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SEE SHEET 2A FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	50079.1.1	1	20

CONTENTS

LINE	STATION	PLAN	PROFILE	CROSS SECTION
-L-	11+28.53 - 245+23.91	4 - 8	9 - 11	12 - 16

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY CUMBERLAND
PROJECT DESCRIPTION SR-2220 (TOM STARLING RD)
FROM US-301 TO NC-87

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

F. WRIGHT

J. WHITE

T. WILLIAMS

INVESTIGATED BY S&ME, INC.

DRAWN BY B. RATTI

CHECKED BY A.F. RIGGS, JR P.E.

SUBMITTED BY S&ME, INC.

DATE JAN. 2015

REFERENCE: W-5512

PROJECT: 50079.1.1

SIGNATURE	DATE
SIGNATURE	DATE

DATE January 19, 2015

TO: Parsons Transportation Group
5540 Centerview Drive
Suite 217
Raleigh, North Carolina 27606

ATTENTION: Mr. David L. Wilver, P.E.

FROM: S&ME, Inc.
3201 Spring Forest Road
Raleigh, North Carolina 27616

STATE PROJECT: 50079.1.1
F. A. PROJECT: N/A
TIP NUMBER: W-5512
COUNTY: Cumberland
DESCRIPTION: SR 2220 (Tom Starling Road) From US 301 to NC 87
SUBJECT: Roadway Subsurface Investigation – Inventory Report

Project Description

S&ME, Inc. has completed the authorized roadway inventory report for the above referenced project. This report was performed in accordance with our Subconsultant Professional Services Agreement between Parsons Transportation Group, Inc. and S&ME, Inc. dated June 15, 2014 and the terms and conditions stated within.

The project is located about 3 miles south of Fayetteville, North Carolina in Cumberland County. The project consists of approximately 3.5 miles of widening, resurfacing and realigning portions of the existing roadway along SR 2220 (Tom Starling Road) from US 311 to NC 87. The typical roadway section will consist of two lanes with added turn lanes and 8 to 11 foot wide shoulders with guardrails as needed.

A subsurface investigation was conducted by S&ME between October 27, 2014 and October 28, 2014 by performing 12 soil test borings. Drilling consisted of advancing 3-1/4 inch diameter hollow stem augers with standard penetration testing utilizing a Diedrich D-50 drill rig mounted on a track rig equipped with an automatic hammer. The borings were advanced to depths of 10 feet (elevations 81.6 to 91.1 feet) at ground surface elevations ranging from about 91.6 to 101.1 feet.

Additionally the subsurface soils were probed with a 4 foot long, 1/2 inch diameter, steel, T-handled, probe rod to help identify soft/loose soils. A hand auger bucket was also used to obtain near surface soil samples for visual classification at soil test boring locations.

Representative split-spoon and bulk soil samples were collected for visual classification and selected soil samples were submitted for laboratory analysis. Laboratory testing was performed in accordance with the AASHTO Soil Classification System.

The following alignment totaling 3.46 miles was investigated. Subsurface profiles and cross sections of the alignment are included in this report.

<u>Line</u>	<u>Station</u>
-L-	11+28.53 to 245+23.91

Areas of Special Geotechnical Interest

1. Loose Soils: The following area contains relatively loose non-cohesive soils (N-values less than 4) which may impact subgrade construction and may require stabilization.

<u>Line</u>	<u>Station</u>
-L-	143+50 to 148+00

2. Ground Water: The following interval was found to exhibit a high water table, seasonal high ground water or the potential for ground water related construction problems :

<u>Line</u>	<u>Station</u>
-L-	141+50 to 150+00

Physiography and Geology

The project site is located within the Coastal Plain physiographic and geologic province of North Carolina. The Coastal Plain geologic region has been formed during past transgressive and regressive movements of the ocean into and out of North Carolina. As such, the Coastal Plain province is characterized by subdued topographic features and flat, low lying terrain.

Based on the 1985 Geologic Map of North Carolina, the primary geologic formation at this location is the Cape Fear Formation. The Cape Fear Formation consists of gray, sandy mudstone and blocky clay. The bedding of soils within the Cape Fear formation can be described as laterally continuous with some faint cross bedding. The Middendorf Formation is mapped nearby and lies above the Cape Fear Formation. The Middendorf Formation typically consists of sands, poorly indurated sandstone, and thin beds of sandy mudstone and clay. The lateral continuity of bedding within the Middendorf Formation is poor and cross bedding is common. The near surface soils at this site, within the boring termination depths, appear to be more recent Undifferentiated Coastal Plain sands eroded from the adjacent Middendorf Formation.

Soil Properties

Soils present on this project include roadway embankment fill and Undifferentiated Coastal Plain deposits and soils of the Middendorf and Cape Fear Formations.

Roadway embankment fill materials were not encountered in the soil test borings performed for this investigation.

Undifferentiated Coastal Plain deposits were present at the ground surface in all soil test borings B-1 through B-12. The Undifferentiated Coastal Plain deposits consist of very loose to medium dense white, tan and gray to dark gray and black silty to clayey fine to coarse sand (A-2-4, A-2-7 and A-1-b) with trace amounts of organic matter. The organic content of the soil samples tested were less than 3%. The clayey sands (A-2-7) are highly plastic with a plastic index (P.I.) of 30. These soils appear to be moist to saturated.

The Cape Fear Formation was encountered in boring B-10 at depth of about 8 feet (elevation 83.8 feet) beneath the ground surface. These soils consist of highly plastic hard gray fine sandy silty clay (A-7-6). The plastic index of the sampled clay was 30. These clays appear to be moist.

Groundwater

Groundwater was measured in borings B-8, B-9, B-10, and B-11 at depths of 3.9 to 6.5 feet (elevations 86.4 to 88.9 feet) beneath the ground surface at completion of drilling. Stabilized water levels measured in open bore holes after 24 hours from completion of drilling ranged from 3.5 to 5.8 feet (elevations 86.8 to 88.1 feet) beneath the ground surface. Soil test boring B-8 was backfilled at completion of drilling and the remaining borings caved at depths of 4.3 to 6.3 feet beneath the ground surface. Based on these measurements and the depths at which saturated sands were encountered in the borings, groundwater is anticipated to be present within 3.5 to 6.3 feet beneath existing grades. The depth of water beneath the ground surface will fluctuate with seasonal precipitation and may occur at higher elevations at other times of the year. Perched ground water conditions may exist during the typically wetter months above less permeable clayey soils.

APPENDIX A

The following bulk samples were obtained to perform laboratory testing to determine the engineering properties of the on-site soils:

<u>SAMPLE</u>	<u>LINE</u>	<u>STATION</u>	<u>DEPTH</u>	<u>TEST PERFORMED</u>
S-1	-L-	39+30 5' RT	1.0'-5.0'	Standard Proctor and CBR
S-2	-L-	133+80 10' LT	1.0'-5.0'	Standard Proctor and CBR

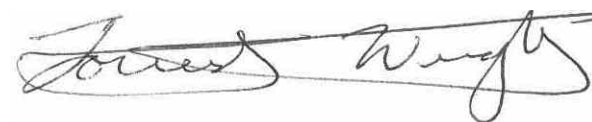
QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. Any wetland, environmental, or contaminant assessment efforts are beyond the scope of this geotechnical exploration; and therefore, those issues are not addressed in this report. The conclusions and findings contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty, express or implied, is made.

Conclusions and findings submitted in this report are based, in part, upon the data obtained from the geotechnical exploration. The nature and extent of variations between and outside of the SPT borings may not become evident until construction. If variations appear evident, then it will be necessary to re-evaluate the recommendations of this report. In the event that any changes in the grades, nature, design, or location of the proposed development are planned, the conclusions and findings contained in this report should be reviewed and modified or confirmed in writing.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours,



Forrest E. Wright, EIT
Staff Professional



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

8/17/99

REVISIONS

17-JAN-2015 17:21
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 $T = 249.16'$
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 $SE = 0.08$

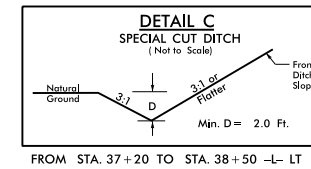
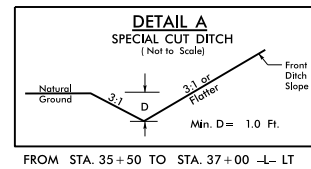
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 $L = 281.0'$
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 $R = 50.00'$

-DRIVE 2-
 PI Sta 10+33.95
 $\Delta = 6^\circ 56' 10.0" (LT)$
 $D = 114' 35" 29.6"$
 $L = 60.5'$
 $T = 3.03'$
 $R = 50.00'$

-DRIVE 3-
 PI Sta 10+34.17
 $\Delta = 23^\circ 33' 47.7" (LT)$
 $D = 114' 35" 29.6"$
 $L = 20.56'$
 $T = 10.43'$
 $R = 50.00'$

PARSONS
 3540 CENTER DR., SUITE 201
 RALEIGH, NORTH CAROLINA 27606
 NC LICENSE NO. P1284
 FOR NORTH CAROLINA DEPT. OF TRANSPORTATION

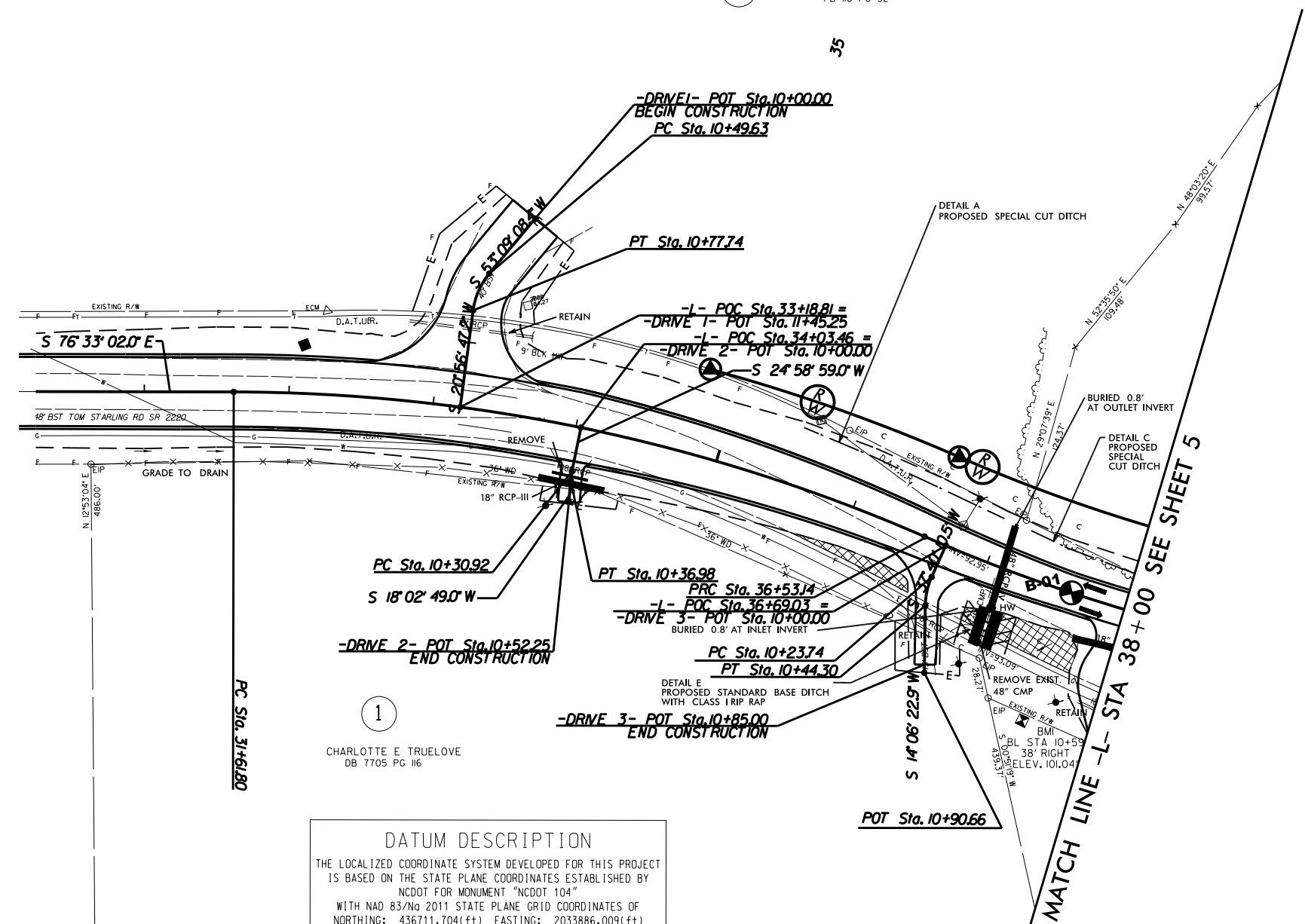
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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



