

**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

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

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3100B	1	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34522.1.4	STP-16(4)	P.E.	
		RAW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	15+35.00 to 198+28.48	4-17	18-24	
-Y2-	12+00.00 to 14+00.00	6	25	
-Y3-	13+20.00 to 17+20.30	6	25	
-Y4-	10+00.00 to 13+20.00	7	25	
-Y5-	11+00.00 to 15+00.91	9	25	
-Y6-	10+00.00 to 13+39.00	9	25	
-Y7-	10+00.00 to 13+00.00	10	26	
-Y8-	10+00.00 to 13+84.00	12	26	
-Y9-	12+61.00 to 14+11.71	13	26	
-Y10-	10+19.00 to 13+19.41	14	26	
-Y11-	10+00.00 to 14+63.00	15	26	
-Y12-	10+06.00 to 18+56.24	15	27	
SAMPLE RESULTS		28		

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34522.1.4 (R-3100B) F.A. PROJ. STP-16(4)
COUNTY CATAWBA
PROJECT DESCRIPTION NC 16 NORTH OF SR 1801 (CLAREMONT RD.)
AND NORTH OF SR 1814 (CALDWELL RD.)

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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.

CONTRACT: ID: R-3100B

PERSONNEL
J.K. STICKNEY

C.L. SMITH

INVESTIGATED BY J.E. BEVERLY

CHECKED BY C.B. LITTLE

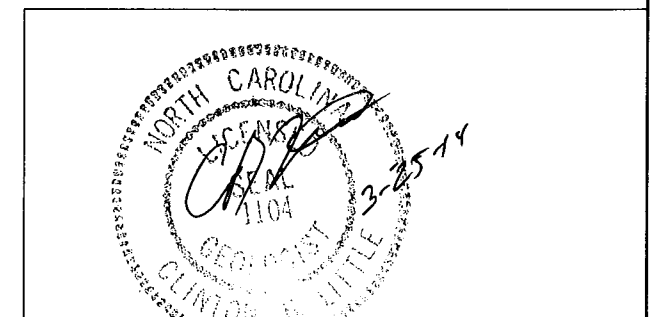
SUBMITTED BY C.B. LITTLE

DATE JANUARY 2014

DRAWN BY: J.K. McCLURE

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

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



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 34522.1.4 (R-3100B)	SHEET NO. 2
--	----------------

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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6		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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPON 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:		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, 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 DISCLOSED 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 IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. 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.																																																																																																																																																																	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th colspan="3"></th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> </tr> <tr> <th>LIQUID LIMIT (PL)</th> <td>≤ 5</td> <td>≤ 10</td> <td>≤ 15</td> <td>≤ 20</td> <td>≤ 25</td> <td>≤ 30</td> <td>≤ 35</td> <td>≤ 40</td> <td>≤ 45</td> <td>≤ 50</td> <td>≤ 55</td> <td>≤ 60</td> <td>≤ 65</td> <td>≤ 70</td> </tr> <tr> <th>PLASTIC INDEX (PI)</th> <td>≤ 4</td> <td>≤ 7</td> <td>≤ 10</td> <td>≤ 13</td> <td>≤ 16</td> <td>≤ 19</td> <td>≤ 22</td> <td>≤ 25</td> <td>≤ 28</td> <td>≤ 31</td> <td>≤ 34</td> <td>≤ 37</td> <td>≤ 40</td> <td>≤ 43</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">FINE SAND</td> <td colspan="2">SILTY SAND</td> <td colspan="2">SANDY SILT</td> <td colspan="2">SILT</td> <td colspan="2">CLAYEY SILT</td> <td colspan="2">CLAY</td> <td colspan="2">MUCK, PEAT</td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td colspan="3">FAIR TO POOR</td> <td colspan="3">POOR</td> <td colspan="3">UNSATURABLE</td> </tr> </table>		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				SYMBOL															% PASSING	100	100	100	100	100	100	100	100	100	100	100	100	100	100	LIQUID LIMIT (PL)	≤ 5	≤ 10	≤ 15	≤ 20	≤ 25	≤ 30	≤ 35	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	PLASTIC INDEX (PI)	≤ 4	≤ 7	≤ 10	≤ 13	≤ 16	≤ 19	≤ 22	≤ 25	≤ 28	≤ 31	≤ 34	≤ 37	≤ 40	≤ 43	USUAL TYPES OF MAJOR MATERIALS	FINE SAND		SILTY SAND		SANDY SILT		SILT		CLAYEY SILT		CLAY		MUCK, PEAT		GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR			POOR			UNSATURABLE			MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">COMPRESSIBILITY</th> </tr> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 31</td> <td>LIQUID LIMIT EQUAL TO 31-50</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td></td> <td></td> <td></td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td></td> <td></td> <td></td> </tr> </table>		COMPRESSIBILITY				SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	LIQUID LIMIT EQUAL TO 31-50	LIQUID LIMIT GREATER THAN 50	MODERATELY COMPRESSIBLE				HIGHLY COMPRESSIBLE				<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">PERCENTAGE OF MATERIAL</th> </tr> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table>		PERCENTAGE OF MATERIAL				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY
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																																																																																																																																																												
SYMBOL																																																																																																																																																																							
% PASSING	100	100	100	100	100	100	100	100	100	100	100	100	100	100																																																																																																																																																									
LIQUID LIMIT (PL)	≤ 5	≤ 10	≤ 15	≤ 20	≤ 25	≤ 30	≤ 35	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70																																																																																																																																																									
PLASTIC INDEX (PI)	≤ 4	≤ 7	≤ 10	≤ 13	≤ 16	≤ 19	≤ 22	≤ 25	≤ 28	≤ 31	≤ 34	≤ 37	≤ 40	≤ 43																																																																																																																																																									
USUAL TYPES OF MAJOR MATERIALS	FINE SAND		SILTY SAND		SANDY SILT		SILT		CLAYEY SILT		CLAY		MUCK, PEAT																																																																																																																																																										
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR			POOR			UNSATURABLE																																																																																																																																																										
COMPRESSIBILITY																																																																																																																																																																							
SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	LIQUID LIMIT EQUAL TO 31-50	LIQUID LIMIT GREATER THAN 50																																																																																																																																																																				
MODERATELY COMPRESSIBLE																																																																																																																																																																							
HIGHLY COMPRESSIBLE																																																																																																																																																																							
PERCENTAGE OF MATERIAL																																																																																																																																																																							
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																																				
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE																																																																																																																																																																				
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE																																																																																																																																																																				
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME																																																																																																																																																																				
HIGHLY ORGANIC	>10%	>20%	HIGHLY																																																																																																																																																																				
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS		ROCK HARDNESS																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TDNS/F²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td><4 4 TO 10 10 TO 30 30 TO 50 >50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td><2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30</td> <td><0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4</td> </tr> </table>		PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TDNS/F 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 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td></td> <td>SOIL SYMBOL</td> <td></td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td></td> <td>INFERRED SOIL BOUNDARY</td> <td></td> <td>INFERRED ROCK LINE</td> <td></td> <td>ALLUVIAL SOIL BOUNDARY</td> <td></td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> </tr> <tr> <td></td> <td>TEST BORING</td> <td></td> <td>AUGER BORING</td> <td></td> <td>CORE BORING</td> <td></td> <td>MONITORING WELL</td> <td></td> <td>PIEZOMETER INSTALLATION</td> <td></td> <td>SLOPE INDICATOR INSTALLATION</td> <td></td> <td>CONE PENETROMETER TEST</td> </tr> <tr> <td></td> <td>SOUNDING ROD</td> <td></td> <td>SPT N-VALUE</td> <td></td> <td>SPT REFUSAL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>			ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		SOIL SYMBOL		ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		INFERRED SOIL BOUNDARY		INFERRED ROCK LINE		ALLUVIAL SOIL BOUNDARY		DIP & DIP DIRECTION OF ROCK STRUCTURES		TEST BORING		AUGER BORING		CORE BORING		MONITORING WELL		PIEZOMETER INSTALLATION		SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST		SOUNDING ROD		SPT N-VALUE		SPT REFUSAL								<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">VERY HARD</th> <th colspan="2">HARD</th> <th colspan="2">MODERATELY HARD</th> <th colspan="2">SOFT</th> <th colspan="2">VERY SOFT</th> </tr> <tr> <td>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</td> <td>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</td> <td>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.</td> <td>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.</td> <td>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.</td> <td>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		VERY HARD		HARD		MODERATELY HARD		SOFT		VERY SOFT		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	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.	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.	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.	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																																																																																													
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TDNS/F 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 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4																																																																																																																																																																				
	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		SOIL SYMBOL		ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		INFERRED SOIL BOUNDARY		INFERRED ROCK LINE		ALLUVIAL SOIL BOUNDARY		DIP & DIP DIRECTION OF ROCK STRUCTURES																																																																																																																																																										
	TEST BORING		AUGER BORING		CORE BORING		MONITORING WELL		PIEZOMETER INSTALLATION		SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST																																																																																																																																																										
	SOUNDING ROD		SPT N-VALUE		SPT REFUSAL																																																																																																																																																																		
VERY HARD		HARD		MODERATELY HARD		SOFT		VERY SOFT																																																																																																																																																															
CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	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.	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.	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.	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.																																																																																																																																																																		
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		FRACTURE SPACING		BEDDING																																																																																																																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>U.S. STD. SIEVE SIZE</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th>OPENING (MM)</th> <td>4.76</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>COBBLE (COB.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GRAVEL (GR.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>COARSE SAND (CS.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>FINE SAND (FS.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>SILT (SL.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>CLAY (CL.)</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		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 (CS.)							FINE SAND (FS.)							SILT (SL.)							CLAY (CL.)							<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MICA - MICA</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>MOD. - MODERATELY</td> <td>W - UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>NP - NON PLASTIC</td> <td>W_s - DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAMPLE ABBREVIATIONS</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SAP. - SAPROLITIC</td> <td>S - BULK</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SD. - SAND, SANDY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>F - FINE</td> <td>SL. - SILT, SILTY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>FDSS. - FOSSILIFEROUS</td> <td>SLI. - SLIGHTLY</td> <td>RS - ROCK</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>TCR - TRICONE REFUSAL</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>w - MOISTURE CONTENT</td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>HI. - HIGHLY</td> <td></td> <td></td> </tr> </table>		AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST	BT - BORING TERMINATED	MICA - MICA	WEA. - WEATHERED	CL - CLAY	MOD. - MODERATELY	W - UNIT WEIGHT	CPT - CONE PENETRATION TEST	NP - NON PLASTIC	W _s - DRY UNIT WEIGHT	CSE - COARSE	ORG. - ORGANIC		DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS	DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK	e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON	F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE	FDSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK	FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL	FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO	HI. - HIGHLY			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">VERY WIDE</th> <th colspan="2">WIDE</th> <th colspan="2">MODERATELY CLOSE</th> <th colspan="2">CLOSE</th> <th colspan="2">VERY CLOSE</th> </tr> <tr> <td>MORE THAN 10 FEET</td> <td>3 TO 10 FEET</td> <td>1 TO 3 FEET</td> <td>0.16 TO 1 FEET</td> <td>LESS THAN 0.16 FEET</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		VERY WIDE		WIDE		MODERATELY CLOSE		CLOSE		VERY CLOSE		MORE THAN 10 FEET	3 TO 10 FEET	1 TO 3 FEET	0.16 TO 1 FEET	LESS THAN 0.16 FEET						<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">TERM</th> <th colspan="2">THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		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																						
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 (CS.)																																																																																																																																																																							
FINE SAND (FS.)																																																																																																																																																																							
SILT (SL.)																																																																																																																																																																							
CLAY (CL.)																																																																																																																																																																							
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST																																																																																																																																																																					
BT - BORING TERMINATED	MICA - MICA	WEA. - WEATHERED																																																																																																																																																																					
CL - CLAY	MOD. - MODERATELY	W - UNIT WEIGHT																																																																																																																																																																					
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	W _s - DRY UNIT WEIGHT																																																																																																																																																																					
CSE - COARSE	ORG. - ORGANIC																																																																																																																																																																						
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS																																																																																																																																																																					
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK																																																																																																																																																																					
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON																																																																																																																																																																					
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE																																																																																																																																																																					
FDSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK																																																																																																																																																																					
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL																																																																																																																																																																					
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO																																																																																																																																																																					
HI. - HIGHLY																																																																																																																																																																							
VERY WIDE		WIDE		MODERATELY CLOSE		CLOSE		VERY CLOSE																																																																																																																																																															
MORE THAN 10 FEET	3 TO 10 FEET	1 TO 3 FEET	0.16 TO 1 FEET	LESS THAN 0.16 FEET																																																																																																																																																																			
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																																																																																																																																																																				
PLASTICITY		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NONPLASTIC</th> <th>LOW PLASTICITY</th> <th>MED. PLASTICITY</th> <th>HIGH PLASTICITY</th> </tr> <tr> <td>0-5</td> <td>6-15</td> <td>16-25</td> <td>26 OR MORE</td> </tr> <tr> <td>VERY LOW</td> <td>SLIGHT</td> <td>MEDIUM</td> <td>HIGH</td> </tr> </table>		NONPLASTIC	LOW PLASTICITY	MED. PLASTICITY	HIGH PLASTICITY	0-5	6-15	16-25	26 OR MORE	VERY LOW	SLIGHT	MEDIUM	HIGH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">DRILL UNITS:</th> <th colspan="2">ADVANCING TOOLS:</th> <th colspan="2">HAMMER TYPE:</th> </tr> <tr> <td><input type="checkbox"/> MOBILE B-</td> <td><input type="checkbox"/> BK-51</td> <td><input type="checkbox"/> CME-45C</td> <td><input checked="" type="checkbox"/> CME-55B</td> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:		<input type="checkbox"/> MOBILE B-	<input type="checkbox"/> BK-51	<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> CME-55B	<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.																																																																																																																										
NONPLASTIC	LOW PLASTICITY	MED. PLASTICITY	HIGH PLASTICITY																																																																																																																																																																				
0-5	6-15	16-25	26 OR MORE																																																																																																																																																																				
VERY LOW	SLIGHT	MEDIUM	HIGH																																																																																																																																																																				
DRILL UNITS:		ADVANCING TOOLS:		HAMMER TYPE:																																																																																																																																																																			
<input type="checkbox"/> MOBILE B-	<input type="checkbox"/> BK-51	<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> CME-55B	<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/>																																																																																																																																																																		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																		
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.																																																																																																																																																																						
COLOR		FRACURE SPACING		INDURATION																																																																																																																																																																			
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.		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FRACURE SPACING</th> <th colspan="2">BEDDING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		FRACURE SPACING		BEDDING		VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">INDURATION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		INDURATION		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.																																																																																																																												
FRACURE SPACING		BEDDING																																																																																																																																																																					
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																																																																																																				
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																				
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																				
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																				
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																				
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																				
INDURATION																																																																																																																																																																							
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.																																																																																																																																																																						
PLASTICITY		FRACURE SPACING		INDURATION																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>VERY LOW</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>MEDIUM</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		PLASTICITY INDEX (PI)		DRY STRENGTH		0-5	VERY LOW	6-15	SLIGHT	16-25	MEDIUM	26 OR MORE	HIGH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FRACURE SPACING</th> <th colspan="2">BEDDING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		FRACURE SPACING		BEDDING		VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">INDURATION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		INDURATION		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.																																																																																																																
PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																					
0-5	VERY LOW	6-15	SLIGHT																																																																																																																																																																				
16-25	MEDIUM	26 OR MORE	HIGH																																																																																																																																																																				
FRACURE SPACING		BEDDING																																																																																																																																																																					
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																																																																																																				
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																				
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																				
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																				
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																				
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																				
INDURATION																																																																																																																																																																							
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.																																																																																																																																																																						
PLASTICITY		FRACURE SPACING		INDURATION																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>VERY LOW</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>MEDIUM</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		PLASTICITY INDEX (PI)		DRY STRENGTH		0-5	VERY LOW	6-15	SLIGHT	16-25	MEDIUM	26 OR MORE	HIGH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FRACURE SPACING</th> <th colspan="2">BEDDING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		FRACURE SPACING		BEDDING		VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">INDURATION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		INDURATION		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.																																																																																																																
PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																					
0-5	VERY LOW	6-15	SLIGHT																																																																																																																																																																				
16-25	MEDIUM	26 OR MORE	HIGH																																																																																																																																																																				
FRACURE SPACING		BEDDING																																																																																																																																																																					
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																																																																																																				
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																				
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																				
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																				
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																				
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																				
INDURATION																																																																																																																																																																							
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.																																																																																																																																																																						
PLASTICITY		FRACURE SPACING		INDURATION																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>VERY LOW</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>MEDIUM</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		PLASTICITY INDEX (PI)		DRY STRENGTH		0-5	VERY LOW	6-15	SLIGHT	16-25	MEDIUM	26 OR MORE	HIGH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FRACURE SPACING</th> <th colspan="2">BEDDING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		FRACURE SPACING		BEDDING		VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">INDURATION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table>		INDURATION		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.																																																																																																																
PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																					
0-5	VERY LOW	6-15	SLIGHT																																																																																																																																																																				
16-25	MEDIUM	26 OR MORE	HIGH																																																																																																																																																																				
FRACURE SPACING		BEDDING																																																																																																																																																																					
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																																																																																																				
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																				
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																				
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																				
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																				
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																				
INDURATION																																																																																																																																																																							
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.																																																																																																																																																																						
PLASTICITY		FRACURE SPACING		INDURATION																																																																																																																																																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">PLASTICITY INDEX (PI)</th> <th colspan="2">DRY STRENGTH</th> </tr> <tr> <td>0-5</td> <td>VERY LOW</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>16-25</td> <td>MEDIUM</td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>		PLASTICITY INDEX (PI)		DRY STRENGTH		0-5	VERY LOW	6-15	SLIGHT	16-25	MEDIUM	26 OR MORE	HIGH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">FRACURE SPACING</th> <th colspan="2">BEDDING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		FRACURE SPACING		BEDDING		VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">INDURATION</th> </tr> <tr> <td>FRIABLE</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; G</td></tr></table>		INDURATION		FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; G																																																																																																																						
PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																					
0-5	VERY LOW	6-15	SLIGHT																																																																																																																																																																				
16-25	MEDIUM	26 OR MORE	HIGH																																																																																																																																																																				
FRACURE SPACING		BEDDING																																																																																																																																																																					
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																																																																																																				
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																																																																																																				
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																																																																																																				
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																																																																																																				
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																																																																																																				
		THINLY LAMINATED	< 0.008 FEET																																																																																																																																																																				
INDURATION																																																																																																																																																																							
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; G																																																																																																																																																																						

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

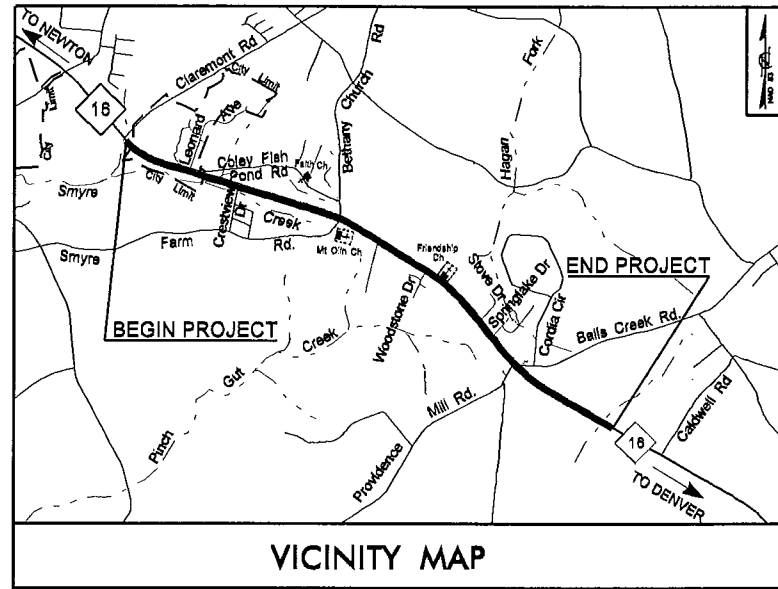
CATAWBA COUNTY

**LOCATION: NC 16 NORTH OF SR 1801 (CLAREMONT RD) AND
NORTH OF SR 1814 (CALDWELL RD)**

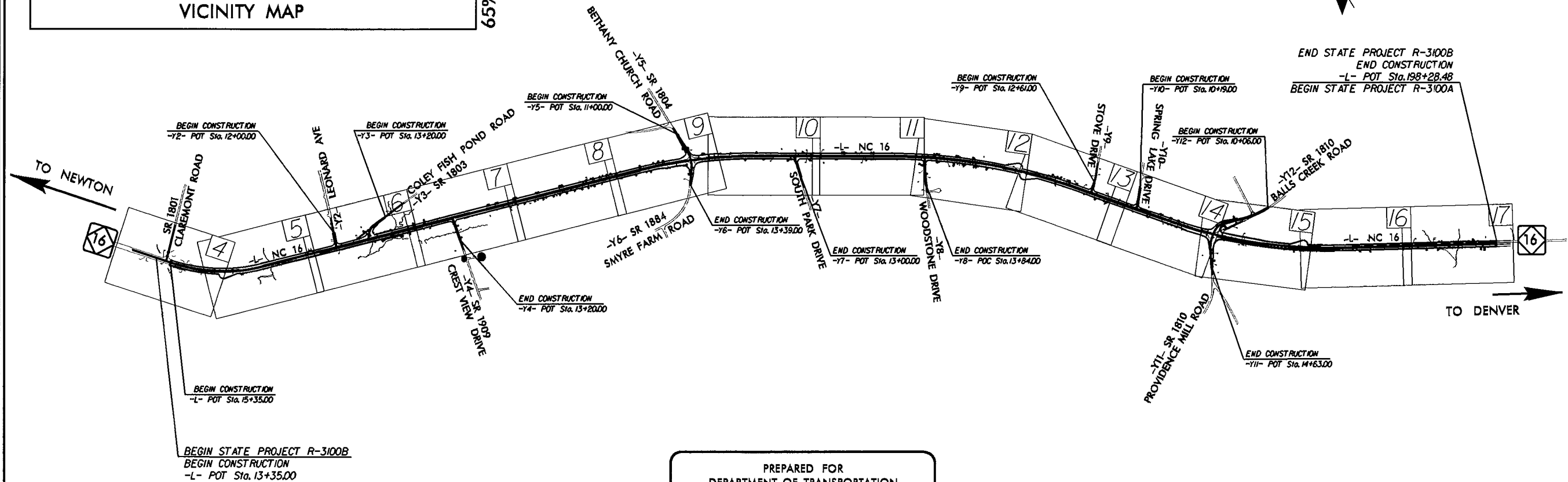
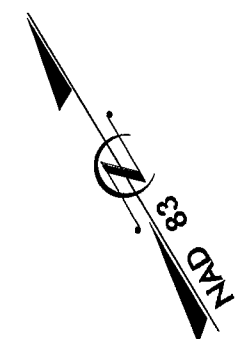
TYPE OF WORK: GRADING, DRAINAGE, PAVING & SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3100B	2A	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34522.1.4	STP-16(4)	PE	

TIP PROJECT: R-3100B



65% SUBMITTAL



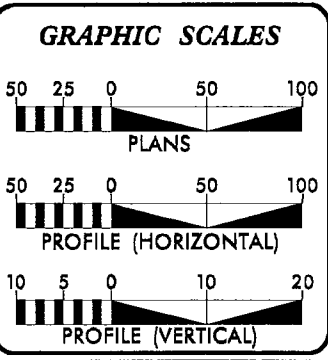
PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC

NCDOT CONTACT: Brenda Moore, PE, CPM

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

CONTRACT:



DESIGN DATA

ADT 2016 =	13,050
ADT 2036 =	20,200
DHV =	10 %
D =	65 %
T =	9 % *
V =	50 MPH
*(TTST 4% + DUAL 5%)	
FUNC CL =	RURAL ARTERIAL
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3100B =	3.46 Miles
TOTAL LENGTH TIP PROJECT R-3100B =	3.46 Miles

Prepared in the Office of:
URS
URS Corporation - North Carolina
1400 Perimeter Park Drive
Marraville, North Carolina 27560
TELEPHONE (919) 461-1100 FAX (919) 461-1415
NC LICENSE # C-2203

2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	EDWARD G. EDENS, PE PROJECT ENGINEER
JANUARY 17, 2014	
LETTING DATE:	JEFFREY R. HEXT PROJECT DESIGN ENGINEER
JANUARY 19, 2016	

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

February 5, 2014

STATE PROJECT: 34522.1.4 (R-3100B)
F.A. PROJECT: STP-16(4)
COUNTY: Catawba
DESCRIPTION: NC 16 from North of SR 1801 (Claremont Rd.) and North of SR 1814 (Caldwell Rd.)

