

CONTRACT: C202067 ID: R-4430

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

# ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34623.1.1 F.A. PROJ. R-4430  
COUNTY HENDERSON  
PROJECT DESCRIPTION SR-1783 (UPWARD ROAD)  
FROM US-176 TO SR-1006

## INVENTORY

CONTENTS			
LINE	STATION	SHEET NUMBERS	
		PLAN	PROFILE XSECT
-L-	14+96 to 161+68	4 - 14	17
-Y7-	11+80 to 17+75	8	40
-Y11-	5+40 to 11+46	9	41
-Y16-	10+00 to 16+38	11	43
SUBJECT		SHEET NUMBER	
SAMPLE RESULTS		45	

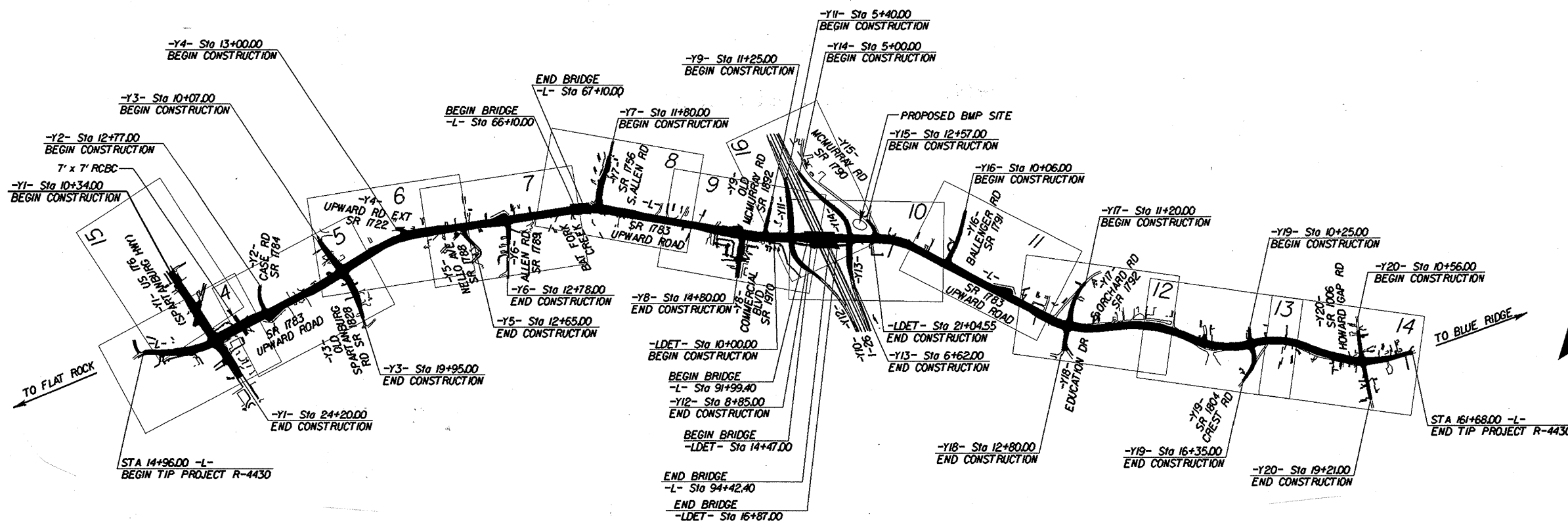
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4430	1	50
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34623.1.1	STP-1783 (1)	P.E.	
34623.3.1	STP-1783 (1)	R / W	
34623.3.1	STP-1783 (1)	UTILITIES	
34623.2.2	STP-1783 (1)	CONSTRUCTION	

### 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.

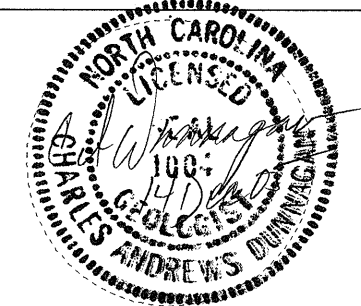
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORHOLE. THE LABORATORY SAMPLE DATA AND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

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



- PERSONNEL
- T B DANIEL
  - P O LOCKAMY
  - C J COFFEY
  - L E LANKFORD
  - J T WILLIAMS

INVESTIGATED BY C A DUNNAGAN  
CHECKED BY W D FRYE, JR  
SUBMITTED BY W D FRYE, JR  
DATE DECEMBER 2005



DRAWN BY: C A DUNNAGAN

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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. 34623.1J (R-4430)	SHEET NO. 2/50
--	-------------------

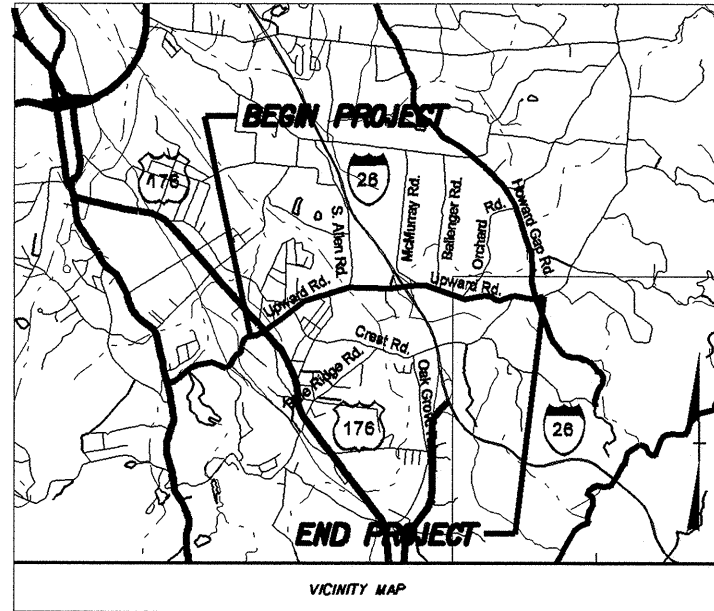
SUBSURFACE INVESTIGATION

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 (AASHTO T206, 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, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY 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.  ANGULARITY OF GRAINS 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 SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	ALLUVIUM (ALLUV.) - SOILS 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 DISLOGGED 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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - 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.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b> 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-4, A-5 A-6, A-7 SYMBOL [Diagrams showing soil symbols for various groups] % PASSING: 10, 40, 200 LIQUID LIMIT PLASTIC INDEX GROUP INDEX USUAL TYPES OF MAJOR MATERIALS: STONE FRAGS., GRAVEL AND SAND, FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS GEN. RATING AS A SUBGRADE: EXCELLENT TO GOOD, FAIR TO POOR, FAIR TO POOR, POOR, UNSUITABLE PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30	<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.  <b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50  <b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	<b>WEATHERING</b> FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	<b>ROCK HARDNESS</b> VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.
<b>CONSISTENCY OR DENSENESS</b> PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> ) GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE, LOOSE, MEDIUM DENSE, DENSE, VERY DENSE <4, 4 TO 10, 10 TO 30, 30 TO 50 N/A GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY 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	<b>MISCELLANEOUS SYMBOLS</b> 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 SOUNDING ROD TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL	<b>ABBREVIATIONS</b> AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HI - HIGHLY MED - MEDIUM MICA - MICACEOUS MOD - MODERATELY NP - NON PLASTIC ORG - ORGANIC PMT - PRESSUREMETER TEST SAP - SAPROLITIC SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA - WEATHERED γ <sub>u</sub> - UNIT WEIGHT γ <sub>d</sub> - DRY UNIT WEIGHT	<b>TEXTURE OR GRAIN SIZE</b> U.S. STD. SIEVE SIZE OPENING (MM) 4, 10, 40, 60, 200, 270 BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM 305, 75, 2.0, 0.25, 0.05, 0.005 IN. 12, 3
<b>SOIL MOISTURE - CORRELATION OF TERMS</b> SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE - MDIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<b>EQUIPMENT USED ON SUBJECT PROJECT</b> DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-550, PORTABLE HOIST, OTHER ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT, OTHER HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST, OTHER	<b>FRACTURE SPACING</b> TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.6 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET  <b>BEDDING</b> 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  <b>INDURATION</b> 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.	<b>PLASTICITY</b> NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

**TIP PROJECT: R-4430**

SEE SHEET 1-A FOR INDEX OF SHEETS  
SEE SHEET 1-B FOR CONVENTIONAL PLAN SHEET SYMBOLS



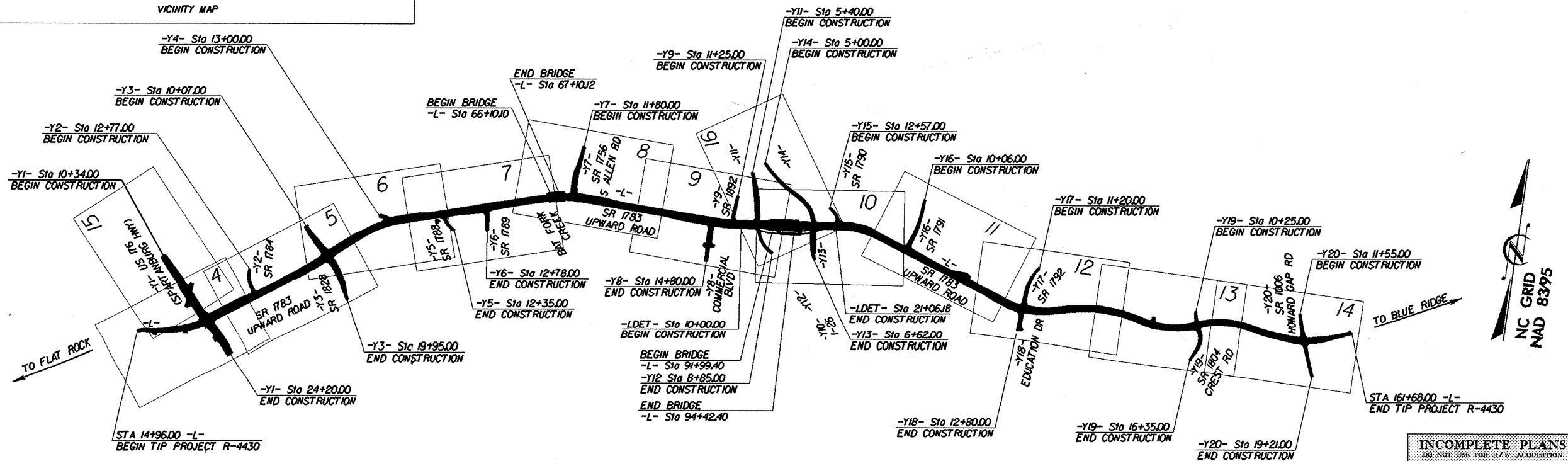
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**HENDERSON COUNTY**

**LOCATION: SR 1783 (UPWARD ROAD) FROM US 176 (SPARTANBURG HWY) TO SR 1006 (HOWARD GAP ROAD)**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT, AND STRUCTURES**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4430	2A	50
STATE PROJ. NO.	R.A. PROJ. NO.	DESCRIPTION	
34623.1.1	STP-1783 (1)	P.E.	

**STRUCTURE RECOMMENDATIONS**



NCDOT CONTACT: B.D. TAYLOR, P.E.  
PROJECT ENGINEER  
ROADWAY DESIGN UNIT

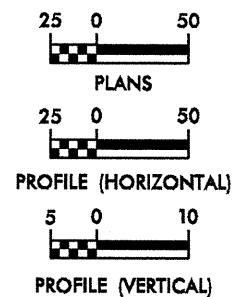
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_\_\_\_  
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF EAST FLAT ROCK

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

This document, together with the concepts and designs presented herein, is an "as shown" instrument of service and is not to be used for any other purpose without the written authorization and approval of Kimley-Horn and Associates, Inc. or its duly authorized representative. The user of this document shall be responsible for obtaining all necessary permits and approvals from the appropriate authorities. The user of this document shall be responsible for obtaining all necessary permits and approvals from the appropriate authorities. The user of this document shall be responsible for obtaining all necessary permits and approvals from the appropriate authorities.

**CONTRACT:**

**GRAPHIC SCALE**



**DESIGN DATA**

ADT 2008 = 21,600 VPD  
ADT 2028 = 34,700 VPD  
DHV = 10%  
D = 60%  
T = 5% \*  
V = 50 mph  
VERTICAL CURVE DESIGN EXCEPTIONS  
FUNCTIONAL CLASSIFICATION: URBAN ARTERIAL  
\* (TTST 3% + DUAL 2%)

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT R-4430 = 2.714 MILES  
LENGTH OF STRUCTURE TIP PROJECT R-4430 = 0.065 MILES  
TOTAL LENGTH OF TIP PROJECT R-4430 = 2.779 MILES

PLANS PREPARED FOR NCDOT BY:



2002 STANDARD SPECIFICATIONS

RIGHT-OF-WAY DATE:  
OCTOBER 20, 2006

LETTING DATE:  
OCTOBER 21, 2008

**JEFFREY W. MOORE, P.E.**  
PROJECT ENGINEER

**J. JASON PACE**  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: \_\_\_\_\_  
ROADWAY DESIGN

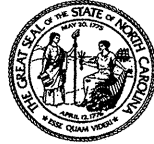
SIGNATURE: \_\_\_\_\_

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER  
DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED  
DIVISION ADMINISTRATOR

\$FILES\$



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

December 13, 2005

STATE PROJECT: 34623.1.1 (R-4430)  
COUNTY: Henderson

DESCRIPTION: SR-1783 (Upward Road) from US-176 (Spartanburg Highway) to SR-1006 (Howard Gap Road)

SUBJECT: Geotechnical Report – Inventory

**Project Description**

This project consists of improvements, primarily widening, of 2.8 miles of SR-1783. Some relocation of SR-1783 is also proposed. Also included are the ramps at the intersection of -L- (SR-1783) and -Y10- (I-26), and several -Y- Lines. The subsurface investigation was conducted using a CME-550 with an automatic drive hammer. Standard Penetration Tests (SPT's) were performed at intervals of 5.0 feet. Several holes were advanced in which SPT's were not performed. One hand auger hole was advanced between -Y10- and -Y14-. Representative soil samples were collected and submitted for testing of quality.

**Areas of Special Geotechnical Interest**

1) Floodplain (Alluvial) Deposits: Minor amounts of alluvium are associated with some of the creeks crossing centerline. More significant deposits are located at the following areas.

<u>Line</u>	<u>Station Interval</u>
-L-	63+00 – 67+50
-L-	95+00 – 97+50

MAILING ADDRESS:  
NC DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL ENGINEERING UNIT  
1589 MAIL SERVICE CENTER  
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088  
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:  
CENTURY CENTER COMPLEX  
BUILDING B  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC 27610

3/50

2) Streams Crossing Centerline:

<u>Line</u>	<u>Station</u>
-L-	26+45
-L-	63+45
-L-	64+85
-L-	70+55 (Bat Fork Crk.)
-L-	79+70
-L-	96+60
-Y15-	10+30

3) Wells: One water well was noted to be within construction limits.

<u>Line</u>	<u>Station</u>	<u>Offset</u>
-Y17-	13+30	20' LT

4) Springs and Seeps: A spring was noted at the following location. It is possible that this is not a natural phenomenon, but the product of drainage from SR-1783, and to a business located to the right of, approximate -L- Station 100+00.

<u>Line</u>	<u>Station</u>	<u>Offset</u>
-L-	97+50	85' RT

5) Debris and Waste: Construction debris is located at the following station interval. This is composed primarily of chunks of concrete and asphalt, piled 2.0 to 4.0 feet high.

<u>Line</u>	<u>Station Interval</u>	<u>Offset</u>
-L-	26+00 to 29+50	40.0' to 50.0' RT

**Physiography and Geology**

Although located in the mountains, the terrain within the project corridor is essentially flat. From the beginning of the project to approximate -L- Station 65+00, land use is mixed single family dwellings and small businesses. From -L- Station 65+00 to -L- Station 101+00, businesses (including gas stations) are predominant. From approximate -L- Station 101+00 to the end of the project, single family dwellings, orchards and a school take up most of the land. The rocks



underlying this project are mica gneisses within the Ashe Meta-morphic suite. They will not be involved in the roadway. Static groundwater was measured in most of the borings near these creeks. The water levels were generally 5.0 feet below proposed grade. Away from these creeks, groundwater was not encountered in any borings.

**Bulk Samples**

The following bulk samples was taken for tests to determine the engineering properties of the soil.