30

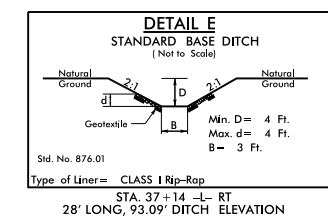
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 GCCFC 2006-GG7
 STARLING INDUSTRIAL LLC
 DB 8956 PG. 35
 PB 116 PG. 32

35



1
 CHARLOTTE E TRUELOVE
 DB 7705 PG 116

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "NCDOT 104" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 436711.7041(±) EASTING: 2033886.0091(±) ELEVATION: 95.61(±)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988681
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 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88



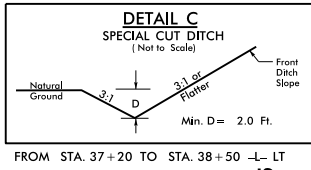
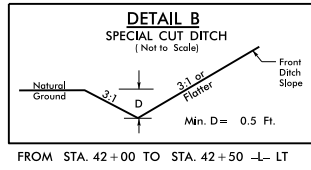
NOTE:
 SEE SHEET 17 FOR -L- PROFILE
 SEE SHEET 24 FOR -DRIVE 1-, -DRIVE 2-, & -DRIVE 3- PROFILE

8/17/99

PARSONS
5840 CANTRELL DR., SUITE 301
RALEIGH, NORTH CAROLINA 27606
NC LICENSE NO. P-5084

PROJECT REFERENCE NO. W-5512	SHEET NO. 5
RW SHEET NO.	
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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

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	PI Sta 10+41.18 $\Delta = 17^\circ 19' 26.3" (LT)$ $D = 229' 10" 59.2"$ $L = 7.56'$ $T = 3.81'$ $R = 25.00'$



MATCH LINE -L- STA 38+00 SEE SHEET 4

MATCH LINE -L- STA 50+00 SEE SHEET 6

KATHERINE McGEACHY
DB 4789 PG 243

CAPE FEAR DISTRIBUTION LTD
DB 7025 PG 343
PB 109 PG 155

PC Sta. 10+37.37

PT Sta. 10+44.93

-DRIVE 4- POT Sta. 10+79.23
END CONSTRUCTION
POT Sta. 11+00.00

**NOT ENOUGH EASEMENT
SS IS OUT OF EX. RW**

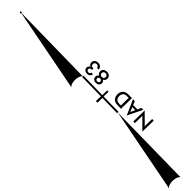
NOTE:
SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 24 FOR -DRIVE 4- PROFILE

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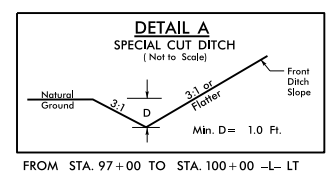
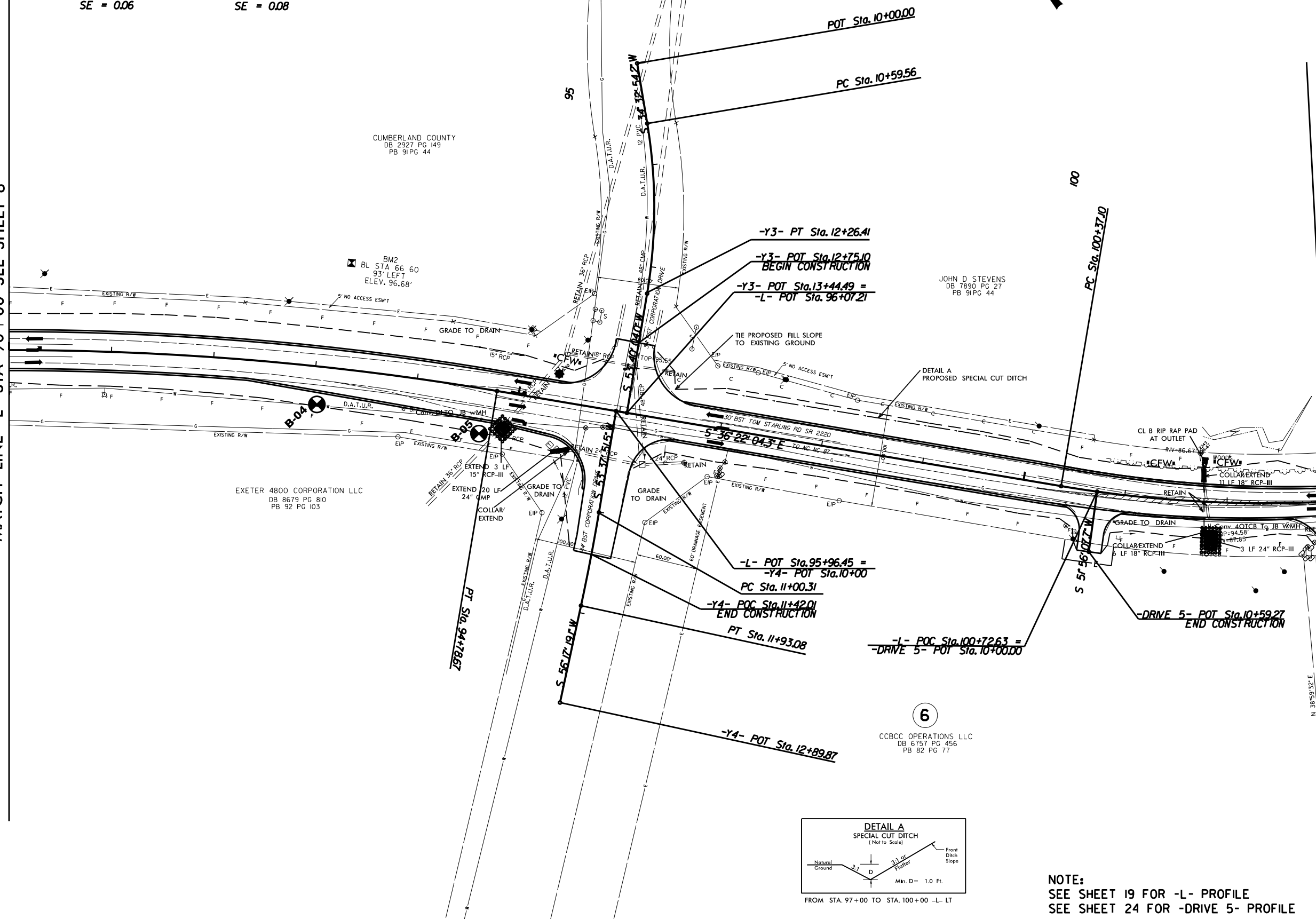
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-	-Y3-	-Y4-
PI Sta 90+89.36 $\Delta = 15' 40" 10.6'$ (RT) $D = 1' 59' 59.5"$ $L = 783.54'$ $T = 394.23'$ $R = 2,865.00'$ $R.D. = 220'$ $SE = 0.06$	PI Sta 102+37.69 $\Delta = 18' 58' 47.3'$ (LT) $D = 4' 46' 28.7"$ $L = 397.51'$ $T = 200.59'$ $R = 1,200.00'$ $R.D. = 220'$ $SE = 0.08$	PI Sta 11+43.76 $\Delta = 19' 07' 09.9'$ (RT) $D = 1' 27' 33.0"$ $L = 166.85'$ $T = 84.21'$ $R = 500.00'$
		PI Sta 11+46.71 $\Delta = 2' 39' 27.6'$ (RT) $D = 2' 51' 53.2"$ $L = 92.77'$ $T = 46.39'$ $R = 2,000.00'$



MATCH LINE -L- STA 90+00 SEE SHEET 8

MATCH LINE -L- STA 103+00 SEE SHEET 10



NOTE:
 SEE SHEET 19 FOR -L- PROFILE
 SEE SHEET 24 FOR -DRIVE 5- PROFILE

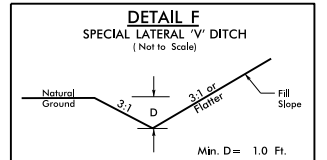
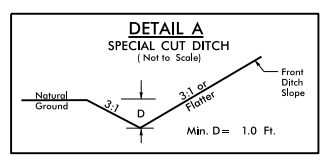
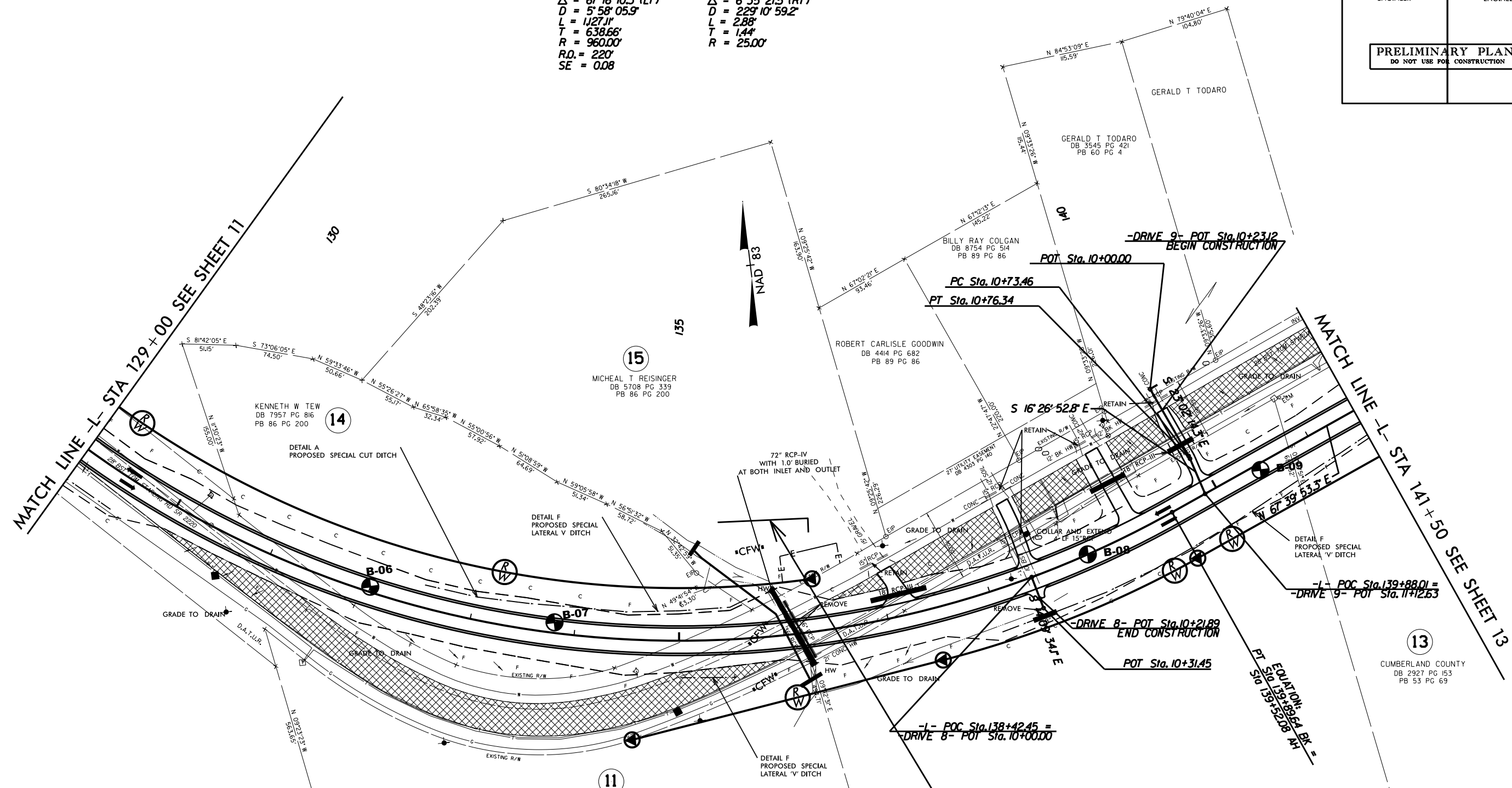
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PROJECT REFERENCE NO. W-5512	SHEET NO. 7
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 FROM STA. 132+50 TO STA. 134+00 -L- LT

