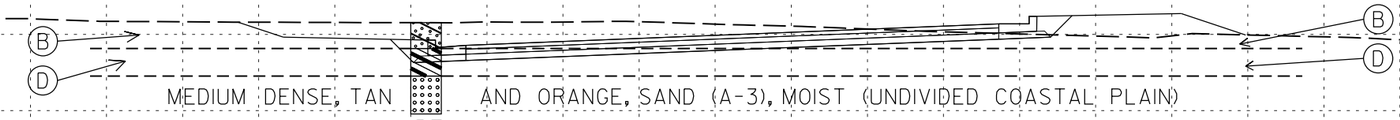
SOIL TEST RESULTS

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-114	24' LT	28+00	1.7-3.5	A-6(7)	40	22	3.5	50.1	14.9	31.4	100	99	50	18	-

Ⓑ LOOSE, BROWN AND TAN, CLAYEY SAND (A-2-6), MOIST (UNDIVIDED COASTAL PLAIN)

Ⓓ SOFT, ORANGE AND TAN, SANDY CLAY (A-6), MOIST (UNDIVIDED COASTAL PLAIN)

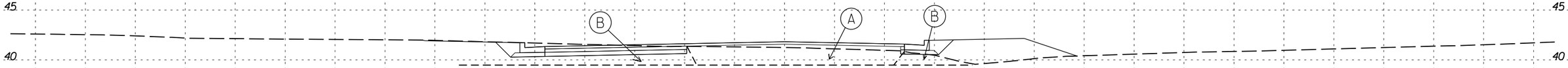


28+00.00

(A) MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

(B) LOOSE, TAN, CLAYEY SAND (A-2-6), MOIST (UNDIVIDED COASTAL PLAIN)

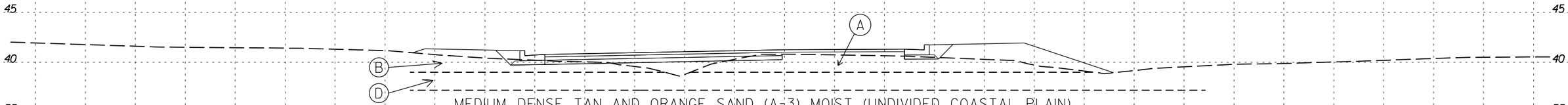
(D) SOFT, ORANGE AND TAN, SANDY CLAY (A-6), MOIST (UNDIVIDED COASTAL PLAIN)



MEDIUM STIFF, TAN AND ORANGE, SANDY CLAY (A-6), MOIST (UNDIVIDED COASTAL PLAIN)

MEDIUM DENSE, TAN, SAND (A-3), MOIST (UNDIVIDED COASTAL PLAIN)

29+50.00



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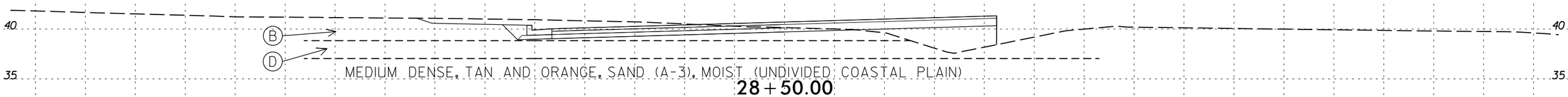
29+00.00



MEDIUM DENSE, TAN AND ORANGE, SAND (A-3), MOIST (UNDIVIDED COASTAL PLAIN)

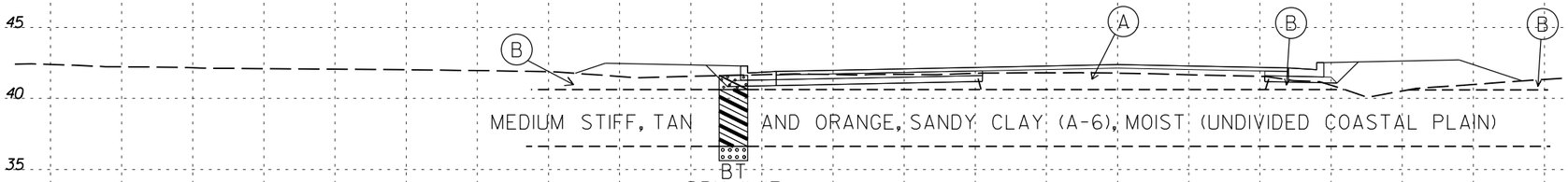
28+50.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-118	27' LT	30+00	1.0-5.0	A-6(6)	29	16	3.0	45.3	17.2	34.5	100	99	56	17	-

(A) MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b) MOIST (ROADWAY EMBANKMENT)

