

CONTRACT: C201208 ID: I-4411

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECTS
-L-	30+00 TO 59+00	4	-	-
-RPA-	10+50 TO 28+57.35	4	6-7	-
-RPB-	10+00 TO 22+75.23	4	7	-
-RPC-	10+00 TO 28+90.43	4	-	-
-RPD-	10+00 TO 19+42.49	4	8	-
-Y-	20+50 TO 48+36.84	4 & 5	6	-
-SRB-	14+00 TO 22+99.42	4	9-10	-
-SRC-	10+00 TO 38+00	4 & 5	10	-

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

**ROADWAY
SUBSURFACE INVESTIGATION**

STATE PROJ. 35604.3 I.D. I-4411 F.A. PROJ. _____
 COUNTY IREDELL
 PROJECT DESCRIPTION PROPOSED INTERCHANGE AT EXISTING
I-77 AND SR 1102 GRADE SEPARATION

INVENTORY

THIS IS A LIMITED INVENTORY REPORT. PLAN SHEETS HAVE BEEN OMITTED IN AREAS WHERE NO SPECIFIC GEOTECHNICAL DATA WAS OBTAINED.

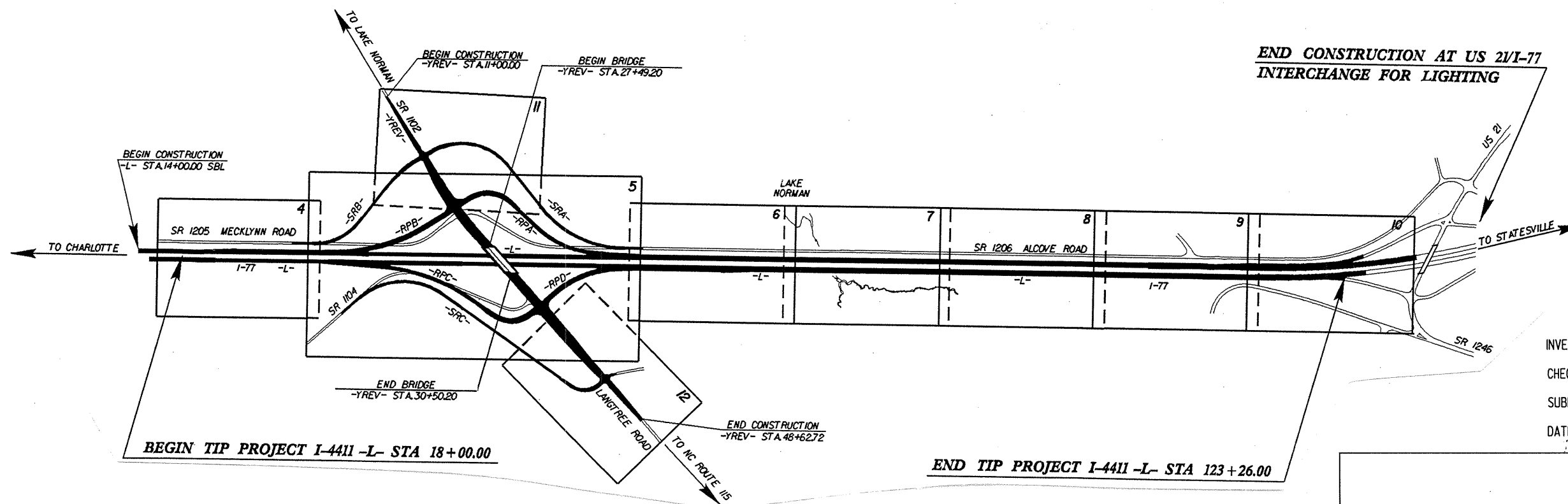
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-4411	1	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35604.1.1		PE	
35604.2.1		RW, UTL	
35604.3.1		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 THIS 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.



PERSONNEL
J.E. ESTEP
D.K. BRATTON

INVESTIGATED BY **C.B. LITTLE**
 CHECKED BY **C.B. LITTLE**
 SUBMITTED BY **C.B. LITTLE**
 DATE **SEPTEMBER 2003**

DRAWN BY: **T.A. MECHUM**

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

9-9-03

[Signature]

SEAL

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
I-4411	6.821012	2	10

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)		ALLUVIUM (ALLUV.) - SOILS WHICH 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, 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 WHICH 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 (F.P.) - 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 - A 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. MOTTLED 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 IN OR B.P.F. 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING			
GENERAL CLASS.		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH VERY SLIGHT (V. SLI.) SLIGHT (SLI.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V. SEV.) COMPLETE			
GROUP CLASS.		COMPRESSIBILITY		MODERATELY SEVERE (MOD. SEV.)			
SYMBOL		SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE		SEVERE (SEV.)			
% PASSING		PERCENTAGE OF MATERIAL		VERY SEVERE (V. SEV.)			
LIQUID LIMIT INDEX		ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC		COMPLETE			
GROUP INDEX		GROUND WATER		VERY HARD			
USUAL TYPES OF MAJOR MATERIALS		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE		HARD			
GEN. RATING AS A SUBGRADE		MISCELLANEOUS SYMBOLS		MODERATELY HARD			
P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30		ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES		MEDIUM HARD			
CONSISTENCY OR DENSENESS		SOUNDING ROD		SOFT			
PRIMARY SOIL TYPE		SPT REFUSAL		VERY SOFT			
COMPACTNESS OR CONSISTENCY		ABBREVIATIONS		MODERATELY SOFT			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		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 FRAGS. - FRAGMENTS MED. - MEDIUM		VERY HARD			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		PMT - PRESSUREMETER TEST SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST		HARD			
TEXTURE OR GRAIN SIZE		EQUIPMENT USED ON SUBJECT PROJECT		MODERATELY HARD			
U.S. STD. SIEVE SIZE OPENING (MM)		DRILL UNITS: MOBILE B-57 BK-51 CME-45 CME-550 PORTABLE HOIST OTHER OTHER		MODERATELY HARD			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F, SD.) SILT (SL.) CLAY (CL.)		ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT OTHER		MODERATELY HARD			
SOIL MOISTURE - CORRELATION OF TERMS		HAMMER TYPE: AUTOMATIC MANUAL		MODERATELY HARD			
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		CORE SIZE: B N H		MODERATELY HARD			
FIELD MOISTURE DESCRIPTION		HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER		MODERATELY HARD			
GUIDE FOR FIELD MOISTURE DESCRIPTION		INDURATION		MODERATELY HARD			
SATURATED - (SAT.)		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		MODERATELY HARD			
WET - (W)		FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED		MODERATELY HARD			
MOIST - (M)		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		MODERATELY HARD			
DRY - (D)		BENCH MARK: ELEVATION: NOTES:		MODERATELY HARD			

09/28/03

See Sheet 1-A For Index of Sheets

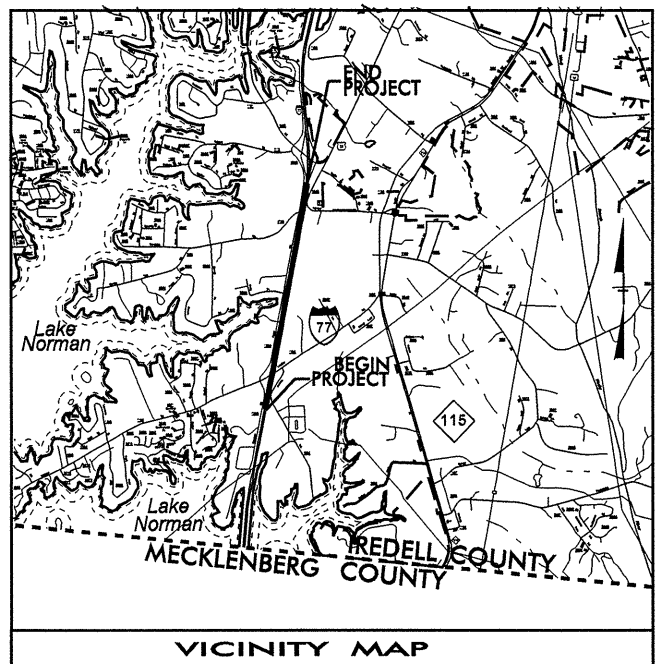
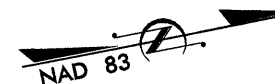
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