FROM STA. 127+20 TO STA. 129+50 -L- RT
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 FROM STA. 135+00 TO STA. 135+50 -L- RT
 FROM STA. 138+00 TO STA. 141+50 -L- RT

NOTE:
 SEE SHEET 20 FOR -L- PROFILE
 SEE SHEET 25 FOR -DRIVE 8- & -DRIVE 9- PROFILE

NEED EXTRA EASEMENT

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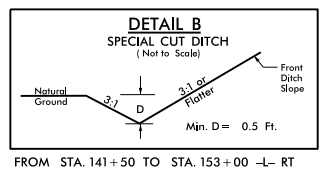
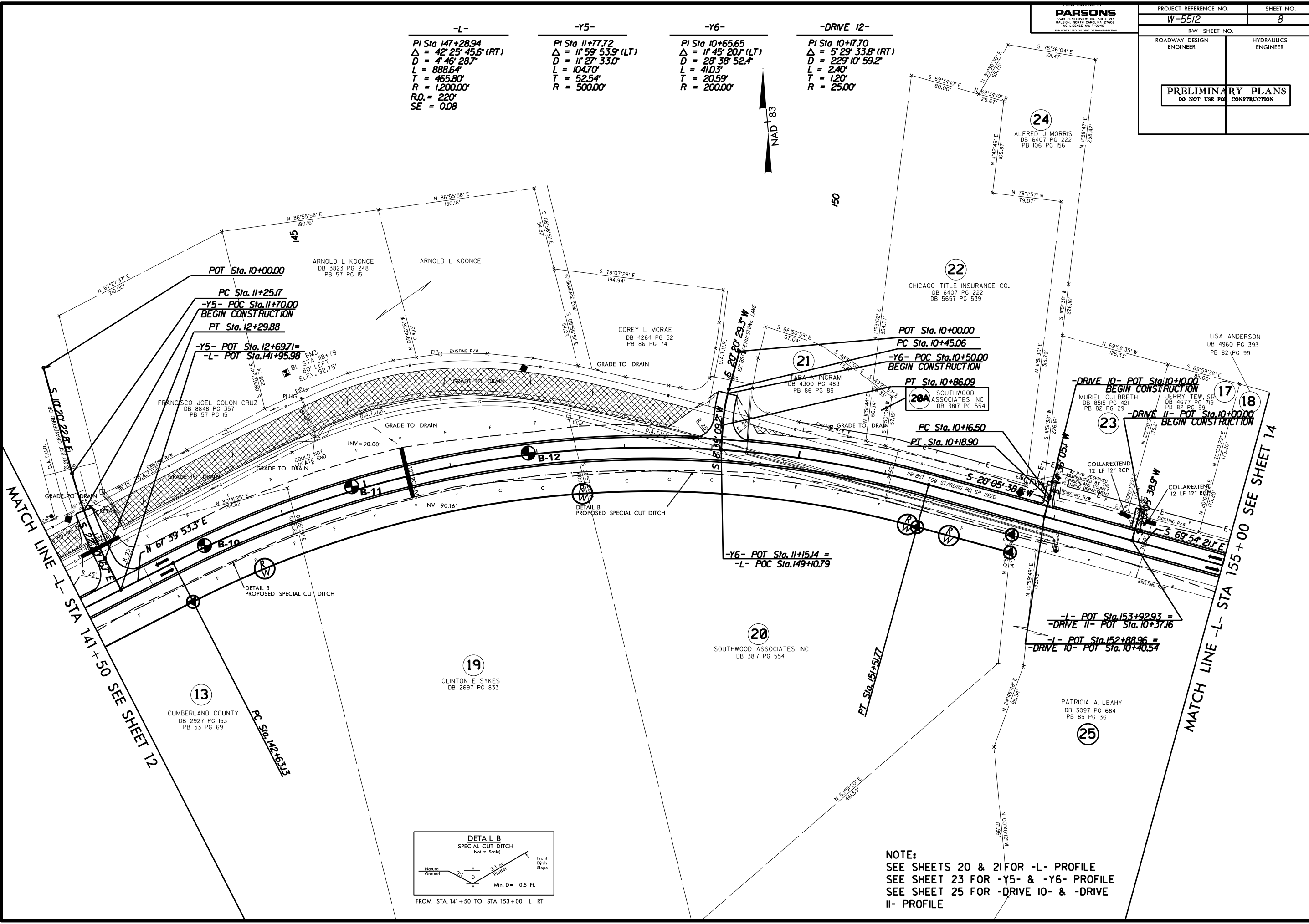
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R/W SHEET NO.		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

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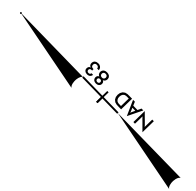
REVISIONS
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17-JAN-2015 11:45
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 8.17/99



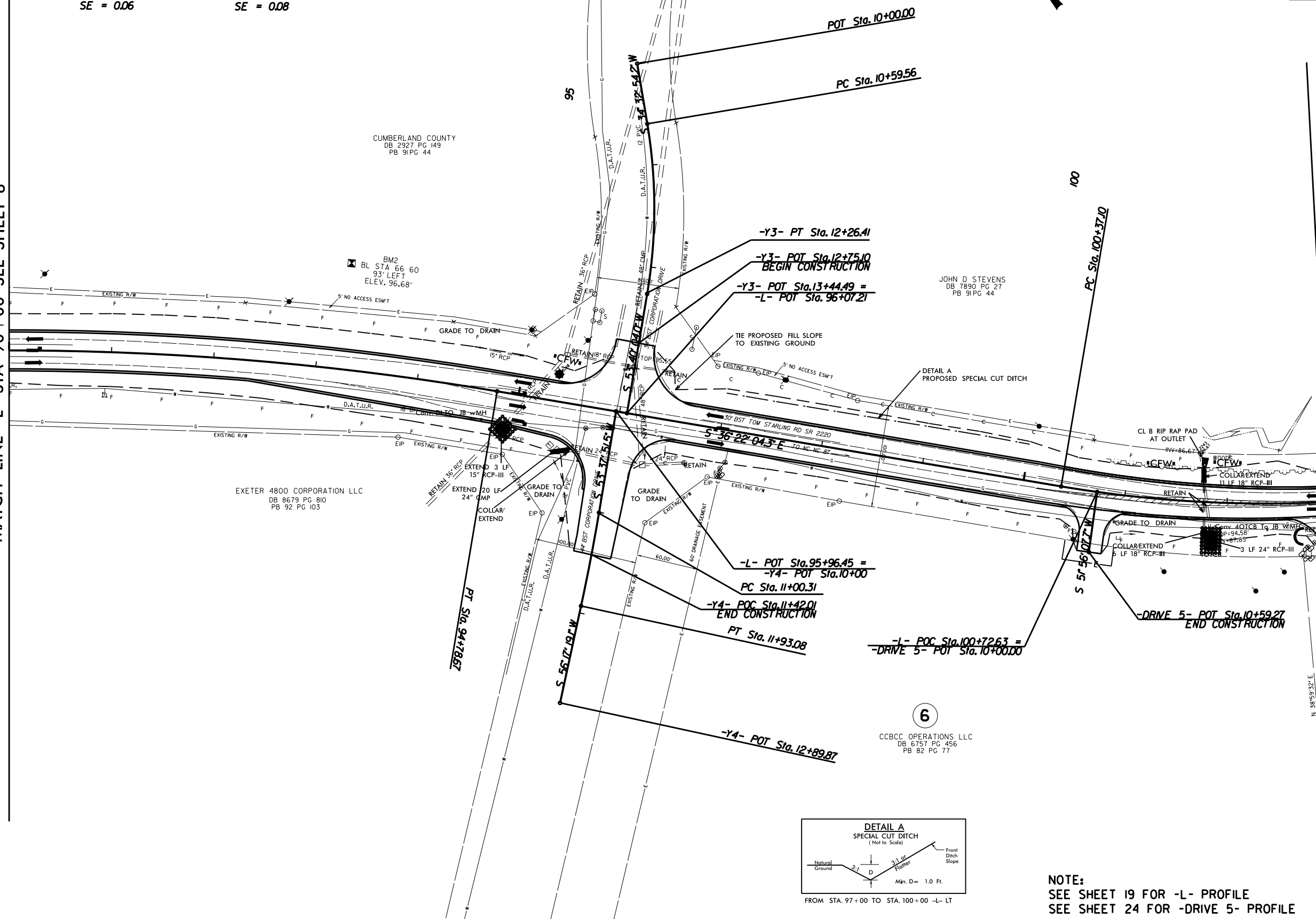
NOTE:
 SEE SHEETS 20 & 21 FOR -L- PROFILE
 SEE SHEET 23 FOR -Y5- & -Y6- PROFILE
 SEE SHEET 25 FOR -DRIVE 10- & -DRIVE 11- PROFILE

-L-	-Y3-	-Y4-
PI Sta 90+89.36 $\Delta = 15' 40" 10.6'$ (RT) $D = 1' 59' 59.5"$ $L = 783.54'$ $T = 394.23'$ $R = 2,865.00'$ $R.O. = 220'$ $SE = 0.06$	PI Sta 102+37.69 $\Delta = 18' 58' 47.3'$ (LT) $D = 4' 46' 28.7"$ $L = 397.51'$ $T = 200.59'$ $R = 1,200.00'$ $R.O. = 220'$ $SE = 0.08$	PI Sta 11+43.76 $\Delta = 19' 07' 09.9'$ (RT) $D = 1' 27' 33.0"$ $L = 166.85'$ $T = 84.21'$ $R = 500.00'$
		PI Sta 11+46.71 $\Delta = 2' 39' 27.6'$ (RT) $D = 2' 51' 53.2"$ $L = 92.77'$ $T = 46.39'$ $R = 2,000.00'$