<u>Sample No.</u>	<u>Location</u>	<u>Depth (Ft.)</u>	<u>Tests</u>
BS-1	133+00, 45.0' RT -L-	0.0 - 10.0	Triaxial Cu, Proctor

**Undisturbed Samples**

Retrieval of an undisturbed "Shelby" tube sample was attempted at -L- Station 26+50, 80.0' LT. Unfortunately, there was no recovery.

**Geotechnical Descriptive Analysis**

This project is essentially widening an existing road through fairly flat terrain. As such, the highest proposed embankment is 21.0 feet at the shoulder point; the deepest cut is about 10.0 feet at the ditchline.

The primary soils encountered along this project are saprolites. These are medium dense silty sands and sandy silts. They contain moderate to abundant amounts of mica.

Residual soils were encountered sporadically throughout the project. These are comprised of stiff sandy silts, silty sands and medium stiff silty clays.

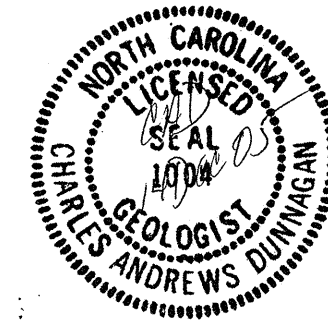
Alluvium is present near the creeks and streams that cross the project corridor. The most extensive deposits are associated with Bat Fork Creek and Dunn's Creek. At Bat Fork Creek, the alluvium is comprised of loose to medium dense silty and soft sandy silt. Organic material is present, generally in trace amounts. The Dunn's Creek site is located near End Bent Two of the bridge on SR-1783 over I-26. Here, the alluvium is very loose to loose silty sand and medium stiff sandy silt. Organic material is occasionally present in moderate amounts, but in thin lenses.

Existing roadway embankment is, of course, present throughout the project. The tallest embankments are under SR-1783 on either side of the bridge over I-26. This material is 20.0 to 25.0 feet of loose to medium dense silty sand with gravel.

Fill was noted in several areas along the project. The most extensive amount of fill is located around Bat Fork Creek. This material is a loose silty sand.

Respectfully Submitted,

Charles A. Dunnagan, LG  
Project Engineering Geologist



# EARTHWORK BALANCE SHEET

3B / 50

Volumes in Cubic Yards

PROJECT TIP # R-4430

COUNTY Henderson

DATE 12/2/2008

SHEET 1 OF 4 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
SUMMARY NO. 1 (LEFT)																
L	14+96.00	23+16.34	792				792	105		0	105	121	0	671	0	671
Y1	10+34.00	19+37.31	1206				1206	671		0	671	772	0	434	0	434
Y1	19+37.31	24+20.00	0				0	0		0	0	0	0	0	0	0
L	23+16.34	44+00.00	4806				4806	19699		0	19699	22654	17848	0	0	0
Y2	12+77.00	15+65.25	63				63	216		0	216	248	185	0	0	0
Y3	10+07.00	14+30.85	1401				1401	600		0	600	690	0	711	0	711
Y3	14+30.85	19+95.00	0				0	0		0	0	0	0	0	0	0
TOTAL SUMMARY NO. 1 (LEFT)			8268	0	0	0	8268	21291	0	0	21291	24485	18033	1816	0	1816
SUMMARY NO. 2 (LEFT)																
L	44+00.00	66+10.00	1327				1327	15812		0	15812	18184	16857	0	0	0
Y4	13+00.00	14+23.44	15				15	141		0	141	162	147	0	0	0
Y5	10+34.75	12+65.00	0				0	0		0	0	0	0	0	0	0
Y6	10+35.27	12+78.00	0				0	0		0	0	0	0	0	0	0
TOTAL SUMMARY NO. 2 (LEFT)			1342	0	0	0	1342	15953	0	0	15953	18346	17004	0	0	0
SUMMARY NO. 3 (LEFT)																
L	67+10.00	91+99.40	4286				4286	11110		0	11110	12777	8491	0	0	0
Y7	11+80.00	17+40.25	67				67	3706		0	3706	4262	4195	0	0	0
Y8	10+54.00	14+80.00	0				0	0		0	0	0	0	0	0	0
Y9	11+25.00	14+04.67	175				175	5		0	5	6	0	169	0	169
Y11	5+40.00	11+06.09	771				771	623		0	623	716	0	55	0	55
Y12	8+85.00	12+32.33	0				0	0		0	0	0	0	0	0	0
LDET	10+00.00	14+47.00	0				0	0		0	0	0	0	0	0	0
Y11DET	5+38.72	11+66.86	526				526	162		0	162	186	0	340	0	340
Y12DET	6+85.76	12+57.05	0				0	0		0	0	0	0	0	0	0
LDET		REMOVAL	0				0	0		0	0	0	0	0	0	0
TOTAL SUMMARY NO. 3 (LEFT)			5825	0	0	0	5825	15606	0	0	15606	17947	12686	564	0	564

## EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

3C / 50

PROJECT TIP # R-4430

COUNTY Henderson

DATE 12/2/2008

SHEET 2 OF 4 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
SUMMARY NO. 4 (LEFT)																
L	94+42.40	128+00.00	1363				1363	11149		0	11149	12821	11458	0	0	0
Y13	10+34.00	24+20.00	0				0	0		0	0	0	0	0	0	0
Y14	23+16.34	44+00.00	296				296	1538		0	1538	1769	1473	0	0	0
LDET	16+87.00	21+04.55	0				0	0		0	0	0	0	0	0	0
LDET		REMOVAL	0				0	0		0	0	0	0	0	0	0
Y15	12+57.00	14+64.50	21				21	418		0	418	481	460	0	0	0
BMP SITE			100				100	1000		0	1000	1150	1050	0	0	0
Y16	10+06.00	16+03.25	2939				2939	266		0	266	306	0	2633	0	2633
Y17	11+20.00	15+98.97	680				680	539		0	539	620	0	60	0	60
Y18	10+34.79	12+80.00	0				0	0		0	0	0	0	0	0	0
TOTAL SUMMARY NO. 4 (LEFT)			5399	0	0	0	5399	14910	0	0	14910	17147	14441	2693	0	2693
SUMMARY NO. 5 (LEFT)																
L	128+00.00	161+68.00	7497				7497	19424		0	19424	22338	14841	0	0	0
Y19	10+25.00	11+83.21	1201				1201	6		0	6	7	0	1194	0	1194
Y19	11+83.21	16+35.00	0				0	0		0	0	0	0	0	0	0
Y20	10+56.00	14+94.84	230				230	198		0	198	228	0	2	0	2
Y20	14+94.84	19+21.00	0				0	0		0	0	0	0	0	0	0
TOTAL SUMMARY NO. 5 (LEFT)			8928	0	0	0	8928	19628	0	0	19628	22573	14841	1196	0	1196
SUMMARY NO. 1 (RIGHT)																
L	14+96.00	23+16.34	39				39	407		0	407	468	429	0	0	0
Y1	10+34.00	19+37.31	0				0	0		0	0	0	0	0	0	0
Y1	19+37.31	24+20.00	353				353	125		0	125	144	0	209	0	209
L	23+16.34	44+00.00	1429				1429	2108		0	2108	2424	995	0	0	0
Y2	12+77.00	15+65.25	0				0	0		0	0	0	0	0	0	0
Y3	10+07.00	14+30.85	0				0	0		0	0	0	0	0	0	0
Y3	14+30.85	19+95.00	1854				1854	395		0	395	454	0	1400	0	1400
TOTAL SUMMARY NO. 1 (RIGHT)			3675	0	0	0	3675	3035	0	0	3035	3490	1424	1609	0	1609

## EARTHWORK BALANCE SHEET

3D / 50

Volumes in Cubic Yards

PROJECT TIP # R-4430

COUNTY Henderson

DATE 12/2/2008

SHEET 3 OF 4 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
SUMMARY NO. 2 (RIGHT)																
L	44+00.00	66+10.00	220				220	1862		0	1862	2141	1921	0	0	0
Y4	13+00.00	14+23.44	0				0	0		0	0	0	0	0	0	0
Y5	10+34.75	12+65.00	126				126	30		0	30	35	0	91	0	91
Y6	10+35.27	12+78.00	132				132	99		0	99	114	0	18	0	18
TOTAL SUMMARY NO. 2 (RIGHT)			478	0	0	0	478	1991	0	0	1991	2290	1921	109	0	109
SUMMARY NO. 3 (RIGHT)																
L	67+10.00	91+99.40	883				883	9462		0	9462	10881	9998	0	0	0
Y7	11+80.00	17+40.25	0				0	0		0	0	0	0	0	0	0
Y8	10+54.00	14+80.00	215				215	104		0	104	120	0	95	0	95
Y9	11+25.00	14+04.67	0				0	0		0	0	0	0	0	0	0
Y11	5+40.00	11+06.09	0				0	0		0	0	0	0	0	0	0
Y12	8+85.00	12+32.33	57				57	957		0	957	1101	1044	0	0	0
LDET	10+00.00	14+47.00	62				62	7948		0	7948	9140	9078	0	0	0
Y11DET	5+38.72	11+66.86	0				0	0		0	0	0	0	0	0	0
Y12DET	6+85.76	12+57.05	46				46	1297		0	1297	1492	1446	0	0	0
LDET		REMOVAL	890				890	100		0	100	115	0	775	0	775
TOTAL SUMMARY NO. 3 (RIGHT)			2153	0	0	0	2153	19868	0	0	19868	22849	21566	870	0	870
SUMMARY NO. 4 (RIGHT)																
L	94+42.40	128+00.00	2126				2126	15240		0	15240	17526	15400	0	0	0
Y13	10+34.00	24+20.00	48				48	1494		0	1494	1718	1670	0	0	0
Y14	23+16.34	44+00.00	0				0	0		0	0	0	0	0	0	0
LDET	16+87.00	21+04.55	81				81	5976		0	5976	6872	6791	0	0	0
LDET		REMOVAL	3984				3984	100		0	100	115	0	3869	0	3869
Y15	12+57.00	14+64.50	0				0	0		0	0	0	0	0	0	0
BMP SITE			0				0	0		0	0	0	0	0	0	0
Y16	10+06.00	16+03.25	0				0	0		0	0	0	0	0	0	0
Y17	11+20.00	15+98.97	0				0	0		0	0	0	0	0	0	0
Y18	10+34.79	12+80.00	5				5	681		0	681	783	778	0	0	0
TOTAL SUMMARY NO. 4 (RIGHT)			6244	0	0	0	6244	23491	0	0	23491	27014	24639	3869	0	3869

## EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

3E / 50

PROJECT TIP # R-4430

COUNTY Henderson

DATE 12/2/2008

SHEET 4 OF 4 SHEETS

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
SUMMARY NO. 5 (RIGHT)																
L	128+00.00	161+68.00	15086				15086	2861		0	2861	3290	0	11796	0	11796
Y19	10+25.00	11+83.21	0				0	0		0	0	0	0	0	0	0
Y19	11+83.21	16+35.00	2294				2294	246		0	246	283	0	2011	0	2011
Y20	10+56.00	14+94.84	0				0	0		0	0	0	0	0	0	0
Y20	14+94.84	19+21.00	320				320	444		0	444	511	191	0	0	0
TOTAL SUMMARY NO. 5 (RIGHT)			17700	0	0	0	17700	3551	0	0	3551	4084	191	13807	0	13807
LEFT SUBTOTAL			29762	0	0	0	29762	87388	0	0	87388	100498	77005	6269	0	6269
RIGHT SUBTOTAL			30250	0	0	0	30250	51936	0	0	51936	59727	49741	20264	0	20264
<b>TOTALS</b>			60012	0	0	0	60012	139324	0	0	139324	160225	126746	26533	0	26533
LOSS DUE TO CLEARING & GRUBBING			-100				-100						100			
SHOULDER MATERIAL								3600			3600	4140	4140			
EARTH WASTE TO REPLACE BORROW													-26533	-26533		-26533
<b>PROJECT TOTALS</b>			59912	0	0	0	59912	142924	0	0	142924	164365	104453	0	0	0
EST 5% FOR REPLACING TOP SOIL ON BORROW PITS													5223			
<b>GRAND TOTALS</b>			59912										109676			
<b>SAY</b>			60000										109700			

\* EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.



REVISIONS



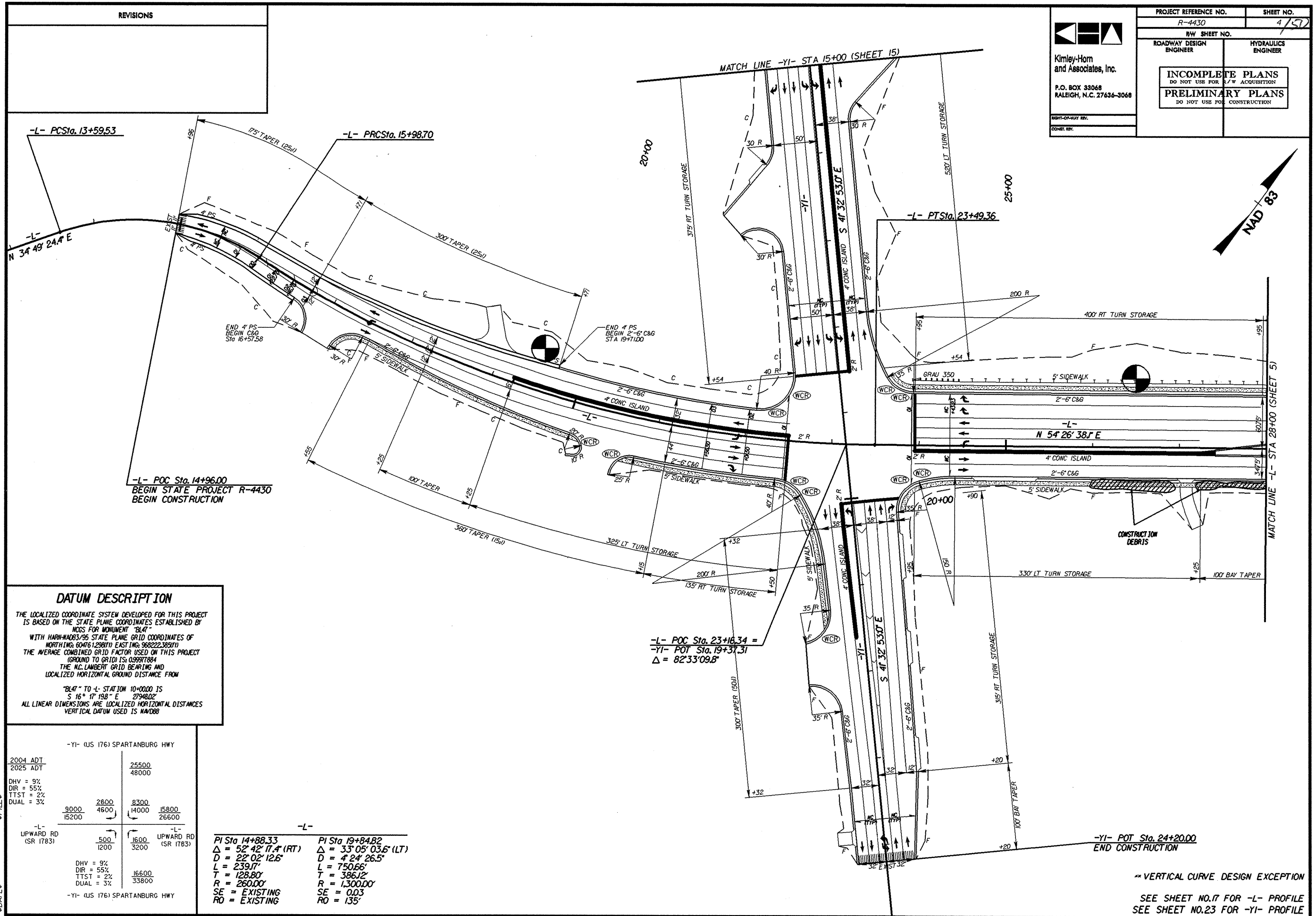
Kimley-Horn  
and Associates, Inc.  
P.O. BOX 33068  
RALEIGH, N.C. 27636-3068

RIGHT-OF-WAY REV.  
CONV. REV.