IREDELL COUNTY

**LOCATION: PROPOSED INTERCHANGE AT EXISTING
I-77 AND SR 1102 GRADE SEPARATION**

**TYPE OF WORK: GRADING, PAVING, WIDENING, GUARDRAIL,
SIGNING AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-4411	2A	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
6.821012		PE	

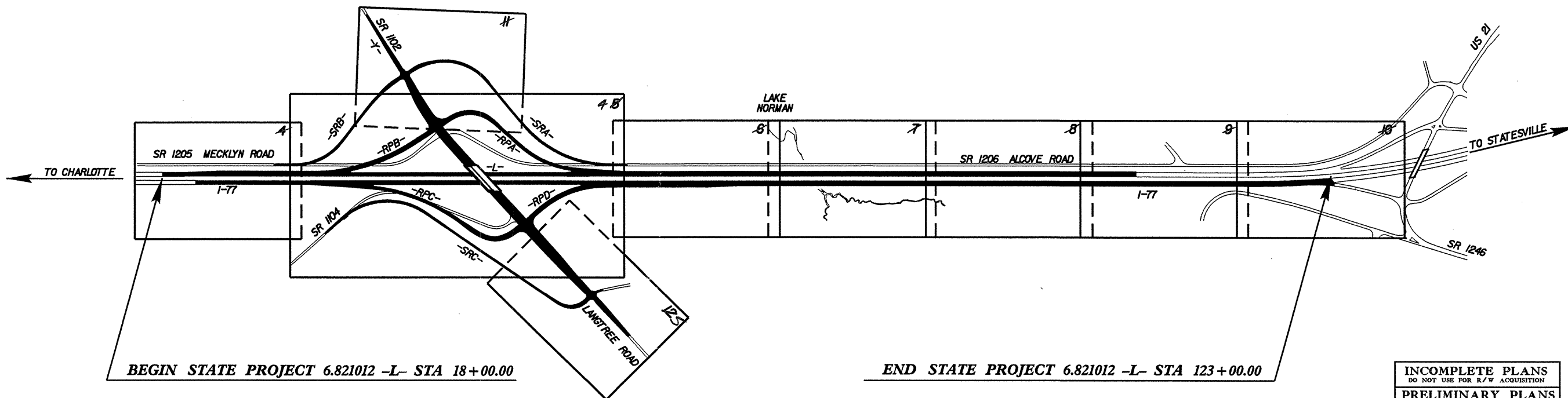


VICINITY MAP

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

PROJECT: I-4411

PROJECT: 6.821012

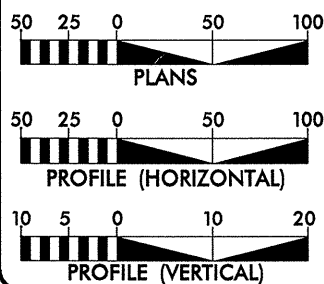


BEGIN STATE PROJECT 6.821012 -L- STA 18+00.00

END STATE PROJECT 6.821012 -L- STA 123+00.00

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

GRAPHIC SCALES



DESIGN DATA

ADT 2001 = 73,000
 ADT 2025 = 110,400
 DHV = 11 %
 D = 60 %
 T = 29 % *
 V = 70 MPH
 * TTST 21% DUAL 8 %

PROJECT LENGTH

TOTAL LENGTH ROADWAY STATE PROJECT 6.821012 = 1.932 MILES

Prepared In the Office of: DIVISION OF HIGHWAYS

1000 Birch Ridge Dr., NC, 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 16, 2004

LETTING DATE:
AUGUST 16, 2005

GREG BREW, PE
PROJECT ENGINEER

D. WILLIAMS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE:
ROADWAY DESIGN
ENGINEER

SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR

DATE

04-SEP-2003 10:26
D:\pco\ec\es\1-4411\GEO\TECH\I4411_r.dwg tsh.dgn



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 04, 2003

STATE PROJECT: 6.821012 (I-4411)
COUNTY: Iredell
DESCRIPTION: Proposed Interchange at Existing I-77
and SR 1102 Grade Separation

SUBJECT: Geotechnical Report – Inventory

A limited investigation was conducted for the project. Three Standard Penetration Test borings and six hand auger borings were conducted and sampled. All borings were conducted within the proposed interchange construction; with reconnaissance only along existing I-77.

The proposed earthwork is relatively minor. The highest proposed embankment is 25', over a narrow valley on -SRA-. The deepest cut of 8-10' is also on -SRA-, and Ramp A. Much of the proposed grade follows the existing (natural) grade. Soil exposures suggested the presence of plastic clays on the surface. This was confirmed by the samples obtained.

All samples obtained returned A-7-5 AASHTO classification. Liquid Limit and Plasticity Index is high in all samples. L.L. ranged from 59 to 83, P.I. from 11 to 44. Clay percentage and Passing #200 Sieve percentage is also high. These results are all indicative of poor quality subgrade soils. Moisture content of the soils was generally between 30% to 35%, probably above optimum but below the Plastic Limit.

Groundwater is not expected to be present near grade.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Clint Little".