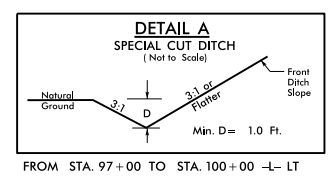
MATCH LINE -L- STA 90+00 SEE SHEET 8

MATCH LINE -L- STA 103+00 SEE SHEET 10



REVISIONS

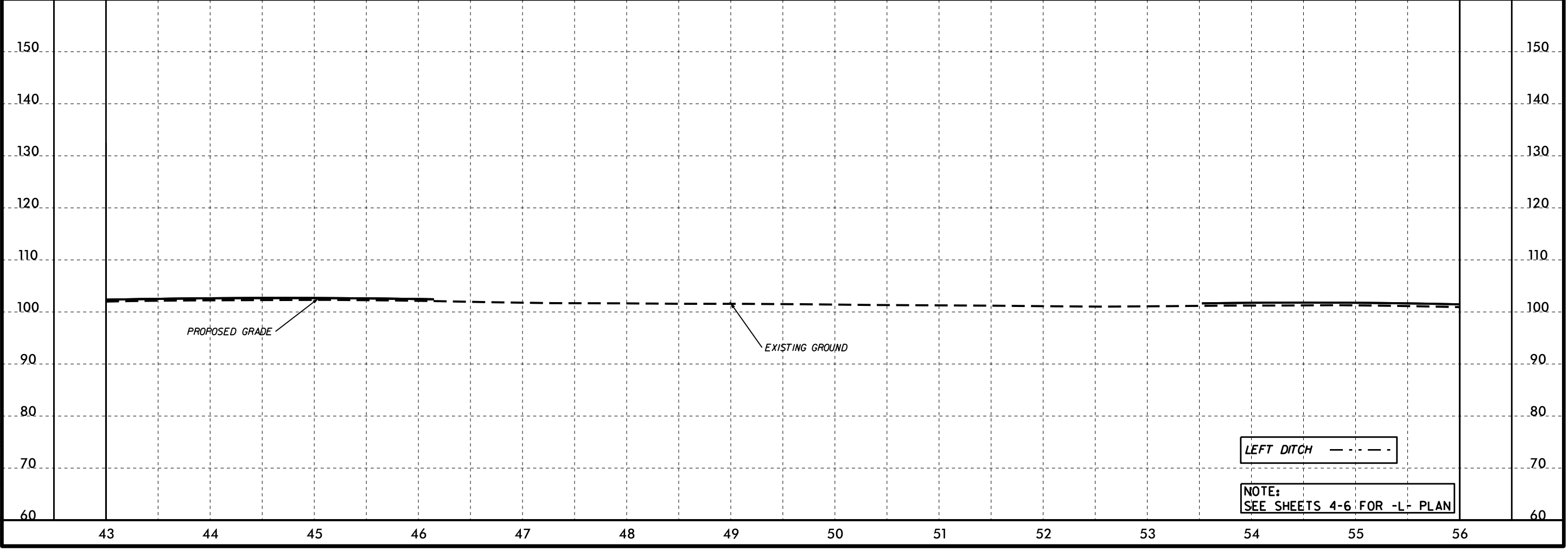
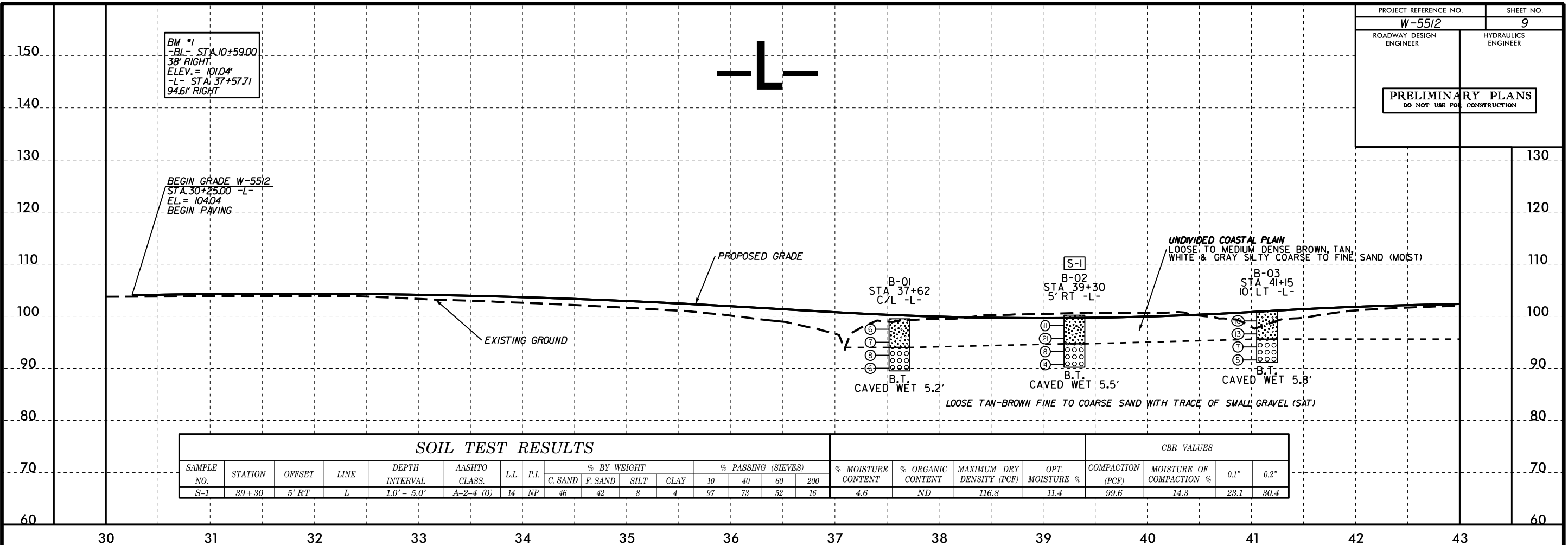
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 8/17/99



NOTE:
 SEE SHEET 19 FOR -L- PROFILE
 SEE SHEET 24 FOR -DRIVE 5- PROFILE

5/28/99

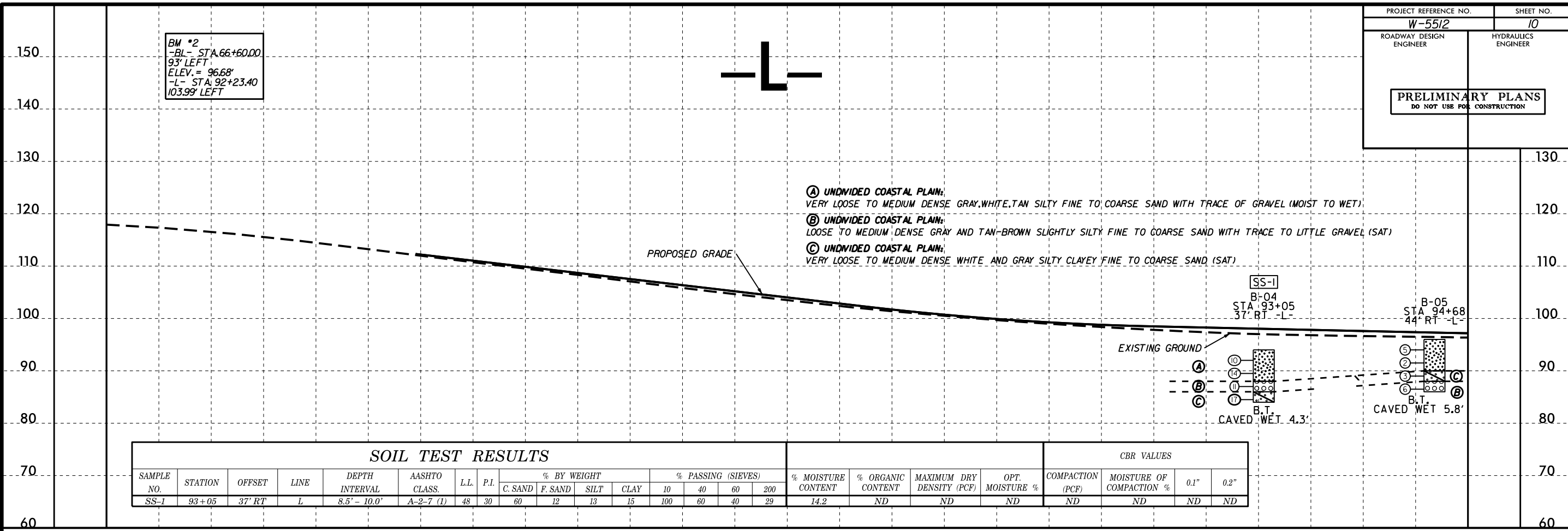
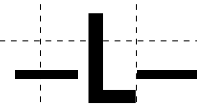
PROJECT REFERENCE NO. W-5512	SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



10-JAN-2015 10:25 AM
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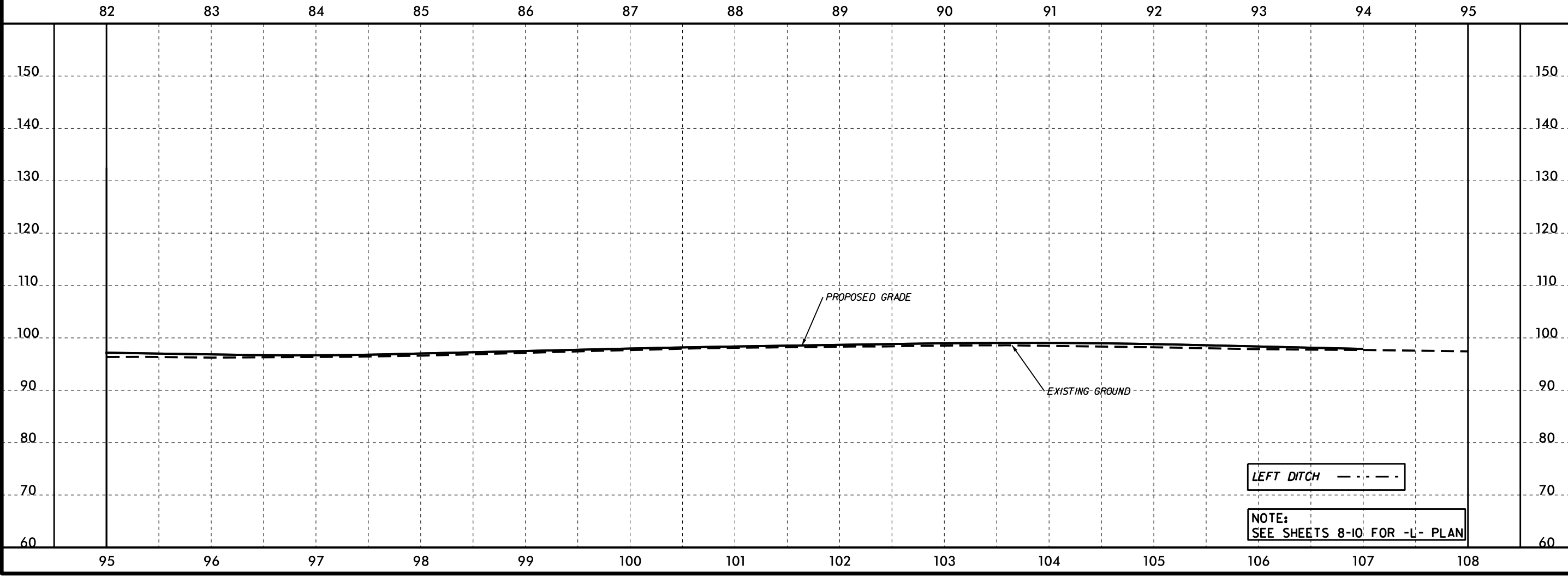
5/28/99

BM *2
-BL- STA. 66+60.00
93' LEFT
ELEV. = 96.68'
-L- STA. 92+23.40
103.99' LEFT



- (A) UNDIVIDED COASTAL PLAIN:
VERY LOOSE TO MEDIUM DENSE GRAY, WHITE, TAN SILTY FINE TO COARSE SAND WITH TRACE OF GRAVEL (MOIST TO WET)
- (B) UNDIVIDED COASTAL PLAIN:
LOOSE TO MEDIUM DENSE GRAY AND TAN-BROWN SLIGHTLY SILTY FINE TO COARSE SAND WITH TRACE TO LITTLE GRAVEL (SAT)
- (C) UNDIVIDED COASTAL PLAIN:
VERY LOOSE TO MEDIUM DENSE WHITE AND GRAY SILTY CLAYEY FINE TO COARSE SAND (SAT)