(B) LOOSE, TAN, CLAYEY SAND (A-2-6), MOIST (UNDIVIDED COASTAL PLAIN)



MEDIUM DENSE, TAN, SAND (A-3), MOIST (UNDIVIDED COASTAL PLAIN)

30+00.00

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
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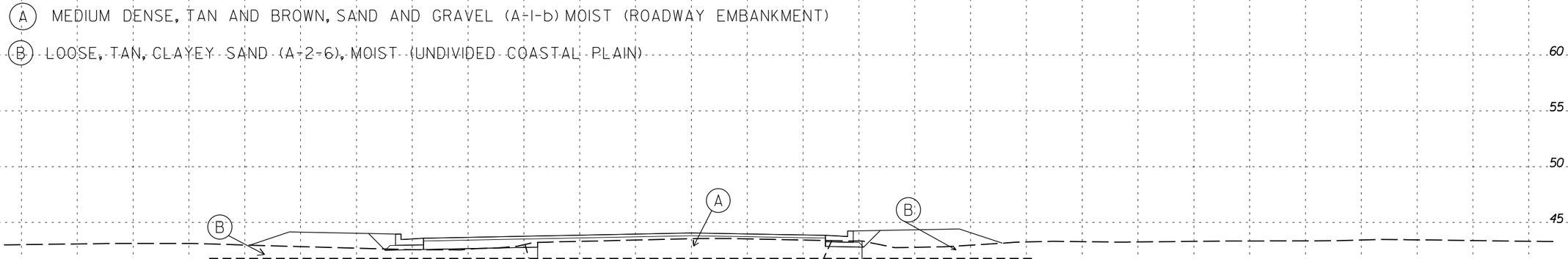
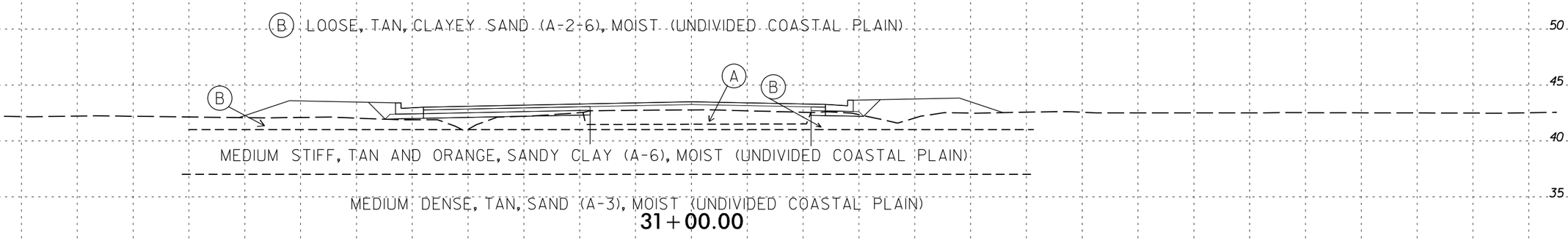
65 60 55 50 45 40 35



31+50.00



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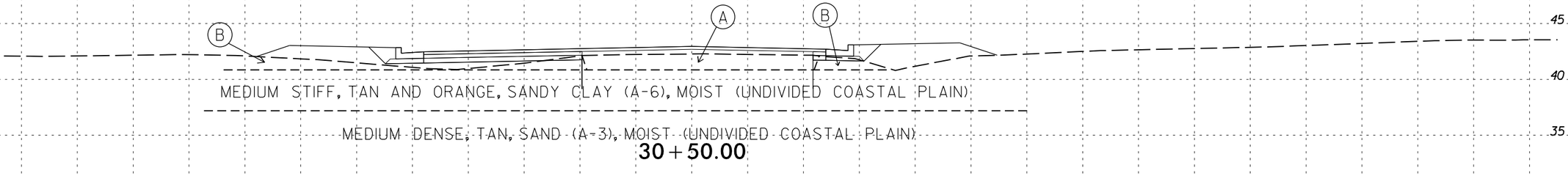

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0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	U-5878	33

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MEDIUM DENSE, BROWN AND TAN SAND (A-3), MOIST (UNDIVIDED COASTAL PLAIN)

BT
DRY 11/17

12 + 50

(A) MEDIUM DENSE, TAN AND BROWN, SAND AND GRAVEL (A-1-b), MOIST (ROADWAY EMBANKMENT)

A

MEDIUM DENSE, BROWN AND TAN SAND (A-3), MOIST (UNDIVIDED COASTAL PLAIN)