SUBJECT: Geotechnical Report – Inventory

This report presents the findings for the proposed multi-lane widening of NC 16 in Catawba County. Beginning and ending station limits for this section of the project are from -L- Sta. 15+35 to 198+28.48. The project begins very close to the intersection of NC 16 and Claremont Rd. and trends southeasterly for 3.46 miles before ending north of Caldwell Rd.

The geotechnical field investigation was conducted in the months of July and October of 2013. An ATV mounted CME 550X drill machine equipped with automatic drop hammer was utilized to perform test boring along the proposed corridor. The following survey lines are addressed in this report.

Line	Station
-L-	15+35 – 198+28.48
-Y2-	12+00 – 14+00
-Y3-	13+20 – 17+20.30
-Y4-	10+00 – 13+20
-Y5-	11+00 – 15+00.91
-Y6-	10+00 – 13+39.00
-Y7-	10+00 – 13+00
-Y8-	10+00 – 13+84
-Y9-	12+61 – 14+11.71
-Y10-	10+19 – 13+19.41
-Y11-	10+00 – 14+63
-Y12-	10+06 – 18+56.24

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
DIRECTOR OF PRECONSTRUCTION
1538 MAIL SERVICE CENTER
RALEIGH NC 27699-1538

TELEPHONE: 919-707-2540
FAX: 919-715-5361
WEBSITE: WWW.NCDOT.GOV

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

Areas of Special Geotechnical Interest:

1. *Groundwater:*

Groundwater was only encountered in alluvial areas during the course of this investigation. The following is a list of those locations:

-L- Station / Offset	Relationship of groundwater to proposed grade
29+00, 94' RT	below grade
42+96, 72' RT	below grade
193+10, 44' RT	below grade

2. *Crystalline Rock:*

Rock was not encountered during the course of this investigation.

3. *High PI Soils: (PI's 28 and greater)*

High PI clay soils occur sporadically along the project corridor. Borings in the following locations encountered high PI clay soils that are shown to be, or likely to be, within 3 feet of proposed grade.

Station / Offset	AASHTO Soil Type	PI Value
-L- 26+60, 62' LT	A-7-5	36
-L- 65+88, 44' LT	A-7-5	35
-L- 69+00, 53' LT	A-7-5	29
-L- 91+60, 50' RT	A-7-5	32
-L- 129+80, 110' LT	A-7-5	47
-L- 132+10, 105' LT	A-7-5	35
-L- 145+05, 33' RT	A-7-5	31
-L- 148+18, 52' RT	A-7-5	49
-L- 169+43, 43' LT	A-7-5	42
-Y6- 11+69, 35' LT	A-7-5	31

4. *Alluvial Soils:*

Alluvial soils occur sporadically along the project corridor. They are the result of small creeks and drainage features that are mostly of little concern. Known alluvial soils types are very soft to soft clayey sandy silt (A-4, A-5), and very loose to loose silty sand (A-2-4). Measured thicknesses ranged from 2' to 9'.

Physiography / Geology:

The project area is in rural southeastern Catawba County between the cities of Newton and Denver. Topography is flat to rolling and traverses along woods, open fields, and residential structures.

Geologically the site lies in the Inner Piedmont and Kings Mountain Belt with micaceous residual soil types originating predominantly from mica schist (CZms) parent rock.

Soil Properties:

1. *Residual Soils:*

These soils are derived from in place weathering of parent materials. They occur in a variety of consistencies, classifications, and stratigraphic sequences. Residual soils are further subdivided into clays, silts, and sands. In most instances residual soils in this area are micaceous with mica amounts ranging from trace to high.

Clays are a prominent soil type along the project corridor. They are found as surface soils and subsoils. Typically they consist of medium stiff to very stiff sandy silty and/or silty sandy clay in the AASHTO classifications of A-7-5, A-7-6, and A-6. Clay soils appear well drained with a plasticity index ranging from 11 to 49. Corresponding liquid limit ranges are between 33 and 88.

Silts are also common and typically consist of medium stiff to very stiff clayey sandy silt. AASHTO classifications are A-4, and A-5. Silts may occur at all depth ranges.

Sands also occur throughout the project corridor at varying depths in the stratigraphic sequence. Sands are typically described as loose to very dense silty sand with AASHTO classifications of A-2-4, A-2-5 and A-1-b.

2. *Alluvial Soils:*

Alluvial soils originate from water transportation and deposition in a floodplain environment. Alluvial deposits along the project corridor are limited to creeks and drainage features. They are typically shallow with known soil types of very soft clayey sandy silt (A-4), loose silty sand (A-2-4), and soft sandy clayey silt (A-5).

3. *Fill Soils:*

Roadway embankment fill soils are present beneath existing NC 16 and its connectors. Roadway fill soils are likely comprised of medium stiff silty sandy clay (A-7, A-6), and medium stiff sandy silt (A-4).

Wells:

The vast majority of residential and business structures along the project corridor rely on well water. There were a number of discovered wells which lie within construction limits, and others in between construction and proposed right of way. In some instances construction limits and right of way boundaries will result in the loss of the primary residence or business structure leaving an abandoned well outside proposed DOT limits. The following list is of wells that are

known to exist in each of these instances. It is possible that there are additional wells that went undetected during our investigation.

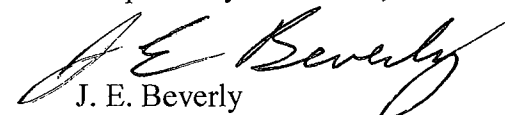
Well Station Location	Notes (ie. within construction limits, etc.)
RT of 55+80 -L-	House likely condemned, well outside R/W
RT of 66+20 -L-	Well within R/W
RT of 73+00 -L-	Well within R/W
LT of 77+20 -L-	Well within R/W
RT of 149+20 -L-	Condemned/Abandoned Gas Station, well outside R/W
LT of 11+50 -Y11-	Well within R/W
LT of 163+95 -L-	Well within construction limits
RT of 181+45 -L-	House likely condemned, well outside R/W
RT of 195+75 -L-	House likely condemned, well location unknown
RT of 196+90 -L-	House likely condemned, well outside R/W

Culverts:

There are 2 proposed culvert extensions and 1 culvert relocation along this section of NC 16. A single boring was performed on the outlet side of each culvert location. Vicinity soils in locations #1 and #3 consisted of 2 – 7' of alluvium in the form of very soft to soft clayey sandy silt (A-4, A-5) overlying residual loose to medium dense silty fine to coarse sand (A-2-4, A-1-b) with mica. In location #2 soils consist of 2' of alluvial soft clayey sandy silt (A-5) overlying residual soft to medium stiff clayey sandy silt (A-5) with mica. Culvert locations 1-3 are as follows:

- 1) -L- 29+00
- 2) -L- 43+60
- 3) -L- 193+00

Respectfully Submitted,

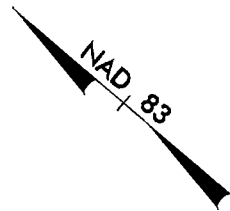

J. E. Beverly
Project Engineering Geologist

8/17/99

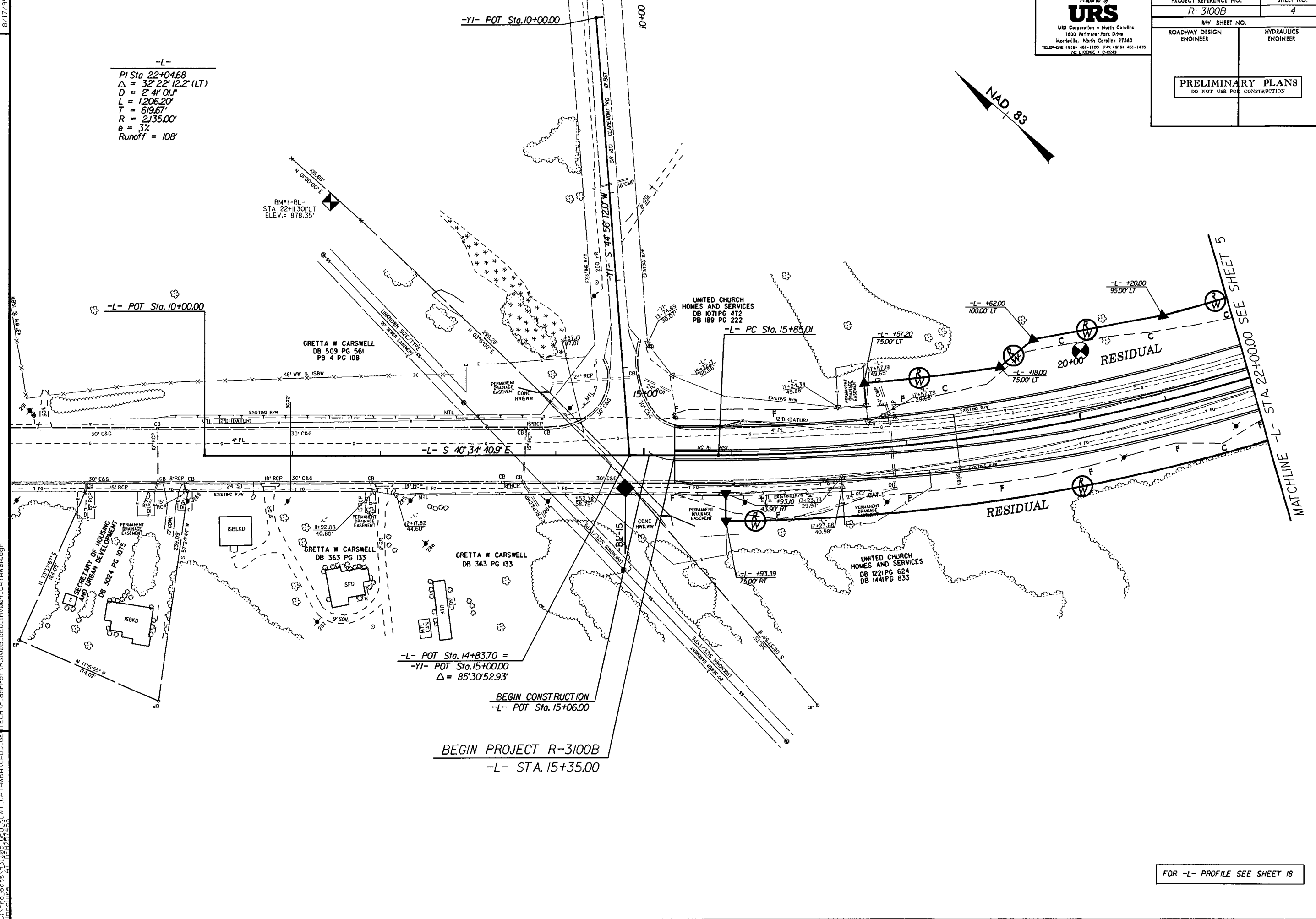
Prepared by
URS
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Morrisville, North Carolina 27560
 TELEPHONE (919) 461-1100 FAX (919) 461-1415
 PG LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 4
RAW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta. 22+04.68
 $\Delta = 32^{\circ} 22' 12.2" (LT)$
 $D = 2' 4" OLV$
 $L = 1,206.20'$
 $T = 619.67'$
 $R = 2,135.00'$
 $e = 3\%$
 Runoff = 108'



REVISIONS



-L- POT Sta. 14+83.70 =
 -YI- POT Sta. 15+00.00
 $\Delta = 85^{\circ} 30' 52.93"$

BEGIN CONSTRUCTION
 -L- POT Sta. 15+06.00

BEGIN PROJECT R-3100B
 -L- STA. 15+35.00

FOR -L- PROFILE SEE SHEET 18

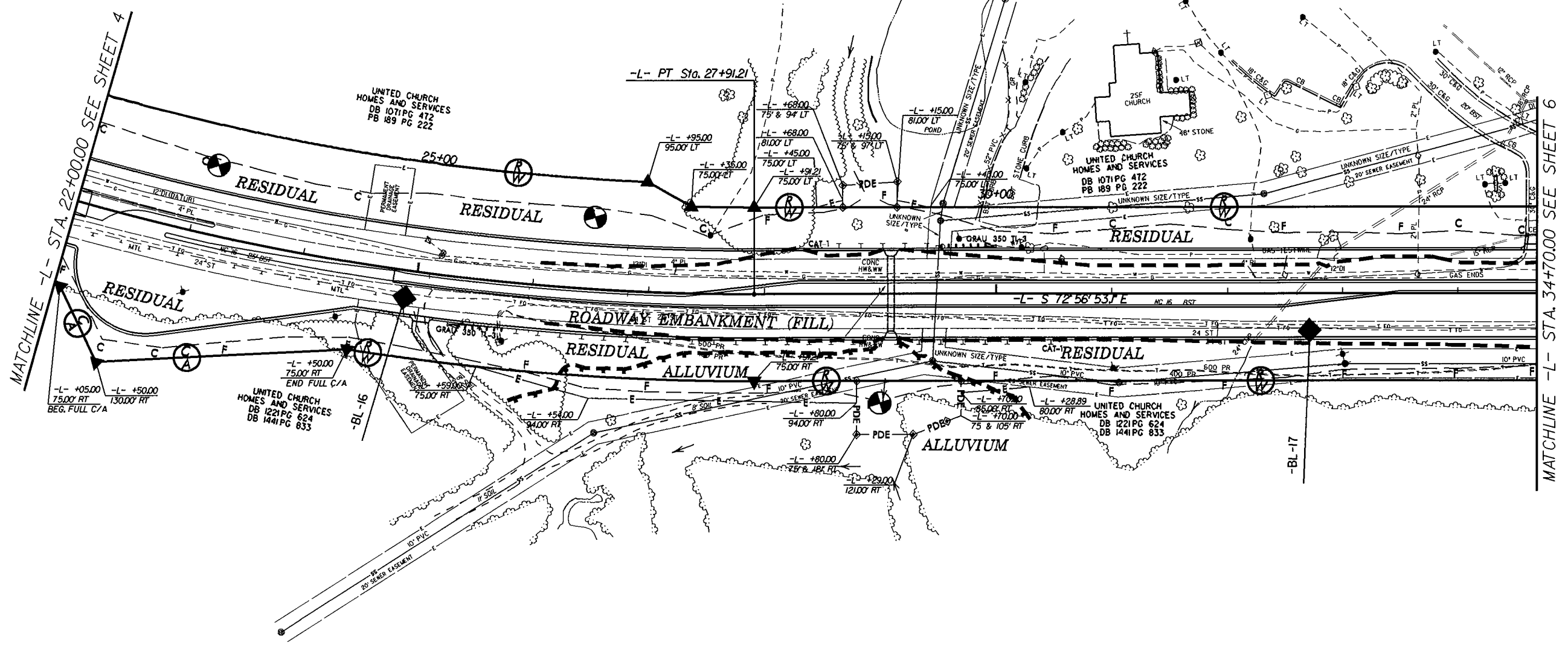
06-JAN-2014 15:31 C:\Projects\3100B_GEO_RDMY_CATAWBANDADD_GEO\TECH\Plan\Prjof\NR3100B_GEO_mv004_CATAWBAND.dgn
 C:\Projects\3100B_GEO_RDMY_CATAWBANDADD_GEO\TECH\Plan\Prjof\NR3100B_GEO_mv004_CATAWBAND.dgn
 15:31
 1/14/02

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
TELEPHONE (919) 481-1100 FAX (919) 461-1415
NO. LICENSE = C-2842

PROJECT REFERENCE NO. R-3100B	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta. 22+04.68
 $\Delta = 32' 22" 12.2" (LT)$
 $D = 2' 41" 01"$
 $L = 1,206.20'$
 $T = 619.67'$
 $R = 2,135.00'$
 $e = 3\%$
 Runoff = 108'



REVISIONS

07-JAN-2014 08:24
 C:\Projects\131005\DWY.CATAMBA\CADD\GEOTECH\Plan\Prof\NR3100B_DEO_rmv005_CATAWA.dgn
 unclined

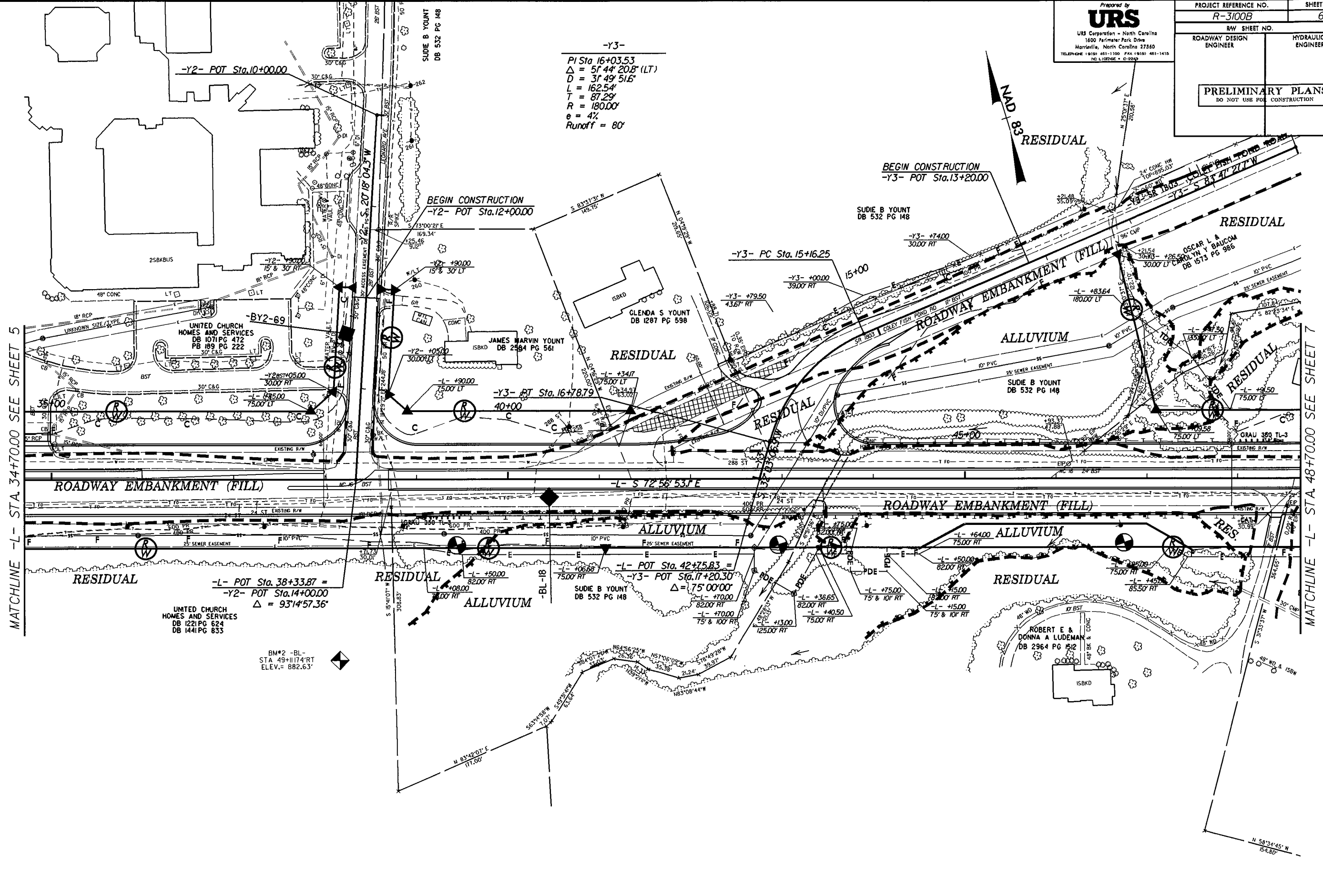
FOR -L- PROFILE SEE SHEET 18

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Parkcenter Park Drive
Morrisville, North Carolina 27560
TELEPHONE (919) 461-1100 FAX (919) 461-1415
PG. L10246E - C-0249