SOIL TEST RESULTS														CBR VALUES									
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	COMPACTION (PCF)	MOISTURE OF COMPACTION %	0.1"	0.2"
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200								
SS-1	93+05	37' RT	L	8.5' - 10.0'	A-2-7 (L)	48	30	60	12	13	15	100	60	40	29	14.2	ND	ND	ND	ND	ND	ND	ND



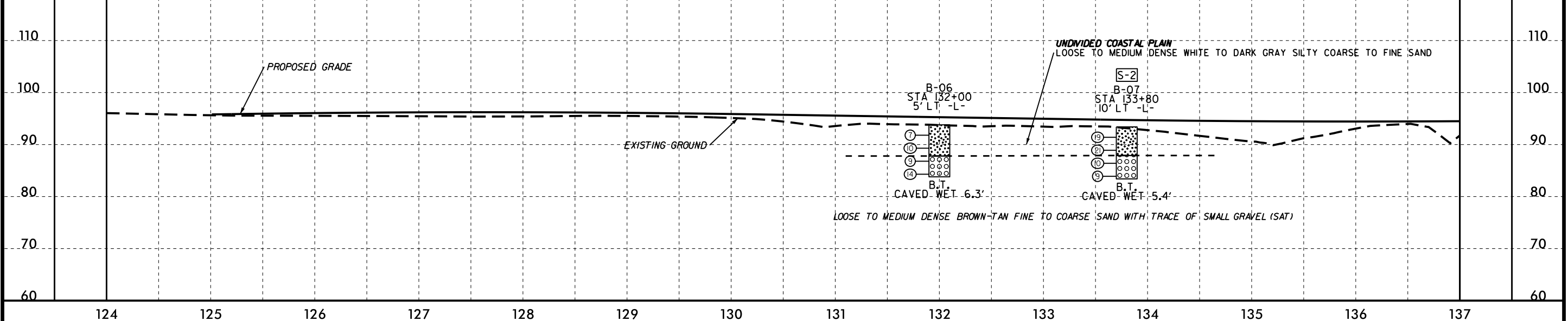
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 10:23 AM 1/15/2015

5/28/99

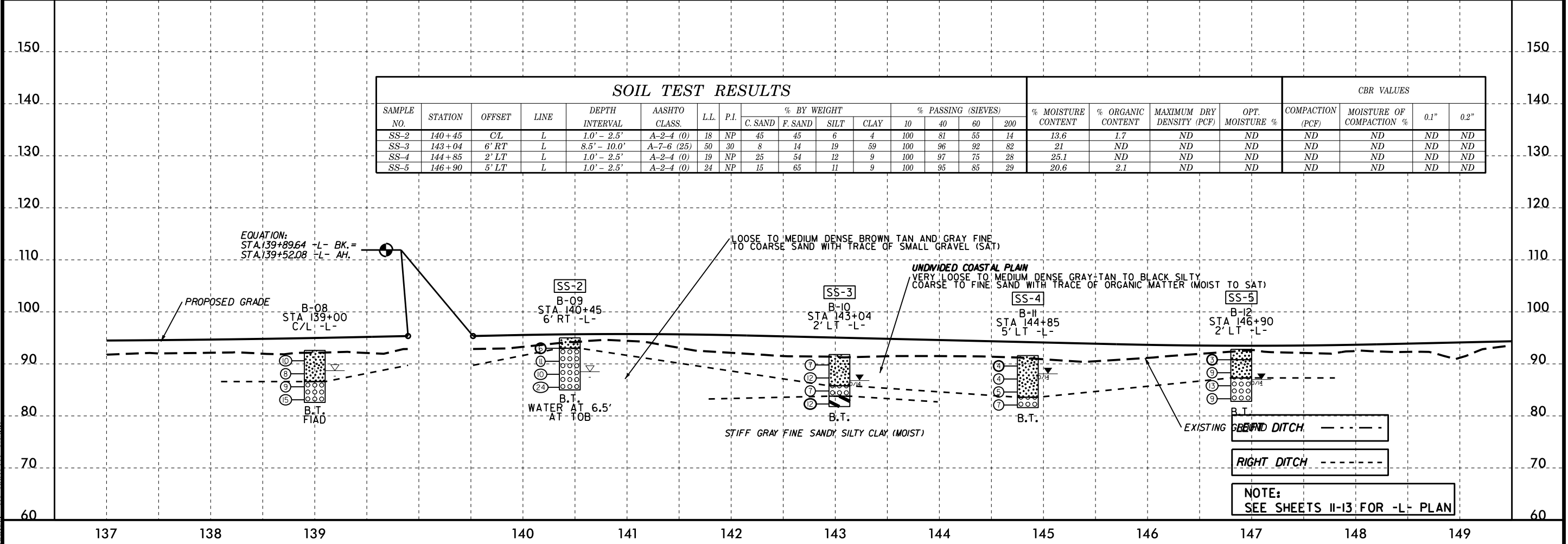
BM #3
 -BL- STA. 118+79.00
 80' LEFT
 ELEV. = 92.75'
 -L- STA. 144+54.00
 151.62' LEFT

PROJECT REFERENCE NO. W-5512	SHEET NO. 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

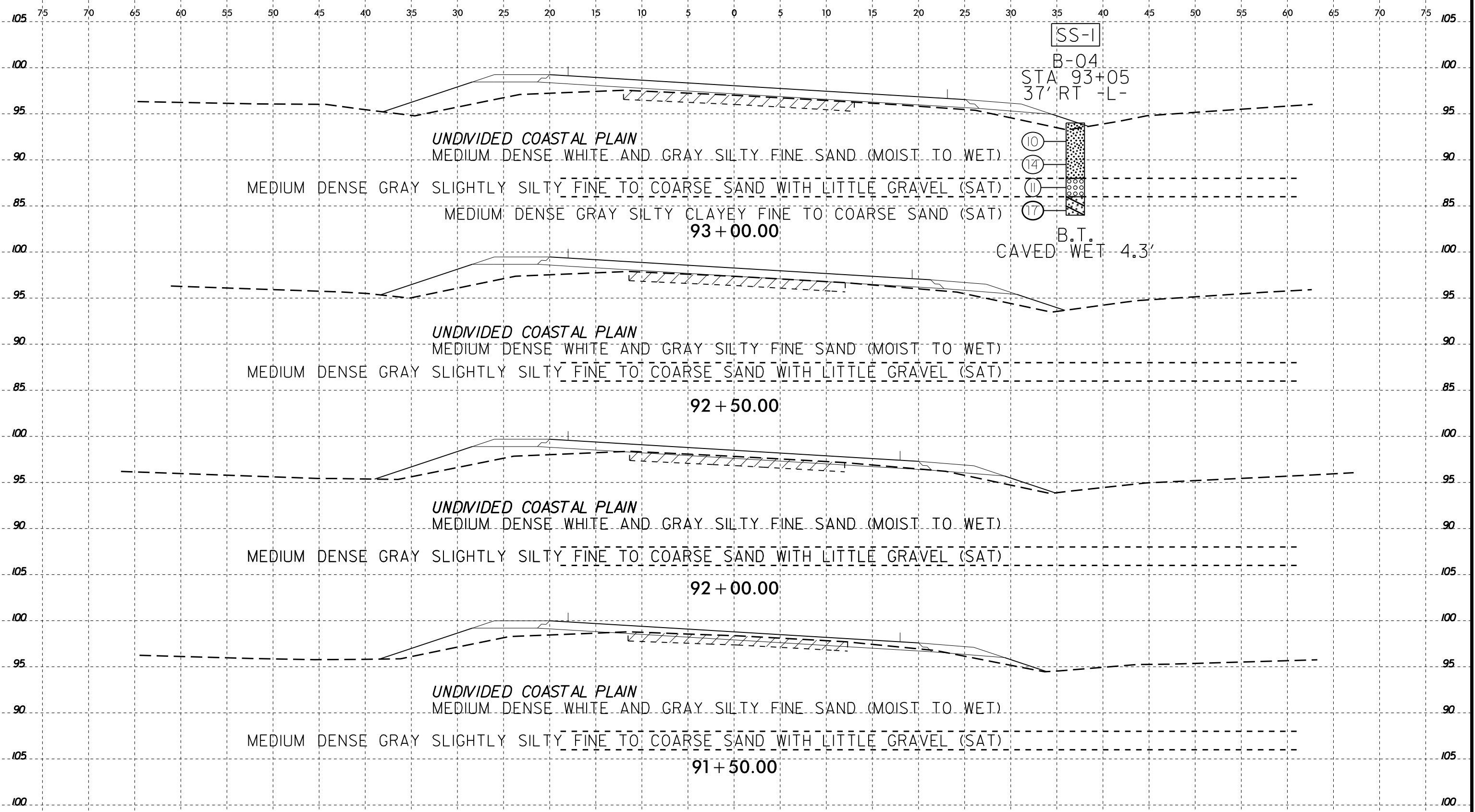
SOIL TEST RESULTS														CBR VALUES									
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	COMPACTION (PCF)	MOISTURE OF COMPACTION %		
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200						0.1"	0.2"	
S-2	133+80	10' LT	L	1.0' - 5.0'	A-2-4 (0)	14	NP	33	50	11	6	100	83	67	24	1.6	ND	116.4	11.1	99.7	13.9	10.7	14.3



SOIL TEST RESULTS														CBR VALUES								
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	MOISTURE OF COMPACTION %		
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200					0.1"	0.2"	
SS-2	140+45	CL	L	1.0' - 2.5'	A-2-4 (0)	18	NP	45	45	6	4	100	81	55	14	13.6	1.7	ND	ND	ND	ND	ND
SS-3	143+04	6' RT	L	8.5' - 10.0'	A-7-6 (25)	50	30	8	14	19	59	100	96	92	82	21	ND	ND	ND	ND	ND	ND
SS-4	144+85	2' LT	L	1.0' - 2.5'	A-2-4 (0)	19	NP	25	54	12	9	100	97	75	28	25.1	ND	ND	ND	ND	ND	ND
SS-5	146+90	5' LT	L	1.0' - 2.5'	A-2-4 (0)	24	NP	15	65	11	9	100	95	85	29	20.6	2.1	ND	ND	ND	ND	ND