PROJECT REFERENCE NO. R-4430 SHEET NO. 4/57

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR A/C W ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



**DATUM DESCRIPTION**  
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCOS FOR MONUMENT BL47 WITH HARN-NAD83/95 STATE PLANE GRID COORDINATES OF NORTHING: 604761298(1) EASTING: 968223303(1) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99977894 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM  
"BL47" TO -L- STATION 10+00.00 IS  
S 16° 17' 19.8" E 27948.02'  
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD88

2004 ADT 2025 ADT

25500	48000
9000	15200
2800	4600
8300	14000
15800	26600

DHV = 9%  
DIR = 55%  
TTST = 2%  
DUAL = 3%

-L- UPWARD RD (SR 1783) 500' 1200'

-L- UPWARD RD (SR 1783) 1600' 3200'

DHV = 9%  
DIR = 55%  
TTST = 2%  
DUAL = 3%

16600 33800

-YI- (US 176) SPARTANBURG HWY

-L-

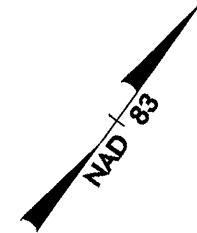
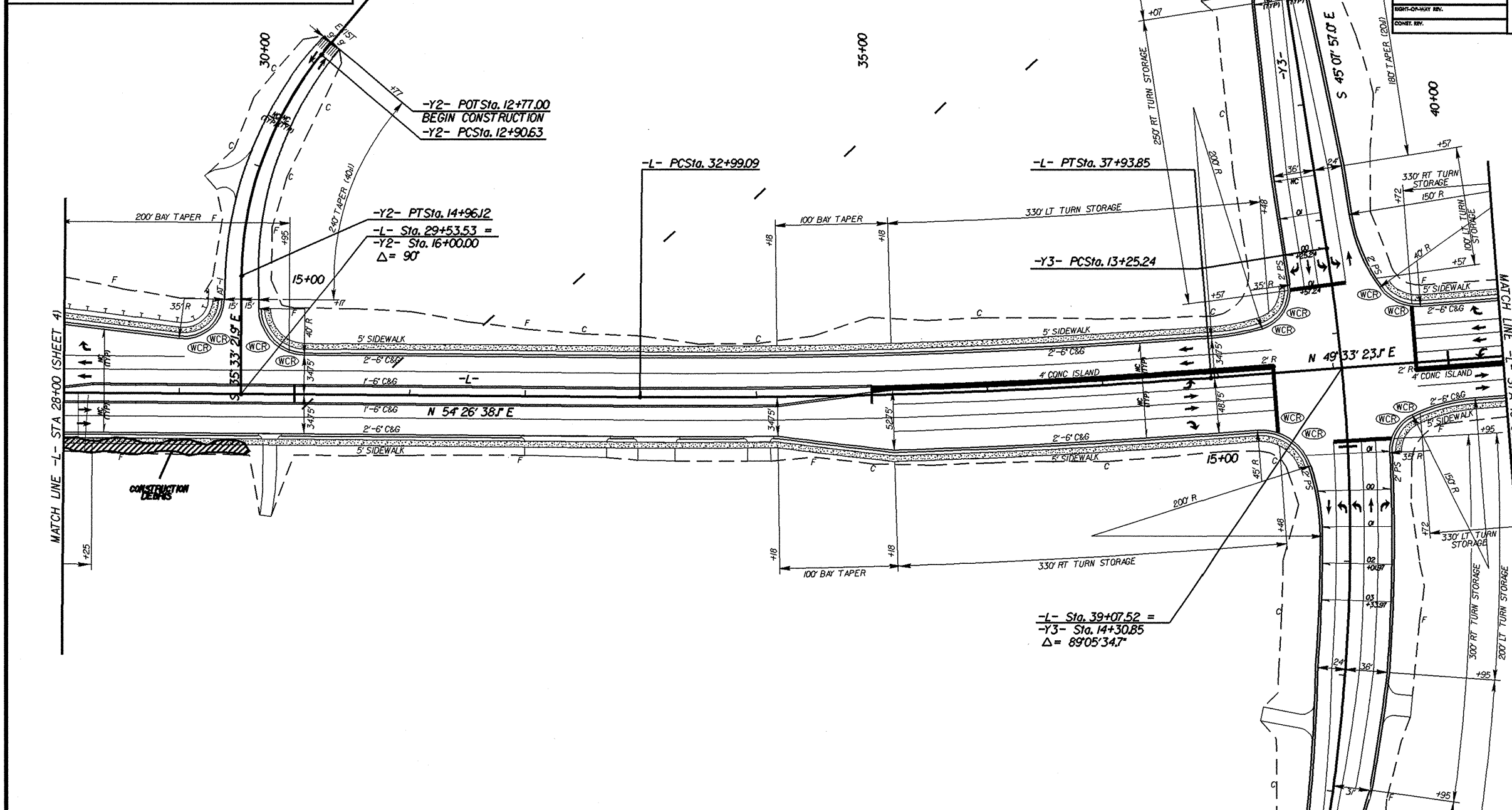
PI Sta 14+88.33 Δ = 52° 42' 17.4" (RT) D = 22° 02' 12.6" L = 239.77' T = 128.80' R = 260.00' SE = EXISTING RO = EXISTING	PI Sta 19+84.82 Δ = 33° 05' 03.6" (LT) D = 4° 24' 26.5" L = 750.66' T = 386.12' R = 1,300.00' SE = 0.03 RO = 135'
---	--

VERTICAL CURVE DESIGN EXCEPTION  
SEE SHEET NO.17 FOR -L- PROFILE  
SEE SHEET NO.23 FOR -YI- PROFILE

REVISIONS	

PROJECT REFERENCE NO. R-4430	SHEET NO. 5/50
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

Kimley-Horn  
and Associates, Inc.  
P.O. BOX 33068  
RALEIGH, N.C. 27634-3068



-Y3- (SR 1828) OLD SPARTANBURG RD			
2004 ADT	2400		
2025 ADT	4800		
DHW = 9% DIR = 5.5% TTST = 2% DUAL = 3%			
15800	1500	700	14700
26600	2600	1200	24600
-L- UPWARD RD (SR 1783)		-L- UPWARD RD (SR 1783)	
	1700	1500	
	3000	2400	
DHW = 9% DIR = 5.1% TTST = 1% DUAL = 5%			
		3500	
		6400	
-Y3- (SR 1828) OLD SPARTANBURG RD			

-L-	-Y2-	-Y3-
PI Sta 35+46.62	PI Sta 13+97.59	PI Sta 16+10.18
$\Delta = 4^{\circ} 53' 15.0''$ (LT)	$\Delta = 39^{\circ} 14' 47.8''$ (LT)	$\Delta = 20^{\circ} 11' 42.3''$ (RT)
D = 0' 59' 16.3"	D = 19' 05' 54.9"	D = 3' 34' 51.6"
L = 494.76'	L = 205.49'	L = 563.95'
T = 247.53'	T = 106.96'	T = 284.93'
R = 5,800.00'	R = 300.00'	R = 1,600.00'
SE = NC	SE = NC	SE = 0.03
RO = NONE	RO = NONE	RO = 96'

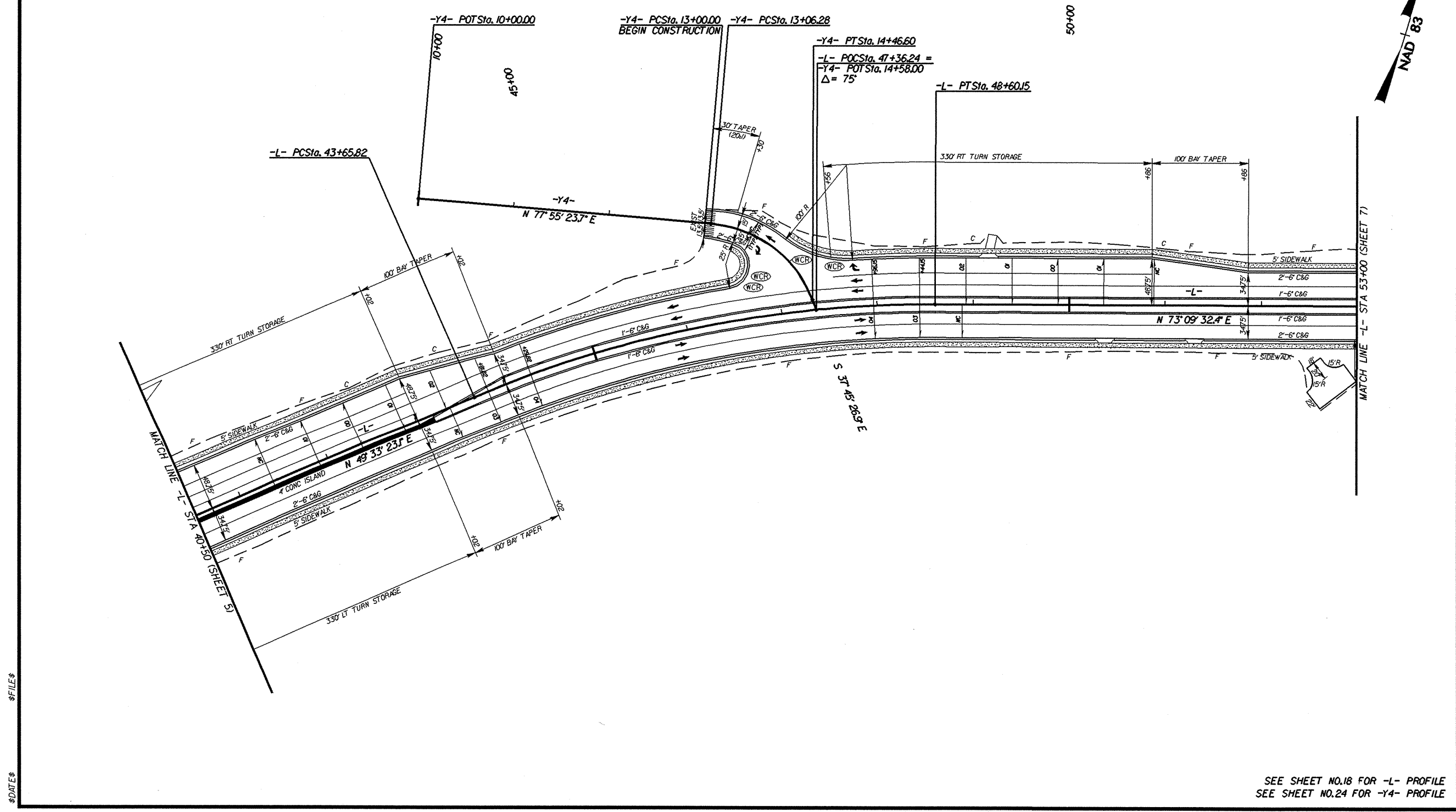
VERTICAL CURVE DESIGN EXCEPTION  
SEE SHEET NO.17 FOR -L- PROFILE  
SEE SHEET NO.23 FOR -Y2- PROFILE  
SEE SHEET NO.24 FOR -Y3 PROFILE

REVISIONS

2004 ADT	DHV = 14%	DIR = 53%	TTST = 2%	DUAL = 3%
2025 ADT				
-Y4- (SR 1722) UPWARD RD EXT				
	3600	5800		
DHV = 9%				
DIR = 55%				
TTST = 2%				
DUAL = 3%				
-L- UPWARD RD (SR 1783)	14700	200	3400	17900
	24600		5600	30000
				-L- UPWARD RD (SR 1783)

-L-	-Y4-
PI Sta 46+16.54	PI Sta 13+84.87
$\Delta = 23^{\circ} 36' 09.3" (RT)$	$\Delta = 64^{\circ} 19' 09.04" (RT)$
D = 4' 46" 28.7"	D = 45' 50" 11.8"
L = 494.33'	L = 140.32'
T = 250.72'	T = 78.59'
R = 1,200.00'	R = 125.00'
SE = 0.04	SE = NC
RO = 192'	RO = NONE

<p>Kimley-Horn and Associates, Inc.</p> <p>P.O. BOX 33068 RALEIGH, N.C. 27636-3068</p> <p>REG. P.E. - HIGHWAY ENGR. CO. REG. ENGR.</p>	PROJECT REFERENCE NO. R-4430	SHEET NO. 6/52
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p><b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION</p> <p><b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION</p>		



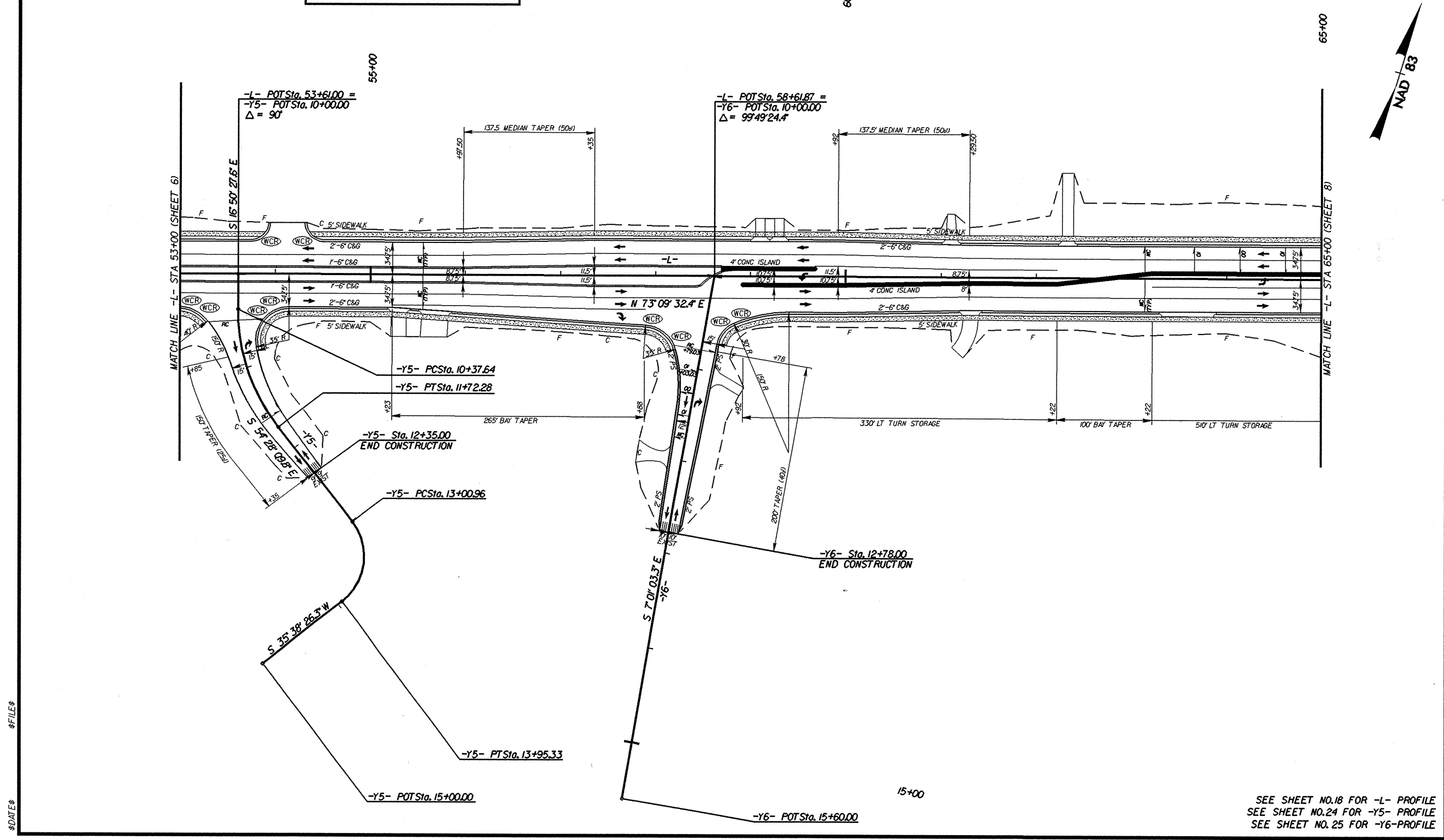
SEE SHEET NO.18 FOR -L- PROFILE  
SEE SHEET NO.24 FOR -Y4- PROFILE

REVISIONS	
2004 ADT	17900
2025 ADT	30000

17900		19400	
UPWARD RD (SR 1783)		UPWARD RD (SR 1783)	
DHV = 5%	800	DHV = 10%	2283
DIR = 55%	1800	DIR = 60%	4200
TTST = 2%		TTST = 2%	
DUAL = 3%		DUAL = 3%	
		DHV = 10%	3100
		DIR = 60%	6000
		TTST = 2%	
		DUAL = 3%	