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	6
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

-Y3-
 PI Sta 16+03.53
 $\Delta = 51' 44" 20.8" (LT)$
 $D = 31' 49" 51.6"$
 $L = 162.54'$
 $T = 87.29'$
 $R = 180.00'$
 $e = 4\%$
 Runoff = 80'



REVISIONS

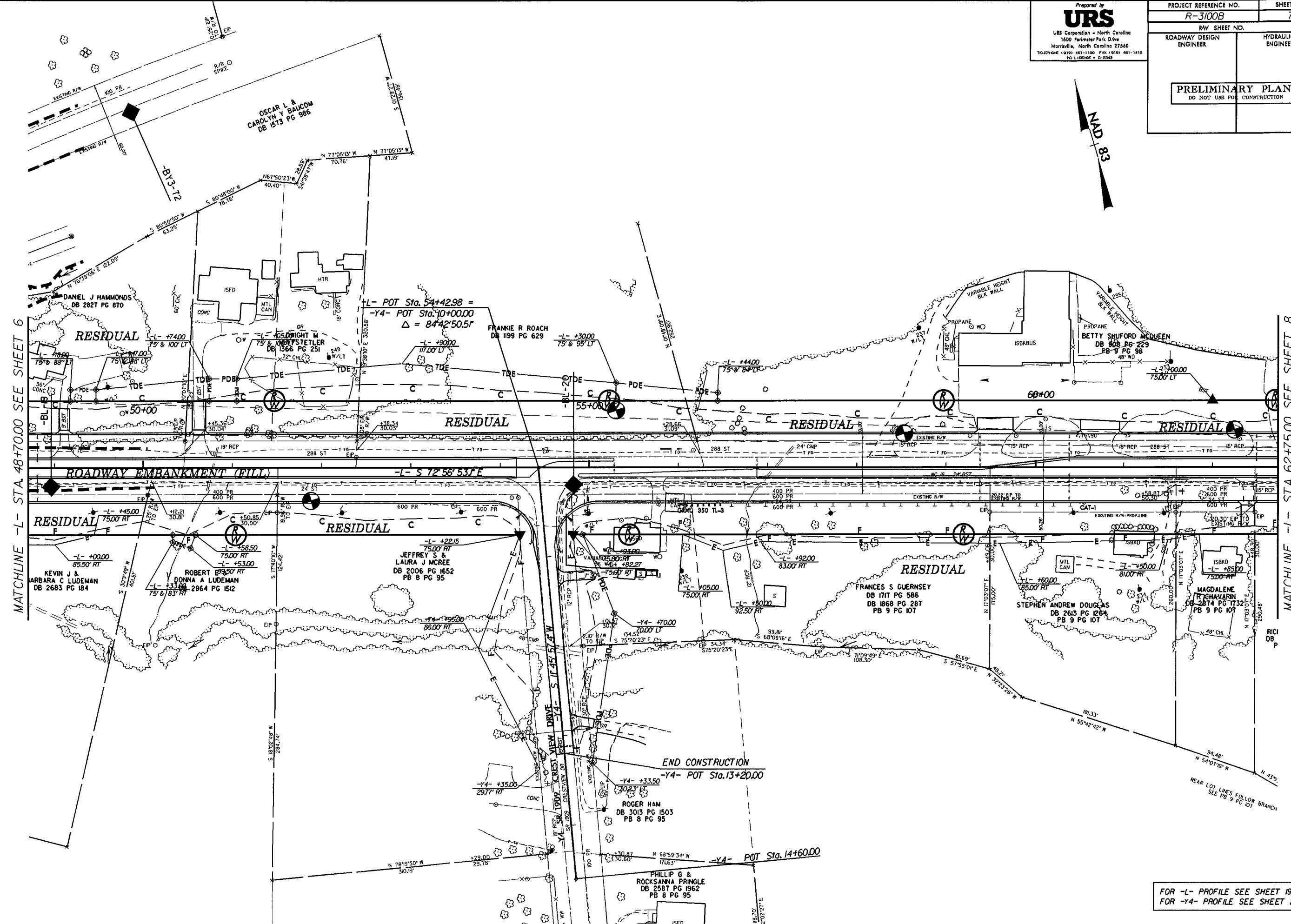
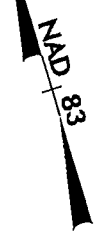
07-JAN-2014 08:26
 C:\Projects\2014\0826\0826\0826\TECH\Plan\Pre-f\N\3100b_CED_mv006_CATAWBA.dgn
 imc

FOR -L- PROFILE SEE SHEET 19
 FOR -Y2- PROFILE SEE SHEET 25
 FOR -Y3- PROFILE SEE SHEET 25

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
703.276.6000 FAX 703.276.6001
NO. 110200000 - 0-0000

PROJECT REFERENCE NO. R-3100B		SHEET NO. 7	
RAW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



MATCHLINE -L- STA 48+70.00 SEE SHEET 6

MATCHLINE -L- STA 62+75.00 SEE SHEET 8

REVISIONS

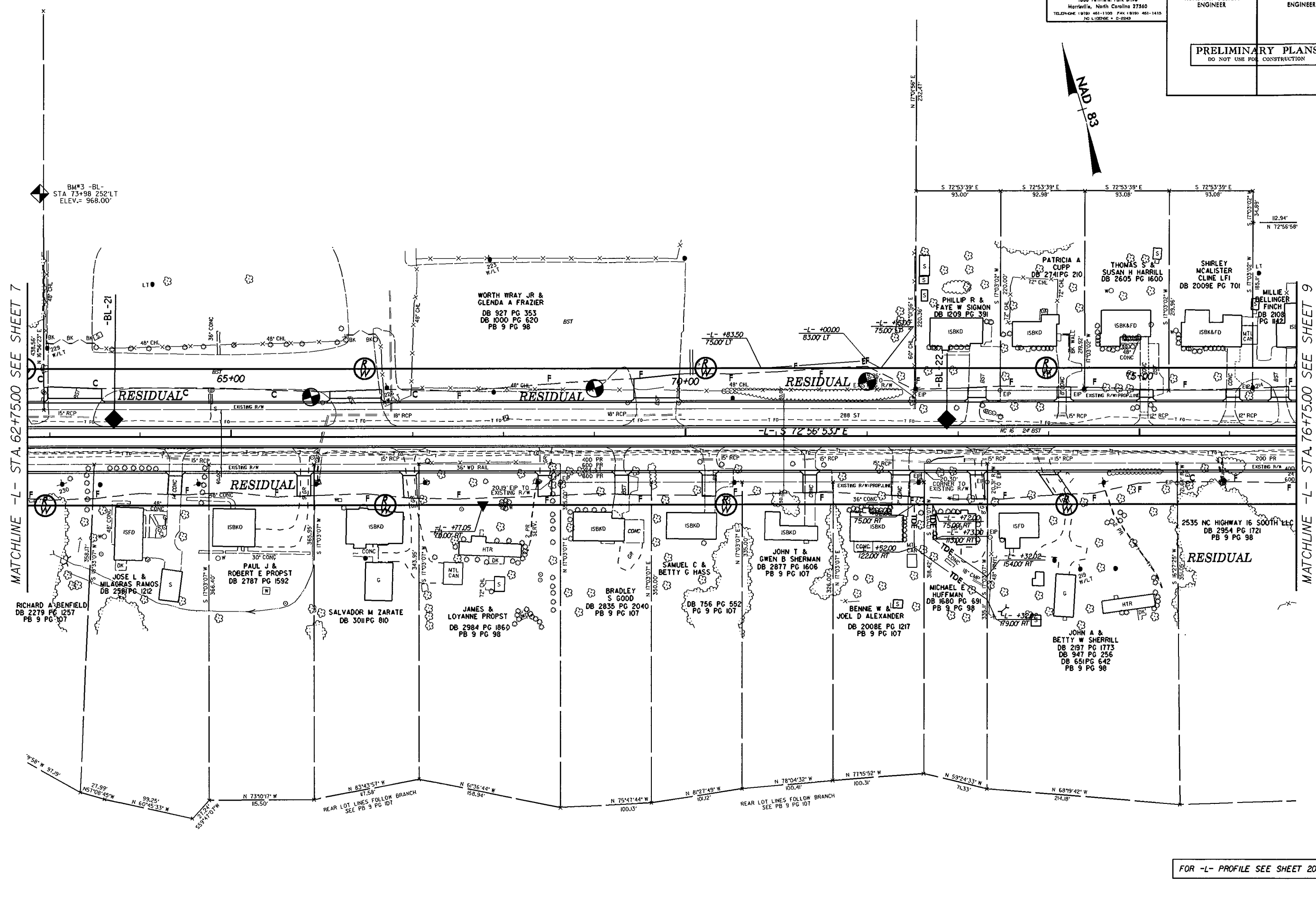
C:\JAN-2014_08-31\008_GEO_RDWY_CATAWBA\CADD_GEO_INV007_CATAWBA.dgn

FOR -L- PROFILE SEE SHEET 19
FOR -Y4- PROFILE SEE SHEET 25

8/17/99

Prepared by
URS
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Morrisville, North Carolina 27560
 TELEPHONE (919) 461-1100 FAX (919) 461-1414
 NO. L10292E - 0-2043

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA. 62+75.00 SEE SHEET 7

MATCHLINE -L- STA. 76+75.00 SEE SHEET 9

REVISIONS

07-JAN-2014 09:21
 C:\Projects\3100B\ROWY_CATAWBA\CADD-GEOTECH\Plan\Prof\AR3100B_GEO_rvw008_CATAWBA.dgn
 mcl

FOR -L- PROFILE SEE SHEET 20

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Harrisville, North Carolina 27550
TELEPHONE (919) 461-1100 FAX (919) 461-1415
PG 110286E - C-2243

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

-L-
PI Sta 88+49.20
 $\Delta = 14' 24" 28.5' (RT)$
 $D = 0' 55" 53.9'$
 $L = 1,546.51'$
 $T = 777.36'$
 $R = 6,150.00'$
 $e = RC$
Runoff = 72'

THELMA GANTT SHERRILL
DB 467 PG 244
DB 760 PG 104
DB 1241 PG 903
DB 1250 PG 653
DB 1778 PG 651

JAMES W POWELL JR
DB 1528 PG 581
DB 1602 PG 456

DONALD RALPH SHERRILL
DB 1678 PG 422

BM#5 -BL-
STA 114+32 193'LT
ELEV. = 1006.46'

RESIDUAL

BELLSOUTH TELECOMMUNICATIONS INC
DB 1445 PG 993
PB 6 PG 134

BILL CECIL SHERRILL
DB 760 PG 102

-L- POT Sta. 101+53.73 =
-Y7- POT Sta. 10+00.00
 $\Delta = 72' 30" 16.4'$
100+00

RESIDUAL

-L- IS 58' 32" 246' E

MATCHLINE -L- STA. 90+50.00 SEE SHEET 9

MATCHLINE -L- STA. 104+50.00 SEE SHEET 11

JIMMY P & SHIRLEY S SHERRILL
DB 551 PG 324
DB 550 PG 62
DB 2623 PG 529
PB 6 PG 134

JIMMY P & SHIRLEY S SHERRILL
DB 551 PG 324
DB 550 PG 62
DB 2623 PG 529
PB 6 PG 134

THELMA GANTT SHERRILL
DB 1778 PG 651

RESIDUAL

DRUMS PARTNERSHIP #1
DB 1917 PG 273
PB 6 PG 134

DARRELL C & GLONDA L DRUM
DB 1917 PG 273
PB 6 PG 134

END CONSTRUCTION
-Y7- POT Sta. 13+00.00

RESIDUAL

-Y7- POT Sta. 14+49.87

FOR -L- PROFILE SEE SHEET 21
FOR -Y7- PROFILE SEE SHEET 26

REVISIONS

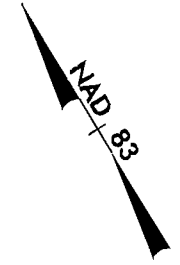
07 JAN 2014 09:26 C:\Projects\1000b_CED\TECH\Plan\Pro-f\NR3100b_CED_mv010_CATAWBA.dgn

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Piedmont Park Drive
Morrisville, North Carolina 27540
TEL: 919-461-1100 FAX: 919-461-1415
NC LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 11
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	CONSTRUCTION

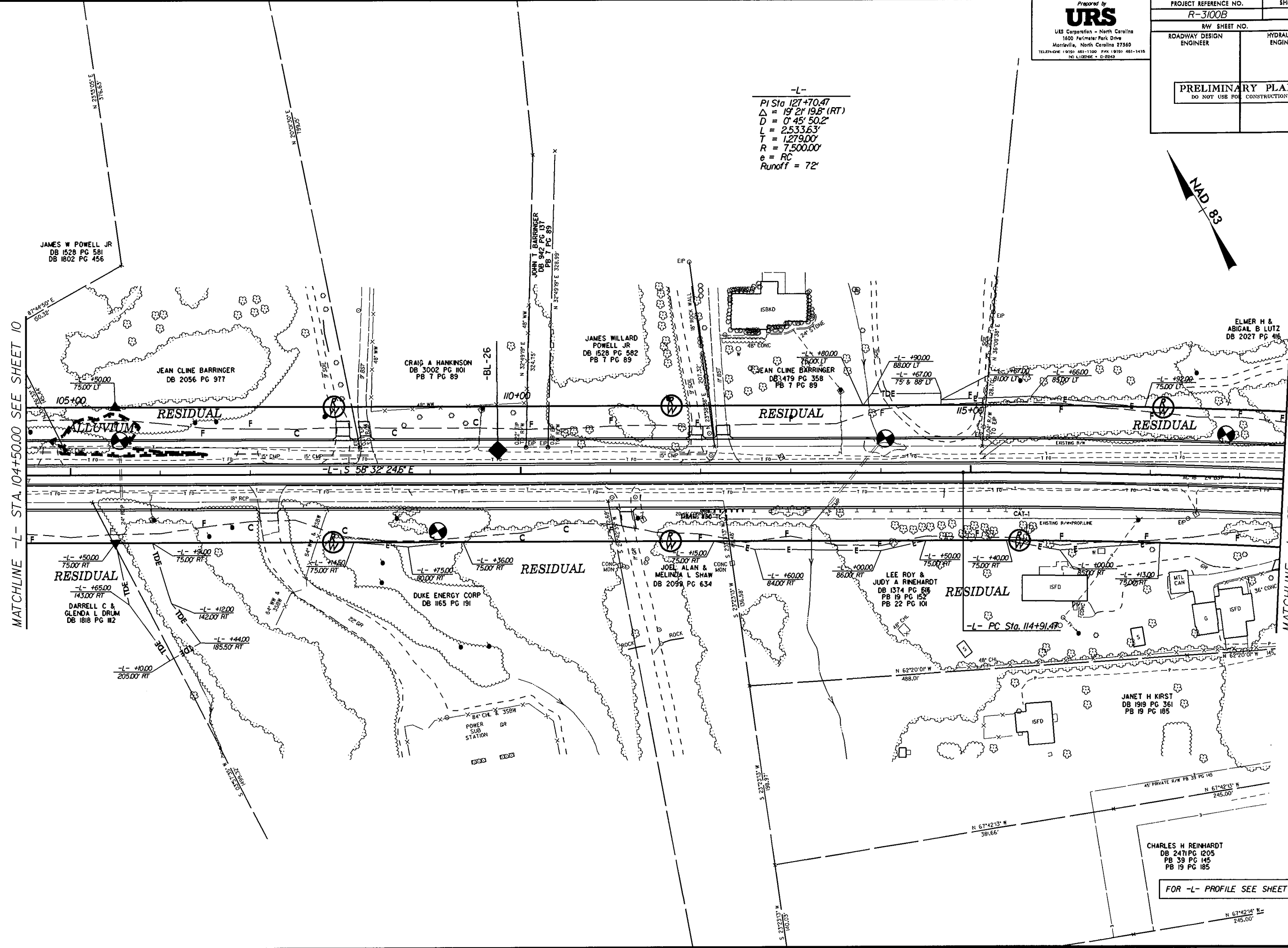
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L-
 PI Sta 127+70.47
 $\Delta = 19' 21" 19.8" (RT)$
 $D = 0' 45" 50.2"$
 $L = 2533.63'$
 $T = 1279.00'$
 $R = 7500.00'$
 $e = RC$
 Runoff = 72'

MATCHLINE -L- STA. 104+50.00 SEE SHEET 10

MATCHLINE -L- STA. 118+50.00 SEE SHEET 12



JAMES W POWELL JR
DB 1528 PG 581
DB 1802 PG 456

JEAN CLINE BARRINGER
DB 2056 PG 977

CRAIG A HANKINSON
DB 3002 PG 101
PB 7 PG 89

JAMES WILLARD POWELL JR
DB 1528 PG 582
PB 7 PG 89

JEAN CLINE BARRINGER
DB 1479 PG 358
PB 7 PG 89

ELMER H & ABIGAIL B LUTZ
DB 2027 PG 416

DARRELL C & GLENDA L DRUM
DB 1818 PG 112

DUKE ENERGY CORP
DB 1165 PG 191

JOEL ALAN & MELINDA L SHAW
DB 2099 PG 634

LEE ROY & JUDY A RNEHARDT
DB 1374 PG 508
PB 19 PG 152
PB 22 PG 101

JANET H KIRST
DB 1919 PG 361
PB 19 PG 185

CHARLES H REINHARDT
DB 2471 PG 1205
PB 39 PG 145
PB 19 PG 185

FOR -L- PROFILE SEE SHEET 21

REVISIONS

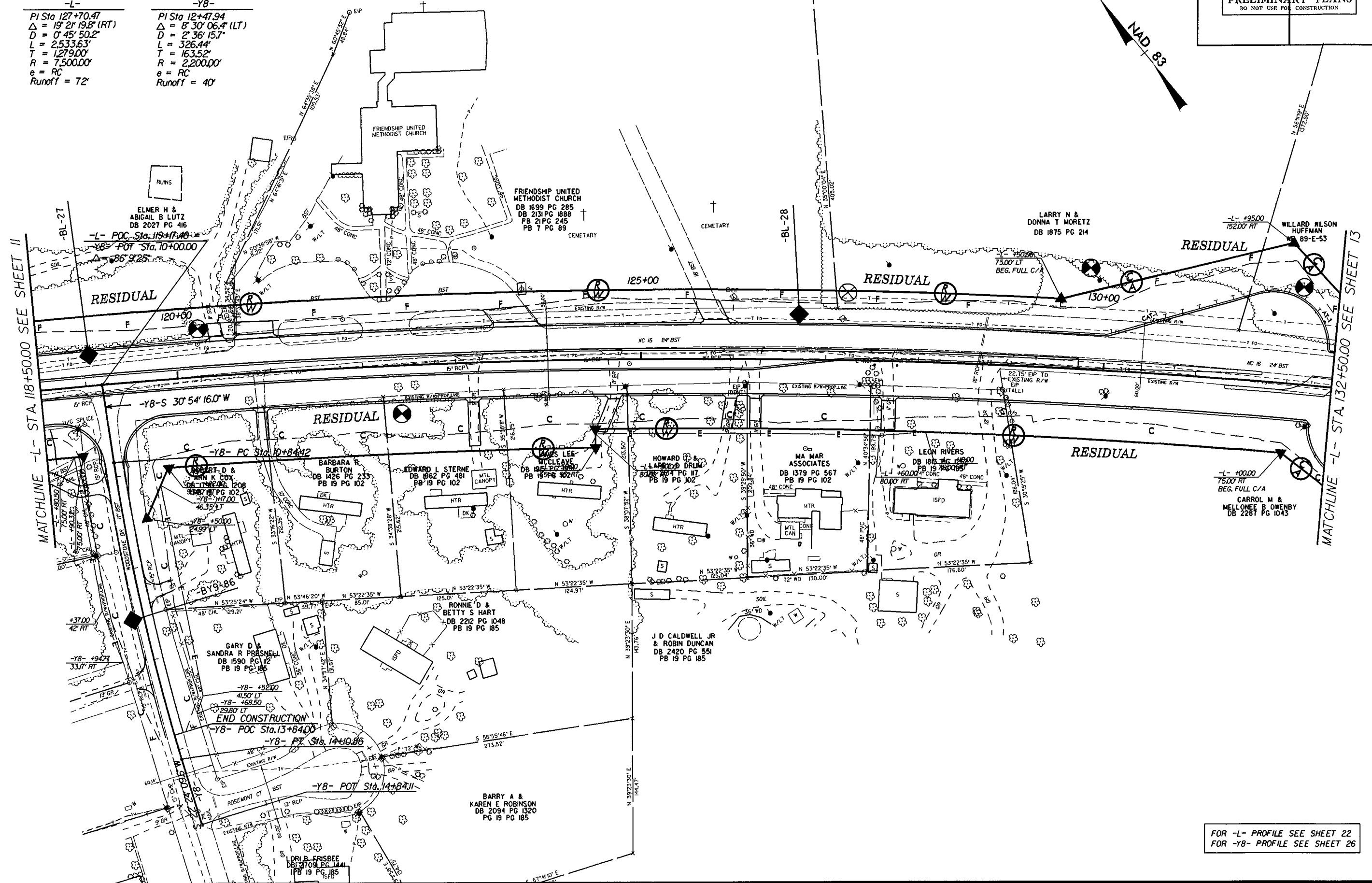
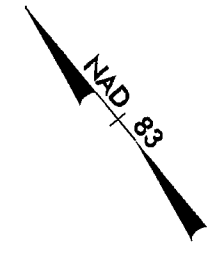
07 JAN 2014 CS:SS
PROJECTS
TECH.PlanPrcf.VR3100b_GEO.mv2011.CATAMBA.dgn