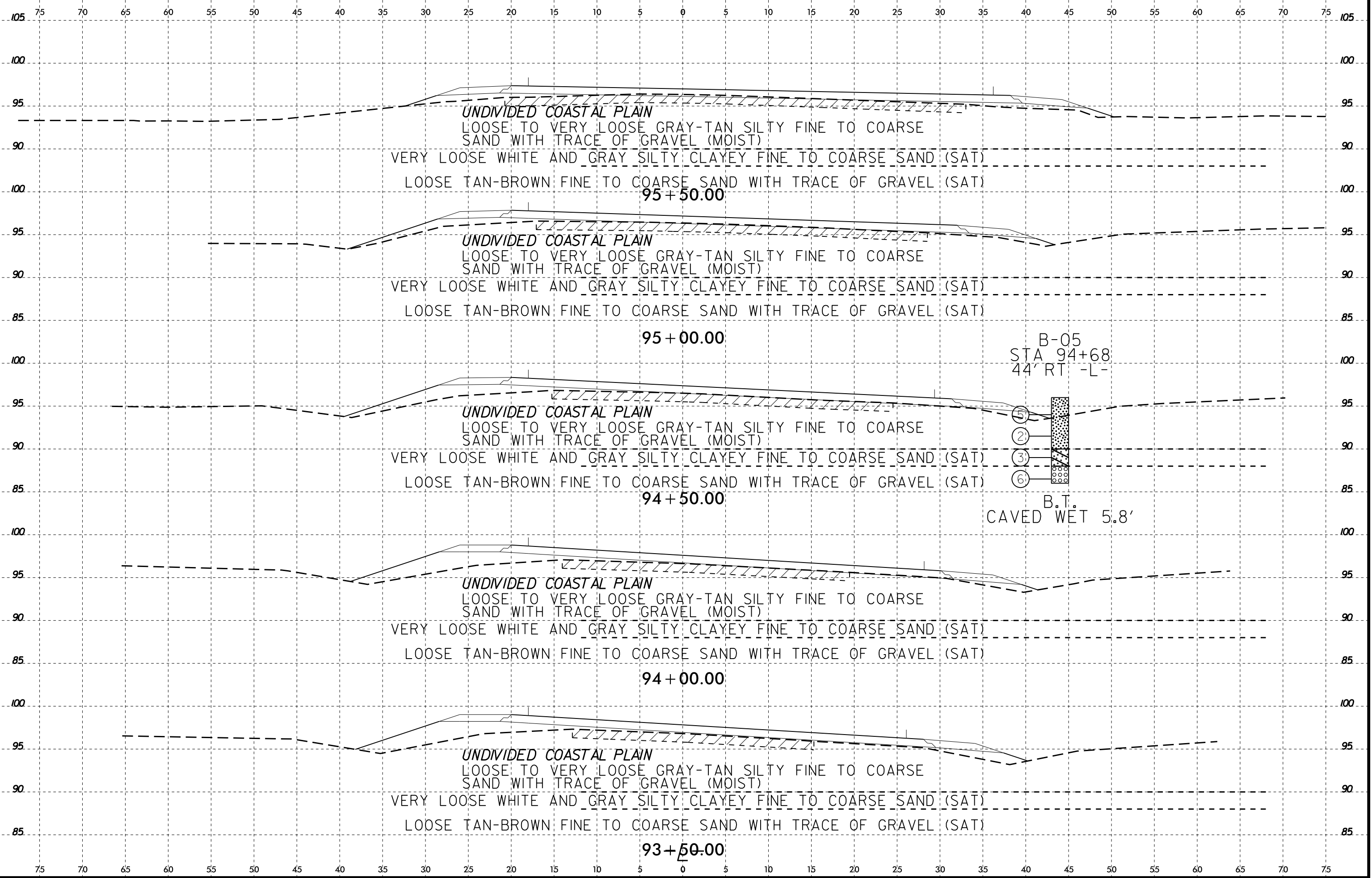


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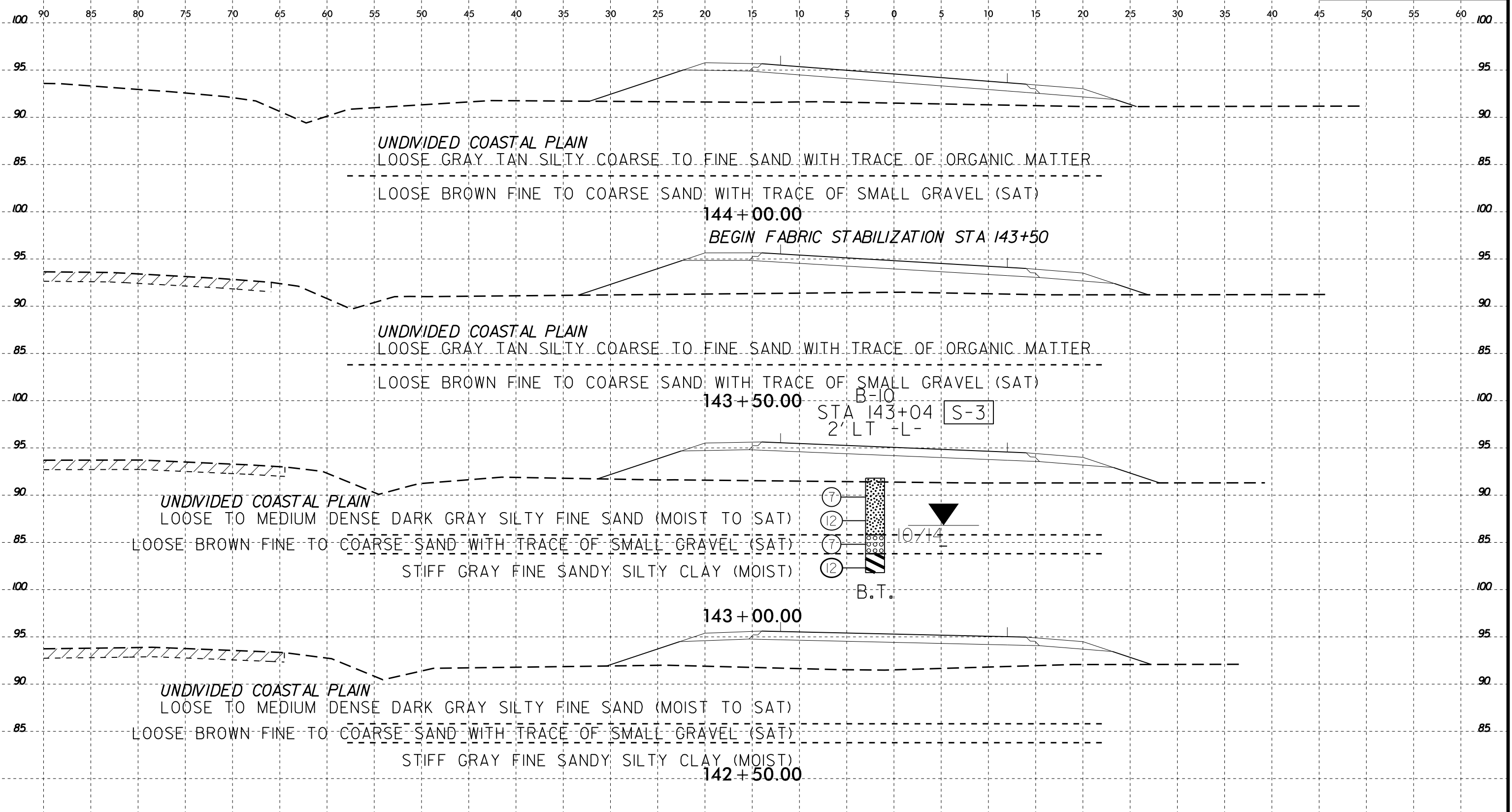
SOIL TEST RESULTS												CBR VALUES											
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	COMPACTION (PCF)	MOISTURE OF COMPACTION %	0.1"	0.2"
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200								
SS-1	93+05	37' RT	L	8.5' - 10.0'	A-2-7 (1)	48	30	60	12	13	15	100	60	40	29	14.2	ND	ND	ND	ND	ND	ND	ND