**-Y5-**  
 PI Sta 11+07.49    PI Sta 13+61.08  
 $\Delta = 37^\circ 37' 42.2''$  (LT)     $\Delta = 90^\circ 06' 36.1''$  (RT)  
 $D = 27' 56' 57.0''$      $D = 95' 29' 34.7''$   
 $L = 134.63'$      $L = 94.36'$   
 $T = 69.84'$      $T = 60.12'$   
 $R = 205.00'$      $R = 60.00'$   
 SE = RC    SE = EXISTING  
 RO = SEE PLANS    RO = EXISTING

PROJECT REFERENCE NO. R-4430	SHEET NO. 7/52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
Kimley-Horn and Associates, Inc. P.O. BOX 33068 RALEIGH, N.C. 27636-3068 <small>505-D-4-WAY RD. CONWT. RD.</small>	

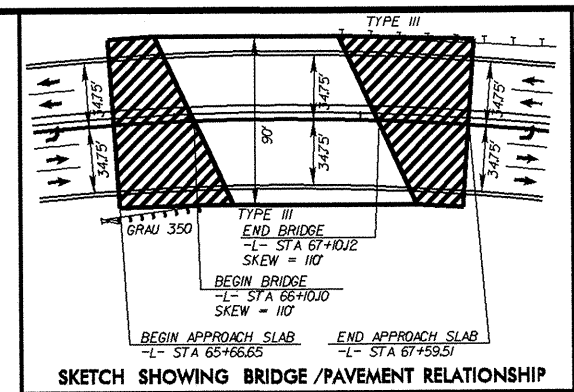


\$FILE\$  
 \$DATE\$

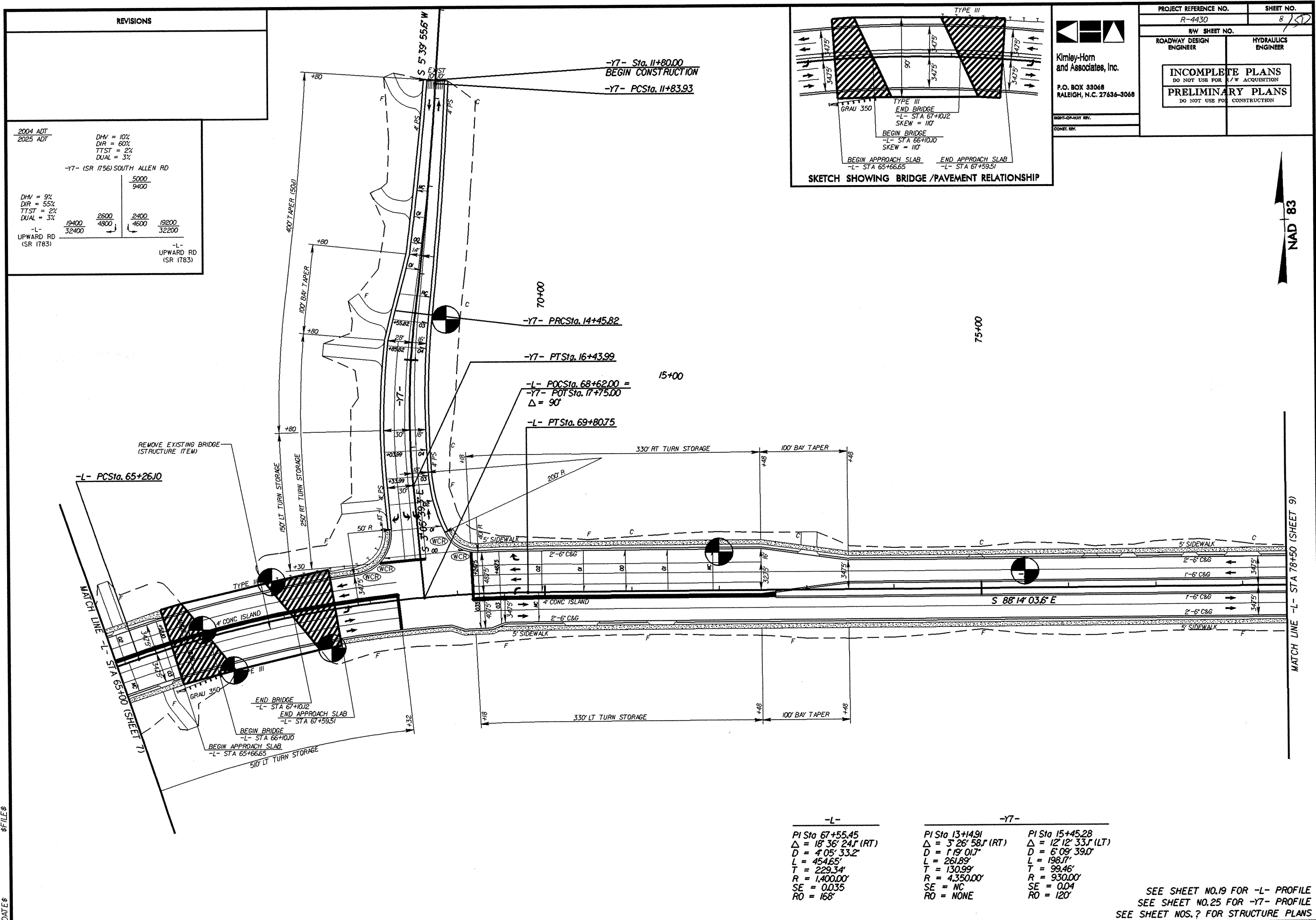
SEE SHEET NO.18 FOR -L- PROFILE  
 SEE SHEET NO.24 FOR -Y5- PROFILE  
 SEE SHEET NO. 25 FOR -Y6-PROFILE

REVISIONS	

2004 ADT	DHV = 10%		DIR = 60%	
2025 ADT	TTST = 2%		DUAL = 3%	
-Y7- (SR 1756) SOUTH ALLEN RD				
	5000	2400	19200	
	9400	4600	32200	
-L- UPWARD RD (SR 1783)				
	19400	2600	19200	
	32400	4800	32200	
-L- UPWARD RD (SR 1783)				



PROJECT REFERENCE NO. R-4430		SHEET NO. 8/17	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			
Kimley-Horn and Associates, Inc. P.O. BOX 33048 RALEIGH, N.C. 27634-3048			
RIGHT-OF-WAY REV. CONST. REV.			



-L-	-Y7-
PI Sta 67+55.45	PI Sta 13+14.91
$\Delta = 18' 36'' 24.1''$ (RT)	$\Delta = 3' 26'' 58.1''$ (RT)
D = 4' 05' 33.2"	D = 1' 19' 01.7"
L = 454.65'	L = 261.89'
T = 229.34'	T = 130.99'
R = 1,400.00'	R = 4,350.00'
SE = 0.035	SE = NC
RO = 168'	RO = NONE
	PI Sta 15+45.28
	$\Delta = 12' 12'' 33.1''$ (LT)
	D = 6' 09' 39.0"
	L = 198.77'
	T = 99.46'
	R = 930.00'
	SE = 0.04
	RO = 120'

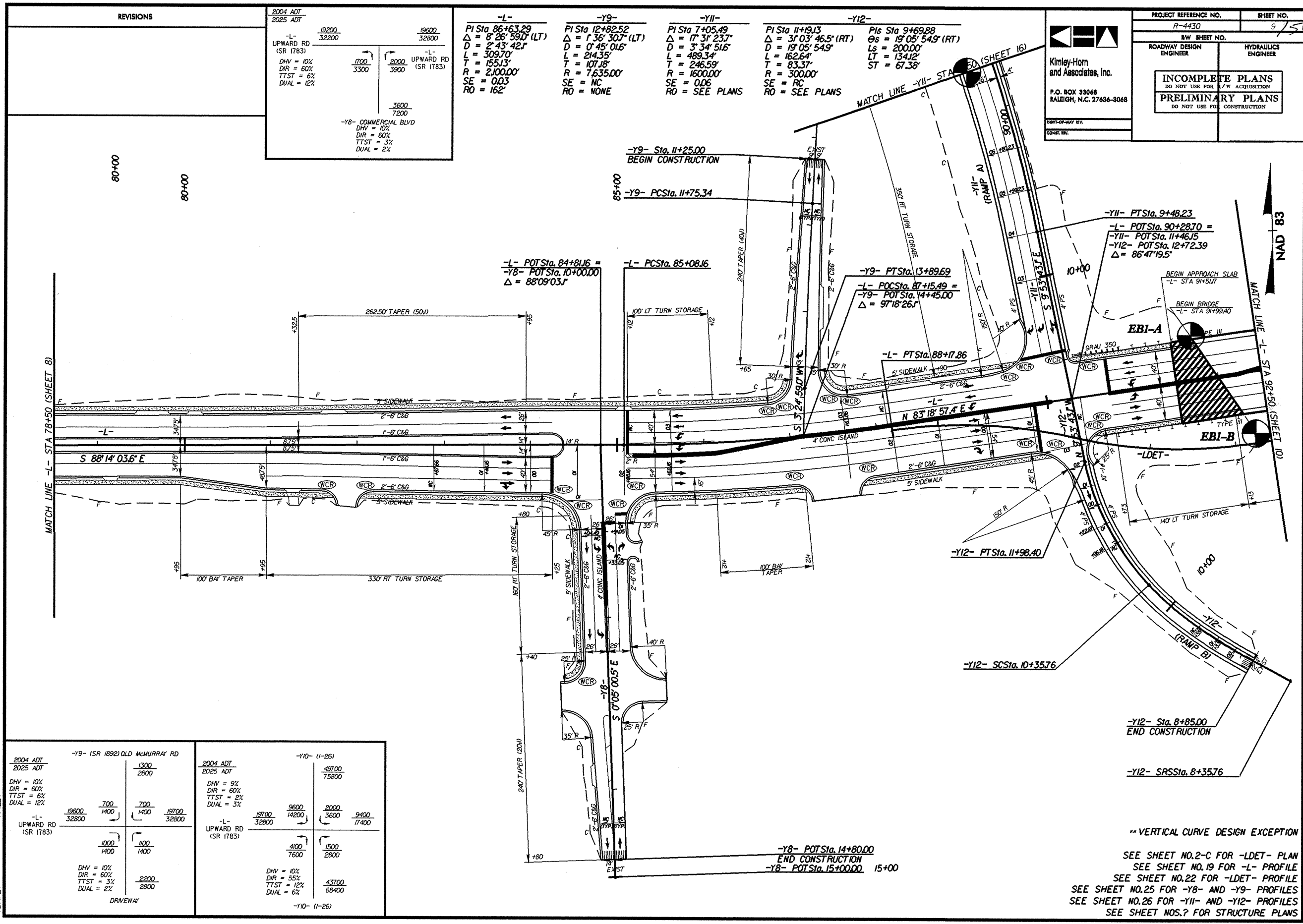
SEE SHEET NO.19 FOR -L- PROFILE  
 SEE SHEET NO.25 FOR -Y7- PROFILE  
 SEE SHEET NOS. ? FOR STRUCTURE PLANS

\$FILES\$  
\$DATE\$

MATCH LINE -L- STA 78+50 (SHEET 9)

NAD 83





REVISIONS	
2004 ADT 2025 ADT	19200 32200
-L- UPWARD RD (SR 1783)	1700 3300
DHV = 10% DIR = 60% TTST = 6% DUAL = 12%	
19600 32800	19600 32800
-L- UPWARD RD (SR 1783)	2000 3900
DHV = 10% DIR = 60% TTST = 6% DUAL = 12%	
3600 7200	
-Y8- COMMERCIAL BLVD DHV = 10% DIR = 60% TTST = 3% DUAL = 2%	

-L-	-Y9-	-Y11-	-Y12-
PI Sta. 86+63.29 $\Delta = 8' 26' 59''$ (LT) D = 2' 43' 42" L = 309.70' T = 155.13' R = 2,100.00' SE = 0.03 RO = 162°	PI Sta. 12+82.52 $\Delta = 1' 36' 30.7''$ (LT) D = 0' 45' 01.6" L = 214.35' T = 107.18' R = 7,635.00' SE = NC RO = NONE	PI Sta. 7+05.49 $\Delta = 17' 31' 23.7''$ D = 3' 34' 51.6" L = 489.34' T = 246.59' R = 1600.00' SE = 0.06 RO = SEE PLANS	PI Sta. 11+19.13 $\Delta = 31' 03' 46.5''$ (RT) D = 19' 05' 54.9" L = 162.64' T = 83.37' R = 300.00' SE = RC RO = SEE PLANS
			PI Sta. 9+69.88 $\Delta = 19' 05' 54.9''$ (RT) Ls = 200.00' LT = 134.12' ST = 67.38'

**Kimley-Horn and Associates, Inc.**  
P.O. BOX 33068  
RALEIGH, N.C. 27636-3068

ROADWAY DESIGN ENGINEER

PROJECT REFERENCE NO. R-4430  
SHEET NO. 9/50

HYDRAULICS ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR ACQUISITION

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

2004 ADT 2025 ADT	-Y9- (SR 1892) OLD McMURRAY RD	
DHV = 10% DIR = 60% TTST = 6% DUAL = 12%	19600 32800	1400 2800
-L- UPWARD RD (SR 1783)	1000 1400	1100 1400
DHV = 10% DIR = 60% TTST = 3% DUAL = 2%	2200 2800	
	DRAWNWAY	

2004 ADT 2025 ADT	-Y10- (I-26)	
DHV = 9% DIR = 60% TTST = 2% DUAL = 3%	19700 32800	9600 14200
-L- UPWARD RD (SR 1783)	4100 7600	1500 2800
DHV = 10% DIR = 55% TTST = 12% DUAL = 6%	43700 68400	
	-Y10- (I-26)	

\*\* VERTICAL CURVE DESIGN EXCEPTION

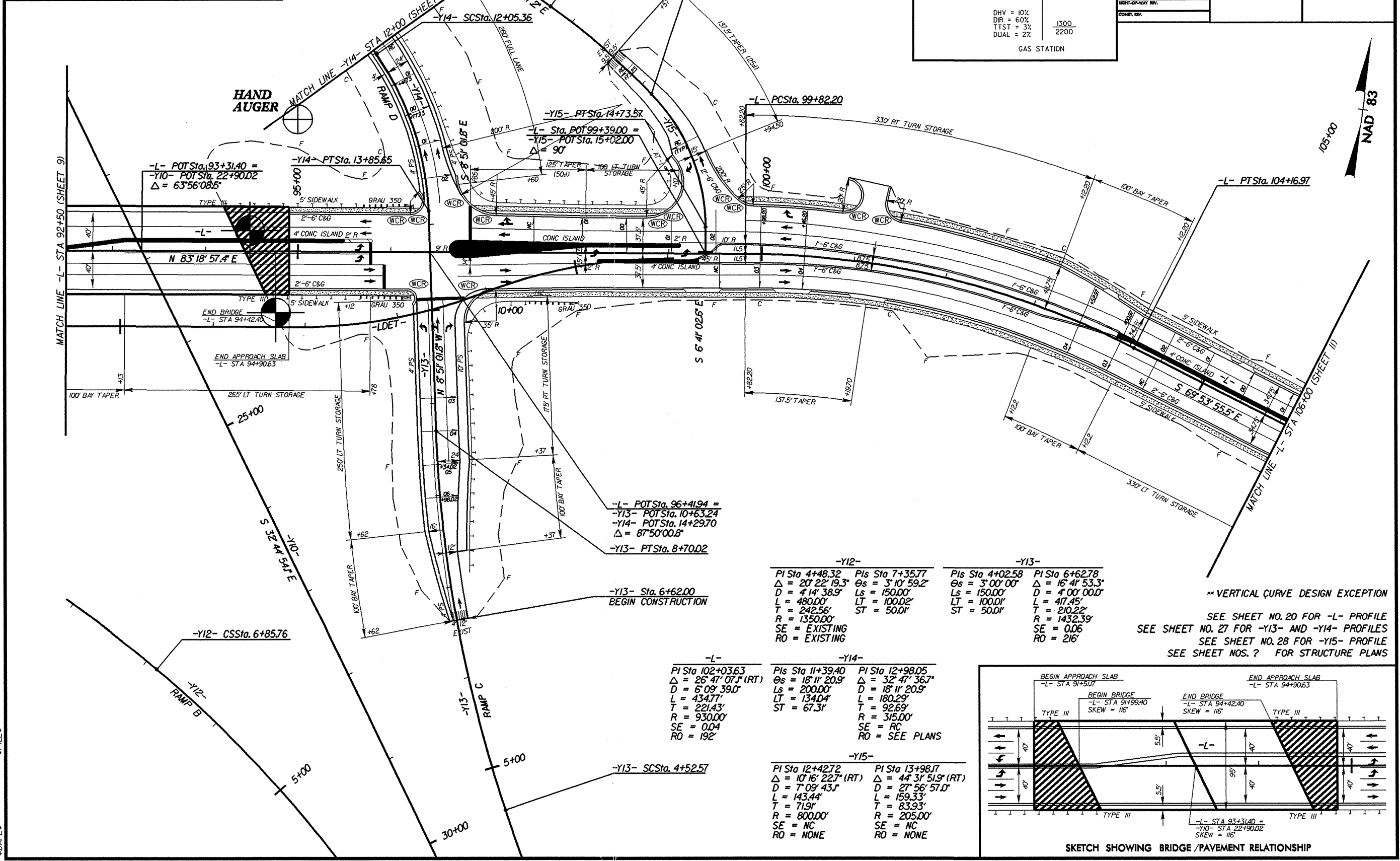
SEE SHEET NO.2-C FOR -LDET- PLAN  
SEE SHEET NO.19 FOR -L- PROFILE  
SEE SHEET NO.22 FOR -LDET- PROFILE  
SEE SHEET NO.25 FOR -Y8- AND -Y9- PROFILES  
SEE SHEET NO.26 FOR -Y11- AND -Y12- PROFILES  
SEE SHEET NOS.? FOR STRUCTURE PLANS