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
TELEPHONE (919) 461-1100 FAX (919) 461-1413
NC LICENSE # 0-2243

PROJECT REFERENCE NO.	R-3100B	SHEET NO.	12
RAW SHEET NO.		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS			
DO NOT USE FOR		CONSTRUCTION	

<p>-L-</p> <p>PI Sta 127+70.47 $\Delta = 19' 21" 19.8" (RT)$ $D = 0' 45' 50.2"$ $L = 2,533.63'$ $T = 1,279.00'$ $R = 7,500.00'$ $e = RC$ Runoff = 72'</p>	<p>-Y8-</p> <p>PI Sta 12+47.94 $\Delta = 8' 30' 06.4" (LT)$ $D = 2' 36' 15.7"$ $L = 326.44'$ $T = 163.52'$ $R = 2,200.00'$ $e = RC$ Runoff = 40'</p>
--	---



REVISIONS

07:14N-2014_08:30
C:\p\projects\AT\11257465
07:14N-2014_08:30
C:\p\projects\AT\11257465
TECH\Plan\p-r\of\NR3100b_GED_mv012_CATAWBA.dgn

FOR -L- PROFILE SEE SHEET 22
FOR -Y8- PROFILE SEE SHEET 26

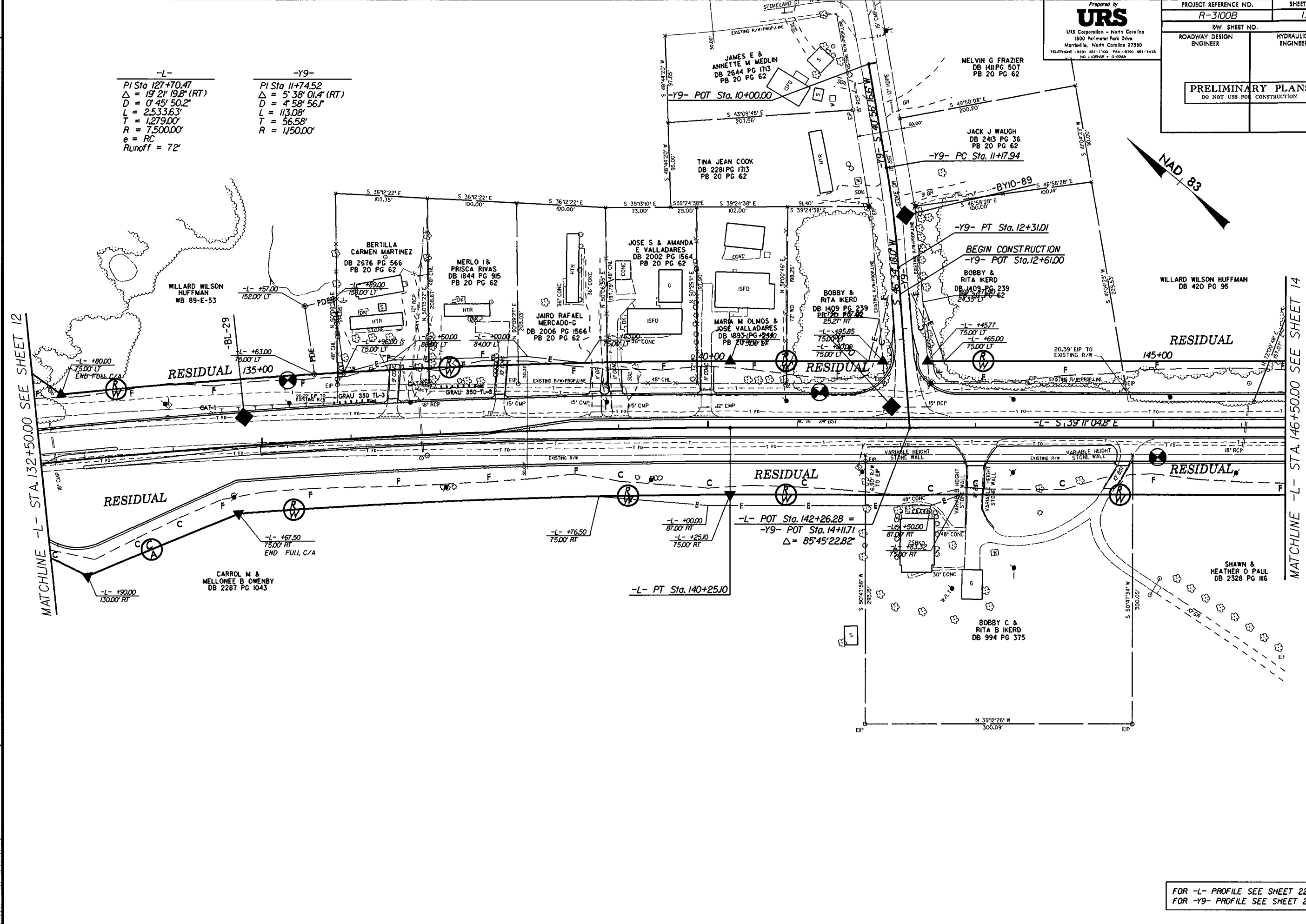
8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park, Drive
Morrisville, North Carolina 27560
TELEPHONE (919) 481-1100 FAX (919) 461-1415
N.C. LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
PI Sta 127+70.47
 $\Delta = 19' 21'' 19.8''$ (RT)
 $D = 0' 45'' 50.2''$
 $L = 2,533.63'$
 $T = 1,279.00'$
 $R = 7,500.00'$
 $e = RC$
Runoff = 72'

-Y9-
PI Sta 11+74.52
 $\Delta = 5' 38'' 01.4''$ (RT)
 $D = 4' 58'' 56.1''$
 $L = 113.08'$
 $T = 56.58'$
 $R = 1,150.00'$



MATCHLINE -L- STA. 132+50.00 SEE SHEET 12

MATCHLINE -L- STA. 146+50.00 SEE SHEET 14

REVISIONS

C:\Projects\2014_08\32 CATAWBA\CAD\GEO\TECH\Plan\Prof\13100b_GEO_INV\013_CATAWBA.dgn
13100B_GEO_ROWY_CATAWBA\CADD_GEO\TECH\Plan\Prof\13100b_GEO_INV\013_CATAWBA.dgn
13100B_GEO_ROWY_CATAWBA\CADD_GEO\TECH\Plan\Prof\13100b_GEO_INV\013_CATAWBA.dgn

FOR -L- PROFILE SEE SHEET 22
FOR -Y9- PROFILE SEE SHEET 26

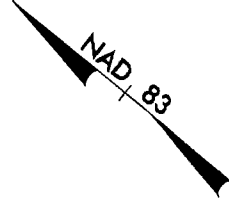
8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
TELEPHONE: (919) 461-1100 FAX: (919) 461-1418
NO. L10000000 - 0-2049

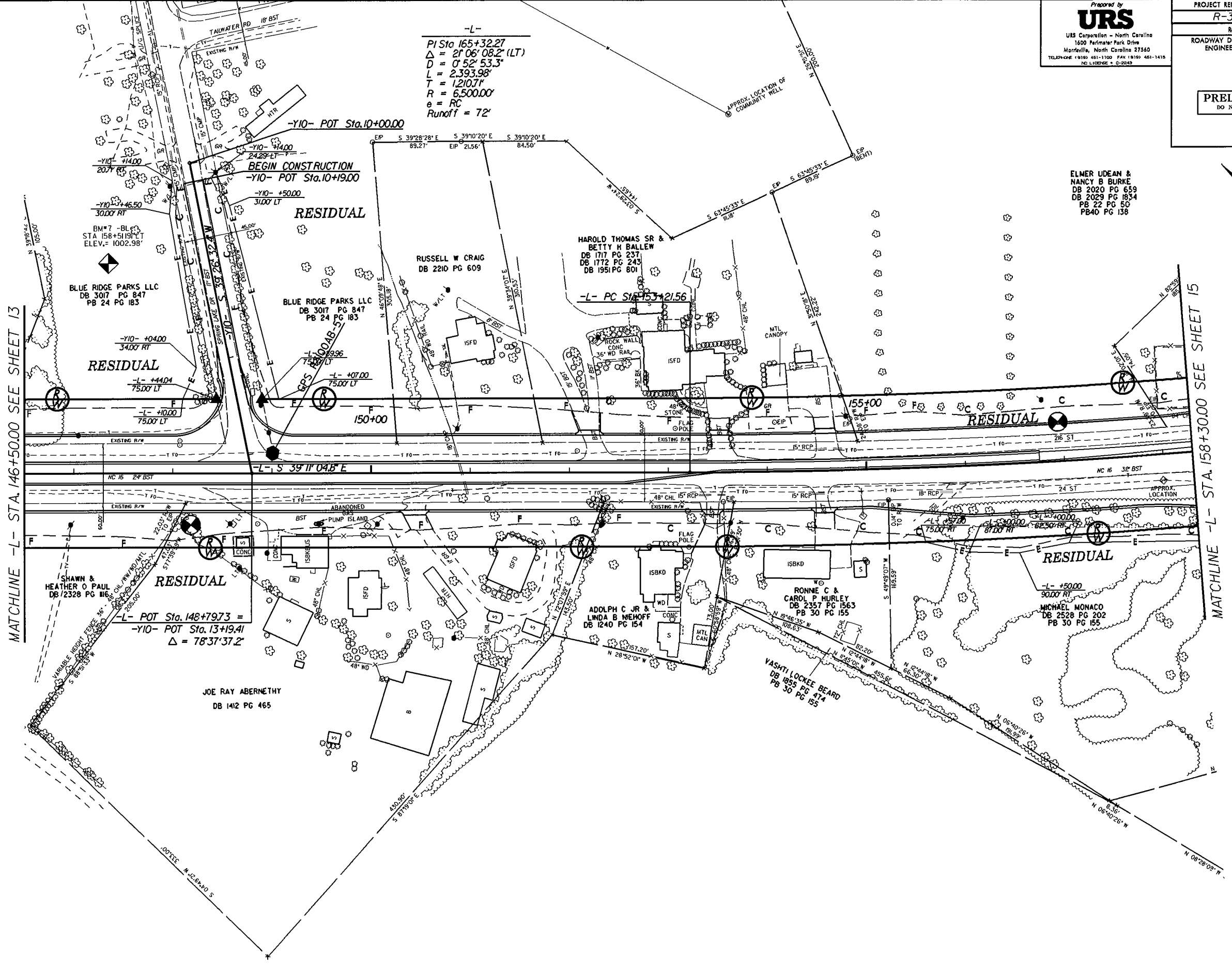
PROJECT REFERENCE NO. R-3100B	SHEET NO. 14
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	CONSTRUCTION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ELMER UDEAN &
NANCY B BURKE
DB 2020 PG 659
DB 2029 PG 1894
PB 22 PG 50
PB40 PG 138



-L-
PI Sta 165+32.27
 $\Delta = 21' 06" 08.2" (LT)$
D = $0' 52" 53.3"$
L = 2,393.98'
T = 1210.71'
R = 6,500.00'
e = RC
Runoff = 72'



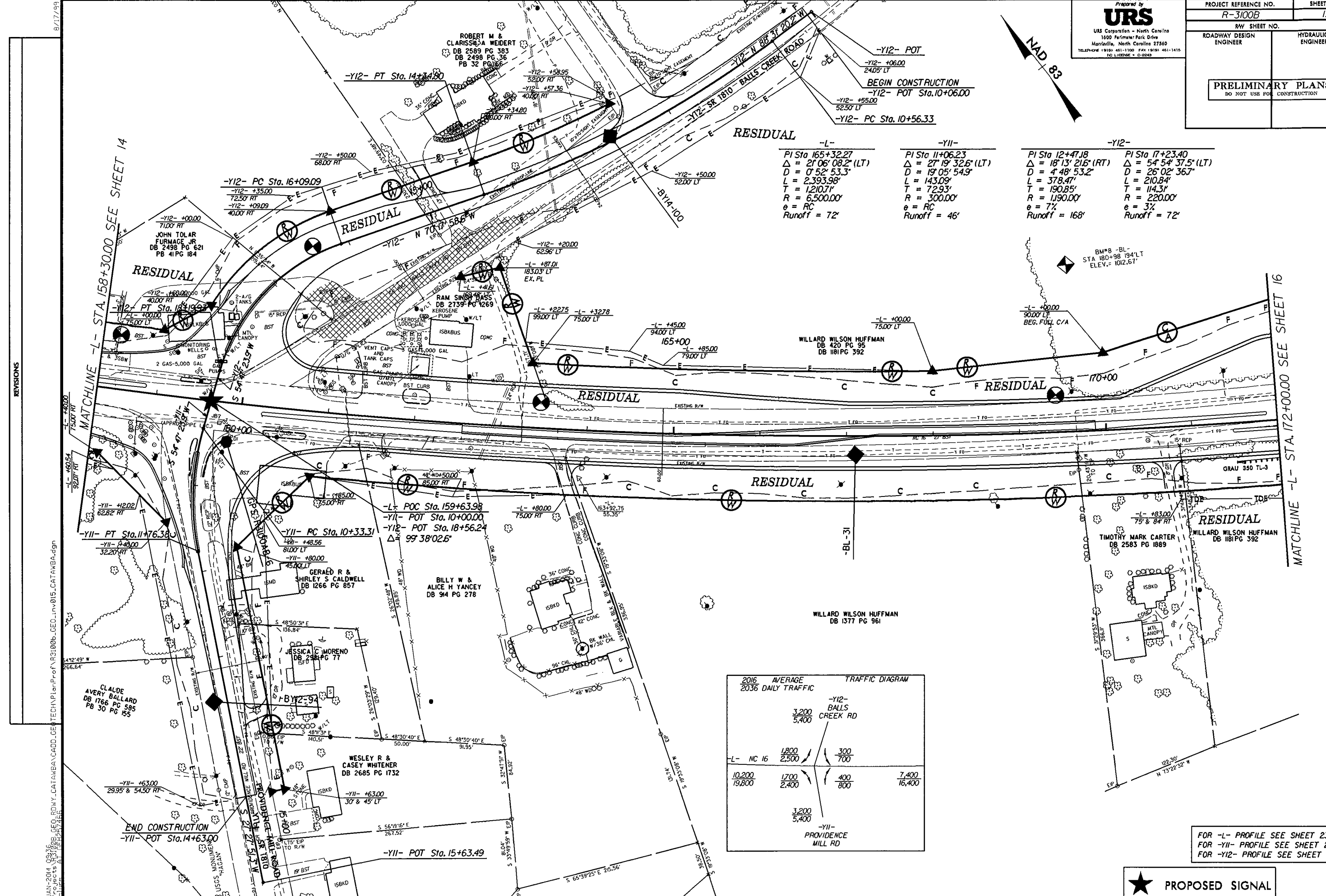
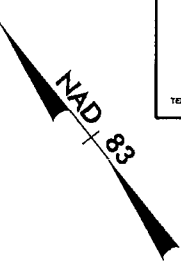
MATCHLINE -L- STA. 146+50.00 SEE SHEET 13

MATCHLINE -L- STA. 158+30.00 SEE SHEET 15

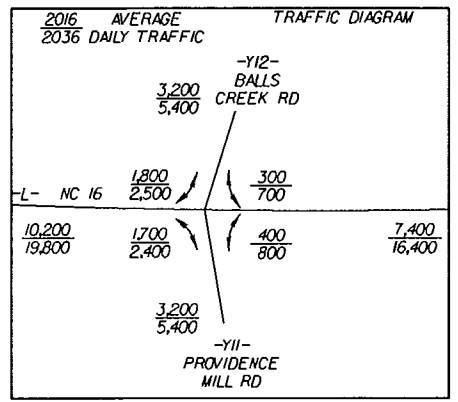
REVISIONS

07-JAN-2014 09:54
C:\Projects\131000B\DEO_RDMY_CATAWBA\CADD\DE\TECH\Plan\Prof\NR3100b_DEO_rnv014_CATAWBA.dgn
uncplotted AT 12:25:44 PM

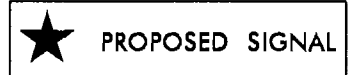
FOR -L- PROFILE SEE SHEET 23
FOR -Y10- PROFILE SEE SHEET 26



-L-	-YII-	-YI2-	-YI2-
PI Sta 165+32.27	PI Sta 11+06.23	PI Sta 12+47.18	PI Sta 17+23.40
$\Delta = 21^{\circ} 06' 08.2''$ (LT)	$\Delta = 27^{\circ} 19' 32.6''$ (LT)	$\Delta = 18^{\circ} 13' 21.6''$ (RT)	$\Delta = 54^{\circ} 54' 37.5''$ (LT)
$D = 0^{\circ} 52' 53.3''$	$D = 19^{\circ} 05' 54.9''$	$D = 4^{\circ} 48' 53.2''$	$D = 26^{\circ} 02' 36.7''$
$L = 2,393.98'$	$L = 143.09'$	$L = 378.47'$	$L = 210.84'$
$T = 1,210.71'$	$T = 72.93'$	$T = 190.85'$	$T = 114.31'$
$R = 6,500.00'$	$R = 300.00'$	$R = 1,190.00'$	$R = 220.00'$
$e = RC$	$e = RC$	$e = 7\%$	$e = 3\%$
Runoff = 72'	Runoff = 46'	Runoff = 168'	Runoff = 72'



FOR -L- PROFILE SEE SHEET 23
 FOR -YII- PROFILE SEE SHEET 26
 FOR -YI2- PROFILE SEE SHEET 27



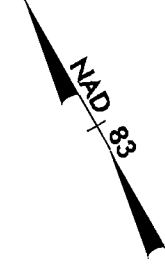
REVISIONS

07-JAN-2014 09:36 C:\Projects\2014\15-CATAWBA\GEOTECH\PLANS\PROJ\3100B_GEO.rvt\015_CATAWBA.dgn

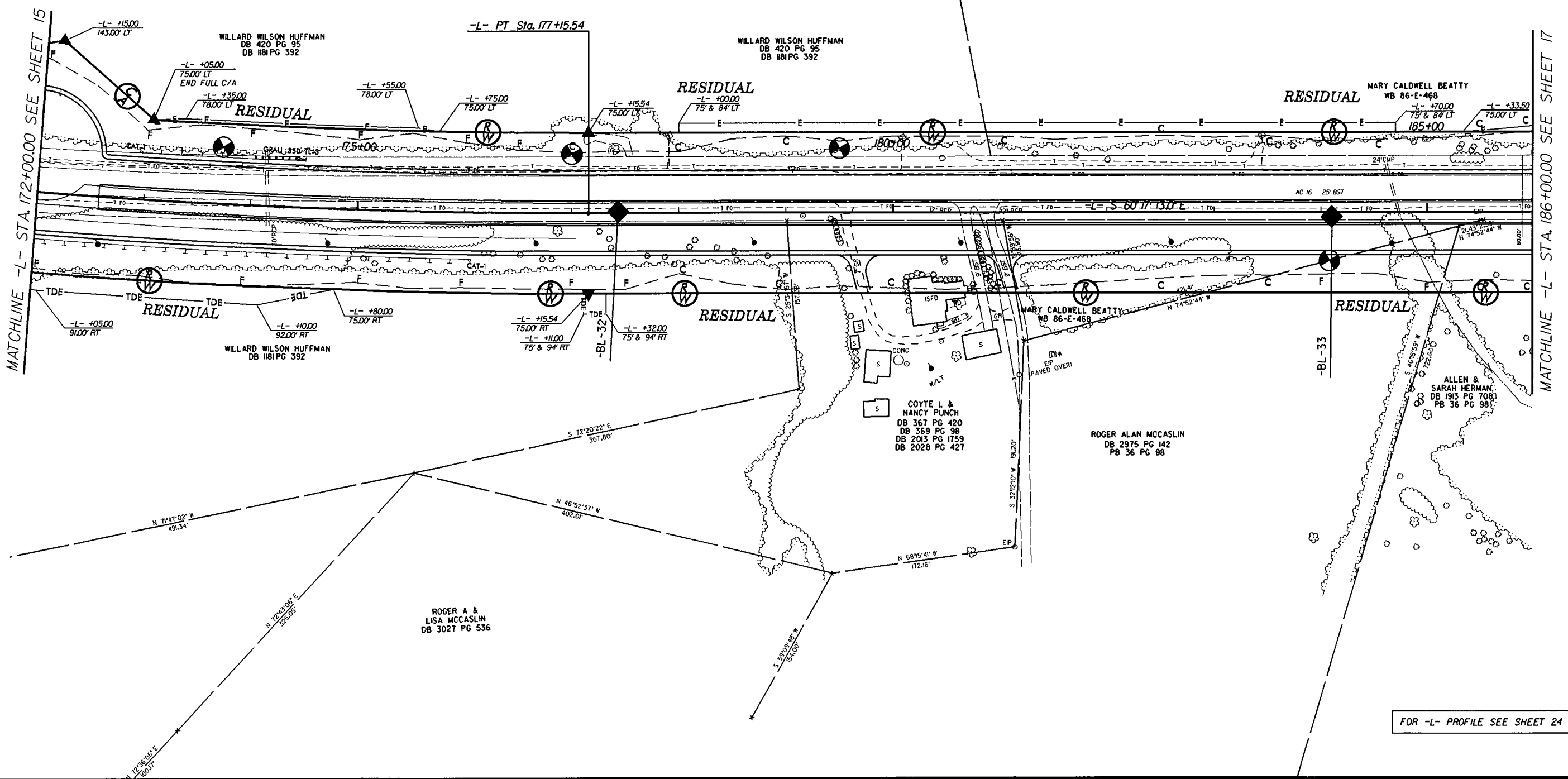
8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Parkcenter Park Drive
Harrisville, North Carolina 27540
TELEPHONE (919) 461-1100 FAX (919) 461-1415
NC LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-L-
PI Sta 165+32.27
 $\Delta = 21' 06" 08.2" (LT)$
 $D = 0' 52" 53.3"$
 $L = 2,393.98'$
 $T = 1,210.71'$
 $R = 6,500.00'$
 $e = RC$
Runoff = 72'