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 BRATTI

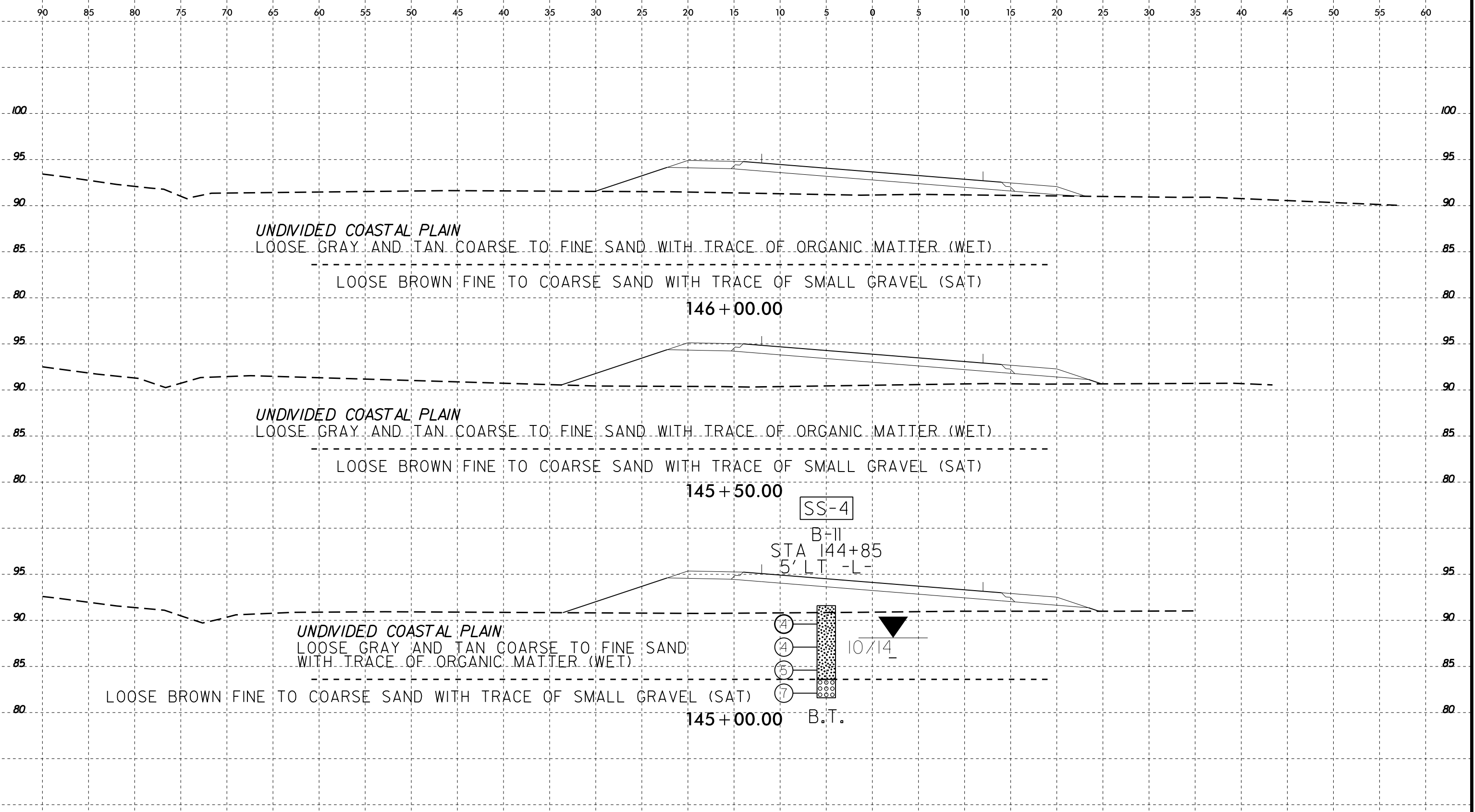


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 BRATTI AT 13500

8/23/99
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 BRATTI - 13000



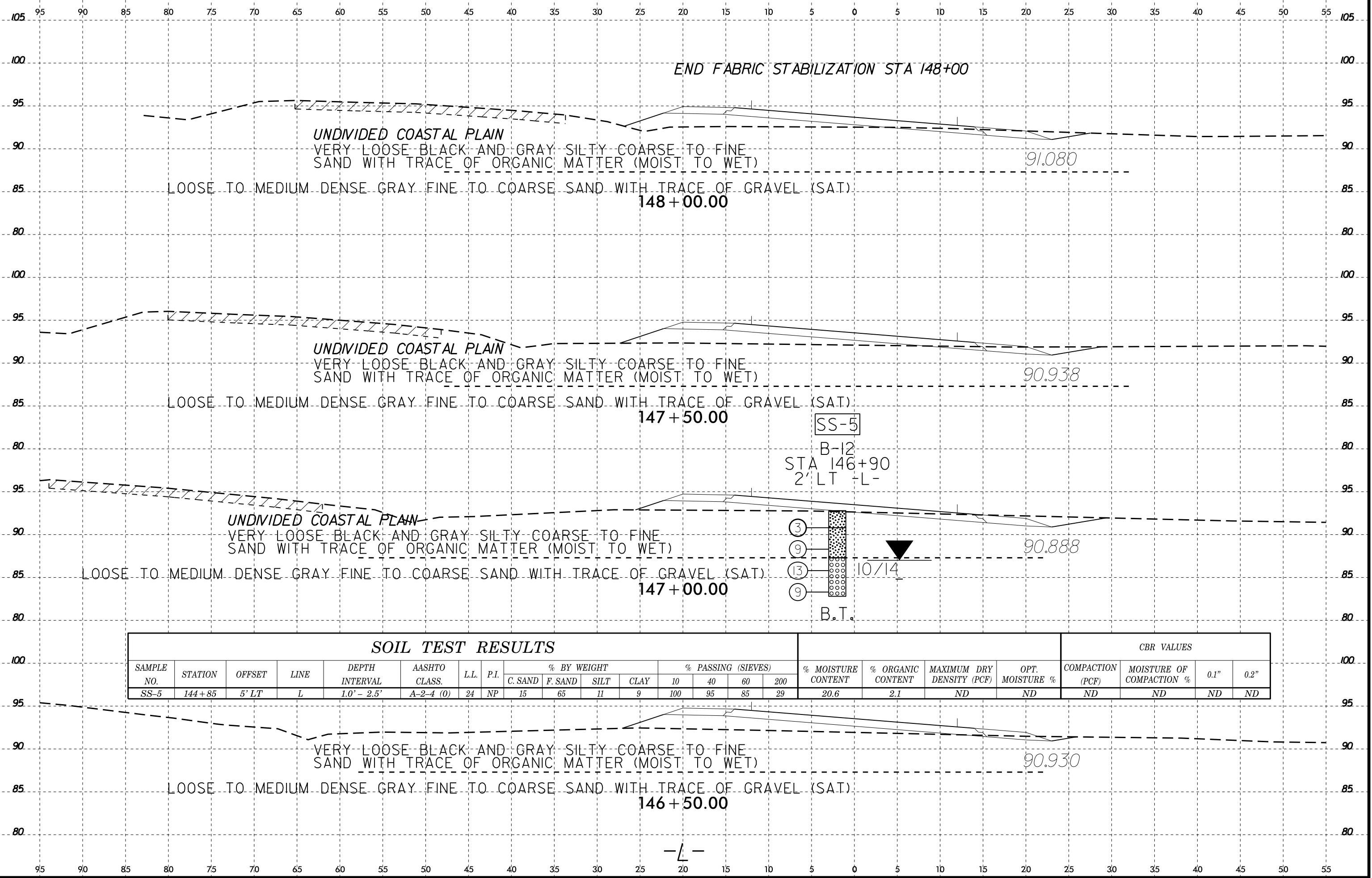
SOIL TEST RESULTS												CBR VALUES											
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	COMPACTION (PCF)	MOISTURE OF COMPACTION %	0.1"	0.2"
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200								
SS-3	143+04	2' LT	L	8.0' - 10.0'	A-7-6 (25)	50	30	8	14	19	59	100	96	92	82	21.0	ND	ND	ND	ND	ND	ND	ND



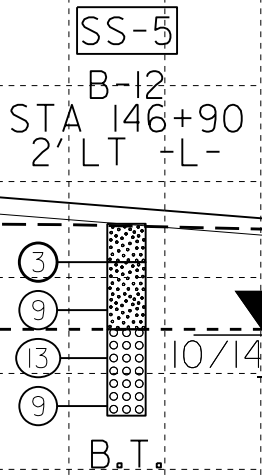
SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	CBR VALUES			
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200					COMPACTION (PCF)	MOISTURE OF COMPACTION %	0.1"	0.2"
SS-4	144+85	5' LT	L	1.0' - 2.5'	A-2-4 (0)	19	NP	25	54	12	9	100	97	75	29	25.1	ND	ND	ND	ND	ND	ND	ND

8/23/99
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 BRATTI-3500



SOIL TEST RESULTS														CBR VALUES								
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)				% MOISTURE CONTENT	% ORGANIC CONTENT	MAXIMUM DRY DENSITY (PCF)	OPT. MOISTURE %	COMPACTION (PCF)	MOISTURE OF COMPACTION %	
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200						0.1"	0.2"
SS-5	144+85	5' LT	L	1.0' - 2.5'	A-2-4 (0)	24	NP	15	65	11	9	100	95	85	29	20.6	2.1	ND	ND	ND	ND	ND



-L-

Moisture - Density Report

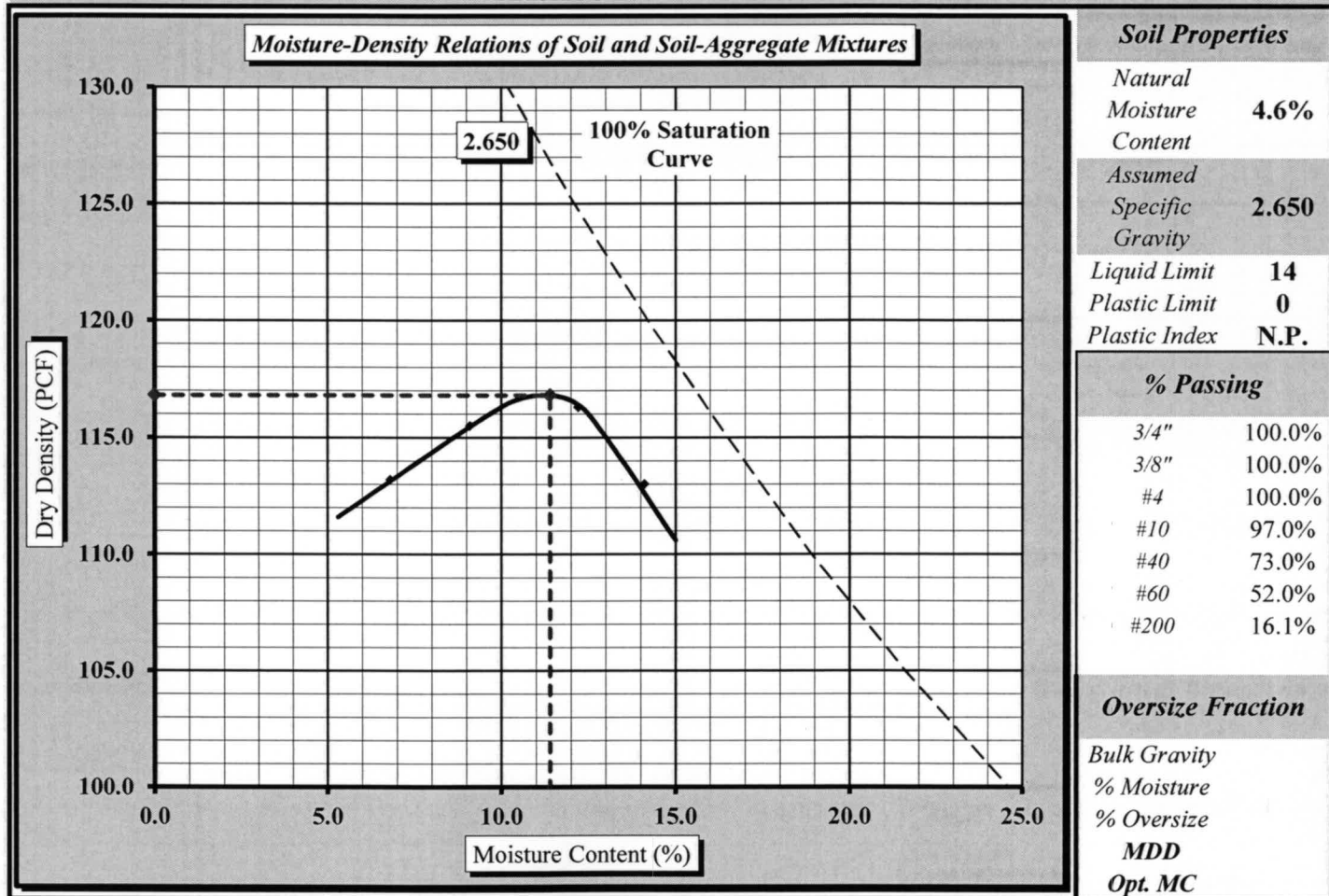


Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	1305-14-079	W-5512	Report Date:	11/5/14	
Project Name:	Tom Starling Road (SR2220)		Test Date(s):	11/3 - 11/5/14	
Client Name:	Parsons Transportation Group Inc.				
Client Address:	Raleigh, North Carolina				
Boring #:	B-2	Sample #:	S-1	Sample Date:	10/27/2014
Location:	STA 39+30 -L-	Offset:	5' RT	Depth:	1 - 5 ft
Sample Description:	White Silty Fine to Coarse SAND (A-2-4) (0)				

Maximum Dry Density 116.8 PCF. Optimum Moisture Content 11.4%
 AASHTO T99 -- Method A



Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
 Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
 Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations:
 AASHTO T88: Particle Size Analysis of Soils
 AASHTO T265: Laboratory Determination of Moisture Content of Soils
 AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET 104-01-0703 Laboratory Manager 11/5/14
 Technical Responsibility Certification # Position Date

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CBR (California Bearing Ratio) of Laboratory
 Compacted Soil
 AASHTO T 193

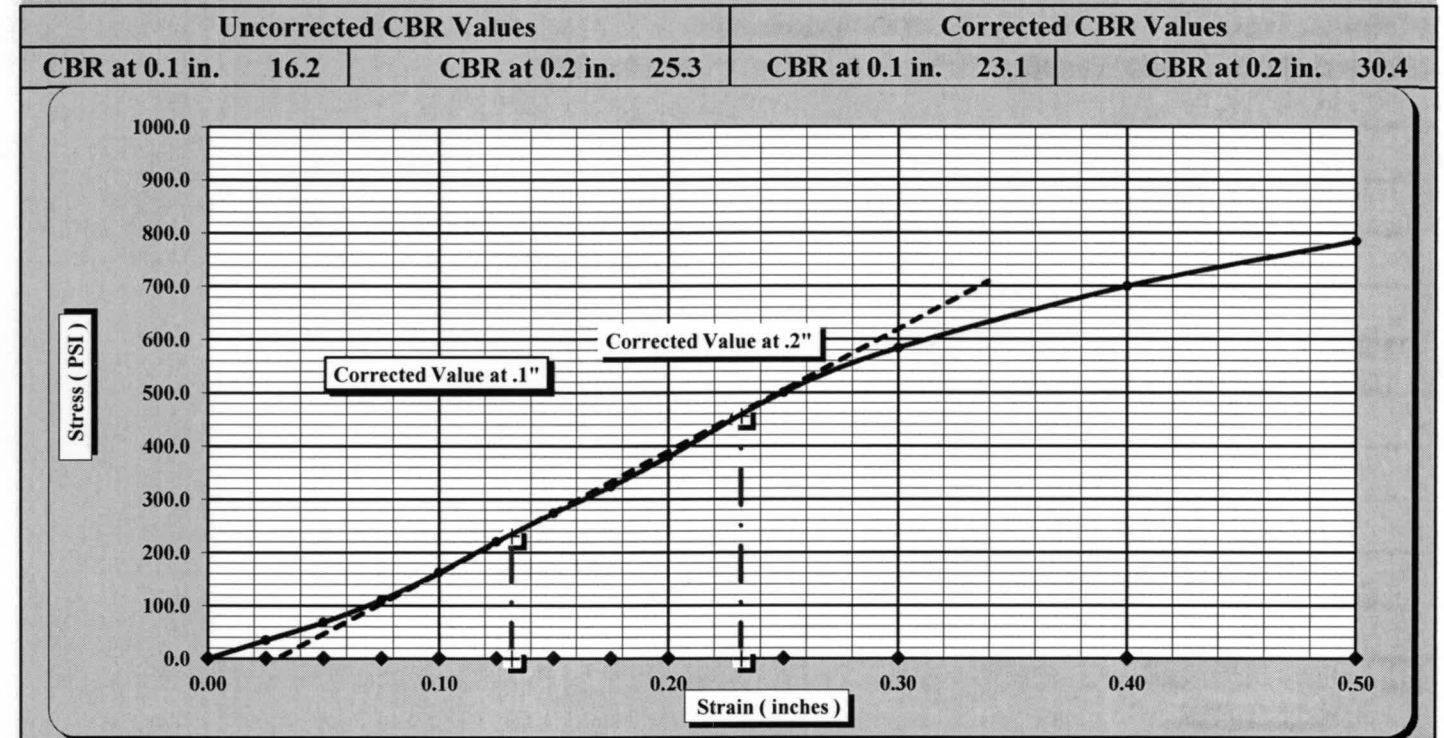


Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	1305-14-079	W-5512	Report Date:	11/10/14	
Project Name:	Tom Starling Road (SR 2220)		Test Date(s)	11/3 - 10/10/14	
Client Name:	Parsons Transportation Group Inc.				
Client Address:	Raleigh, North Carolina				
Boring #:	B-2	Sample #:	S-1	Sample Date:	10/27/14
Location:	STA 39+30 -L-	Offset:	5' RT	Depth (ft):	1 - 5 ft.
Sample Description:	White Silty Fine to Coarse SAND (A-2-4) (0)				

AASHTO T99 Method A Maximum Dry Density: 116.8 PCF Optimum Moisture Content: 11.4%
 Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: 0.0%



CBR Sample Preparation: Performed on the fine fraction
 The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	115.3
Initial Dry Density (PCF)	116.3	Average Final Moisture Content	15.2%
Moisture Content of the Compacted Specimen	14.3%	Moisture Content (top 1" after soaking)	15.8%
Percent Compaction	99.6%	Percent Swell	0.1%
Soak Time:	96-hr	Surcharge Weight	10.0
Liquid Limit	14	Surcharge Wt. per sq. Ft.	50.9
		Plastic Index	N.P.