REVISIONS

2004 ADT	-Y15- (SR 1790) MCMURRAY RD			
2025 ADT	1700	4600		
DHV = 9%	9400	1000	500	8900
DIR = 60%	17400	2800	1600	16200
TTST = 2%				
DUAL = 3%				
-L- UPWARD RD (SR 1783)				
	500	1000	500	1000
DHV = 10%				
DIR = 60%				
TTST = 3%				
DUAL = 2%				
GAS STATION				

PROJECT REFERENCE NO. R-4430	SHEET NO. 10/50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

Kimley-Horn and Associates, Inc.  
P.O. BOX 33068  
RALEIGH, N.C. 27636-3068

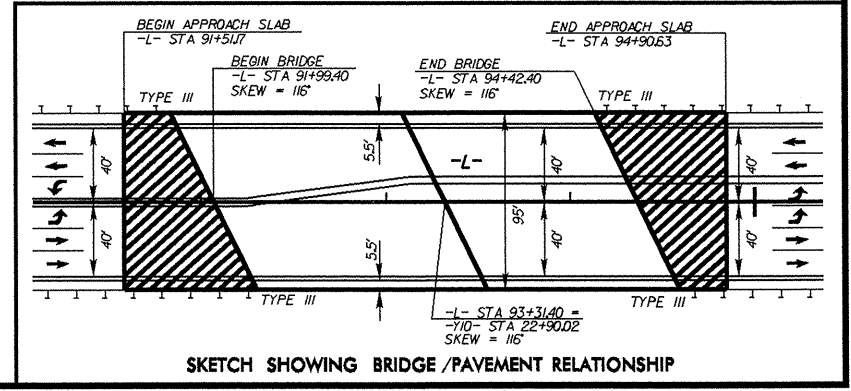


-Y12-		-Y13-	
PI Sta 4+48.32	PI Sta 7+35.77	PIs Sta 4+02.58	PI Sta 6+62.78
$\Delta = 20' 22' 19.3''$	$\Theta_s = 3' 10' 59.2''$	$\Theta_s = 3' 00' 00''$	$\Delta = 16' 4' 53.3''$
$D = 4' 14' 38.9''$	$L_s = 150.00'$	$L_s = 150.00'$	$D = 4' 00' 00.0''$
$L = 480.00'$	$LT = 100.02'$	$LT = 100.01'$	$L = 417.45'$
$T = 242.56'$	$ST = 50.0'$	$T = 210.22'$	$T = 210.22'$
$R = 1350.00'$		$R = 1432.39'$	
SE = EXISTING		SE = 0.06	
RO = EXISTING		RO = 216'	

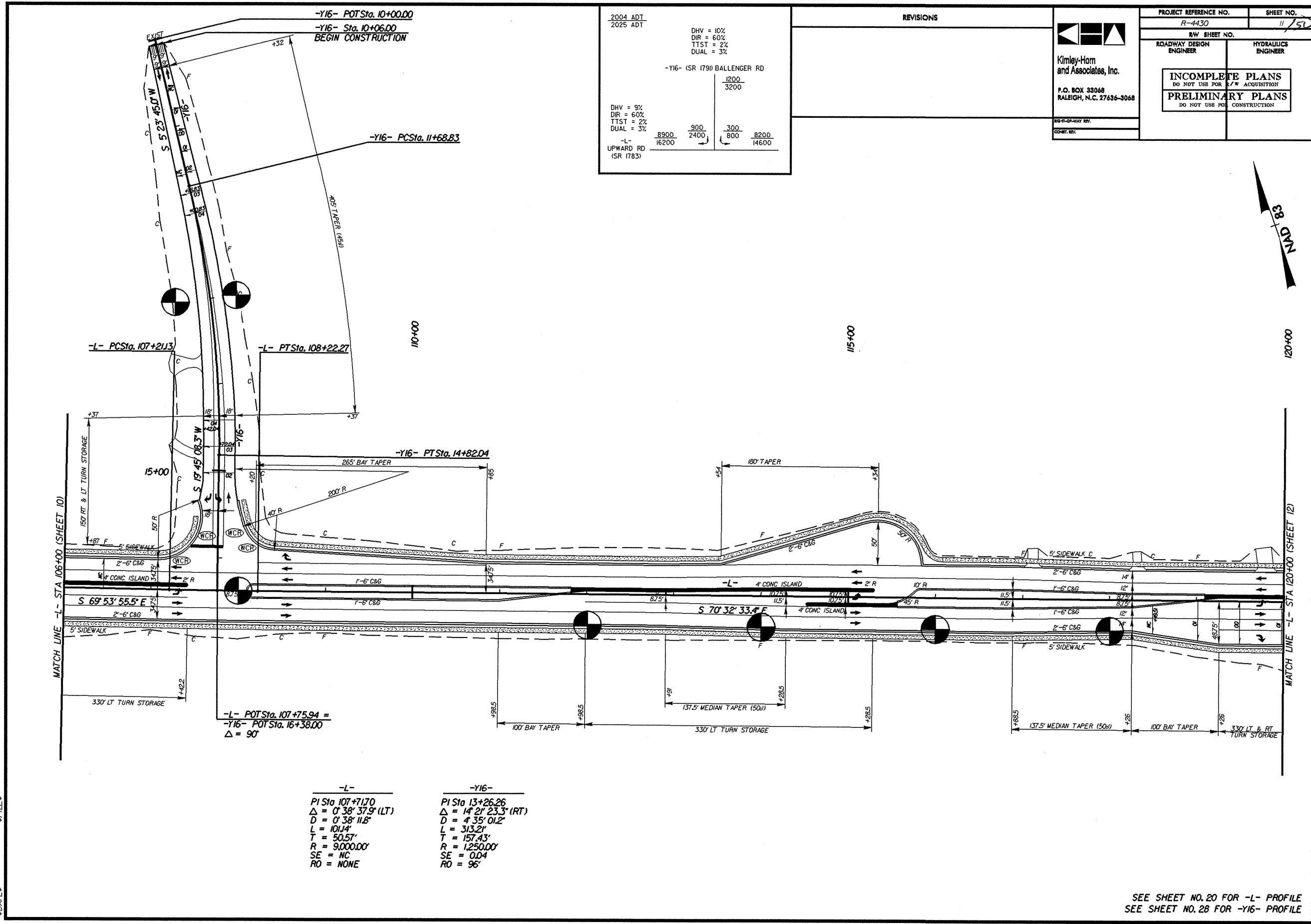
  

-Y14-		-Y15-	
PI Sta 102+03.63	PIs Sta 11+39.40	PI Sta 12+42.72	PI Sta 13+98.17
$\Delta = 26' 47' 07.1''$ (RT)	$\Theta_s = 18' 11' 20.9''$	$\Delta = 10' 16' 22.7''$ (RT)	$\Delta = 44' 31' 51.9''$ (RT)
$D = 6' 09' 39.0''$	$D = 32' 47' 36.7''$	$D = 7' 09' 43.1''$	$D = 27' 56' 57.0''$
$L = 434.77'$	$L_s = 200.00'$	$L = 143.44'$	$L = 159.33'$
$T = 221.43'$	$LT = 134.04'$	$T = 71.91'$	$T = 83.93'$
$R = 930.00'$	$ST = 67.31'$	$R = 800.00'$	$R = 205.00'$
SE = 0.04		SE = NC	SE = NC
RO = 192'		RO = NONE	RO = NONE

VERTICAL CURVE DESIGN EXCEPTION  
SEE SHEET NO. 20 FOR -L- PROFILE  
SEE SHEET NO. 27 FOR -Y13- AND -Y14- PROFILES  
SEE SHEET NO. 28 FOR -Y15- PROFILE  
SEE SHEET NOS. ? FOR STRUCTURE PLANS



\$FILES\$  
\$DATE\$



2004 ADT	DHW = 10%		DIR = 60%	
2025 ADT	TTST = 2%		DUAL = 3%	
-Y16- (SR 179) BALLENGER RD				
	1200	300	8200	
	3200	800	14600	
DHW = 9%	900	300	8200	
DIR = 60%	2400	800	14600	
TTST = 2%				
DUAL = 3%				
-L- UPWARD RD (SR 1783)	8900	16200		

REVISIONS	

PROJECT REFERENCE NO. R-4430	SHEET NO. 11/51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

Kimley-Horn and Associates, Inc.  
 P.O. BOX 33068  
 RALEIGH, N.C. 27636-3068

-L-	-Y16-
PI Sta 107+717.0	PI Sta 13+26.26
Δ = 0° 38' 37.9" (LT)	Δ = 14° 21' 23.3" (RT)
D = 0° 38' 11.8"	D = 4° 35' 01.2"
L = 101.14'	L = 313.21'
T = 50.57'	T = 157.43'
R = 9,000.00'	R = 1,250.00'
SE = NC	SE = 0.04
RO = NONE	RO = 96'

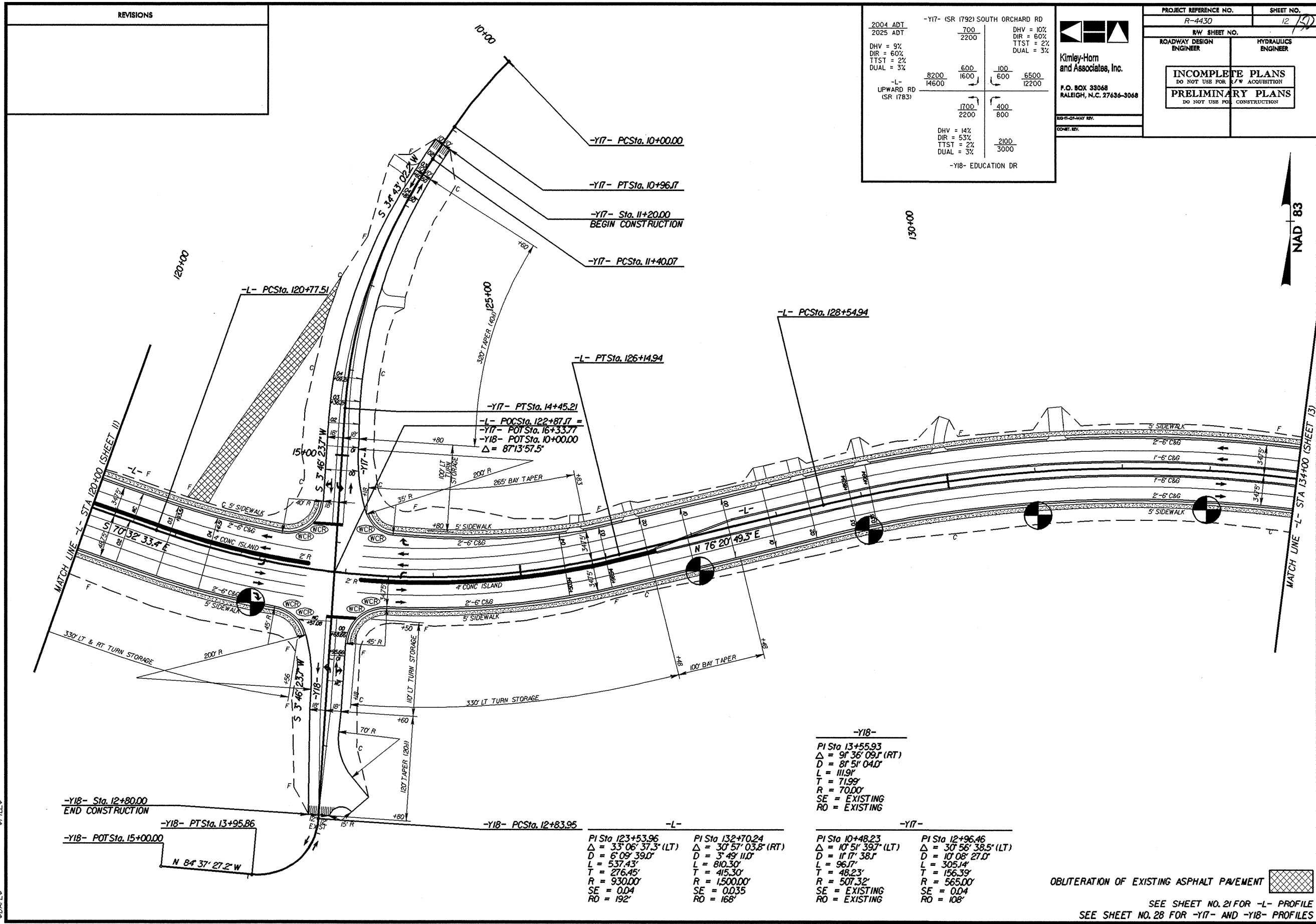
SEE SHEET NO. 20 FOR -L- PROFILE  
 SEE SHEET NO. 28 FOR -Y16- PROFILE

REVISIONS

2004 ADT 2025 ADT	-Y17- (SR 1792) SOUTH ORCHARD RD	DHV = 10% DIR = 60% TTST = 2% DUAL = 3%
8200 14600	700 2200	100 6500
-L- UPWARD RD (SR 1783)	1700 2200	400 800
		DHV = 14% DIR = 53% TTST = 2% DUAL = 3%
		2100 3000
		-Y18- EDUCATION DR

PROJECT REFERENCE NO. R-4430	SHEET NO. 12 (15)
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