MATCHLINE -L- STA. 172+00.00 SEE SHEET 15

MATCHLINE -L- STA. 186+00.00 SEE SHEET 17

REVISIONS

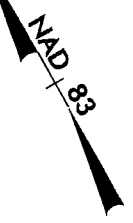
07-JAN-2014 09:39
C:\p2\projects\3100B\GEO\RDWY\CATAMBA\CADD_GEO\TWP016_CATAMBA.dgn
C:\p2\projects\3100B\GEO\RDWY\CATAMBA\CADD_GEO\TWP016_CATAMBA.dgn
C:\p2\projects\3100B\GEO\RDWY\CATAMBA\CADD_GEO\TWP016_CATAMBA.dgn

FOR -L- PROFILE SEE SHEET 24

8/17/99

Prepared by
URS
 URS Corporation - North Carolina
 1600 Park Plaza Drive
 Morrisville, North Carolina 27560
 TELEPHONE 919/915 461-1100 FAX 919/915 461-1410
 NC LICENSE # C-2043

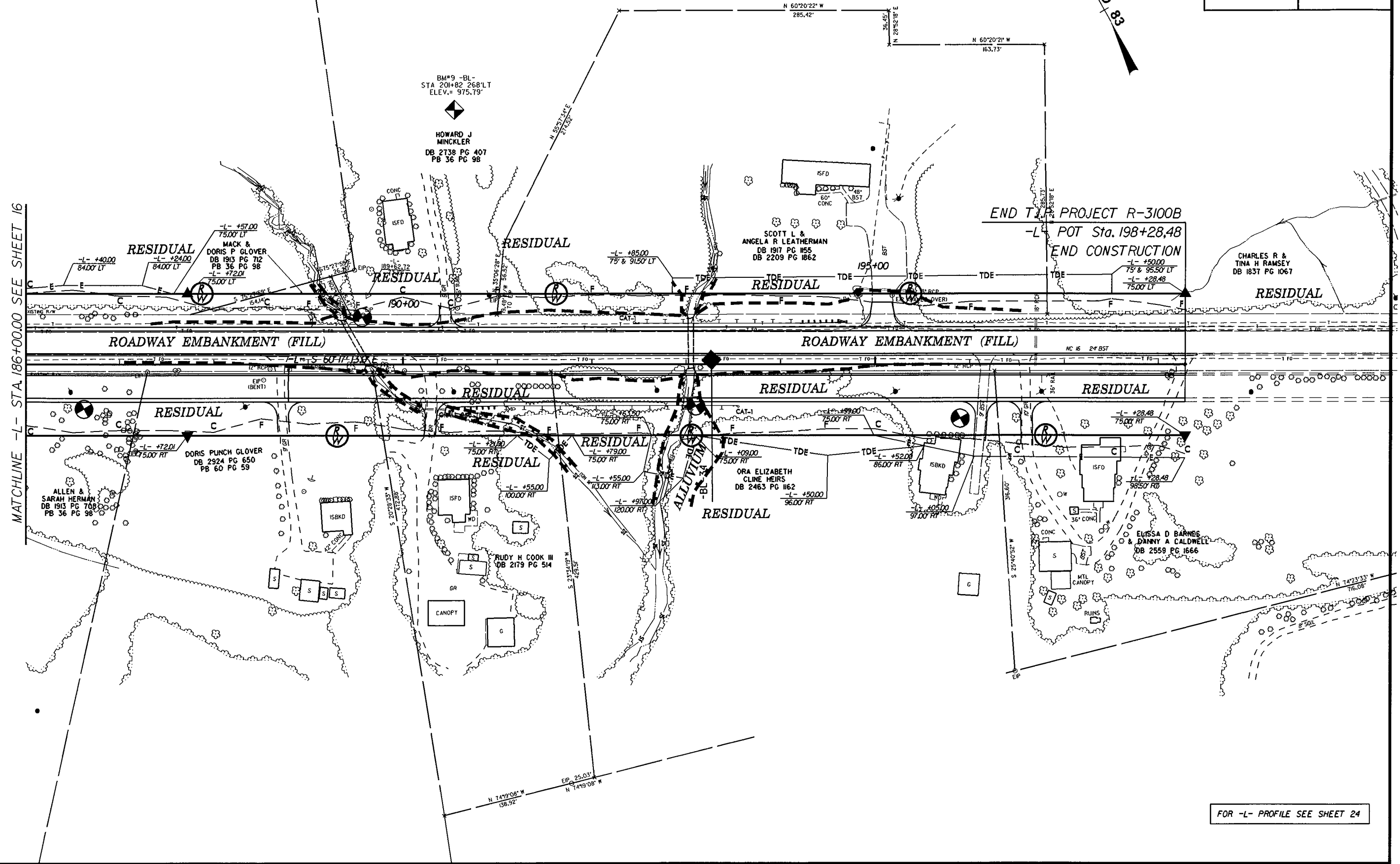
PROJECT REFERENCE NO.	SHEET NO.
R-3100B	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA 186+00.00 SEE SHEET 16

REVISIONS

07-JAN-2014 09:46
 C:\Projects\17006\GEO_ROWY_CATAWBA\CADD_GEO\TECH\Plan\Prof\AR3100b_GEO.inv\017_CATAWBA.dgn
 mclh...

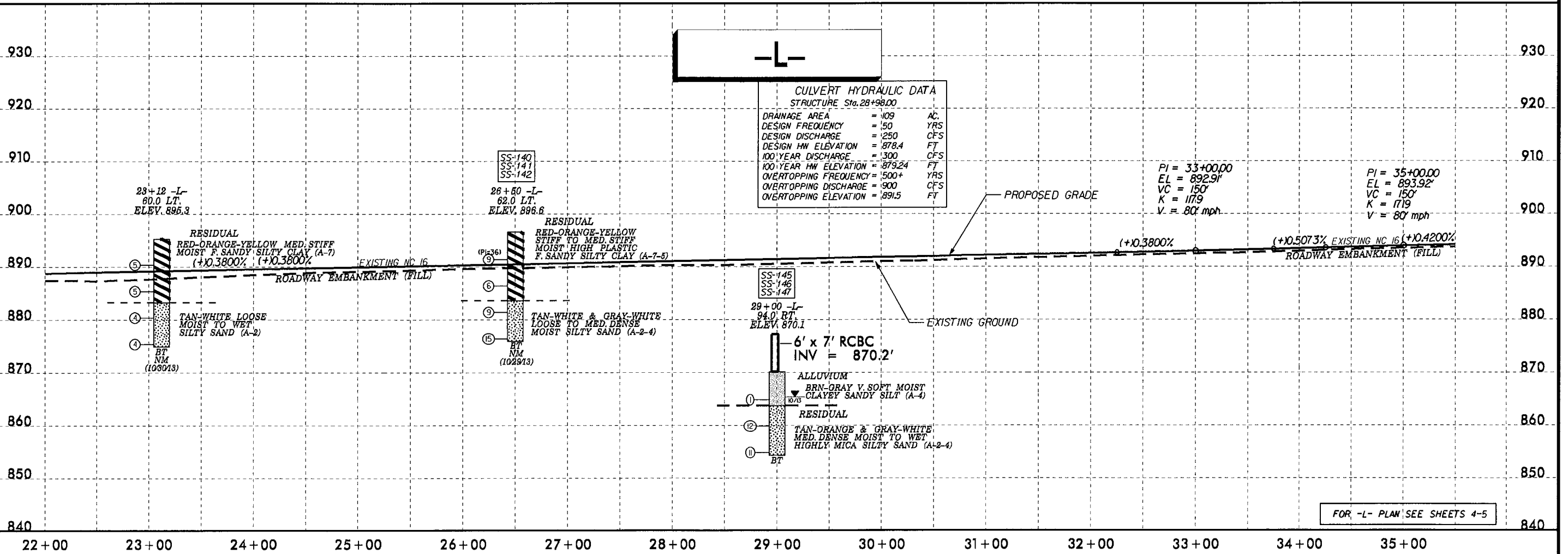
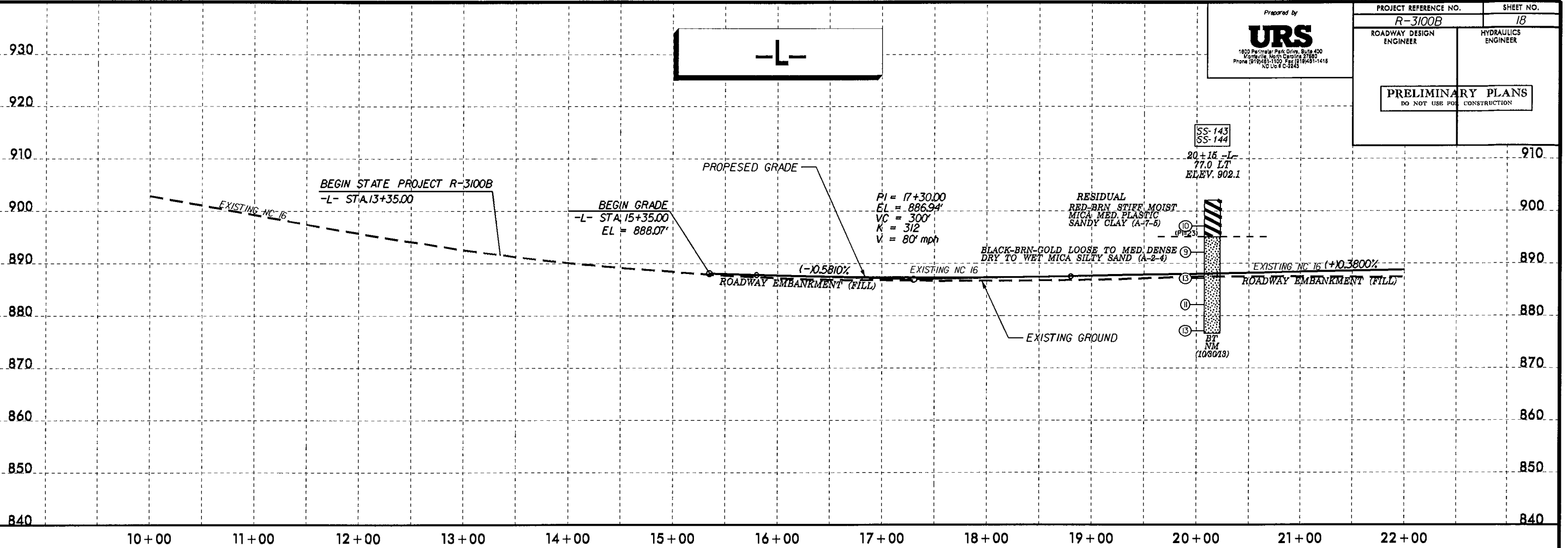


FOR -L- PROFILE SEE SHEET 24

5/28/95

Prepared by
URS
1800 Piedmont Park Drive, Suite 400
Wilmington, North Carolina 27609
Phone (919) 487-1100 Fax (919) 487-1418
NO Lic # C-2242

PROJECT REFERENCE NO. R-3100B	SHEET NO. 18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



FOR -L- PLAN SEE SHEETS 4-5

19-DEC-2013 10:30 C:\projects\102813\RDWY_CATAWBA\CADD_GEO\TECH\Plan\Prof\VR3100b_GEO_pf:018_CATAWBA.dgn

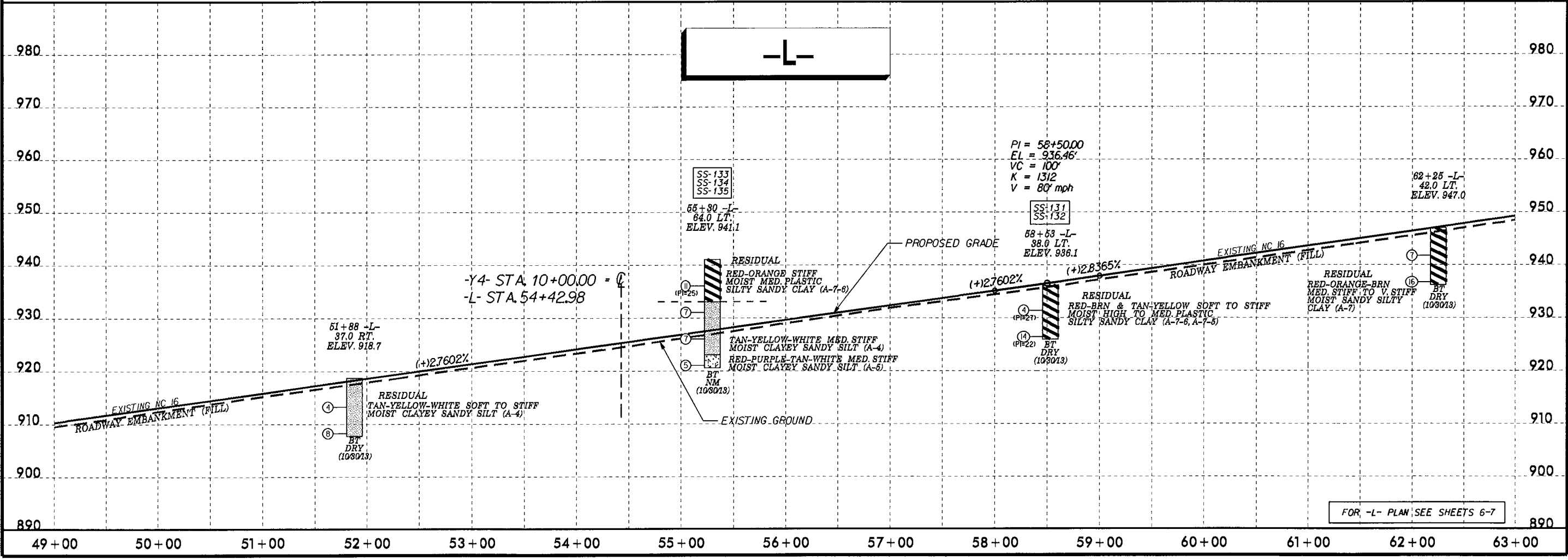
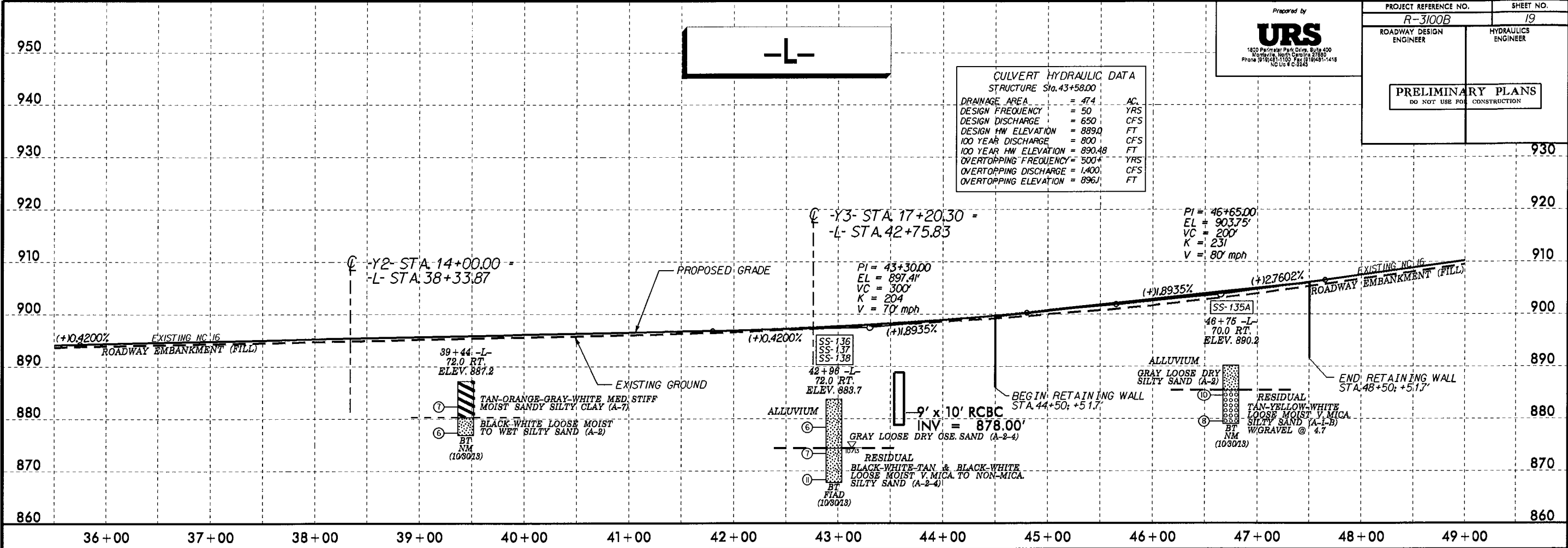
5/28/99

Prepared by
URS
 1820 Parkside Park Drive, Suite 400
 Cary, North Carolina 27504
 Phone (919) 461-1100 Fax (919) 461-1418
 NC Lic # C-2245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

CULVERT HYDRAULIC DATA
 STRUCTURE STA. 43+58.00

DRAINAGE AREA	= 474	AC.
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 650	CFS
DESIGN HW ELEVATION	= 889.0	FT
100 YEAR DISCHARGE	= 800	CFS
100 YEAR HW ELEVATION	= 890.48	FT
OVERTOPPING FREQUENCY	= 500*	YRS
OVERTOPPING DISCHARGE	= 1,400	CFS
OVERTOPPING ELEVATION	= 896.1	FT



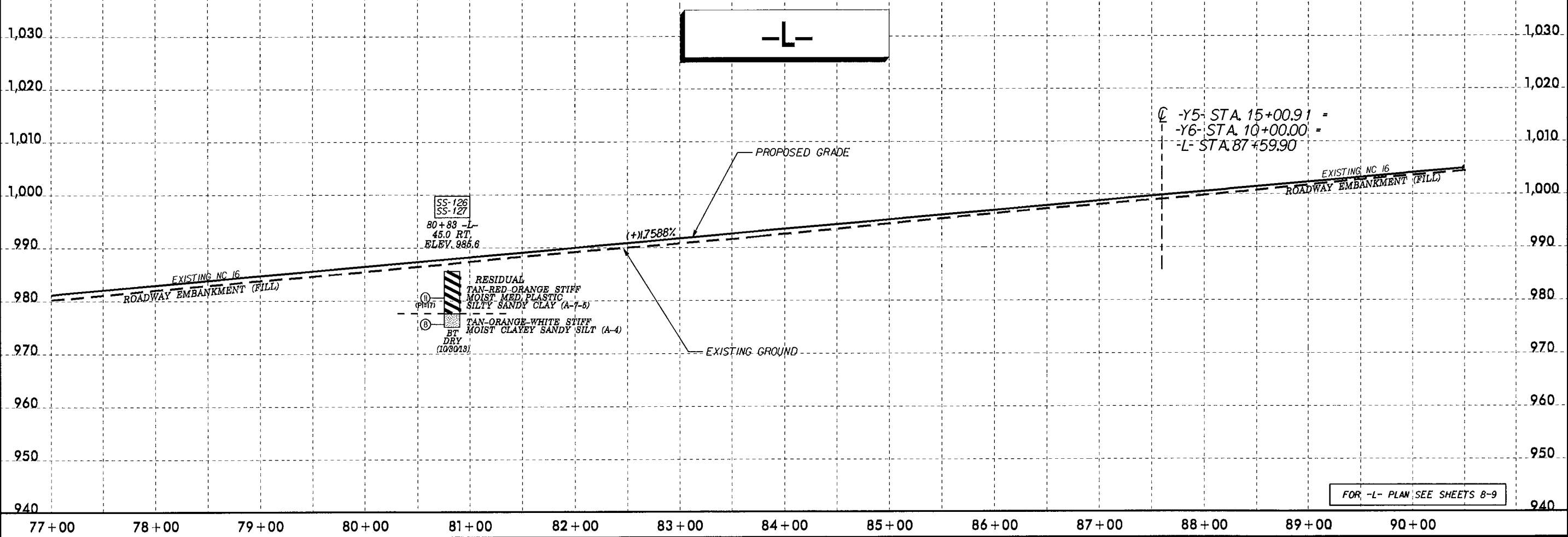
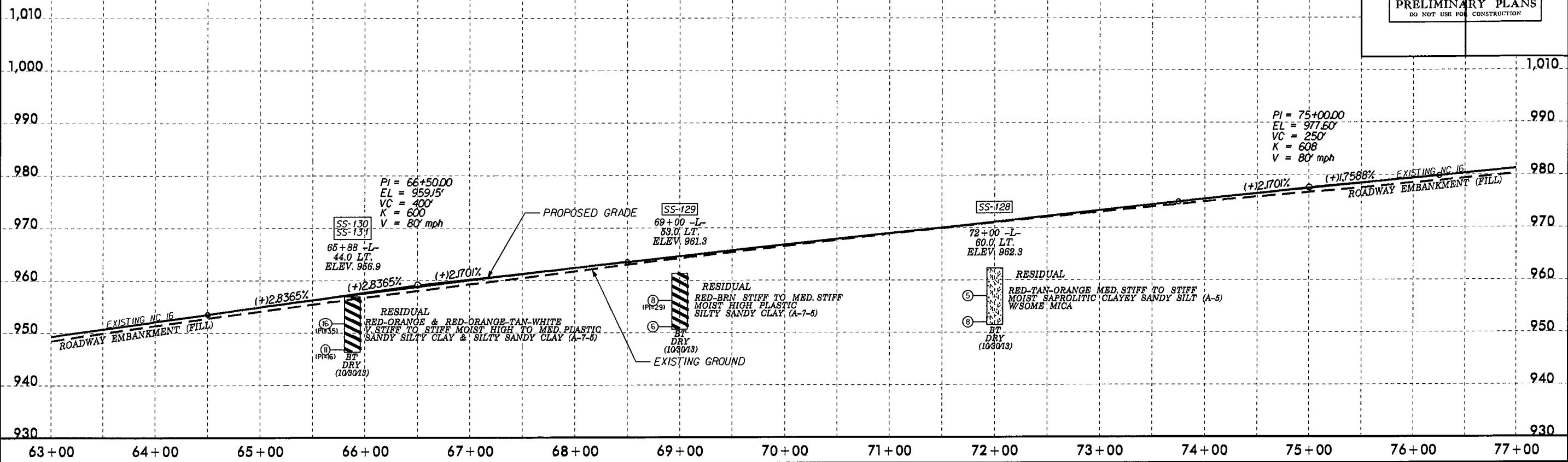
FOR -L- PLAN SEE SHEETS 6-7