Clint Little
Engineering Geologist

3A/10

PROJECT: I-4411		COUNTY: IREDELL					COMPUTED BY: WILLIAM			CHECKED BY: DW		
LOCATION	EXCAVATION					EMBANKMENT				BORROW	WASTE	
	TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUITABLE UNCLASS.	SUITABLE UNCLASS.	TOTAL EMBANKMENT	ROCK EMBANKMENT	EARTH EMBANKMENT	EMBANKMENT PLUS 20%		SUITABLE	UNSUITABLE
SUMMARY 1												
SRA 10+50.00 - 28+00.00	12,109				12,109	23,421		23,421	28,105	15,996		
SRB 10+50.00 - 25+00.00	2,352				2,352	722		722	866			1,486
RPA 16+00.00 - 28+00.00	19,656				19,656	7,121		7,121	8,545			11,111
RPB 15+00.00 - 22+00.00	4,564				4,564	7,271		7,271	8,725	4,161		
YREV 11+50.00 - 27+50.00	2,911				2,911	18,575		18,575	22,290	19,379		
LLT 14+00.00 - 44+00.00	3,471				3,471	1,357		1,357	1,628			1,843
SUMMARY 1 TOTAL	45,063				45,063	58,467		58,467	70,160	39,536		14,439
SUMMARY 2												
LLT 44+00.00 - 74+00.00	4,079				4,079	3,408		3,408	4,090	11		
SUMMARY 2 TOTAL	4,079				4,079	3,408		3,408	4,090	11		
SUMMARY 3												
LLT 74+00.00 - 104+00.00	4,526				4,526	551		551	661			3,865
SUMMARY 3 TOTAL	4,526				4,526	551		551	661			3,865
SUMMARY 4												
LLT 104+00.00 - 105+50.00	488				488	0		0				488
SUMMARY 4 TOTAL	488				488	0		0				488
SUMMARY 1 - 4 SUBTOTAL	54,156				54,156	62,426		62,426	74,911	39,547		18,792
Use Waste in lieu of Borrow For Summary 1-4												-18,792
SUMMARY 1 - 4 TOTAL	54,156				54,156	62,426		62,426	74,911	20,755		
SUMMARY 5												
L-MED 16+00.00 - 46+00.00	3,842				3,842	53		53	64			3,778
SUMMARY 5 TOTAL	3,842				3,842	53		53	64			3,778
SUMMARY 6												
L-MED 46+00.00 - 76+00.00	4,063				4,063	104		104	125			3,938
SUMMARY 6 TOTAL	4,063				4,063	104		104	125			3,938
SUMMARY 7												
L-MED 76+00.00 - 106+00.00	4,099				4,099	115		115	138			3,961
SUMMARY 7 TOTAL	4,099				4,099	115		115	138			3,961
SUMMARY 8												
L-MED 106+00.00 - 125+00.00	1,466				1,466	39		39	47			1,419
SUMMARY 8 TOTAL	1,466				1,466	39		39	47			1,419
SUMMARY 5 - 8 TOTAL	13,470				13,470	311		311	373			13,097
SUMMARY 9												
RPC 15+50.00 - 28+50.00	325				325	15,136		15,136	18,163	17,838		
RPD 14+00.00 - 18+50.00	455				455	5,007		5,007	6,008	5,553		
SRC 10+50.00 - 37+50.00	1,702				1,702	14,649		14,649	17,579	15,877		
YREV 30+50.00 - 48+00.00	3,729				3,729	18,247		18,247	21,896	18,167		
DRW 10+50.00 - 11+ 90.00	91				91							91
LRT 15+00.00 - 45+00.00	3,875				3,875	953		953	1,144			2,731
SUMMARY 9 TOTAL	10,177				10,177	53,992		53,992	64,790	57,436		2,822
SUMMARY 10												
LRT 45+00.00 - 75+00.00	13,857				13,857	3,533		3,533	4,240			9,617
SUMMARY 10 TOTAL	13,857				13,857	3,533		3,533	4,240			9,617
SUMMARY 11												
LRT 75+00.00 - 105+00.00	2,394				2,394	5,468		5,468	6,562	4,168		
SUMMARY 11 TOTAL	2,394				2,394	5,468		5,468	6,562	4,168		
SUMMARY 12												
LRT 105+00.00 - 125+00.00	2,013				2,013	747		747	896			1,117
SUMMARY 12 TOTAL	2,013				2,013	747		747	896			1,117
SUMMARY 9 - 12 SUBTOTAL	28,441				28,441	63,740		63,740	76,488	61,603		13,556
Use Waste in lieu of Borrow For Summary 9-12												-13,556
SUMMARY 9 - 12 TOTAL	28,441				28,441	63,740		63,740	76,488	48,047		
USE SELECT GRANULAR MATERIAL IN LIEU OF BORROW (CLASS II & CLASS III)						-833		-833	-1,000	-1,000		
ESTIMATE SHOULDER MATERIAL						28,000		28,000	33,600	33,600		
ESTIMATE LOSS DUE TO CLEAR & GRUBBING	-5,750				-5,750					5,750		
PROJECT TOTAL	90,317				90,317	153,644		153,644	184,373	107,152		13,097
ESTIMATE 5% TO REPLACE TOPSOIL ON BORROW PIT										5,358		
GRAND TOTAL	90,317				90,317	153,644		153,644	184,373	112,510		
SAY	90,320									112,510		13,097

ESTIMATE UNDERCUT = 4,400 CY
 PAVEMENT STRUCTURE VOLUME = 39,250 CY

PROJECT REFERENCE NO.	DATE
1-41	2
ROADWAY DESIGN	PROPOSED
INCOMPLETE PLANS	DO NOT USE FOR CONSTRUCTION

PI STA 14+00.00	PI STA 15+00.00	PI STA 16+00.00
PA = 14+00.00	PA = 15+00.00	PA = 16+00.00
LA = 14+00.00	LA = 15+00.00	LA = 16+00.00
EA = 14+00.00	EA = 15+00.00	EA = 16+00.00
PI STA 17+00.00	PI STA 18+00.00	PI STA 19+00.00
PA = 17+00.00	PA = 18+00.00	PA = 19+00.00
LA = 17+00.00	LA = 18+00.00	LA = 19+00.00
EA = 17+00.00	EA = 18+00.00	EA = 19+00.00

PI STA 20+00.00	PI STA 21+00.00	PI STA 22+00.00
PA = 20+00.00	PA = 21+00.00	PA = 22+00.00
LA = 20+00.00	LA = 21+00.00	LA = 22+00.00
EA = 20+00.00	EA = 21+00.00	EA = 22+00.00

PI STA 23+00.00	PI STA 24+00.00	PI STA 25+00.00
PA = 23+00.00	PA = 24+00.00	PA = 25+00.00
LA = 23+00.00	LA = 24+00.00	LA = 25+00.00
EA = 23+00.00	EA = 24+00.00	EA = 25+00.00

PI STA 26+00.00	PI STA 27+00.00	PI STA 28+00.00
PA = 26+00.00	PA = 27+00.00	PA = 28+00.00
LA = 26+00.00	LA = 27+00.00	LA = 28+00.00
EA = 26+00.00	EA = 27+00.00	EA = 28+00.00

PI STA 29+00.00	PI STA 30+00.00	PI STA 31+00.00
PA = 29+00.00	PA = 30+00.00	PA = 31+00.00
LA = 29+00.00	LA = 30+00.00	LA = 31+00.00
EA = 29+00.00	EA = 30+00.00	EA = 31+00.00

PI STA 32+00.00	PI STA 33+00.00	PI STA 34+00.00
PA = 32+00.00	PA = 33+00.00	PA = 34+00.00
LA = 32+00.00	LA = 33+00.00	LA = 34+00.00
EA = 32+00.00	EA = 33+00.00	EA = 34+00.00

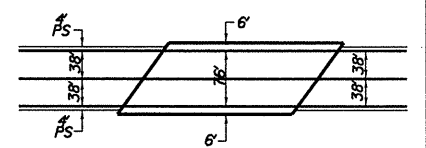
PI STA 35+00.00	PI STA 36+00.00	PI STA 37+00.00
PA = 35+00.00	PA = 36+00.00	PA = 37+00.00
LA = 35+00.00	LA = 36+00.00	LA = 37+00.00
EA = 35+00.00	EA = 36+00.00	EA = 37+00.00

PI STA 38+00.00	PI STA 39+00.00	PI STA 40+00.00
PA = 38+00.00	PA = 39+00.00	PA = 40+00.00
LA = 38+00.00	LA = 39+00.00	LA = 40+00.00
EA = 38+00.00	EA = 39+00.00	EA = 40+00.00