Kimley-Horn and Associates, Inc.  
P.O. BOX 33068  
RALEIGH, N.C. 27636-3068



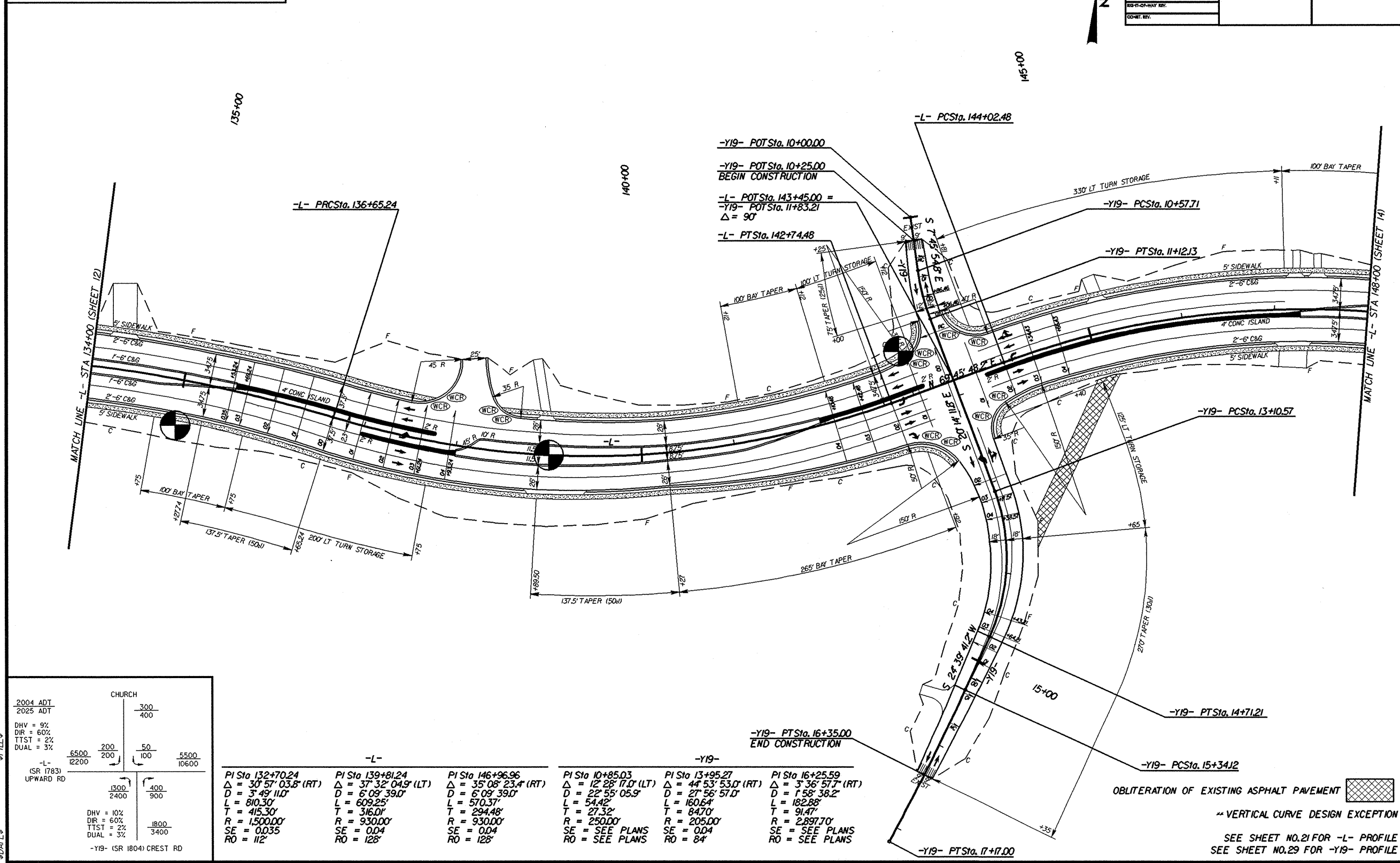
<b>-Y18-</b>	<b>-Y17-</b>
PI Sta 13+55.93	PI Sta 10+48.23
$\Delta = 91' 36" 09.1" (RT)$	$\Delta = 10' 51' 39.7" (LT)$
$D = 81' 51" 04.0"$	$D = 11' 17" 38.1"$
$L = 111.9'$	$L = 96.1'$
$T = 71.98'$	$T = 48.23'$
$R = 70.00'$	$R = 507.32'$
SE = EXISTING	SE = EXISTING
RO = EXISTING	RO = EXISTING

OBLITERATION OF EXISTING ASPHALT PAVEMENT

SEE SHEET NO. 21 FOR -L- PROFILE  
SEE SHEET NO. 28 FOR -Y17- AND -Y18- PROFILES

REVISIONS

PROJECT REFERENCE NO. R-4430		SHEET NO. 13 / 51	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			
Kimley-Horn and Associates, Inc. F.O. BOX 33068 RALEIGH, N.C. 27636-3068			



2004 ADT	300
2025 ADT	400
DHV = 9%	
DIR = 60%	
TTST = 2%	
DUAL = 3%	
CHURCH	
6500	200
12200	100
5500	50
10600	100
-L- (SR 1783) UPWARD RD	
1300	400
2400	900
-Y19- (SR 1804) CREST RD	
DHV = 10%	
DIR = 60%	
TTST = 2%	
DUAL = 3%	
1800	
3400	

-L-			-Y19-		
PI Sta 132+70.24	PI Sta 139+81.24	PI Sta 146+96.96	PI Sta 10+85.03	PI Sta 13+95.27	PI Sta 16+25.59
$\Delta = 30^{\circ} 57' 03.8''$ (RT)	$\Delta = 37^{\circ} 32' 04.9''$ (LT)	$\Delta = 35^{\circ} 08' 23.4''$ (RT)	$\Delta = 12^{\circ} 28' 17.0''$ (LT)	$\Delta = 44^{\circ} 53' 53.0''$ (RT)	$\Delta = 3^{\circ} 36' 57.7''$ (RT)
D = 3' 49' 11.0"	D = 6' 09' 39.0"	D = 6' 09' 39.0"	D = 22' 55' 05.9"	D = 27' 56' 57.0"	D = 1' 58' 38.2"
L = 810.30'	L = 609.25'	L = 570.37'	L = 54.42'	L = 160.64'	L = 182.88'
T = 415.30'	T = 316.01'	T = 294.48'	T = 27.32'	T = 64.70'	T = 91.47'
R = 1,500.00'	R = 930.00'	R = 930.00'	R = 250.00'	R = 205.00'	R = 2,897.70'
SE = 0.035	SE = 0.04	SE = 0.04	SE = SEE PLANS	SE = 0.04	SE = SEE PLANS
RO = 112'	RO = 128'	RO = 128'	RO = SEE PLANS	RO = 84'	RO = SEE PLANS

OBLITERATION OF EXISTING ASPHALT PAVEMENT

VERTICAL CURVE DESIGN EXCEPTION

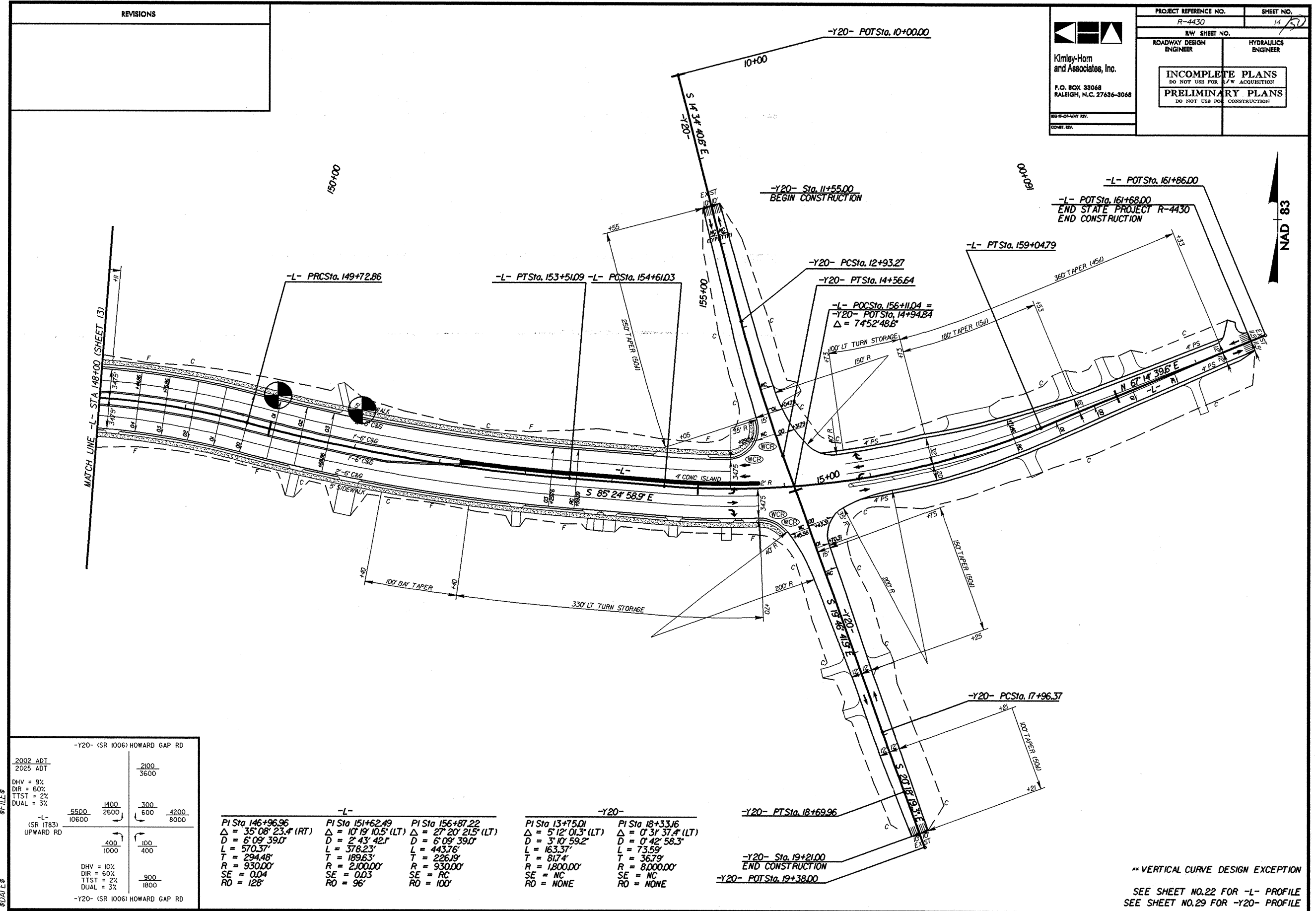
SEE SHEET NO.21 FOR -L- PROFILE

SEE SHEET NO.29 FOR -Y19- PROFILE



REVISIONS

PROJECT REFERENCE NO. R-4430	SHEET NO. 14
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
Kimley-Horn and Associates, Inc. P.O. BOX 33068 RALEIGH, N.C. 27636-3068 <small>88-11-01-WAY REV. CONV. REV.</small>	




-Y20- (SR 1006) HOWARD GAP RD	
2002 ADT	2100
2025 ADT	3600
DHV = 9% DIR = 60% TTST = 2% DUAL = 3%	
5500	1400
10600	2600
300	4200
600	8000
-L- (SR 1783) UPWARD RD 400 1000 100 400	
DHV = 10% DIR = 60% TTST = 2% DUAL = 3%	
-Y20- (SR 1006) HOWARD GAP RD 900 1800	

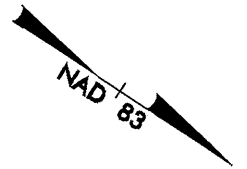
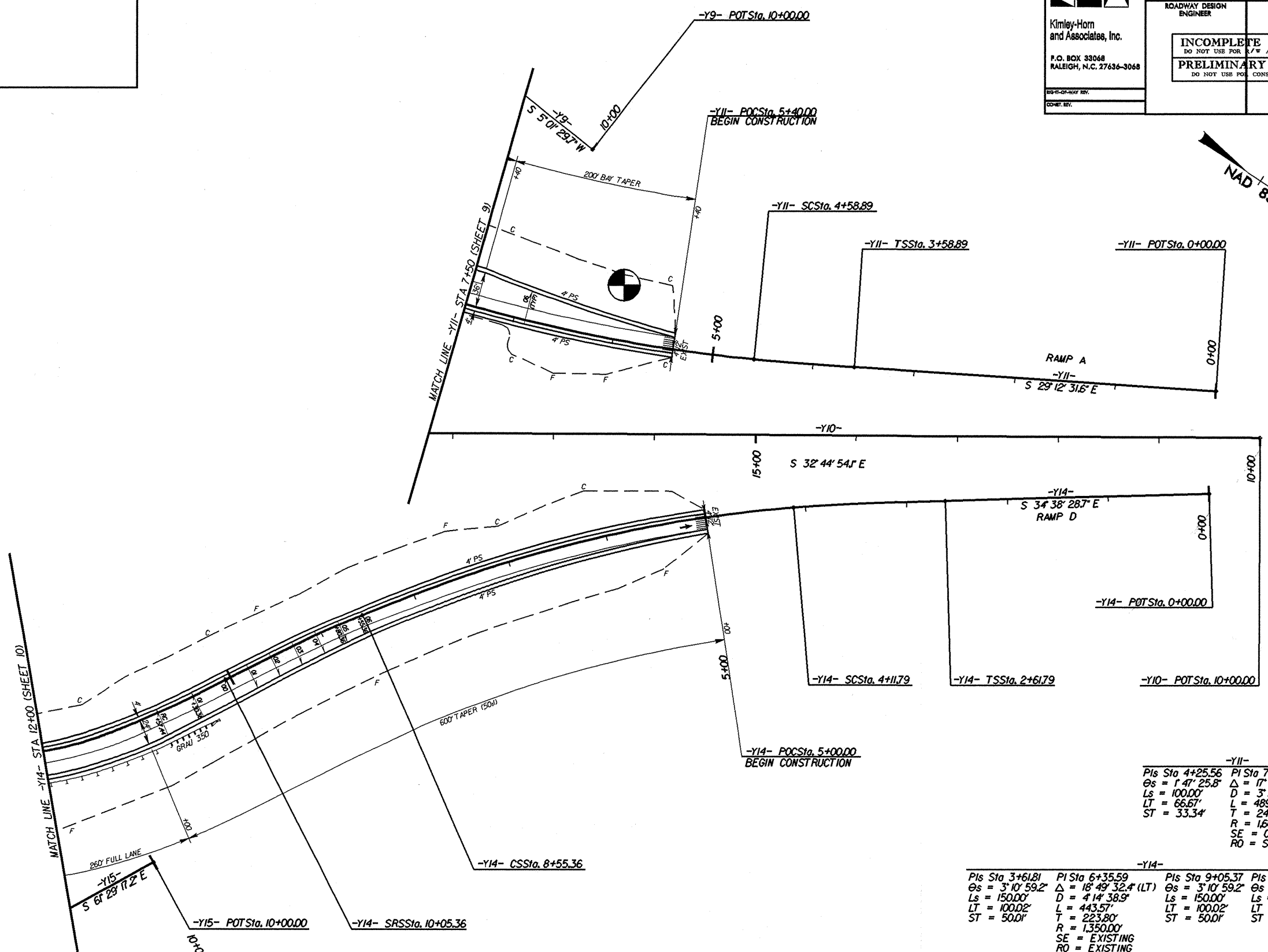
-L-			-Y20-	
PI Sta 146+96.96	PI Sta 151+62.49	PI Sta 156+87.22	PI Sta 13+75.01	PI Sta 18+33.16
$\Delta = 35^{\circ}08'23.4"$ (RT)	$\Delta = 10^{\circ}19'10.5"$ (LT)	$\Delta = 27^{\circ}20'21.5"$ (LT)	$\Delta = 5^{\circ}12'01.3"$ (LT)	$\Delta = 0^{\circ}31'37.4"$ (LT)
D = 6'09'39.0"	D = 2'43'42.1"	D = 6'09'39.0"	D = 3'10'59.2"	D = 0'42'58.3"
L = 570.37'	L = 378.23'	L = 443.76'	L = 163.37'	L = 73.59'
T = 294.48'	T = 189.63'	T = 226.19'	T = 81.74'	T = 36.79'
R = 930.00'	R = 2,100.00'	R = 930.00'	R = 1,800.00'	R = 8,000.00'
SE = 0.04	SE = 0.03	SE = RC	SE = NC	SE = NC
RO = 128'	RO = 96'	RO = 100'	RO = NONE	RO = NONE

\*\* VERTICAL CURVE DESIGN EXCEPTION  
 SEE SHEET NO.22 FOR -L- PROFILE  
 SEE SHEET NO.29 FOR -Y20- PROFILE

REVISIONS

 Kimley-Horn and Associates, Inc. P.O. BOX 33068 RALEIGH, N.C. 27636-3068 601-910-0141 EXT. 100 601-910-0141	PROJECT REFERENCE NO. R-4430	SHEET NO. #6
	RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/CW ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