Notes/Deviations/References:
 Test specimen was compacted to 100% at 3% wet of optimum moisture content.

Mal Krajan, ET 11/10/14 Laboratory Manager
 Technical Responsibility Signature Position Date

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Moisture - Density Report

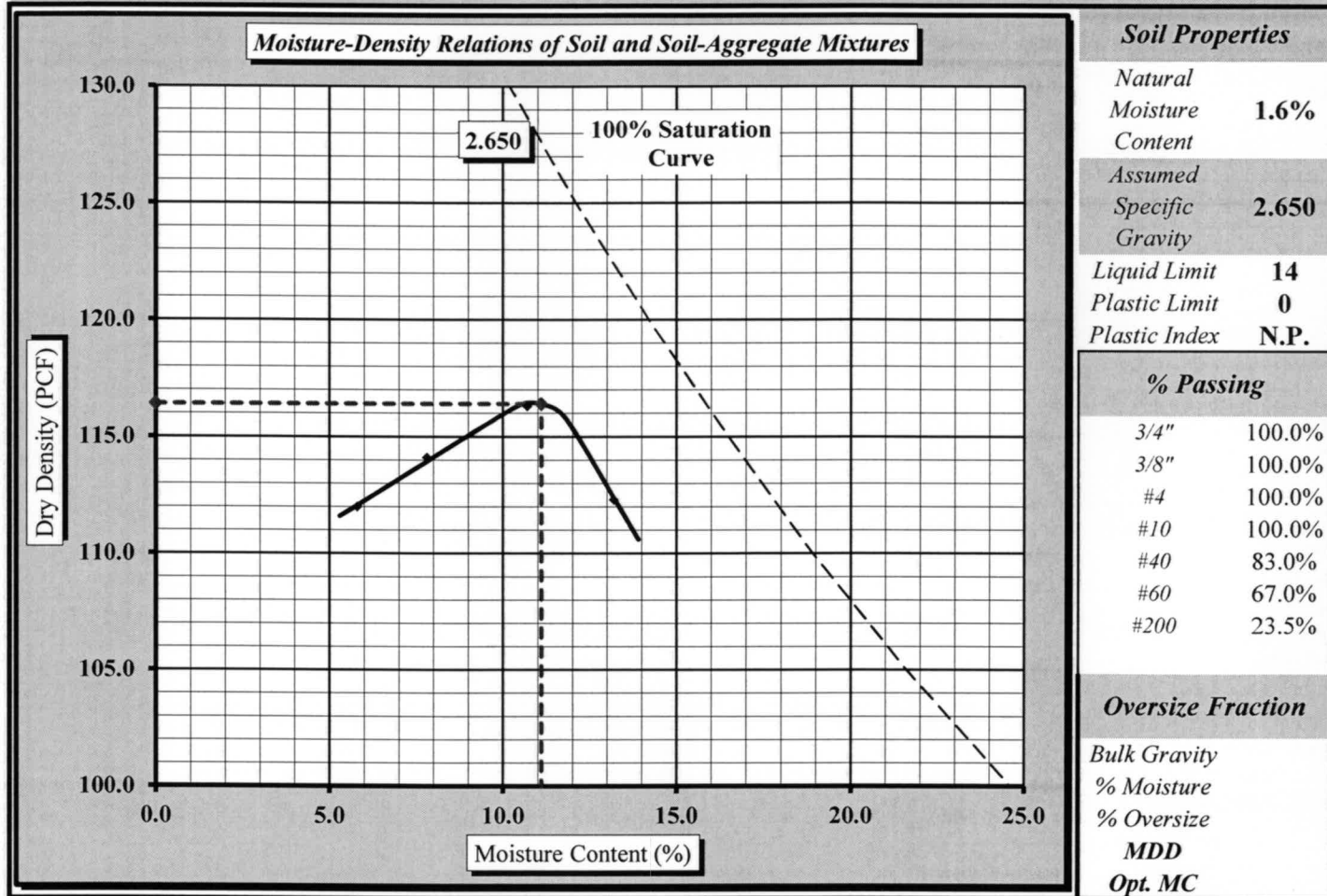


Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	1305-14-079	W-5512	Report Date:	11/5/14	
Project Name:	Tom Starling Road (SR 2220)		Test Date(s):	11/3 - 11/5/14	
Client Name:	Parsons Transportation Group, Inc.				
Client Address:	Raleigh, North Carolina				
Boring #:	B-7	Sample #:	S-2	Sample Date:	5/6/14 - 5/7/14
Location:	STA 133+80 -L-	Offset:	10' LT	Depth:	1 - 5 ft
Sample Description:	White and Gray Silty Coarse to Fine SAND (A-2-4) (0)				

Maximum Dry Density 116.4 PCF. Optimum Moisture Content 11.1%
 AASHTO T99 -- Method A



Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
 Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
 Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations:
 AASHTO T88: Particle Size Analysis of Soils
 AASHTO T265: Laboratory Determination of Moisture Content of Soils
 AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Mal Krajan, ET 104-01-0703 Laboratory Manager 11/5/14
 Technical Responsibility Certification # Position Date

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CBR (California Bearing Ratio) of Laboratory

Compacted Soil

AASHTO T 193

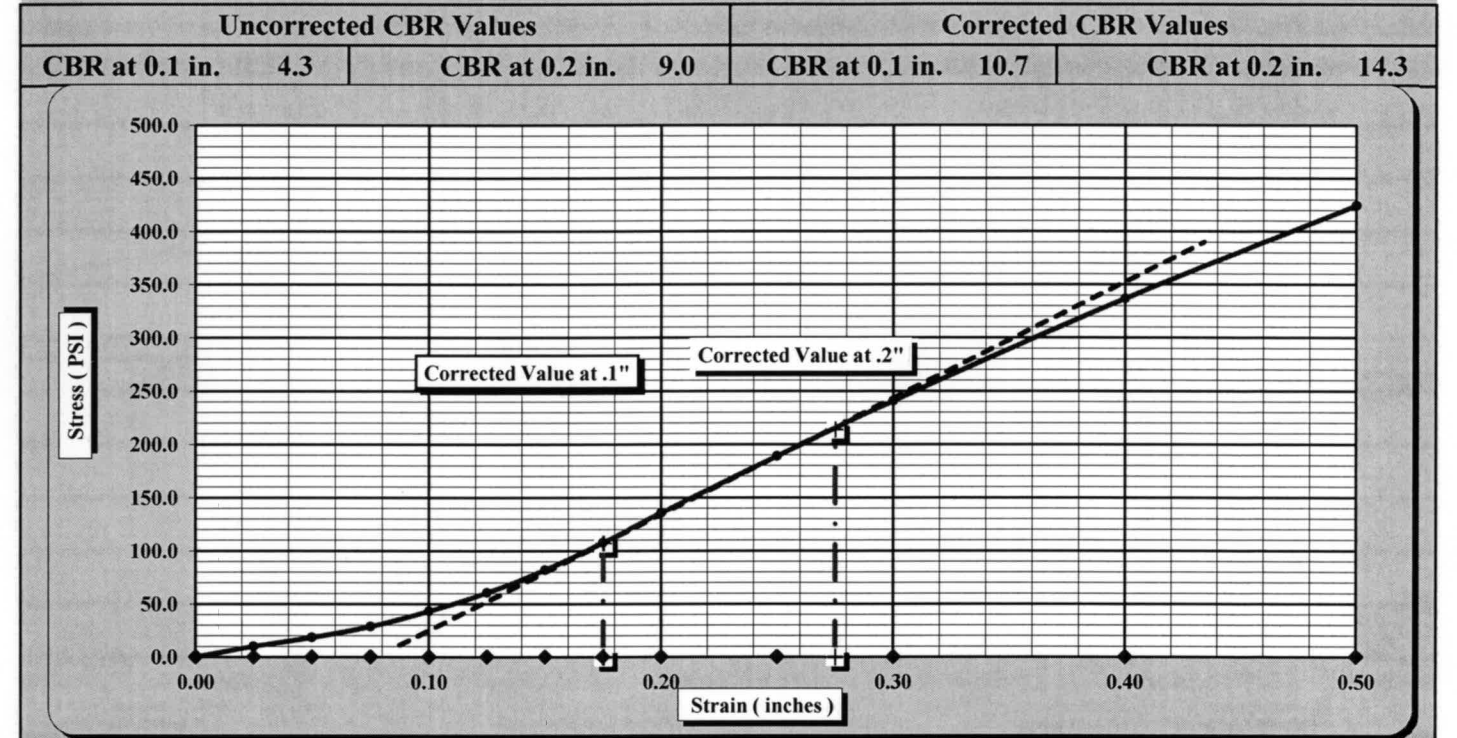


Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	1305-14-079	W-5512	Report Date:	11/10/14	
Project Name:	Tom Starling Road (SR 2220)		Test Date(s):	11/3 - 10/10/14	
Client Name:	Parsons Transportation Group, Inc.				
Client Address:	Raleigh, North Carolina				
Boring #:	B-7	Sample #:	S-2	Sample Date:	10/27/14
Location:	STA 133+80 -L-	Offset:	10' LT	Depth (ft):	1 - 5 ft.
Sample Description:	White and Gray Silty Coarse to Fine SAND (A-2-4) (0)				

AASHTO T99 Method A Maximum Dry Density: 116.4 PCF Optimum Moisture Content: 11.1%
 Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: 0.0%



CBR Sample Preparation: Performed on the fine fraction
 The entire gradation was used and compacted in a 6" CBR mold in accordance with

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	65	Final Dry Density (PCF)	115.0
Initial Dry Density (PCF)	116.0	Average Final Moisture Content	15.1%
Moisture Content of the Compacted Specimen	13.9%	Moisture Content (top 1" after soaking)	15.8%
Percent Compaction	99.7%	Percent Swell	-0.2%
Soak Time:	96-hr	Surcharge Weight	10.0
Liquid Limit	14	Surcharge Wt. per sq. Ft.	50.9
		Plastic Index	N.P.

Notes/Deviations/References:
 Test specimen was compacted to 100% at 3% wet of optimum moisture content.

Mal Krajan, ET Laboratory Manager 11/10/14
 Technical Responsibility Signature Position Date

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