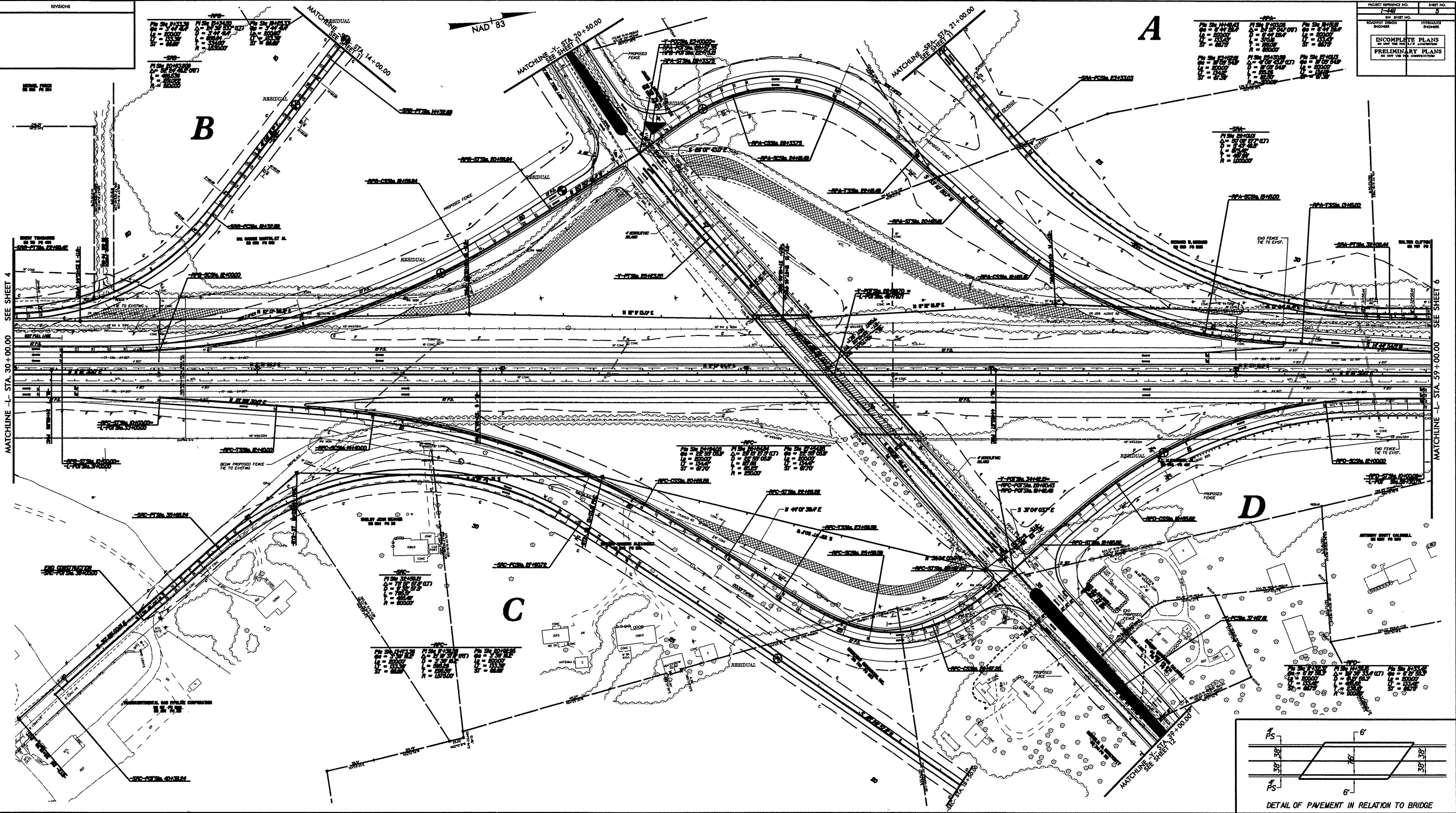
PI STA 41+00.00	PI STA 42+00.00	PI STA 43+00.00
PA = 41+00.00	PA = 42+00.00	PA = 43+00.00
LA = 41+00.00	LA = 42+00.00	LA = 43+00.00
EA = 41+00.00	EA = 42+00.00	EA = 43+00.00

PI STA 44+00.00	PI STA 45+00.00	PI STA 46+00.00
PA = 44+00.00	PA = 45+00.00	PA = 46+00.00
LA = 44+00.00	LA = 45+00.00	LA = 46+00.00
EA = 44+00.00	EA = 45+00.00	EA = 46+00.00

PI STA 47+00.00	PI STA 48+00.00	PI STA 49+00.00
PA = 47+00.00	PA = 48+00.00	PA = 49+00.00
LA = 47+00.00	LA = 48+00.00	LA = 49+00.00
EA = 47+00.00	EA = 48+00.00	EA = 49+00.00



DETAIL OF PAVEMENT IN RELATION TO BRIDGE



NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	11/15/01
2	REVISED TO SHOW PERMIT CONDITIONS	12/10/01
3	REVISED TO SHOW PERMIT CONDITIONS	12/10/01
4	REVISED TO SHOW PERMIT CONDITIONS	12/10/01

MATCHLINE - STA. 30+00.00 SEE SHEET 4

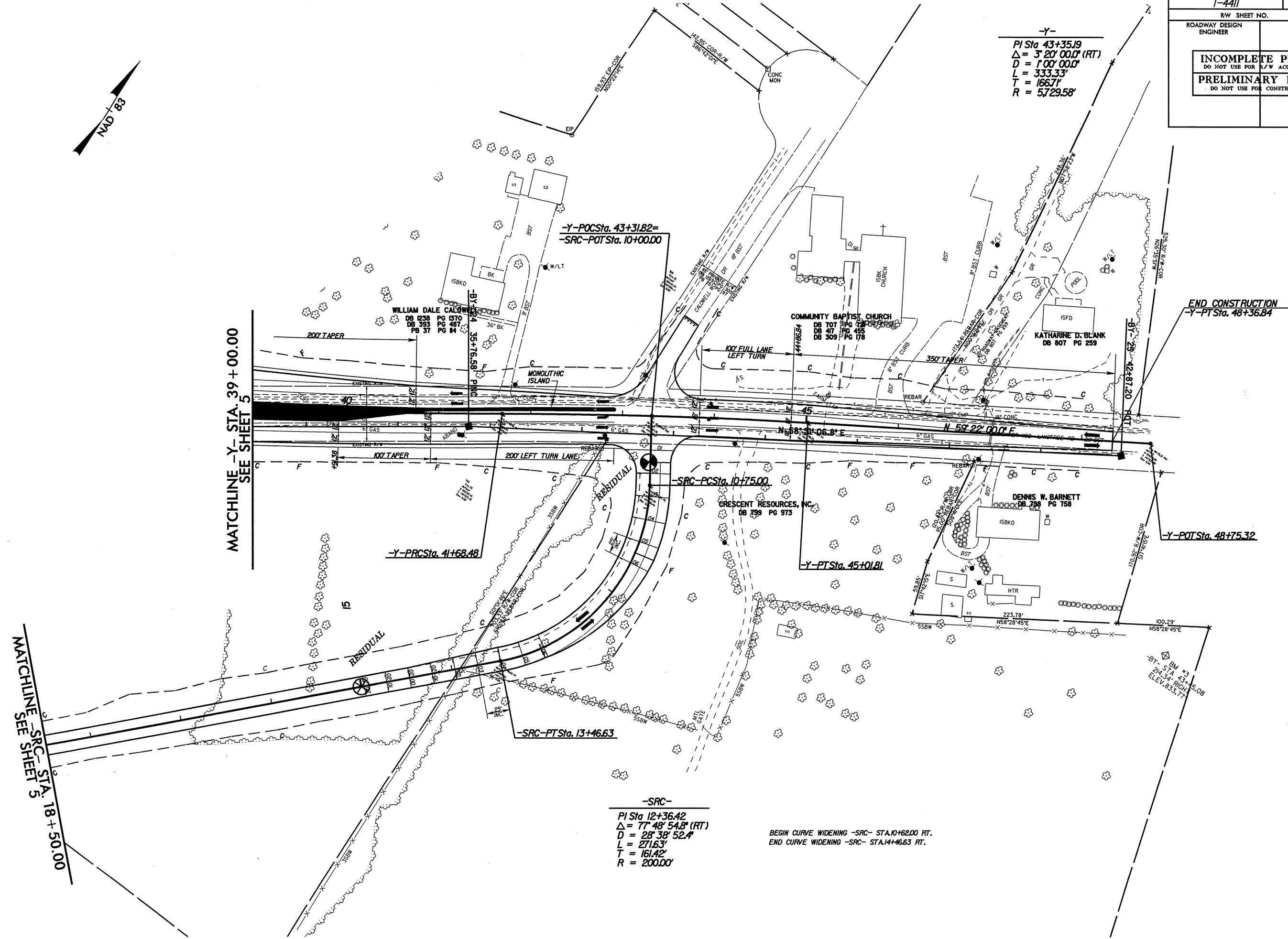
MATCHLINE - STA. 39+00.00 SEE SHEET 6

11/15/01 11:44:11 AM 11/15/01 11:44:11 AM

PROJECT REFERENCE NO. 1-4411	SHEET NO. 125
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-Y-
 PI Sta 43+35.19
 $\Delta = 3' 20' 00.0''$ (RT)
 $D = 1' 00' 00.0''$
 $L = 333.33'$
 $T = 166.71'$
 $R = 5729.58'$



-SRC-
 PI Sta 12+36.42
 $\Delta = 77' 48' 54.8''$ (RT)
 $D = 28' 38' 52.4''$
 $L = 271.63'$
 $T = 161.42'$
 $R = 200.00'$

BEGIN CURVE WIDENING -SRC- STA. 10+62.00 RT.
 END CURVE WIDENING -SRC- STA. 14+46.63 RT.