\$FILE\$  
\$DATE\$

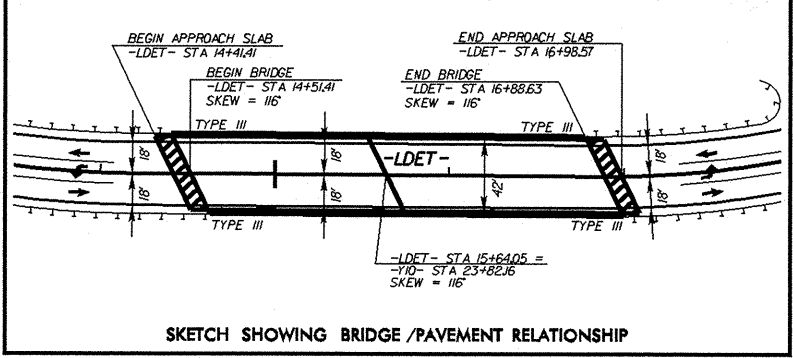


-Y11-			
PIs Sta 4+25.56	PI Sta 7+05.49	PIs Sta 9+05.37	PIs Sta 11+39.40
θs = 1° 47' 25.8"	Δ = 17° 31' 23.7" (RT)	θs = 3° 10' 59.2"	θs = 18° 11' 20.9"
Ls = 100.00'	D = 3° 34' 51.6"	Ls = 150.00'	Ls = 200.00'
LT = 66.67'	L = 489.34'	LT = 100.02'	LT = 134.04'
ST = 33.34'	T = 246.59'	ST = 50.01'	ST = 67.31'
	R = 1,600.00'		
	SE = 0.06		
	RO = SEE PLANS		
-Y14-			
PIs Sta 3+61.81	PI Sta 6+35.59	PIs Sta 9+05.37	PIs Sta 11+39.40
θs = 3° 10' 59.2"	Δ = 18° 49' 32.4" (LT)	θs = 3° 10' 59.2"	θs = 18° 11' 20.9"
Ls = 150.00'	D = 4° 14' 38.9"	Ls = 150.00'	Ls = 200.00'
LT = 100.02'	L = 443.57'	LT = 100.02'	LT = 134.04'
ST = 50.01'	T = 223.80'	ST = 50.01'	ST = 67.31'
	R = 1,350.00'		
	SE = EXISTING		
	RO = EXISTING		

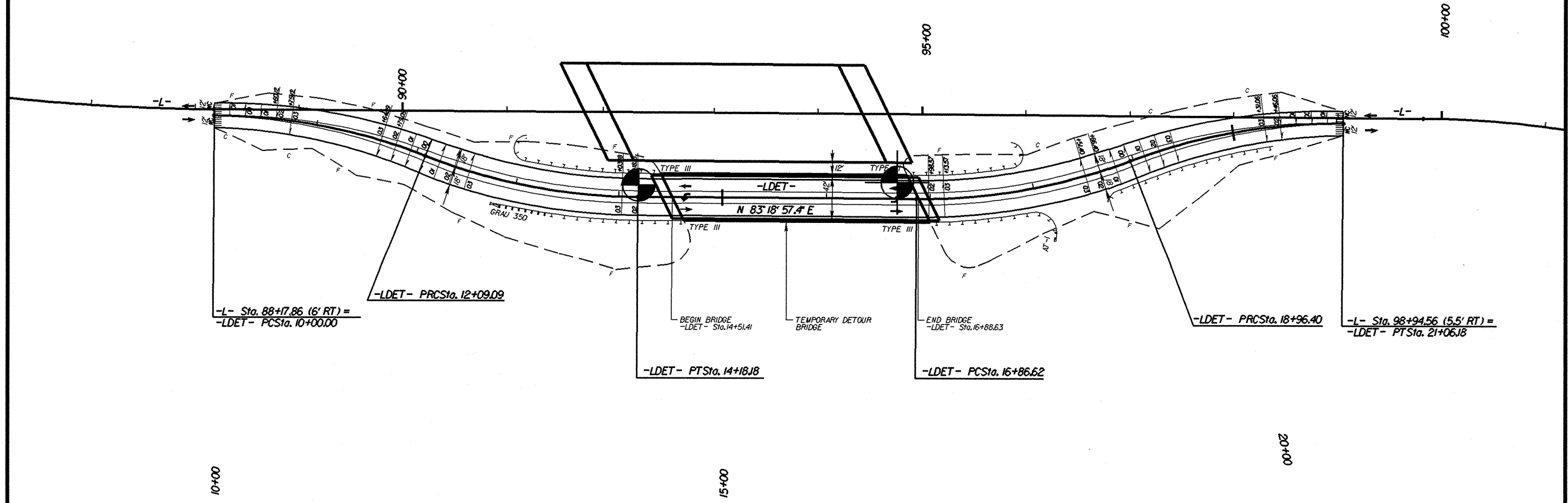
SEE SHEET NO.26 FOR -Y11- PROFILE  
SEE SHEET NO.27 FOR -Y14- PROFILE

16/50

REVISIONS



<p>Kimley-Horn and Associates, Inc. P.O. BOX 33068 RALEIGH, N.C. 27636-3068</p>	PROJECT REFERENCE NO. R-4430	SHEET NO. 2-C
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p><b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION</p> <p><b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION</p>		
<p>DATE: 01/11/83 DRAWN BY: [Name] CHECKED BY: [Name]</p>		



\$FILES\$  
 \$DATES\$

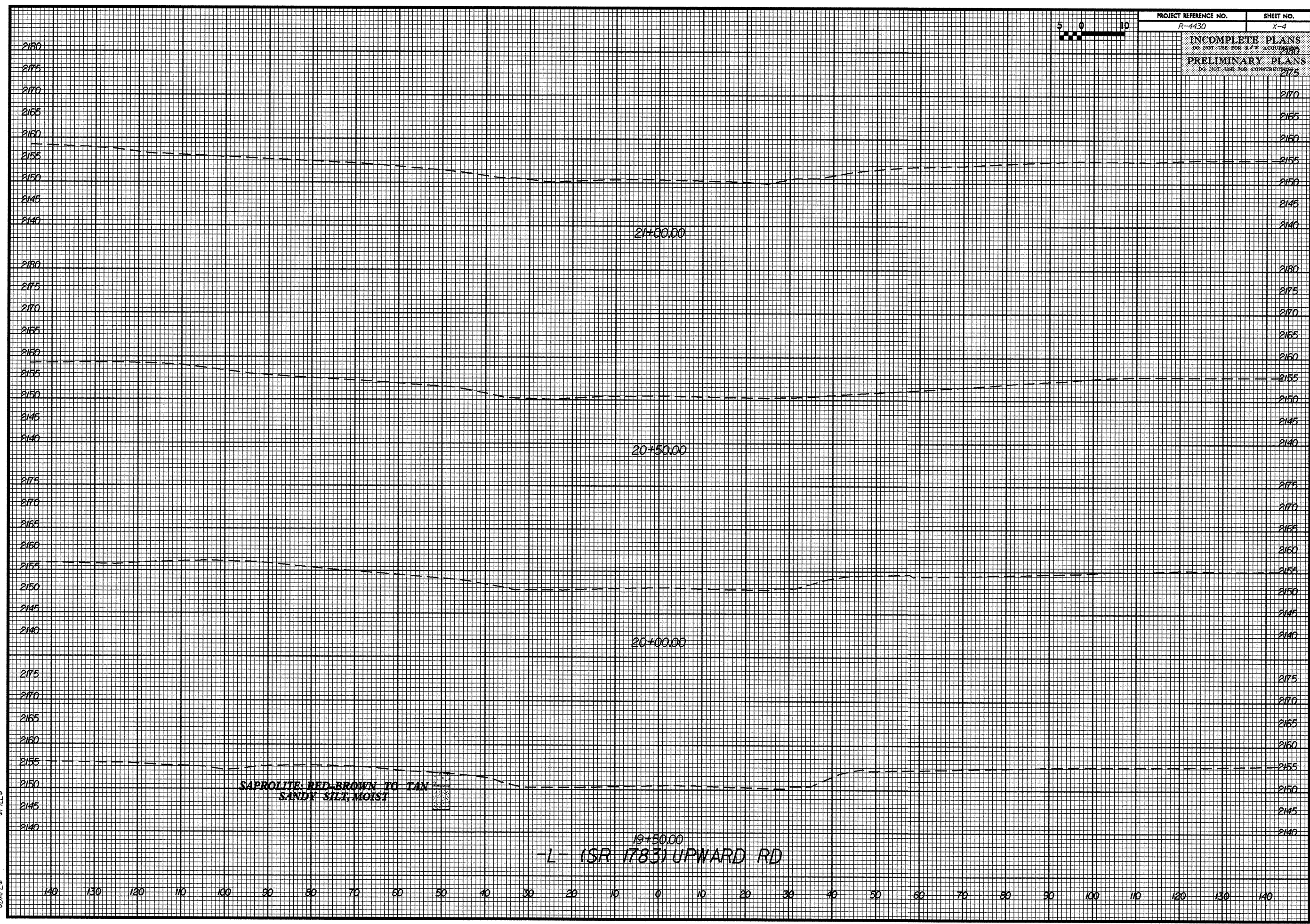
-LDET-			
PI Sta 11+05.76	PI Sta 13+14.85	PI Sta 17+92.73	PI Sta 20+02.51
$\Delta = 21^{\circ} 12' 13.1''$ (RT)	$\Delta = 21^{\circ} 12' 13.1''$ (LT)	$\Delta = 21^{\circ} 16' 25.0''$ (LT)	$\Delta = 21^{\circ} 16' 25.0''$ (RT)
D = 10' 08" 27.0"	D = 10' 08" 27.0"	D = 10' 08" 27.0"	D = 10' 08" 27.0"
L = 209.09'	L = 209.09'	L = 209.78'	L = 209.78'
T = 105.76'	T = 105.76'	T = 106.11'	T = 106.11'
R = 565.00'	R = 565.00'	R = 565.00'	R = 565.00'

SEE SHEET NO. 22 FOR -LDET- PROFILE  
SEE SHEET NOS. ? FOR STRUCTURE PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-4

**INCOMPLETE PLANS**  
DO NOT USE FOR A.P.P. ACQUISITION

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

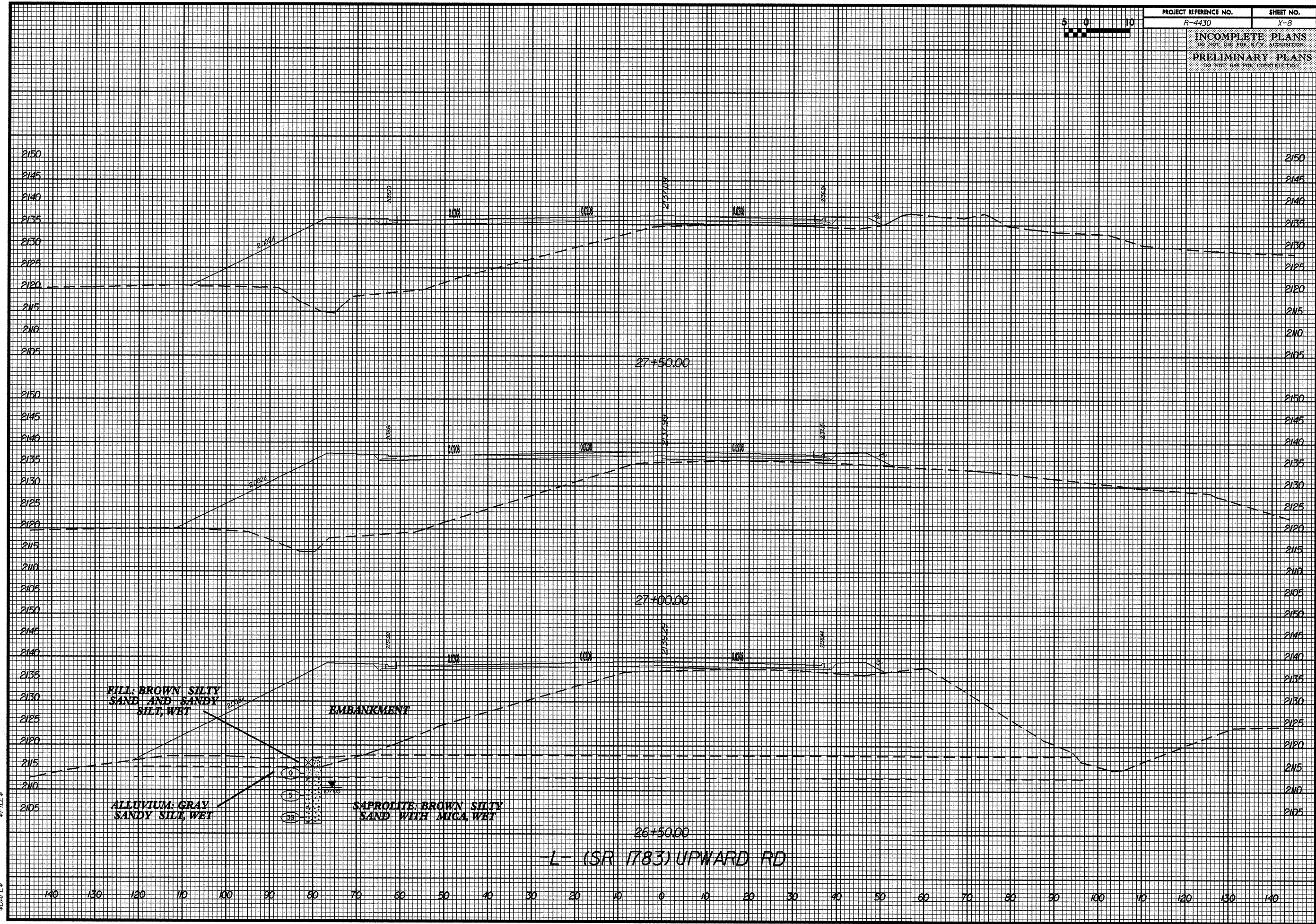


SAPROLITE, RED-BROWN TO TAN  
SANDY SILT, MOIST

19+50.00  
L- (SR 1783) UPWARD RD



PROJECT REFERENCE NO. R-4430	SHEET NO. X-8
INCOMPLETE PLANS DO NOT USE FOR R.F.T. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

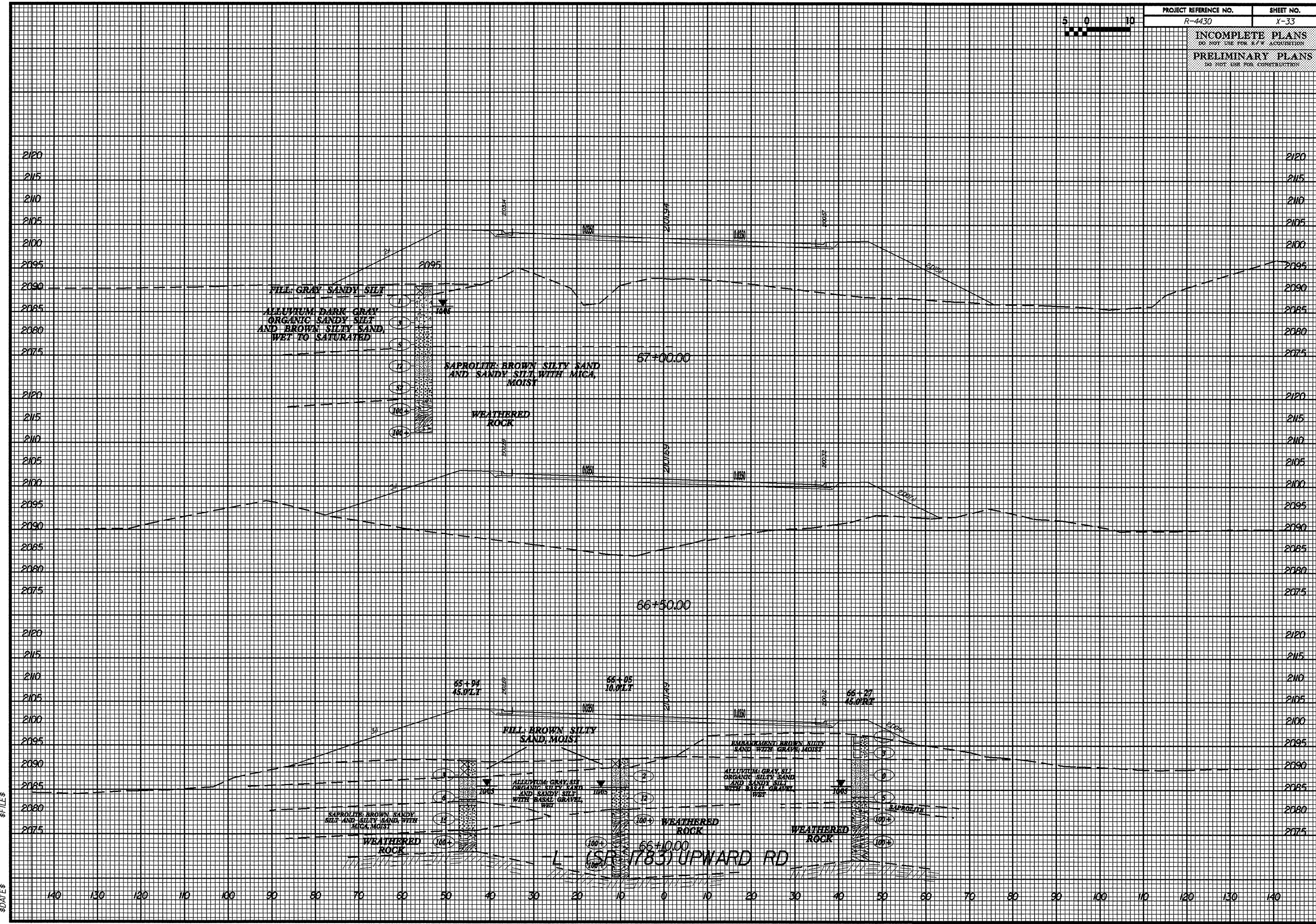
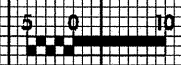