19-DEC-2013 10:43 C:\p\projects\190000\BEG_ROW\Y_CAT\AWBA\CADD\GEO\TECH\F1\m\p\o\F\NR3100b_GED_pf1019_CAT\AWBA.dgn

5/28/99

Prepared by
URS
 1800 Piedmont Park Drive, Suite 400
 Atlanta, North Carolina 27309
 Phone (919)481-1100 Fax (919)481-1418
 NC Lic # C-3245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



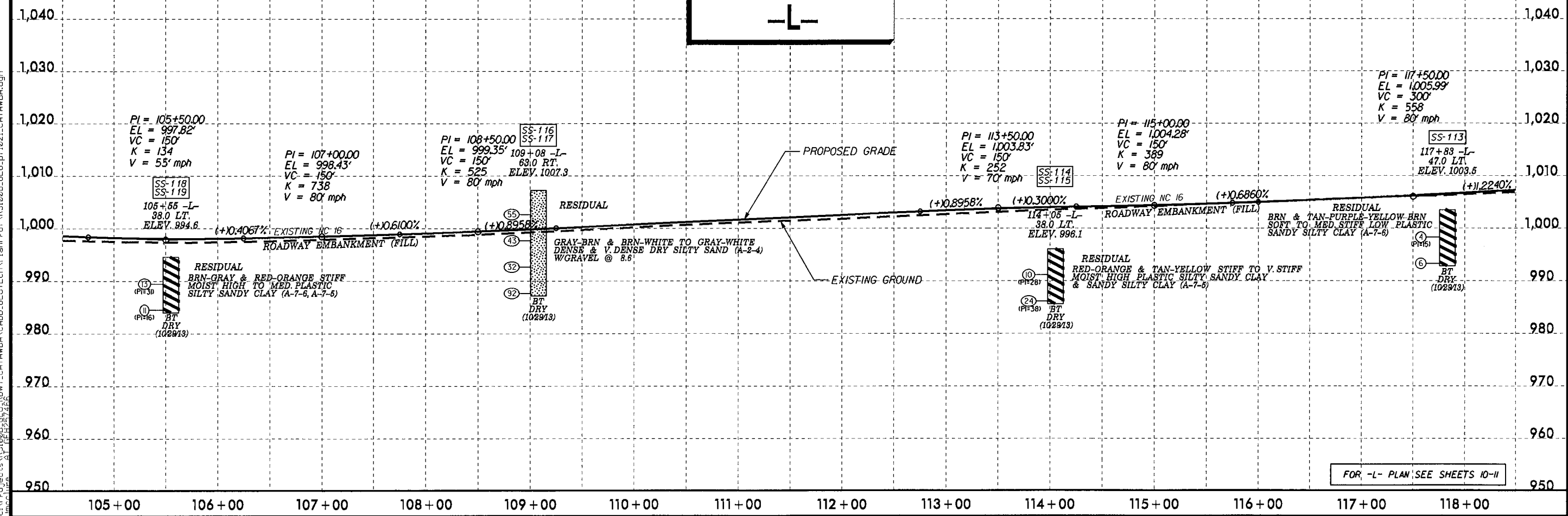
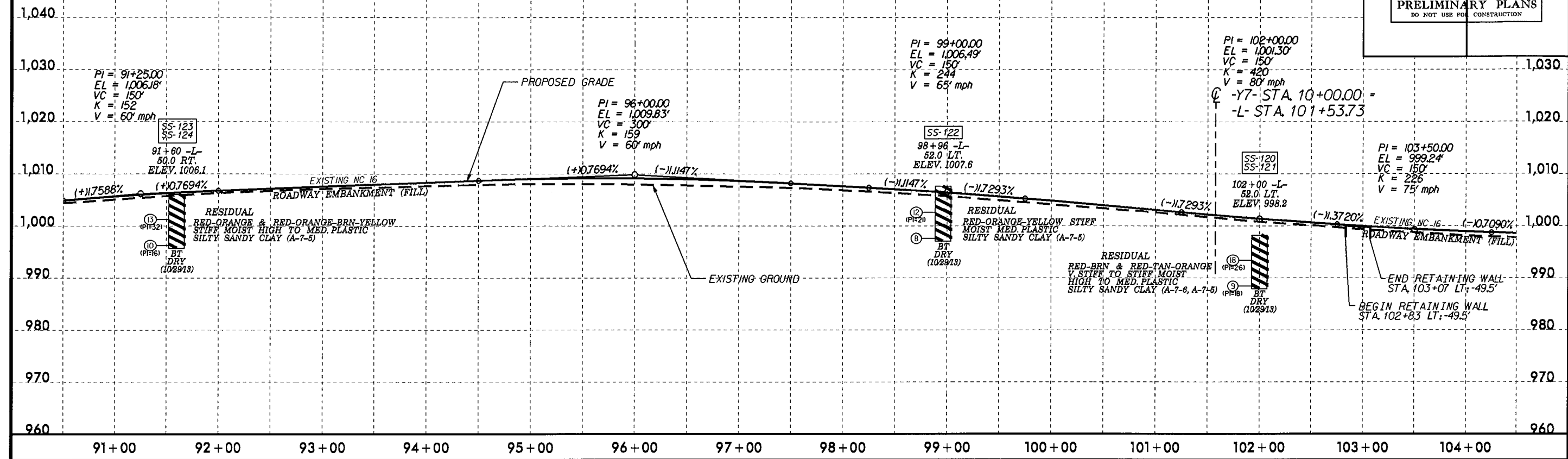
FOR -L- PLAN SEE SHEETS 8-9

18-DEC-2013 10:45 C:\Projects\1831000B\GEO\RDWY\CATAWBA\CADD\GEO\TECH\Plan\Prof of NR3100B.GED.pf.020.CATAWBA.dgn

5/28/95

Prepared by
URS
 1800 Peninsula Park Drive, Suite 400
 Walnut Creek, CA 94597
 Phone (925) 938-1100 Fax (925) 938-1418
 NC Lic # C-3245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



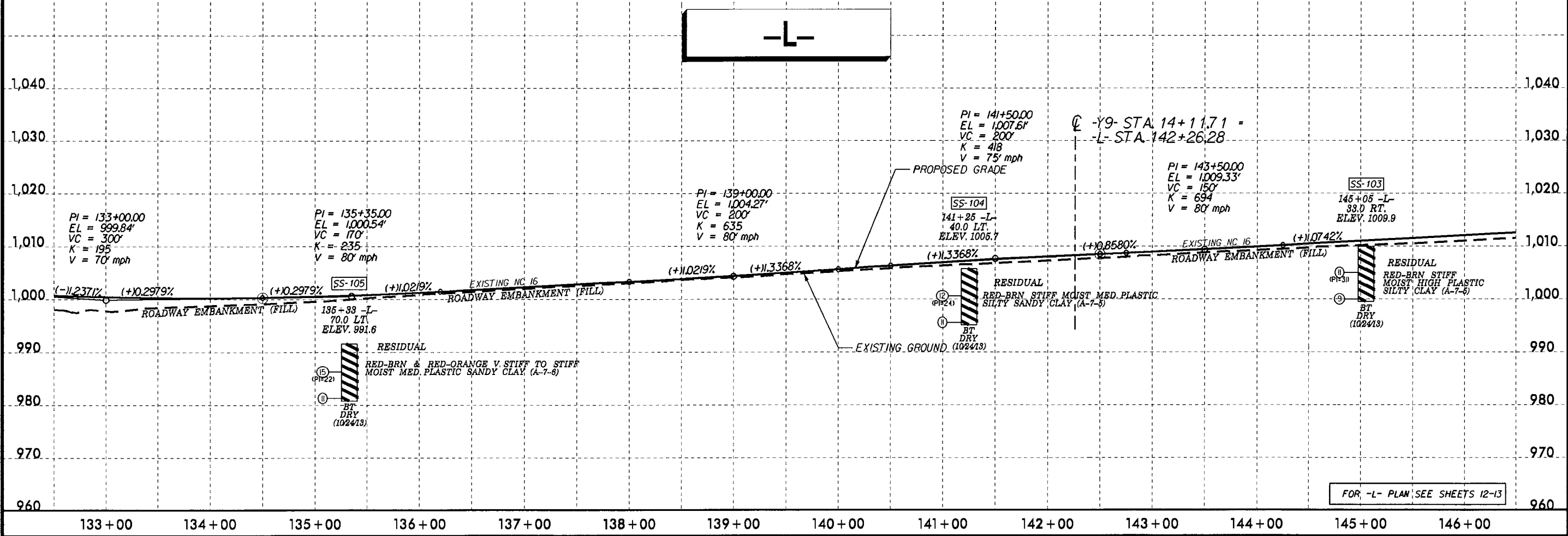
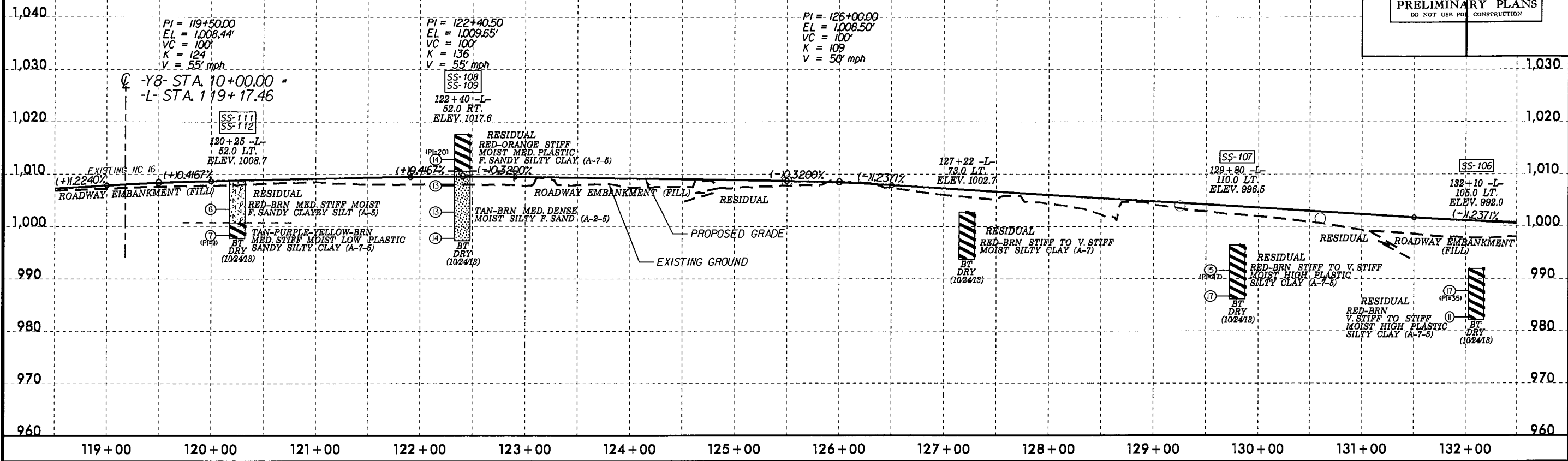
FOR -L- PLAN SEE SHEETS 10-11

19-DEC-2013 10:23 C:\p\projects\231008\250_ROWY_CATAWBA\CADD\DEOTECH\Plan\Pre\N3100b_GEO.pf.021.CATAWBA.dgn

5/28/95

Prepared by
URS
 1600 Peachtree Park Drive, Suite 400
 Atlanta, Georgia 30329
 Phone (404) 875-1100 Fax (404) 875-1418
 NC US # C-2245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



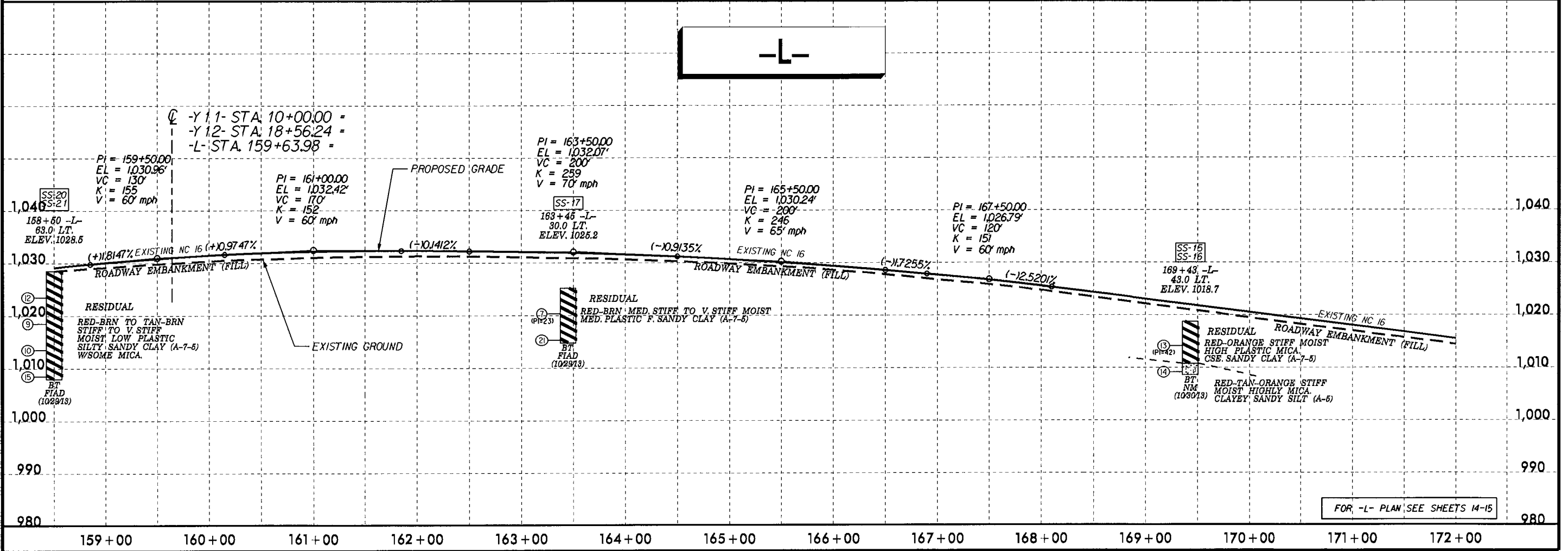
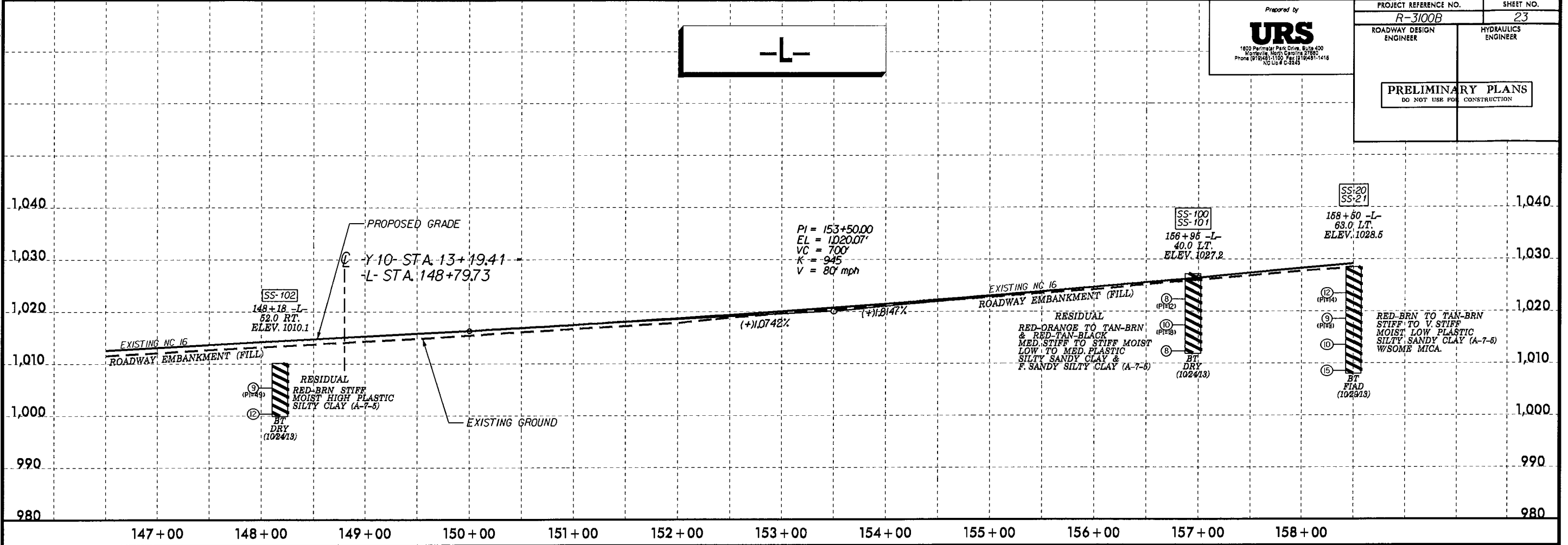
FOR -L- PLAN SEE SHEETS 12-13

19-DEC-2013 10:28 C:\p\projects\100555050_ROWY_CATAWBA\CADD\DETECH\plan\pr-ar3100b-geo-pf.022-CATAWBA.dgn

5/28/99



PROJECT REFERENCE NO.	SHEET NO.
R-3100B	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



FOR -L- PLAN SEE SHEETS 14-15

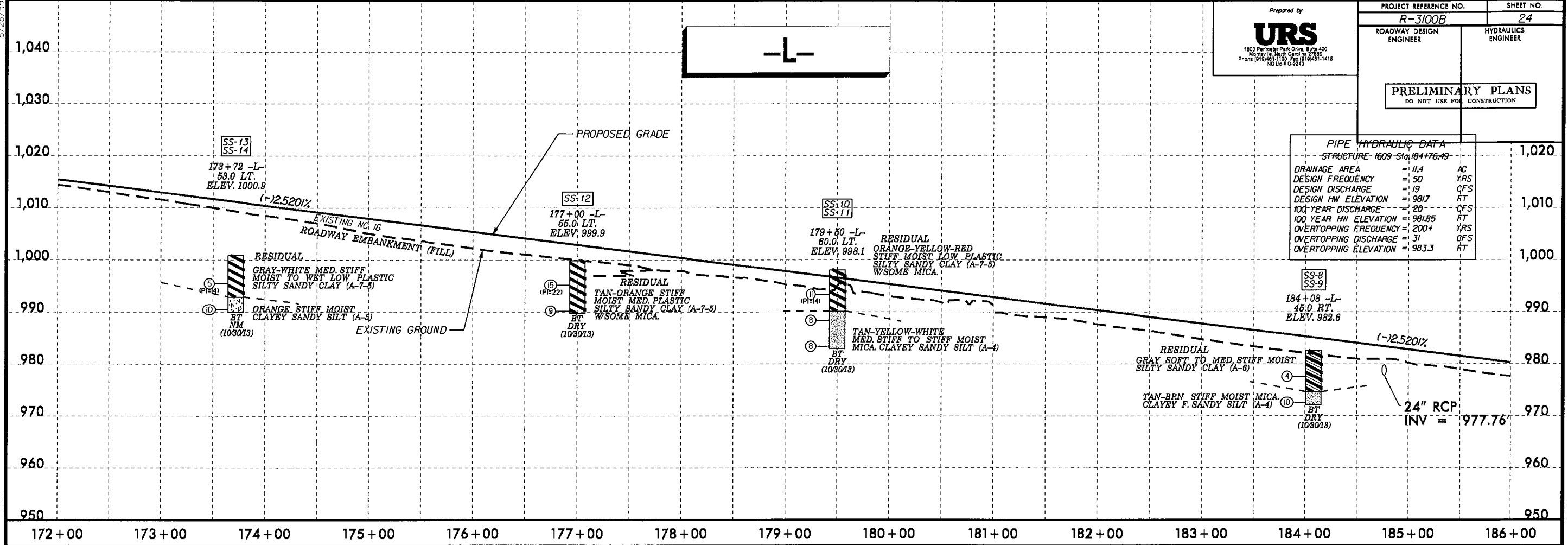
18-DEC-2013 10:53 C:\projects\131020b\50_ROWY_CATAWBA\CADD\GEOTECH\Plan\Prj\131020b_DED_pf_1023_CATAWBA.dgn

5/28/99

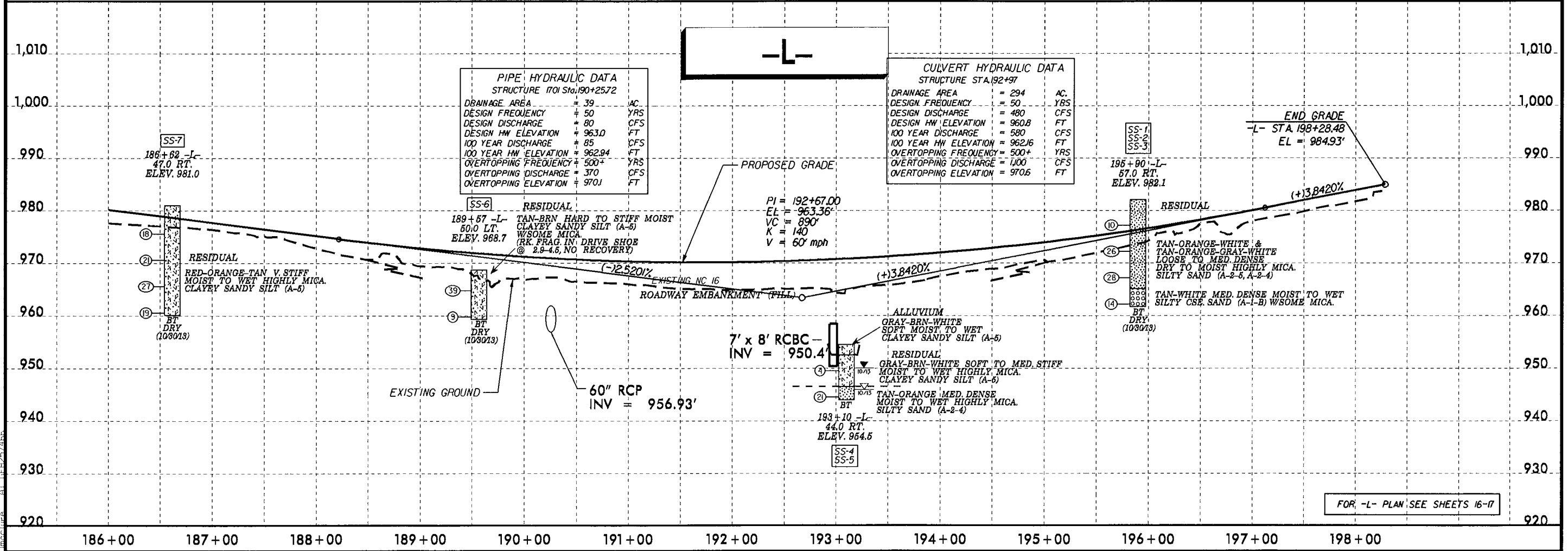
Prepared by
URS
1600 Parmer Park Drive, Suite 400
McAllen, TX 78501
Phone (957) 481-1100 Fax (957) 481-1416
NG Lic # C-2243