REVISIONS

8/17/99

02-SEP-2003 14:09
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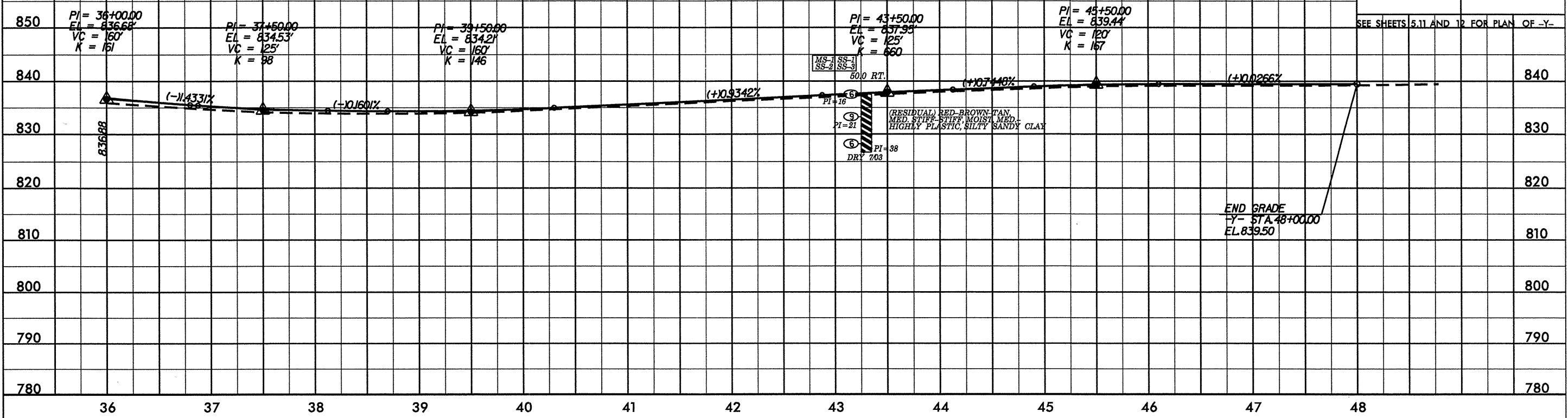
5/28/99

BM*3 - 8 INCH NAIL IN BASE OF 24 INCH RED OAK EL.832377
-Y- STA.43+45.08 214.34' RIGHT
N 654055.204 E 144774.516

PROJECT REFERENCE NO. 1-4411	SHEET NO. 1A-6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

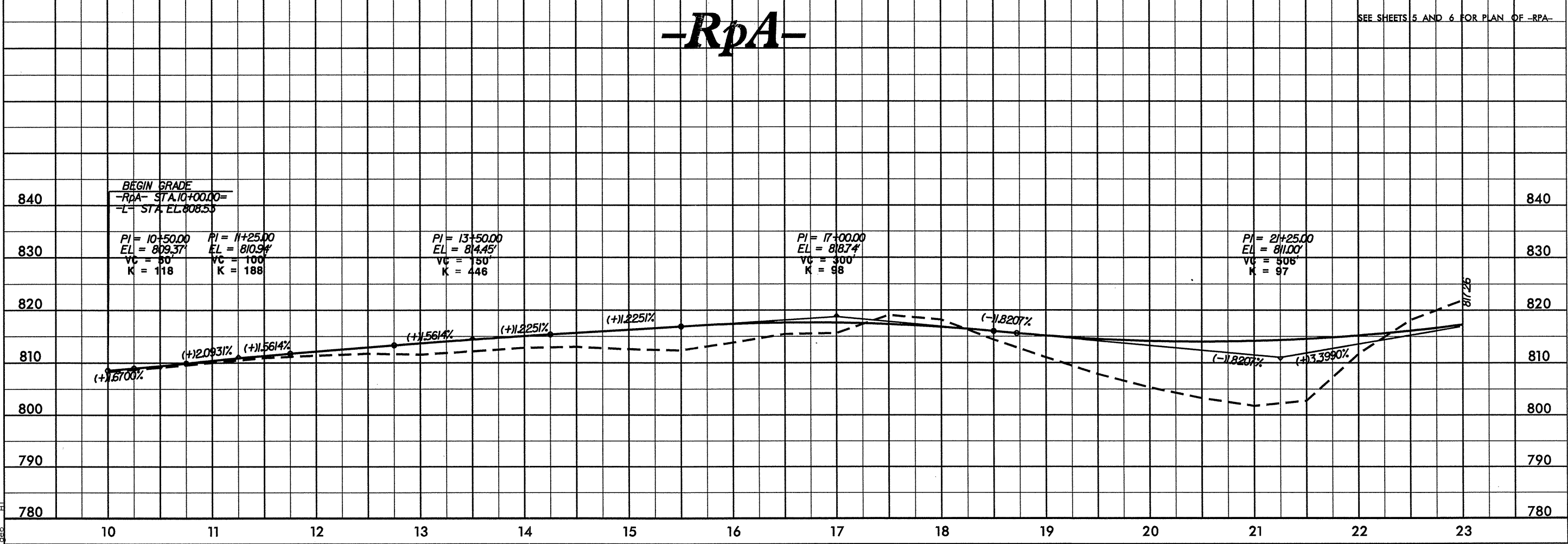
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
MS-1	50 RT	43+30	0.00-1.50											30.2	-
SS-1	50 RT	43+30	0.00-1.50	A-7-5(16)	60	16	4.3	30.4	39.1	26.3	100	99	76	-	-
SS-2	50 RT	43+30	4.30-5.80	A-7-5(20)	61	21	5.1	18.2	32.2	44.5	96	94	79	-	-
SS-3	50 RT	43+30	9.30-10.80	A-7-5(32)	70	38	14.0	11.7	19.6	54.7	100	91	77	-	-

-Y-



SEE SHEETS 5.11 AND 12 FOR PLAN OF -Y-

-RPA-



SEE SHEETS 5 AND 6 FOR PLAN OF -RPA-

04-SEP-2003 09:42
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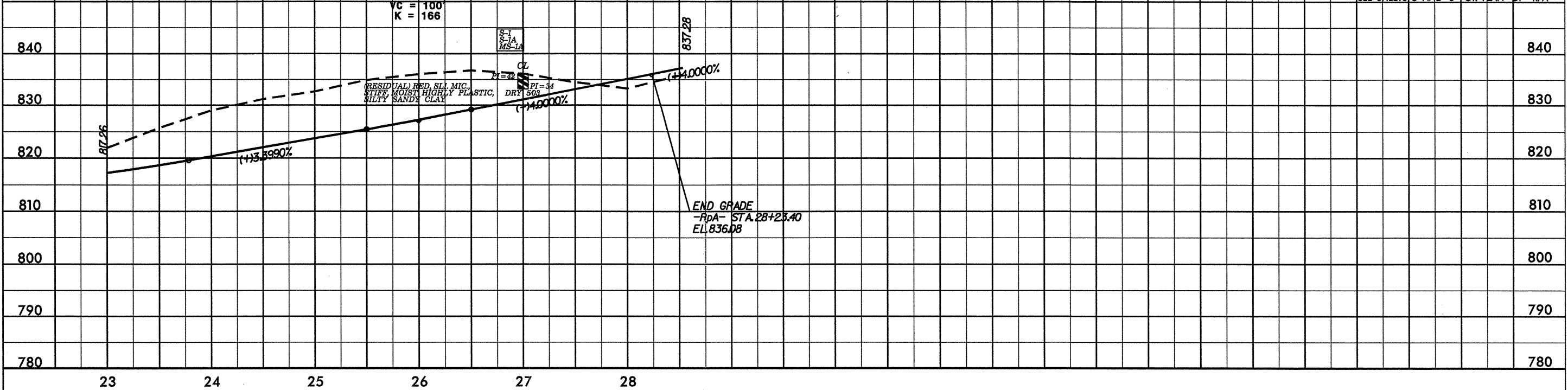
5/28/99