12 + 00

BEGIN CONSTRUCTION
–Y2– STA. 11 + 60

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11 + 50

–Y2–

7.5 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 7.5

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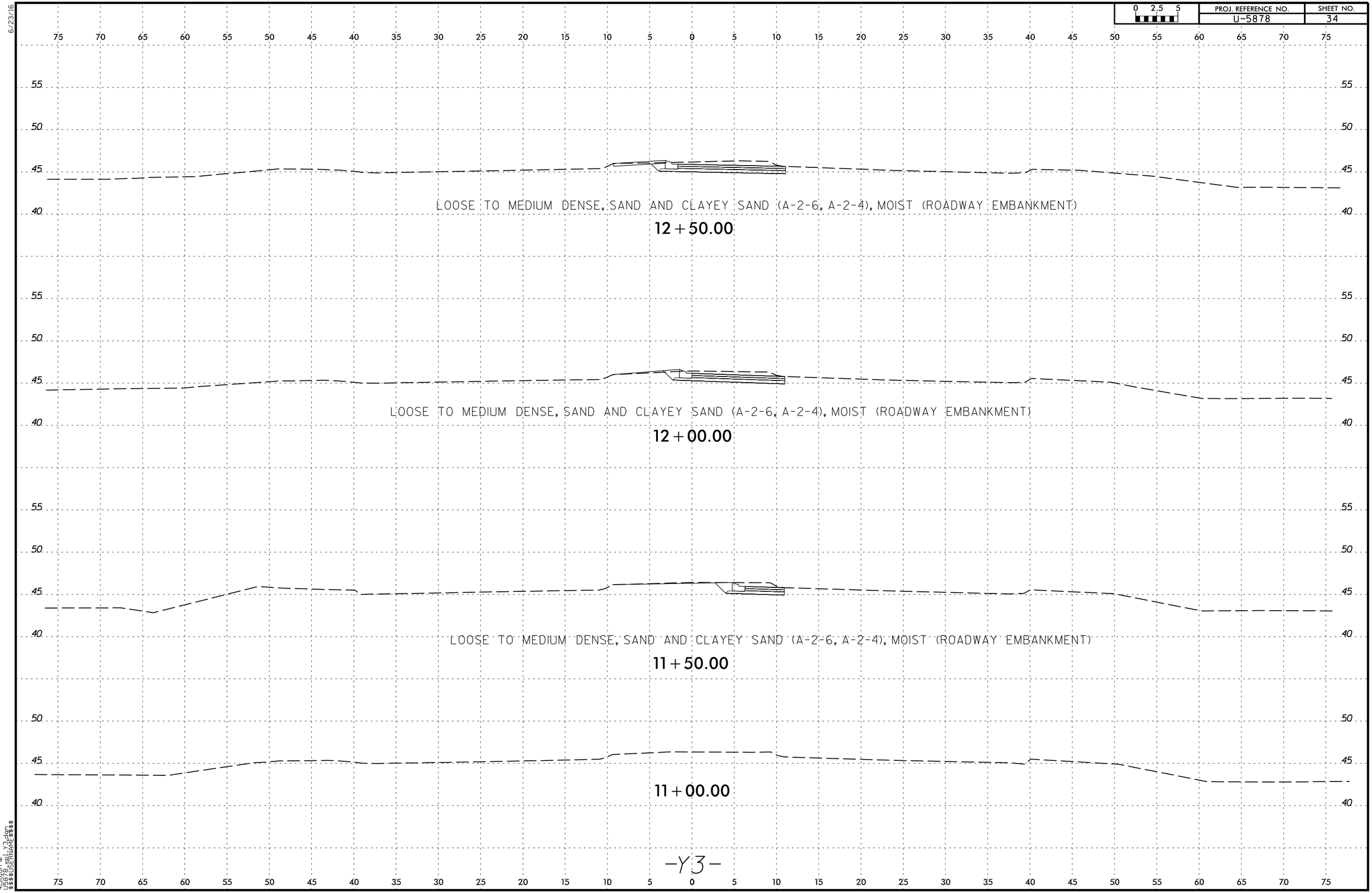

-Y3-

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
U-5878	35

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55 50 45 40

LOOSE TO MEDIUM DENSE, SAND AND CLAYEY SAND (A-2-6, A-2-4, A-1-b), MOIST (ROADWAY EMBANKMENT)

14+00.00

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-121	CL	13+50	1.0-2.3	A-2-4	-	-	7.5	64.7	8.2	19.6	100	98	31	-	-

55 50 45 40

S-121

B
DRY 11/17

LOOSE TO MEDIUM DENSE, SAND AND CLAYEY SAND (A-2-6, A-2-4, A-1-b), MOIST (ROADWAY EMBANKMENT)

13+50.00

55 50 45 40

LOOSE TO MEDIUM DENSE, SAND AND CLAYEY SAND (A-2-6, A-2-4, A-1-b), MOIST (ROADWAY EMBANKMENT)

13+00.00

-Y3-

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