PROJECT REFERENCE NO. R-3100B SHEET NO. 24
ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PIPE HYDRAULIC DATA	
STRUCTURE STA. 184+76.49	
DRAINAGE AREA	= 11.4 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 19 CFS
DESIGN HW ELEVATION	= 981.7 FT
100 YEAR DISCHARGE	= 20 CFS
100 YEAR HW ELEVATION	= 981.85 FT
OVERTOPPING FREQUENCY	= 200+ YRS
OVERTOPPING DISCHARGE	= 31 CFS
OVERTOPPING ELEVATION	= 983.3 FT



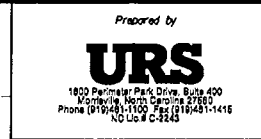
PIPE HYDRAULIC DATA	
STRUCTURE STA. 192+97	
DRAINAGE AREA	= 294 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 480 CFS
DESIGN HW ELEVATION	= 960.8 FT
100 YEAR DISCHARGE	= 580 CFS
100 YEAR HW ELEVATION	= 962.16 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 1100 CFS
OVERTOPPING ELEVATION	= 970.6 FT



FOR -L- PLAN SEE SHEETS 16-17

C:\NCE\2003\0437\CAT\TA\B\CADD\GEO\RD\Y_CAT\BWA\CADD\GEO\TECH\Plan\Prd\NR3100B_GEO.dwg, 04/24/04, CAT\BWA.dwg

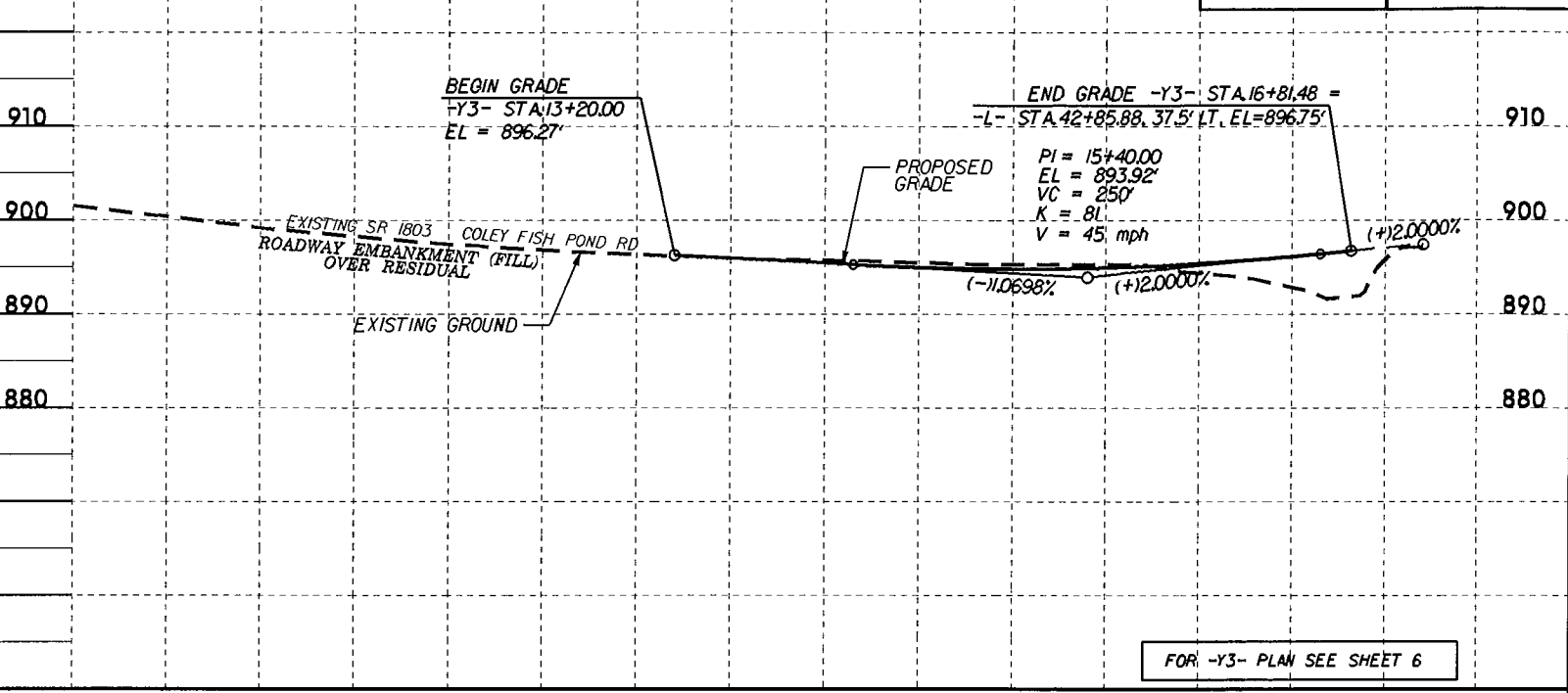
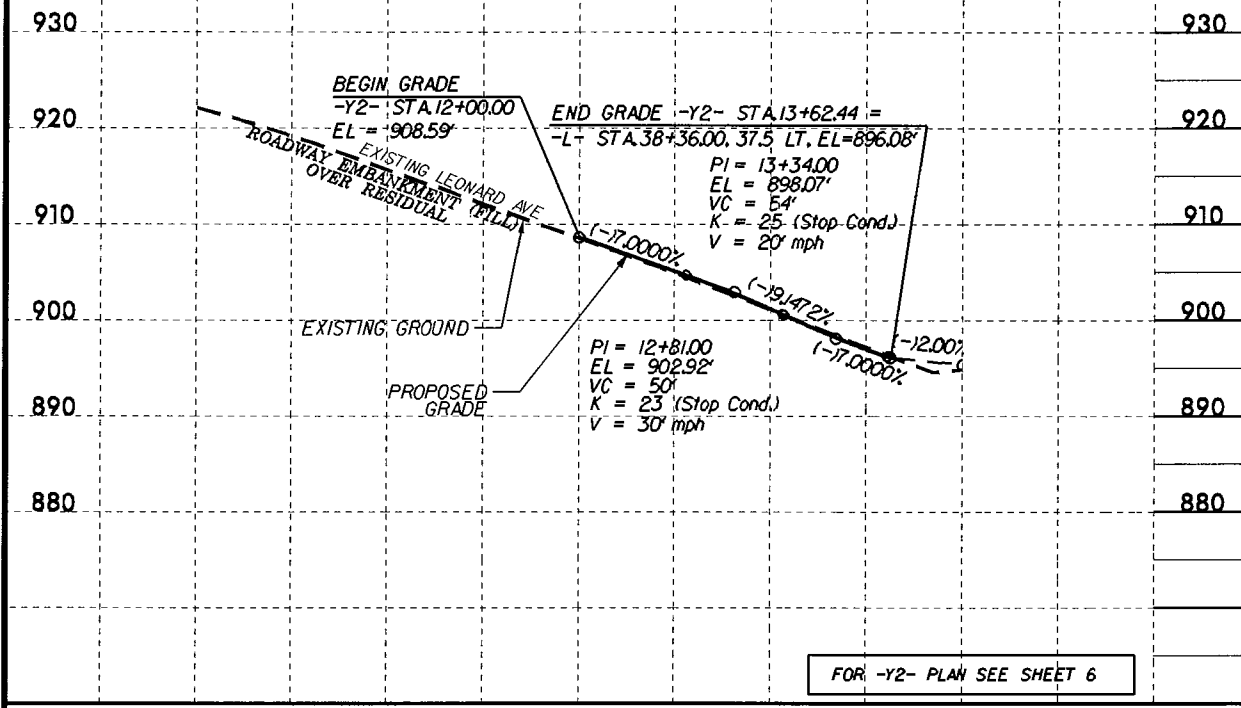
5/28/13



PROJECT REFERENCE NO. R-3100B	SHEET NO. 25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y2-

-Y3-



10+00 11+00 12+00

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

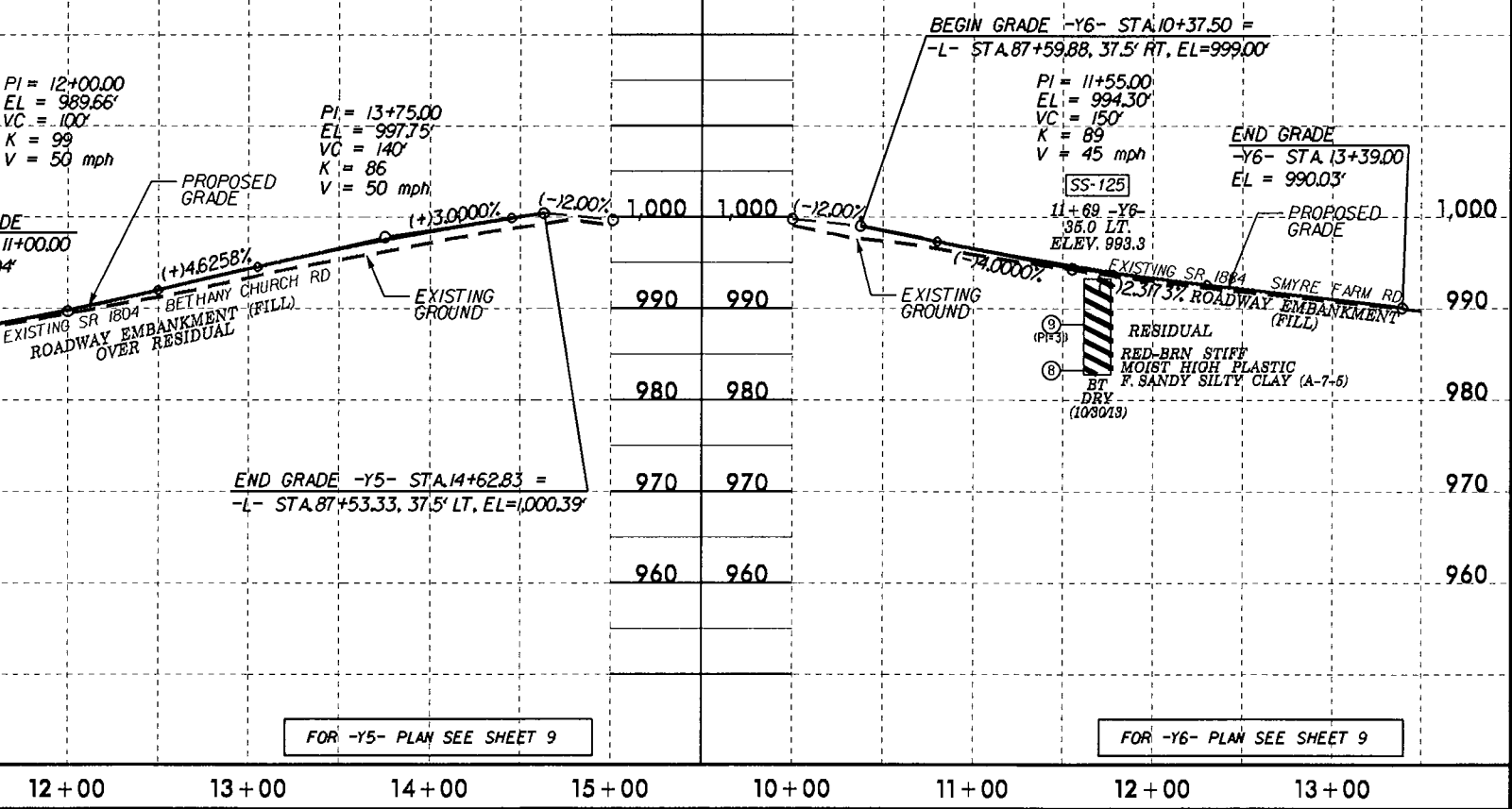
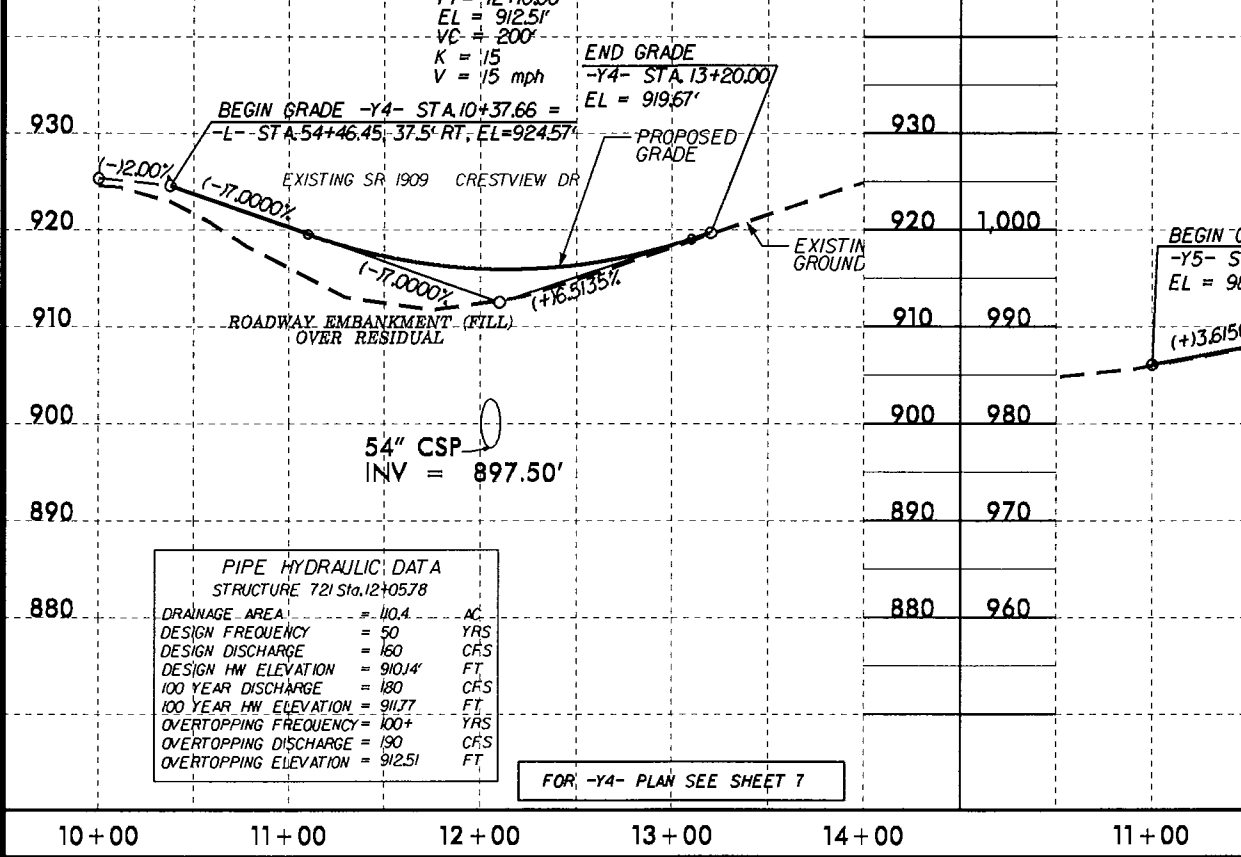
FOR -Y2- PLAN SEE SHEET 6

FOR -Y3- PLAN SEE SHEET 6

-Y4-

-Y5-

-Y6-



10+00 11+00 12+00 13+00 14+00

11+00 12+00 13+00 14+00 15+00 10+00 11+00 12+00 13+00

FOR -Y4- PLAN SEE SHEET 7

FOR -Y5- PLAN SEE SHEET 9

FOR -Y6- PLAN SEE SHEET 9

PIPE HYDRAULIC DATA	
STRUCTURE 721 Sta.12+05.78	
DRAINAGE AREA	= 110.4 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 160 CFS
DESIGN HW ELEVATION	= 910.14 FT
100 YEAR DISCHARGE	= 180 CFS
100 YEAR HW ELEVATION	= 911.77 FT
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING DISCHARGE	= 190 CFS
OVERTOPPING ELEVATION	= 912.51 FT

19-DEC-2013 14:26 C:\p\projects\Y3\1000\GEO\CATAMBA\CADD\GEO\TECH\Plan\pof\13100b_GEO.pf.1025_CATAMBA.dgn

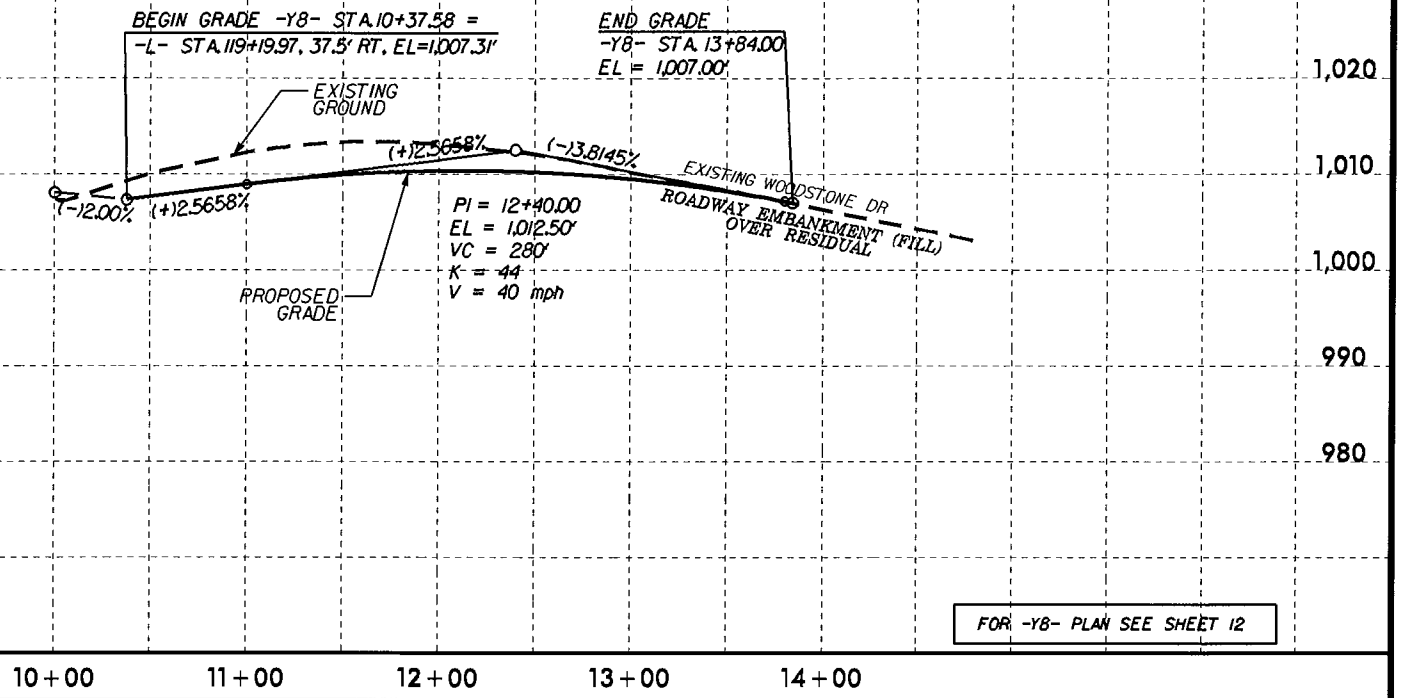
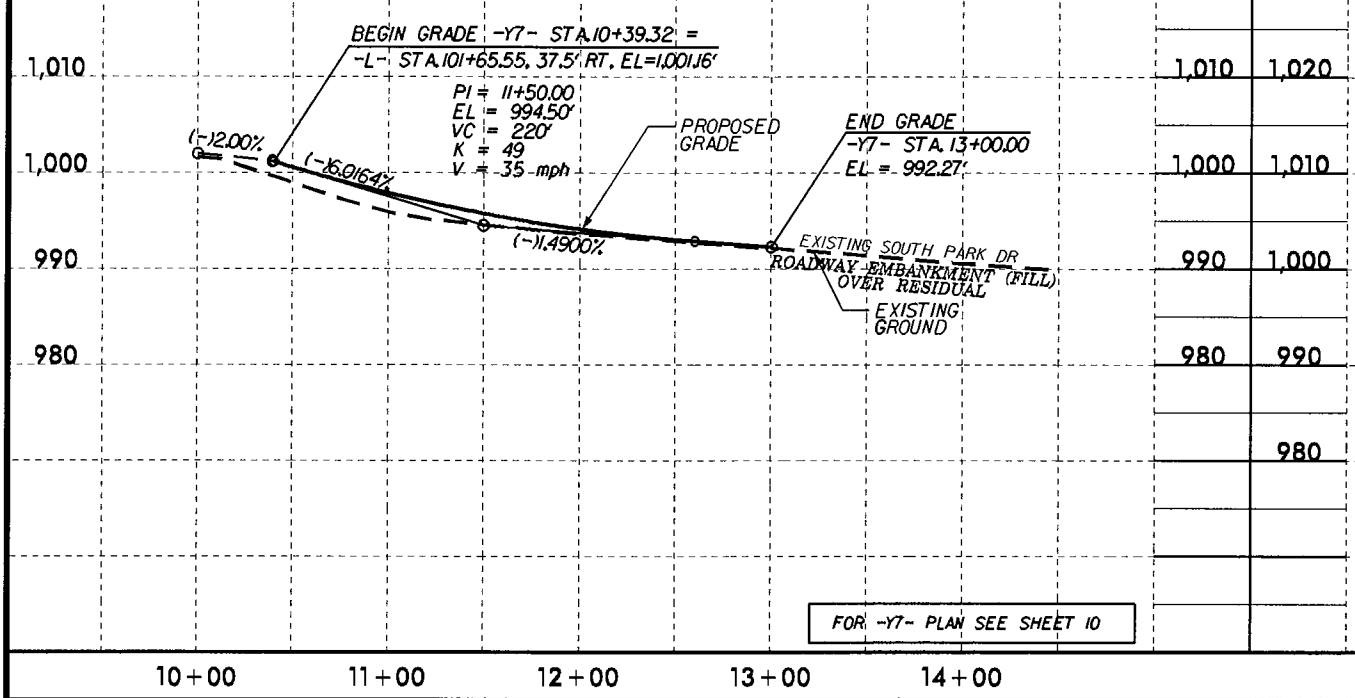
5/28/99