-RpA-

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

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	CL	27+00	0.00-2.00	A-7-5(42)	80	42	1.8	16.2	11.2	70.8	100	99	85	-	-
MS-1A	CL	27+00	0.00-3.00										30.8	-	
S-1A	CL	27+00	2.00-3.00	A-7-5(31)	72	34	2.6	22.9	15.9	58.6	100	99	78	-	-

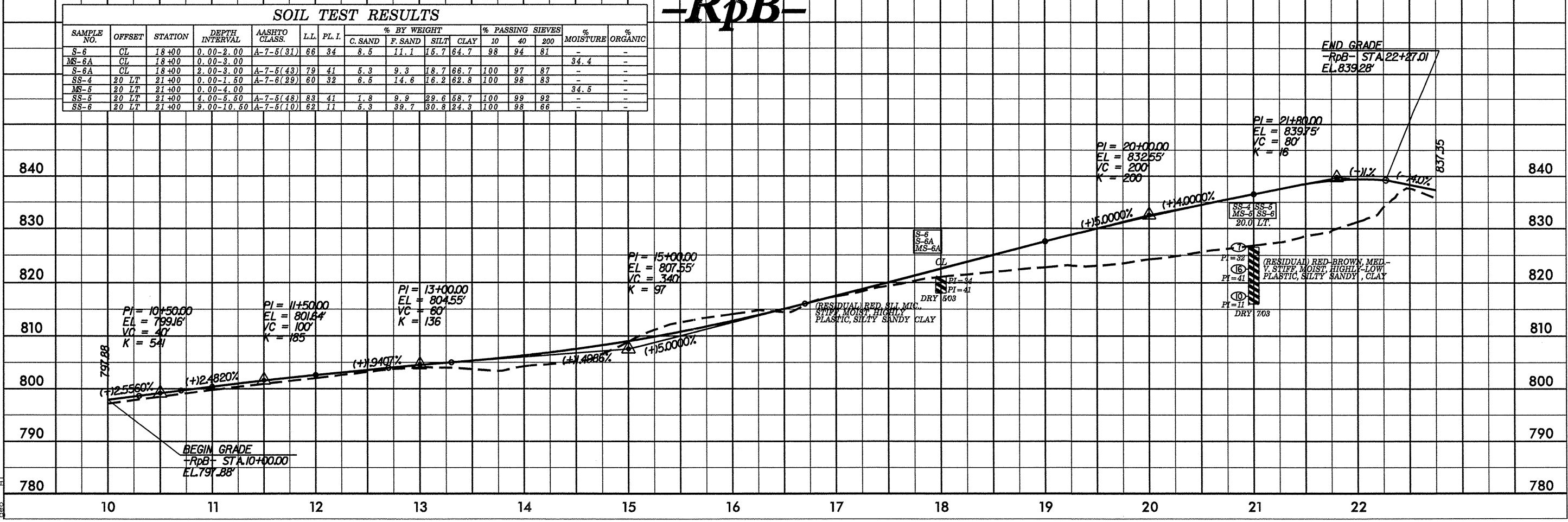
SEE SHEETS 5 AND 6 FOR PLAN OF -RPA-



-RpB-

SEE SHEET 5 FOR PLAN OF -RPB-

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-6	CL	18+00	0.00-2.00	A-7-5(31)	66	34	8.5	11.1	15.7	64.7	98	94	81	-	-
MS-6A	CL	18+00	0.00-3.00										34.4	-	
S-6A	CL	18+00	2.00-3.00	A-7-5(43)	79	41	5.3	9.3	18.7	66.7	100	97	87	-	-
SS-4	20 LT	21+00	0.00-1.50	A-7-6(29)	60	32	6.5	14.6	16.2	62.8	100	98	83	-	-
MS-5	20 LT	21+00	0.00-4.00										34.5	-	
SS-5	20 LT	21+00	4.00-5.50	A-7-5(48)	83	41	1.8	9.9	29.6	58.7	100	99	92	-	-
SS-6	20 LT	21+00	9.00-10.50	A-7-5(10)	62	11	5.3	39.7	30.8	24.3	100	98	66	-	-



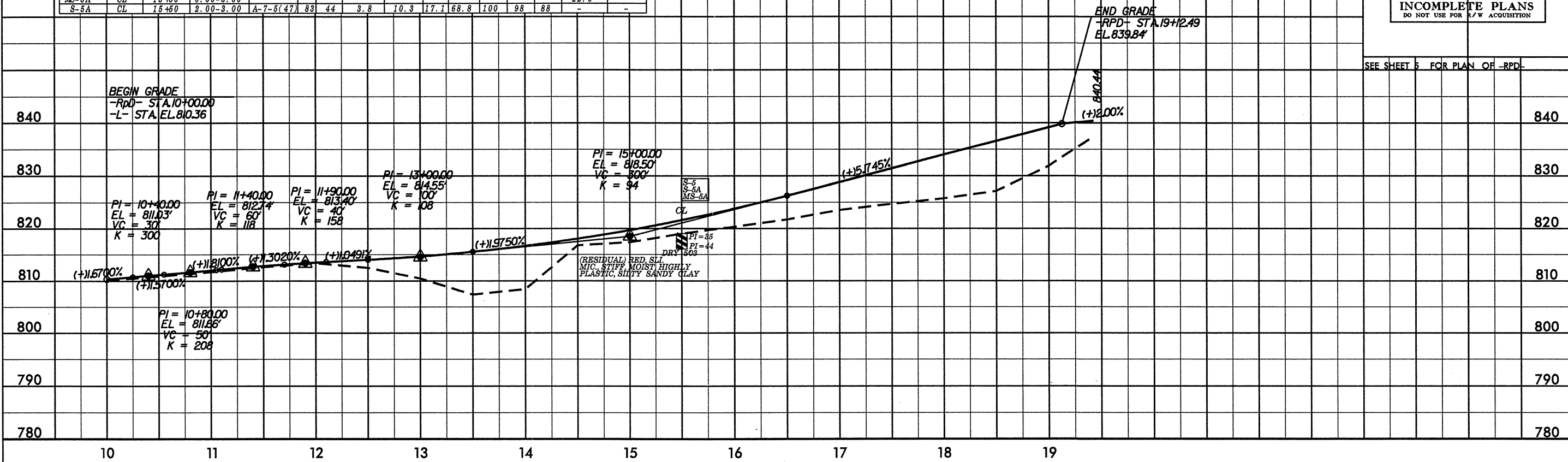
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 geo

5/28/99

PROJECT REFERENCE NO. 1-4411	SHEET NO. 78
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