Prepared by
URS
1800 Piedmont Park Drive, Suite 400
Winston-Salem, North Carolina 27103
Phone (703) 412-1100 Fax (703) 412-1415
NC Lic # 0-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y7-

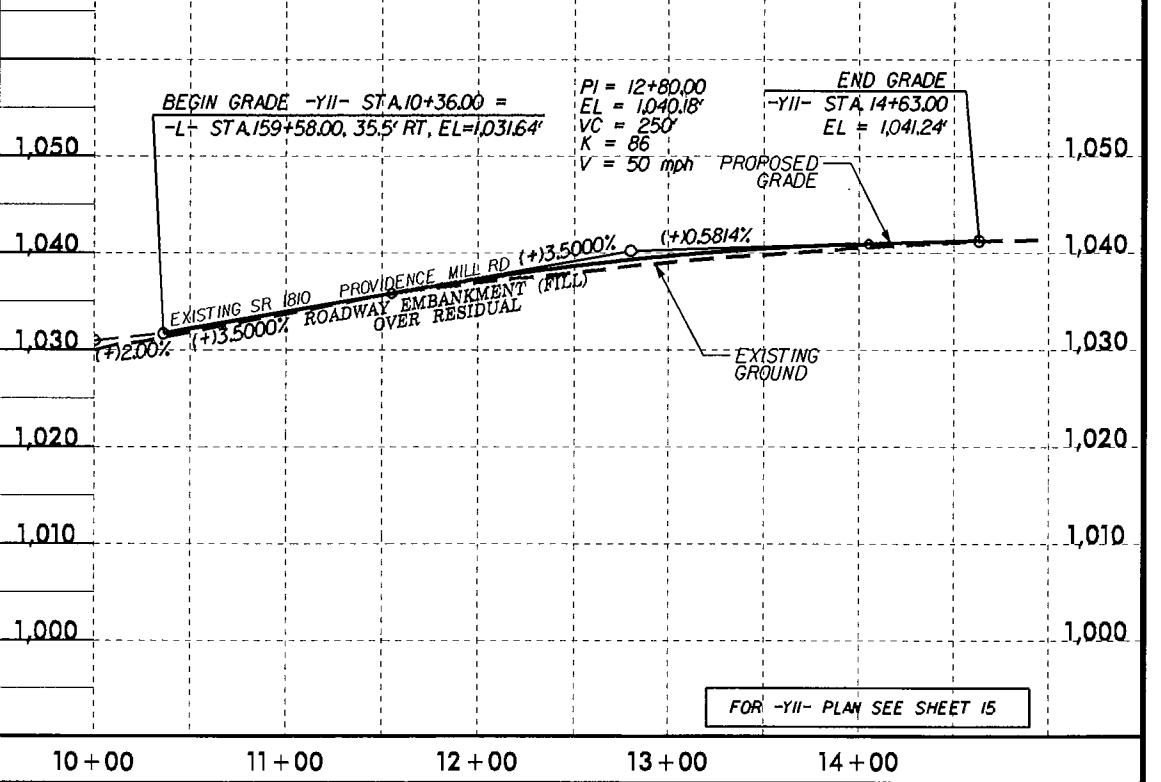
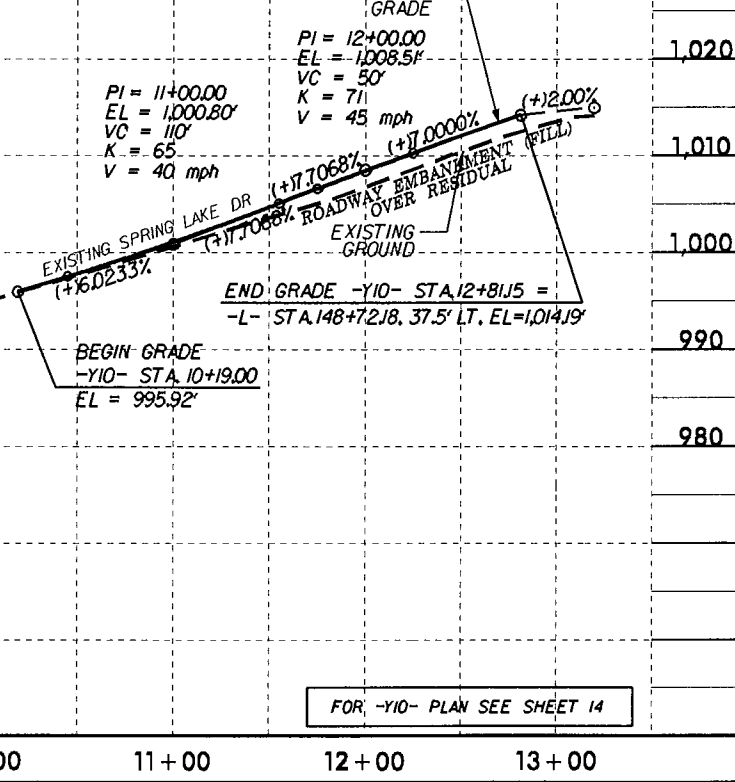
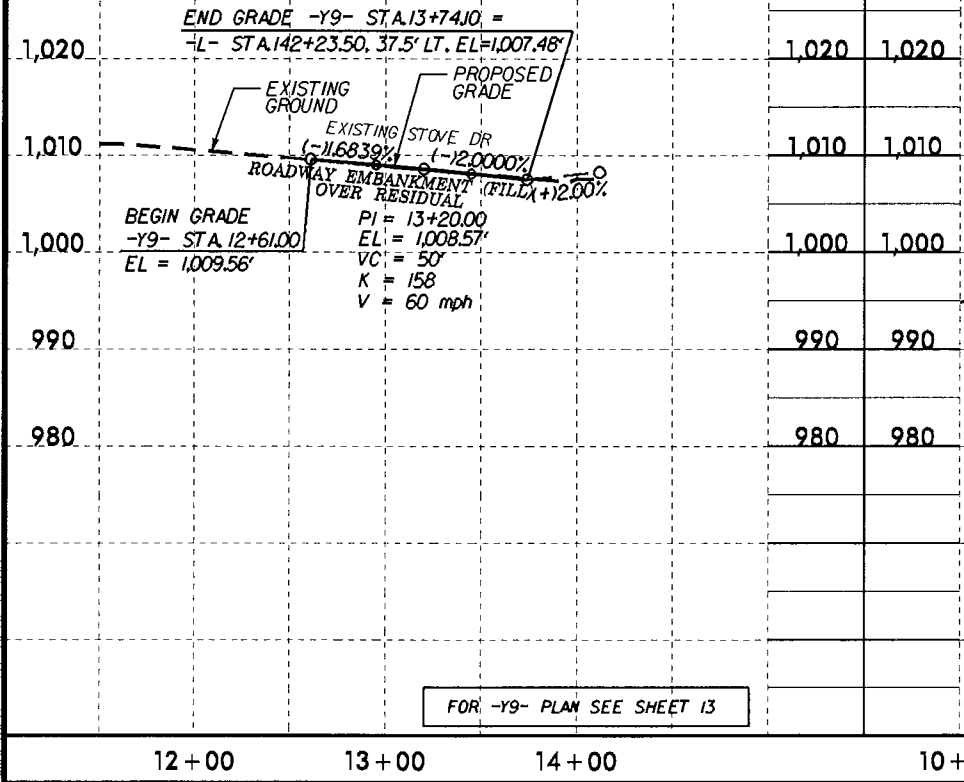
-Y8-



-Y9-

-Y10-

-Y11-



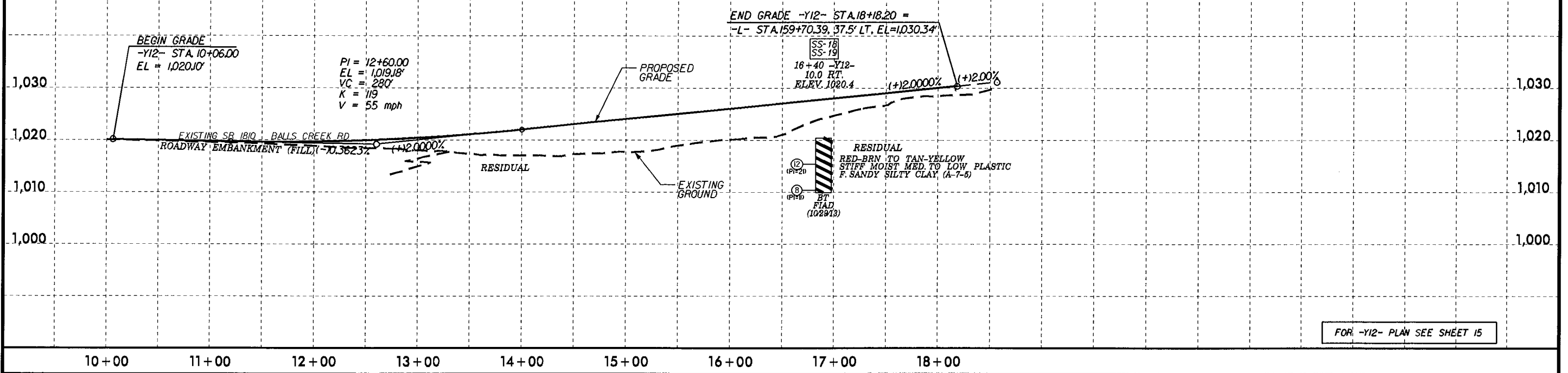
19-DEC-2013 10:22
C:\p\projects\3100B\3100B_GEO_ROWY_CATAWBA\CADD_GEO\TECHN\PlanPrj\3100B_GEO_pf1026_CATAWBA.dgn

5/28/99

Prepared by
URS
 1820 Perimeter Park Drive, Suite 400
 Atlanta, Georgia 30329
 Phone (404) 875-1100 Fax (404) 875-1416
 NC Lic # C-2245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y12-



FOR -Y12- PLAN SEE SHEET 15

19-DEC-2013 10:45
 C:\Projects\Y12\GEO\CADD\CATAMBA\CADD_GEO\TECH\PlanPr-of-R3100b-GED-pf-027-CATAMBA.dgn
 10/27/2013 10:45

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	Line or Boring ID
							C.SAND	F.SAND	SILT	CLAY	10	40	200			
SS-1	57 RT	195+90	4.4-5.4	A-2-5(0)	41	NP	40.0	37.9	14.0	8.1	98	74	28	-	-	L
SS-2	57 RT	195+90	14.4-15.4	A-2-4(0)	39	NP	41.2	30.3	20.5	8.1	94	71	32	-	-	L
SS-3	57 RT	195+90	19.4-20.4	A-1-b(0)	31	NP	56.1	25.4	10.4	8.1	79	45	17	-	-	L
SS-4	44 RT	193+10	4.5-5.5	A-5(0)	43	NP	29.7	39.6	20.7	10.1	96	80	39	-	-	L
SS-5	44 RT	193+10	9.5-10.5	A-2-4(0)	36	NP	48.0	32.7	11.2	8.1	91	63	23	-	-	L
SS-6	50 LT	189+57	8.4-9.4	A-5(1)	43	9	37.5	22.6	21.7	18.2	88	63	40	-	-	L
SS-7	47 RT	186+62	4.9-5.9	A-5(0)	45	NP	27.6	37.3	18.9	16.1	97	80	41	-	-	L
SS-8	45 RT	184+08	4.5-5.5	A-6(1)	33	14	42.8	19.0	10.0	28.3	87	59	36	-	-	L
SS-9	45 RT	184+08	9.5-10.5	A-4(0)	35	NP	28.1	40.8	19.1	12.1	96	83	37	-	-	L
SS-10	60 LT	179+50	4.2-5.2	A-7-5(9)	59	14	27.6	16.3	17.7	38.3	98	80	58	-	-	L
SS-11	60 LT	179+50	9.2-10.2	A-4(0)	37	NP	36.9	24.4	16.4	22.2	93	67	40	-	-	L
SS-12	55 LT	177+00	4.2-5.2	A-7-5(8)	56	22	27.0	17.4	13.2	42.4	82	65	48	-	-	L
SS-13	53 LT	173+72	4.9-5.9	A-7-5(6)	50	14	28.7	17.4	17.7	36.3	90	70	52	-	-	L
SS-14	53 LT	173+72	9.9-10.9	A-5(0)	46	NP	32.3	35.9	19.7	12.1	94	75	37	-	-	L
SS-15	43 LT	169+43	4.1-5.1	A-7-5(32)	87	42	18.8	8.5	8.2	64.6	93	79	69	-	-	L
SS-16	43 LT	169+43	9.1-10.1	A-5(0)	50	NP	37.7	25.2	14.8	22.2	90	66	39	-	-	L
SS-17	30 LT	163+45	4.4-5.4	A-7-5(25)	61	23	5.0	11.9	6.4	76.7	100	97	86	-	-	L
SS-18	10 RT	16+40	4.5-5.5	A-7-5(24)	62	21	3.4	13.3	30.8	52.5	100	98	88	-	-	Y12
SS-19	10 RT	16+40	9.5-10.5	A-7-5(14)	58	11	5.2	16.8	39.7	38.3	98	96	82	-	-	Y12
SS-20	63 LT	158+50	4.5-5.5	A-7-5(10)	53	14	14.3	26.2	17.1	42.4	96	86	64	-	-	L
SS-21	63 LT	158+50	9.5-10.5	A-7-5(13)	58	11	1.6	33.7	34.4	30.3	100	99	78	-	-	L
SS-100	40 LT	156+95	4.4-5.4	A-7-5(8)	49	12	12.5	32.4	33.0	22.1	100	93	63	-	-	L
SS-101	40 LT	156+95	9.4-10.4	A-7-5(17)	55	18	7.4	19.5	36.8	36.2	100	96	78	-	-	L
SS-102	52 RT	148+18	4.2-5.2	A-7-5(57)	85	49	1.4	5.0	27.2	66.4	100	99	95	-	-	L
SS-103	33 RT	145+05	4.4-5.4	A-7-5(39)	73	31	1.0	4.4	36.2	58.4	100	100	96	-	-	L
SS-104	40 LT	141+25	4.6-5.6	A-7-5(17)	54	24	10.9	21.5	15.3	52.3	98	93	69	-	-	L
SS-105	70 LT	135+33	4.8-5.8	A-7-6(9)	50	22	16.7	28.8	8.2	46.3	95	86	54	-	-	L
SS-106	105 LT	132+10	3.8-4.8	A-7-5(44)	77	35	1.0	4.8	37.8	56.3	100	99	96	-	-	L
SS-107	110 LT	129+80	4.3-5.3	A-7-5(56)	88	47	1.8	4.8	22.9	70.4	100	99	95	-	-	L
SS-108	52 RT	122+40	4.3-5.3	A-7-5(20)	65	20	8.5	17.3	30.0	44.3	100	95	78	-	-	L
SS-109	52 RT	122+40	9.3-10.3	A-2-5(0)	42	NP	21.7	54.5	15.7	8.0	91	81	28	-	-	L
SS-111	52 LT	120+25	4.9-5.9	A-5(9)	50	4	0.6	19.9	49.3	30.2	100	100	89	-	-	L
SS-112	52 LT	120+25	9.9-10.9	A-7-5(11)	61	11	10.5	28.4	41.0	20.1	100	93	70	-	-	L
SS-113	47 LT	117+83	4.7-5.7	A-7-6(10)	44	15	13.3	14.7	33.8	38.2	95	87	70	-	-	L
SS-114	38 LT	114+05	4.5-5.5	A-7-5(17)	59	28	20.1	16.3	13.3	50.3	97	84	64	-	-	L
SS-115	38 LT	114+05	9.5-10.5	A-7-5(32)	77	38	17.1	9.9	24.7	48.3	97	83	74	-	-	L
SS-116	63 RT	109+08	4.1-5.1	A-2-4(0)	26	NP	28.4	42.7	22.9	6.0	88	75	32	-	-	L
SS-117	63 RT	109+08	9.1-10.1	A-2-4(0)	24	NP	44.3	36.0	13.7	6.0	100	75	25	-	-	L
SS-118	38 LT	105+55	4.6-5.6	A-7-6(12)	51	31	29.2	17.9	10.7	42.3	95	76	52	-	-	L
SS-119	38 LT	105+55	9.6-10.6	A-7-5(10)	49	16	19.5	20.7	33.6	26.2	97	84	65	-	-	L
SS-120	52 LT	102+00	4.3-5.3	A-7-6(14)	52	26	16.3	26.2	13.3	44.3	100	90	60	-	-	L
SS-121	52 LT	102+00	9.3-10.3	A-7-5(12)	53	18	20.5	18.9	30.4	30.2	100	87	65	-	-	L
SS-122	52 LT	98+96	4.5-5.5	A-7-5(12)	58	21	27.8	15.1	24.9	32.2	99	77	60	-	-	L
SS-123	50 RT	91+60	4.3-5.3	A-7-5(24)	72	32	23.1	10.5	18.1	48.3	100	83	69	-	-	L
SS-124	50 RT	91+60	9.3-10.3	A-7-5(11)	54	16	20.3	17.9	31.6	30.2	99	85	66	-	-	L
SS-125	35 LT	11+69	4.5-5.5	A-7-5(33)	69	31	2.8	14.7	36.2	46.3	100	99	87	-	-	Y-6
SS-126	45 RT	80+83	4.5-5.5	A-7-5(9)	50	17	26.9	18.6	22.1	32.4	100	79	59	-	-	L
SS-127	45 RT	80+83	9.5-10.5	A-4(1)	38	6	33.8	24.7	23.3	18.2	98	74	47	-	-	L
SS-128	60 LT	72+00	4.8-5.8	A-5(3)	44	8	18.0	36.2	29.6	16.2	100	90	53	-	-	L
SS-129	53 LT	69+00	4.7-5.7	A-7-5(24)	69	29	14.2	18.0	19.2	48.6	100	91	72	-	-	L
SS-130	44 LT	65+88	4.6-5.6	A-7-5(31)	75	35	13.2	13.2	23.1	50.6	100	92	77	-	-	L
SS-131	44 LT	65+88	9.6-10.6	A-7-5(9)	56	16	27.1	18.4	26.1	28.3	98	78	58	-	-	L
SS-131A	38 LT	58+53	4.2-5.2	A-7-6(13)	49	27	27.7	17.6	12.1	42.5	100	82	57	-	-	L
SS-132	38 LT	58+53	9.2-10.7	A-7-5(13)	58	22	23.7	18.4	15.4	42.5	100	85	62	-	-	L
SS-133	64 LT	55+30	4.5-5.5	A-7-6(18)	54	25	16.4	17.2	21.9	44.5	100	90	70	-	-	L
SS-134	64 LT	55+30	9.5-10.5	A-4(2)	38	10	27.7	29.6	22.5	20.2	100	84	48	-	-	L
SS-135	64 LT	55+30	19.5-20.5	A-5(2)	46	2	14.6	36.0	31.2	18.2	100	93	57	-	-	L
SS-135A	70 RT	46+75	5.2-6.2	A-1-b(0)	39	NP	50.6	28.9	12.3	8.1	63	40	15	-	-	L
SS-136	72 RT	42+96	4.9-5.9	A-2-4(0)	25	NP	55.3	28.3	8.3	8.1	90	56	17	-	-	L
SS-137	72 RT	42+96	9.9-10.9	A-2-4(0)	36	NP	44.1	36.6	13.2	6.1	96	71	23	-	-	L
SS-138	72 RT	42+96	14.9-15.9	A-2-4(0)	34	NP	27.1	49.6	17.2	6.1	100	90	31	-	-	L
SS-140	62 LT	26+50	4.7-5.7	A-7-5(38)	79	36	3.8	16.2	27.5	52.5	100	98	85	-	-	L
SS-141	62 LT	26+50	14.7-15.7	A-2-4(0)	39	NP	43.0	31.7	19.2	6.1	100	70	31	-	-	L
SS-142	62 LT	26+50	19.7-20.7	A-2-4(0)	37	2	34.7	38.4	20.8	6.1	94	77	31	-	-	L
SS-143	77 LT	20+15	4.4-5.4	A-7-5(8)	58	23	29.1	24.6	7.9	38.4	94	76	47	-	-	L
SS-144	77 LT	20+15	9.4-10.4	A-2-4(0)	39	NP	32.3	45.1	16.6	6.1	95	78	31	-	-	L
SS-145	94 RT	29+00	4.8-5.8	A-4(0)	33	5	20.2	39.2	24.4	16.2	96	85	46	-	-	L
SS-146	94 RT	29+00	9.8-10.8	A-2-4(0)	29	NP	31.9	46.7	15.4	6.1	83	70	23	-	-	L
SS-147	94 RT	29+00	14.8-15.4	A-2-4(0)	34	NP	32.9	43.4	15.6	8.1	100	81	29	-	-	L