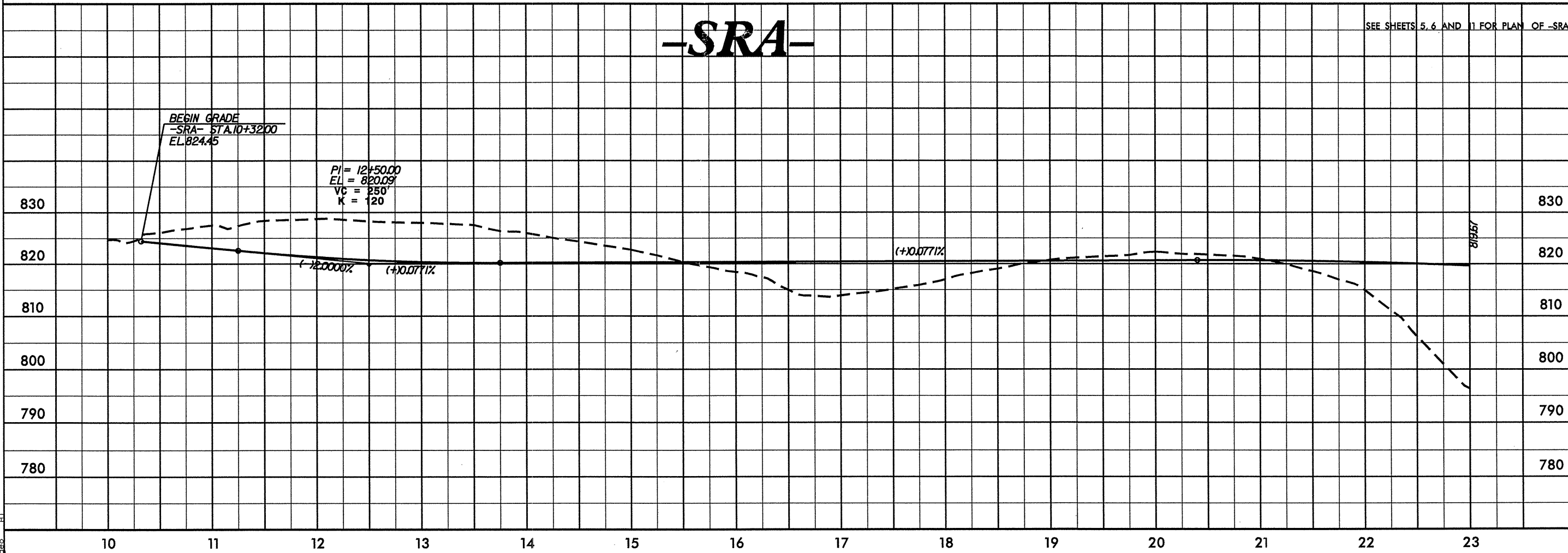
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-5	CL	15+60	0.00-2.00	A-7-5(34)	74	35	4.4	13.5	17.3	64.7	95	93	81	-	-
MS-5A	CL	15+60	0.00-3.00										22.6	-	
S-5A	CL	15+60	2.00-3.00	A-7-5(47)	83	44	3.8	10.3	17.1	68.8	100	98	88	-	-

-Rpd-



SEE SHEET 5 FOR PLAN OF -Rpd-

-SRA-



SEE SHEETS 5, 6 AND 11 FOR PLAN OF -SRA-

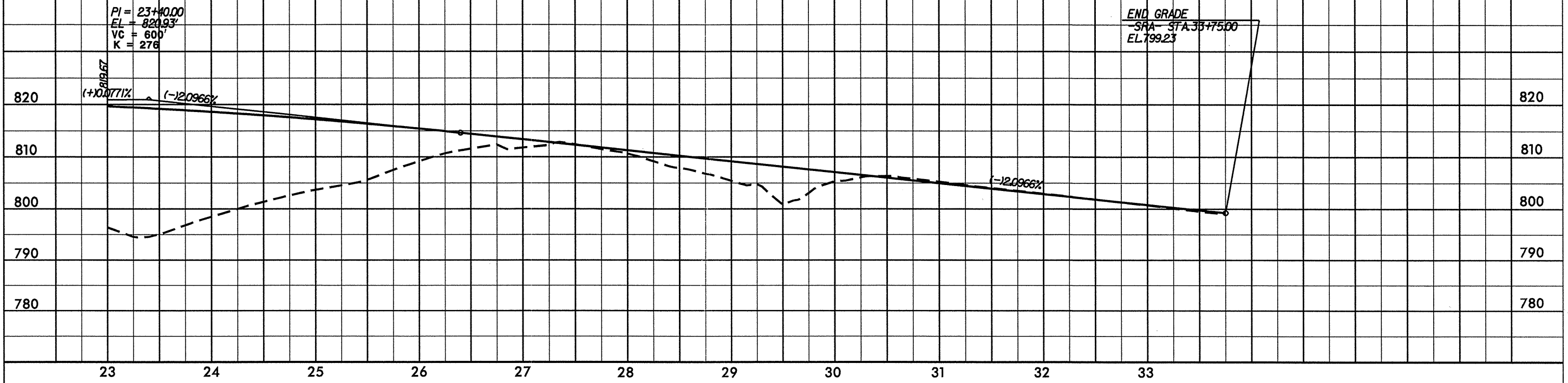
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5/28/99

-SRA-

PROJECT REFERENCE NO. 1-4411	SHEET NO. 18-9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

SEE SHEETS 5, 6 AND 11 FOR PLAN OF -SRA-

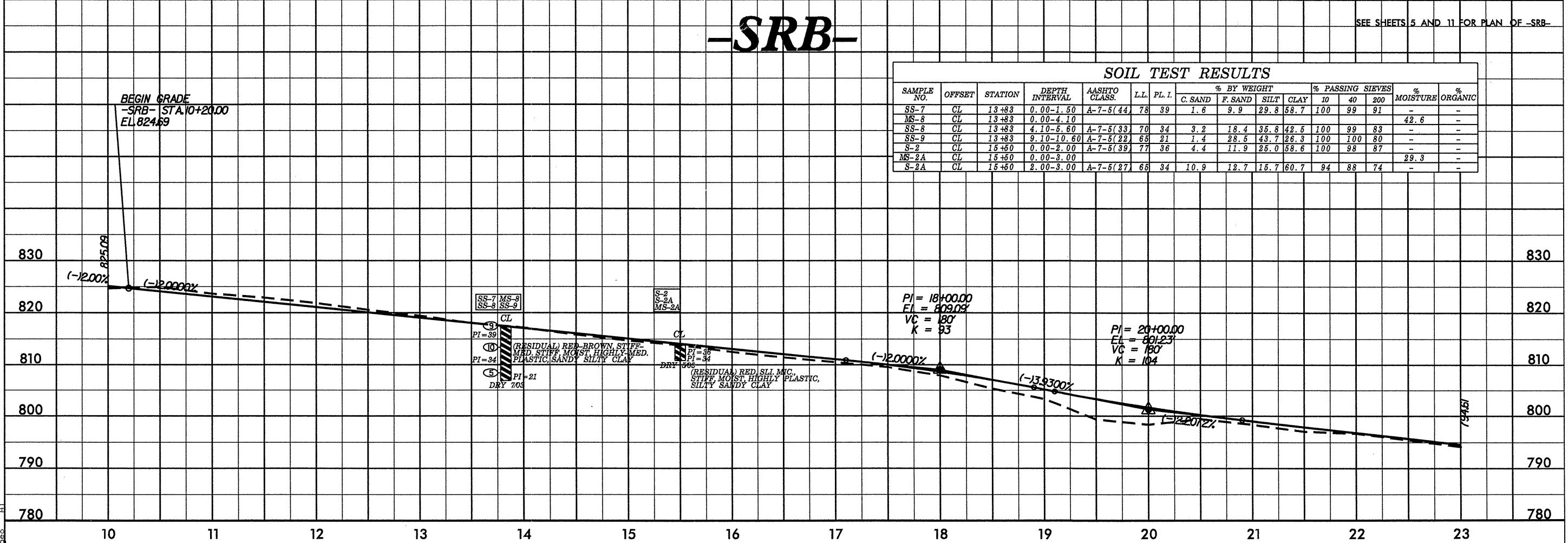


-SRB-

SEE SHEETS 5 AND 11 FOR PLAN OF -SRB-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PL I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-7	CL	13+83	0.00-1.50	A-7-5(44)	78	39	1.6	9.9	29.8	58.7	100	99	91	-	-
MS-8	CL	13+83	0.00-4.10											42.6	-
SS-8	CL	13+83	4.10-5.60	A-7-5(33)	70	34	3.2	18.4	35.8	42.6	100	99	83	-	-
SS-9	CL	13+83	9.10-10.60	A-7-5(22)	65	21	1.4	28.5	43.7	26.3	100	100	80	-	-
S-2	CL	15+50	0.00-2.00	A-7-5(39)	77	36	4.4	11.9	25.0	58.6	100	98	87	-	-
MS-2A	CL	15+50	0.00-3.00											29.3	-
S-2A	CL	15+50	2.00-3.00	A-7-5(27)	65	34	10.9	12.7	15.7	60.7	94	88	74	-	-

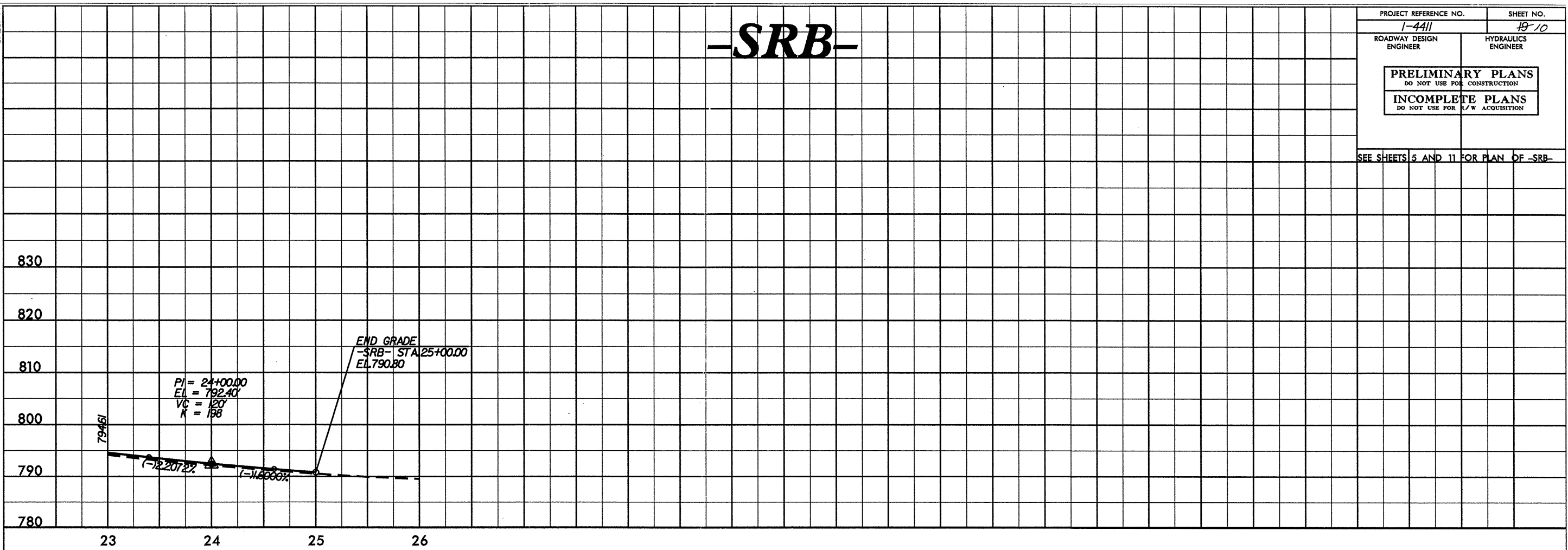


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5/28/99

-SRB-

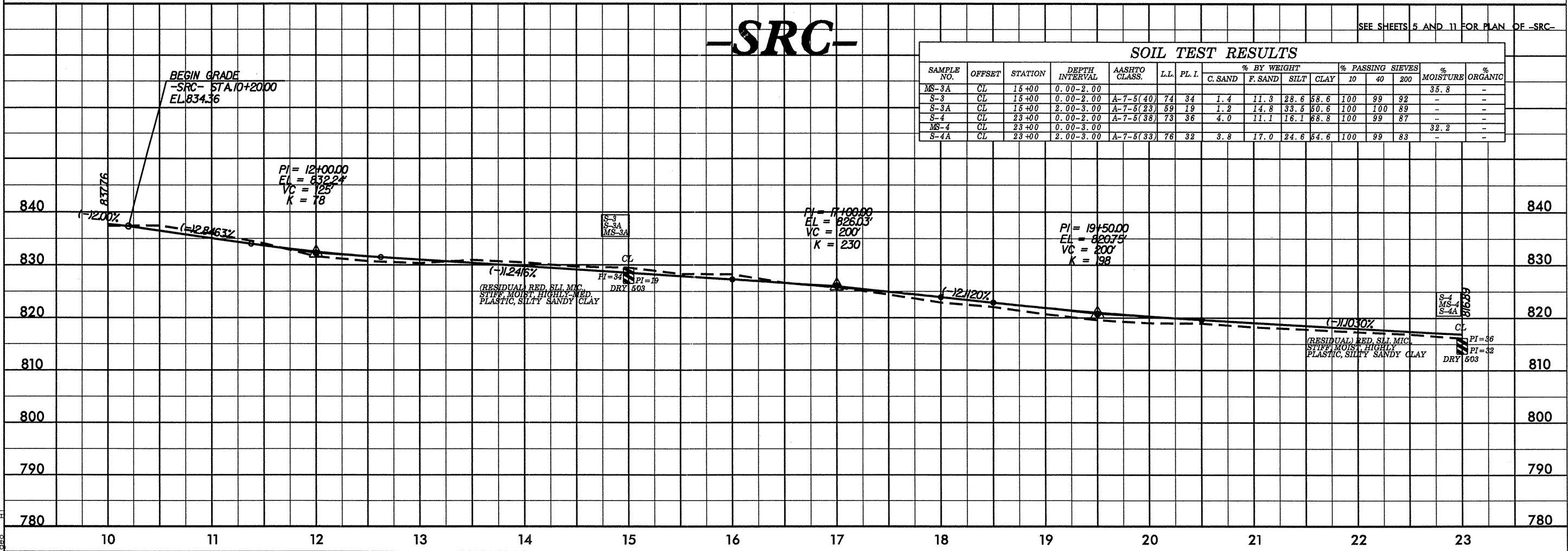
PROJECT REFERENCE NO. 1-4411	SHEET NO. 19/10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
SEE SHEETS 5 AND 11 FOR PLAN OF -SRB-	



SEE SHEETS 5 AND 11 FOR PLAN OF -SRC-

-SRC-

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
MS-3A	CL	15+00	0.00-2.00												
S-3	CL	15+00	0.00-2.00	A-7-5(40)	74	34	1.4	11.3	28.6	58.6	100	99	92	35.8	-
S-3A	CL	15+00	2.00-3.00	A-7-5(23)	69	19	1.2	14.8	33.6	60.6	100	100	89	-	-
S-4	CL	23+00	0.00-2.00	A-7-5(38)	73	36	4.0	11.1	16.1	68.8	100	99	87	-	-
MS-4	CL	23+00	0.00-3.00												
S-4A	CL	23+00	2.00-3.00	A-7-5(33)	76	32	3.8	17.0	24.6	64.6	100	99	83	-	-



04-SEP-2003 09:47
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