ELEVATION

L- (SR 1783) UPWARD RD



**INCOMPLETE PLANS**  
DO NOT USE FOR R.F.V. ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



\$FILES\$

\$DATES\$



2015

2120

2115

2110

2105

2100

2095

2090

2085

2120

2115

2110

2105

2100

2095

2090

2085

2120

2115

2110

2105

2100

2095

2090

2085

2080

2075

2120

2115

2110

2105

2100

2095

2090

2085

2080

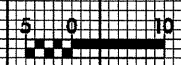
2075

2075

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-34

INCOMPLETE PLANS  
DO NOT USE FOR CONSTRUCTION

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



\$DATE\$

\$FILE\$

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

67+10.00  
L- (SR 1783) UPWARD RD

68+50.00

68+00.00

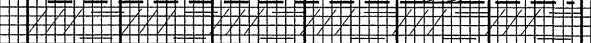
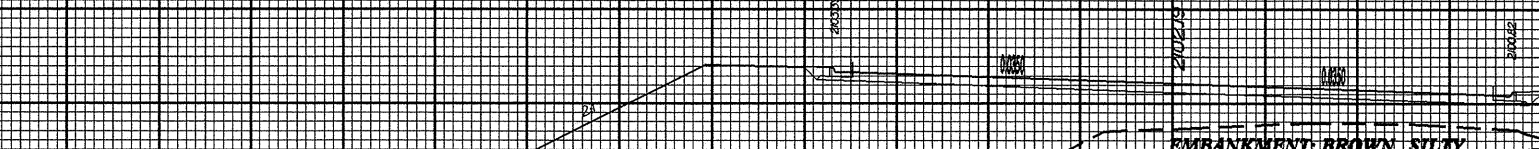
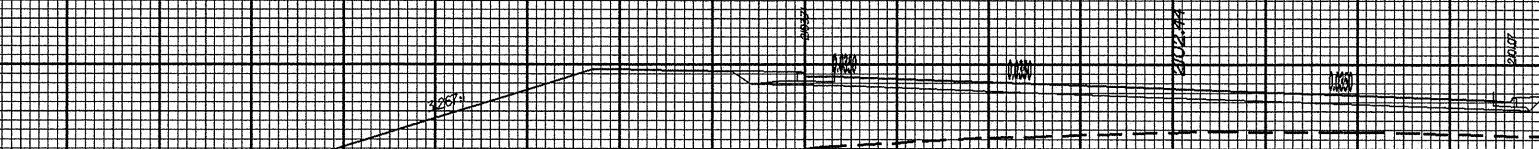
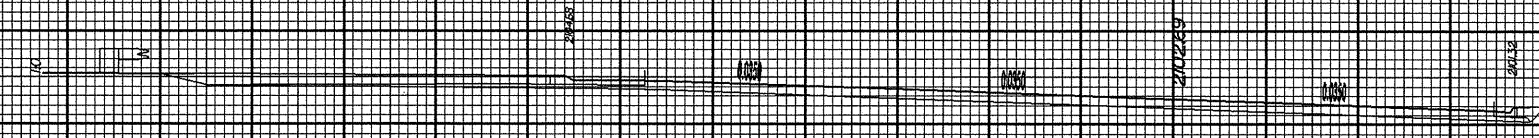
67+46  
45.0' RT

EMBANKMENT BROWN SILTY SAND AND GRAVEL, MOIST

ALLUVIAL GRAVEL SANDY SILTY AND SILTY SAND, ORGANIC, WET

SAPROLITE BROWN SILTY SAND, MOIST

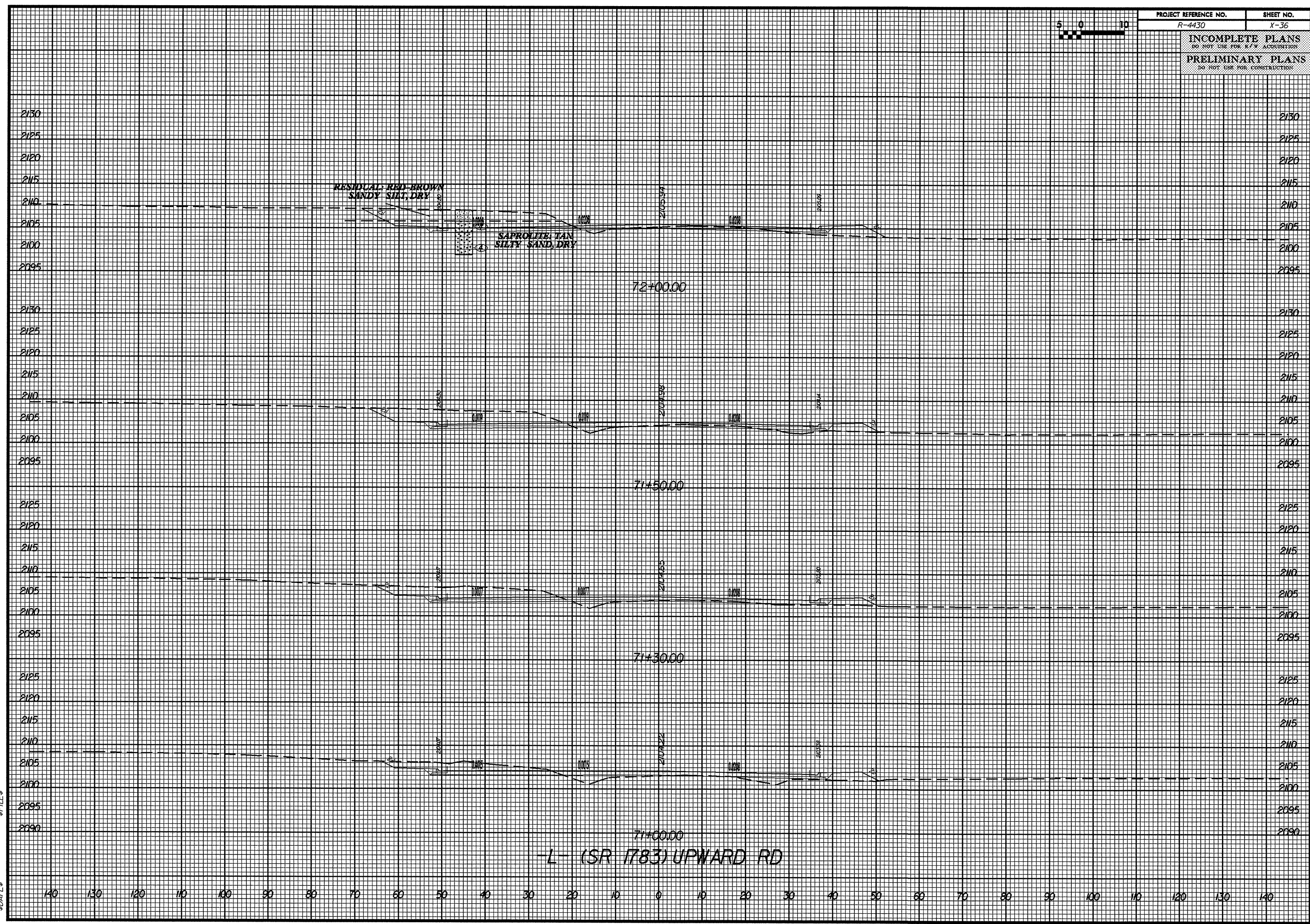
67+50.00 WEATHERED ROCK





**INCOMPLETE PLANS**  
DO NOT USE FOR R.F.P. ACQUISITION

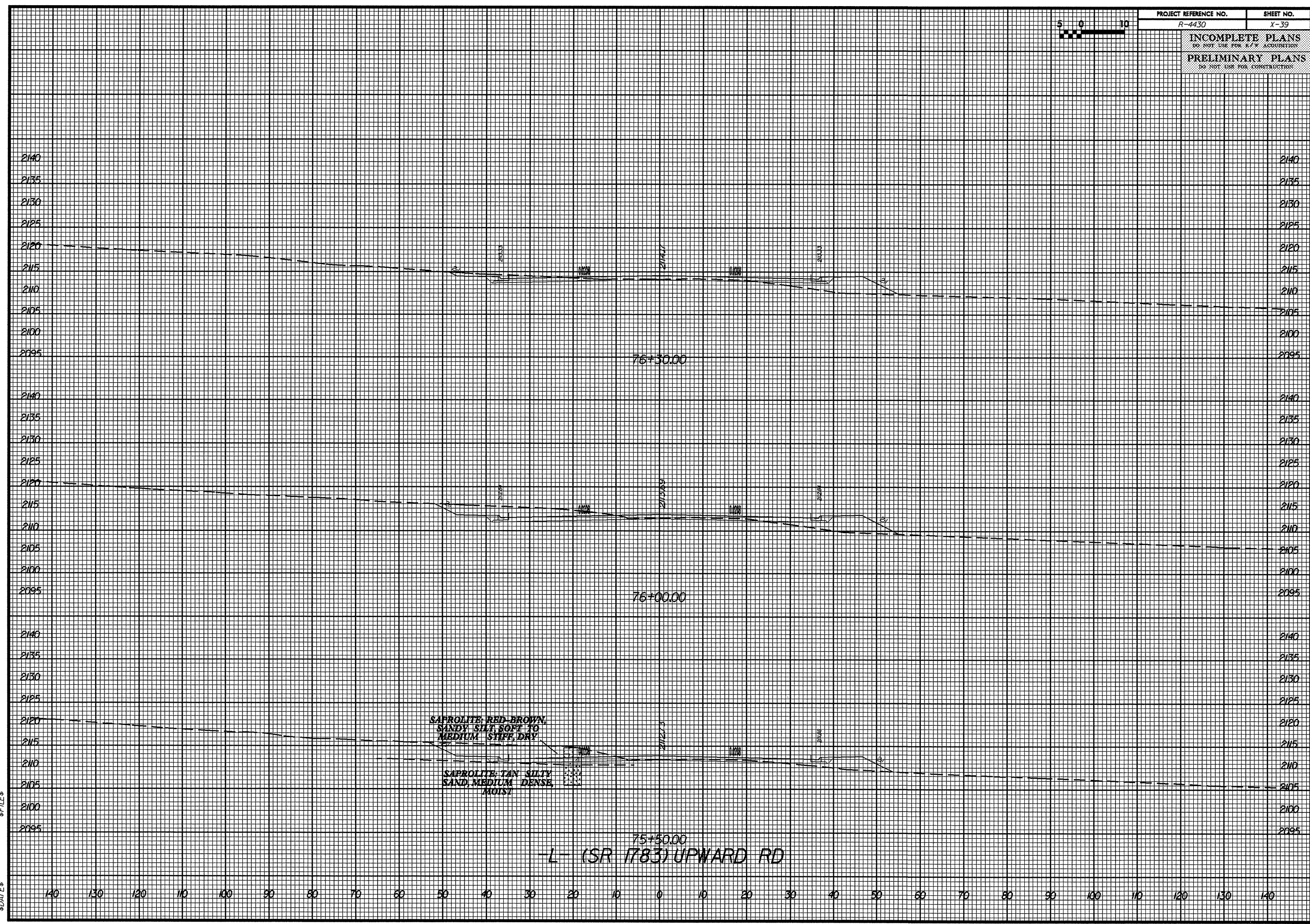
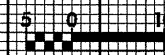
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



L- (SR 1783) UPWARD RD



INCOMPLETE PLANS  
DO NOT USE FOR E.F.F. ACQUISITION  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



SAPROLITE RED BROWN,  
SANDY SILT SOFT TO  
MEDIUM STIFF, DRY

SAPROLITE TAN SILTY  
SAND, MEDIUM DENSE,  
MOIST

75+50.00  
L- (SR 1783) UPWARD RD

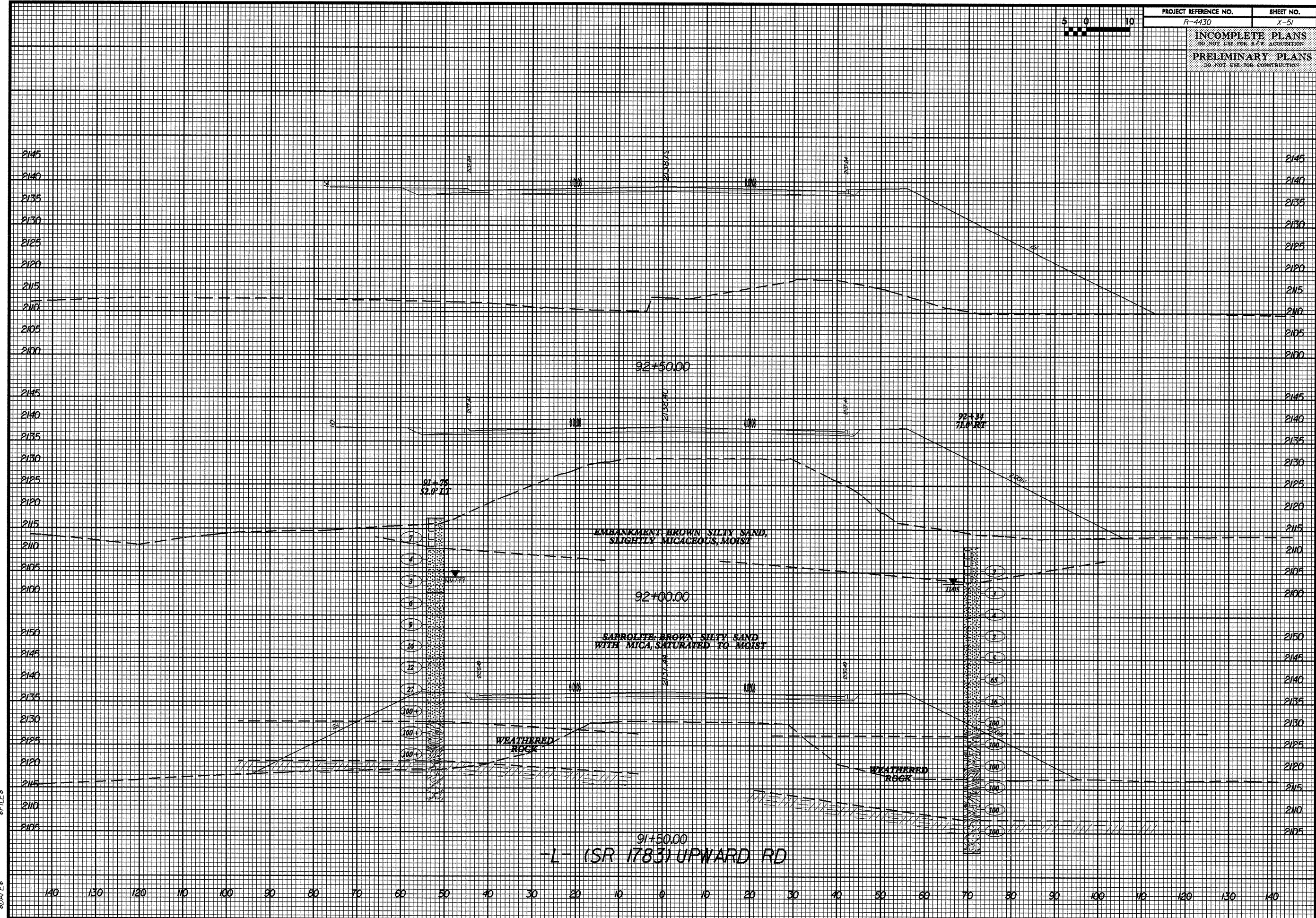
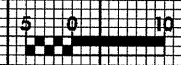
ELEVATION

STATIONING



2/24

PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-51
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ADJUSTMENT	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



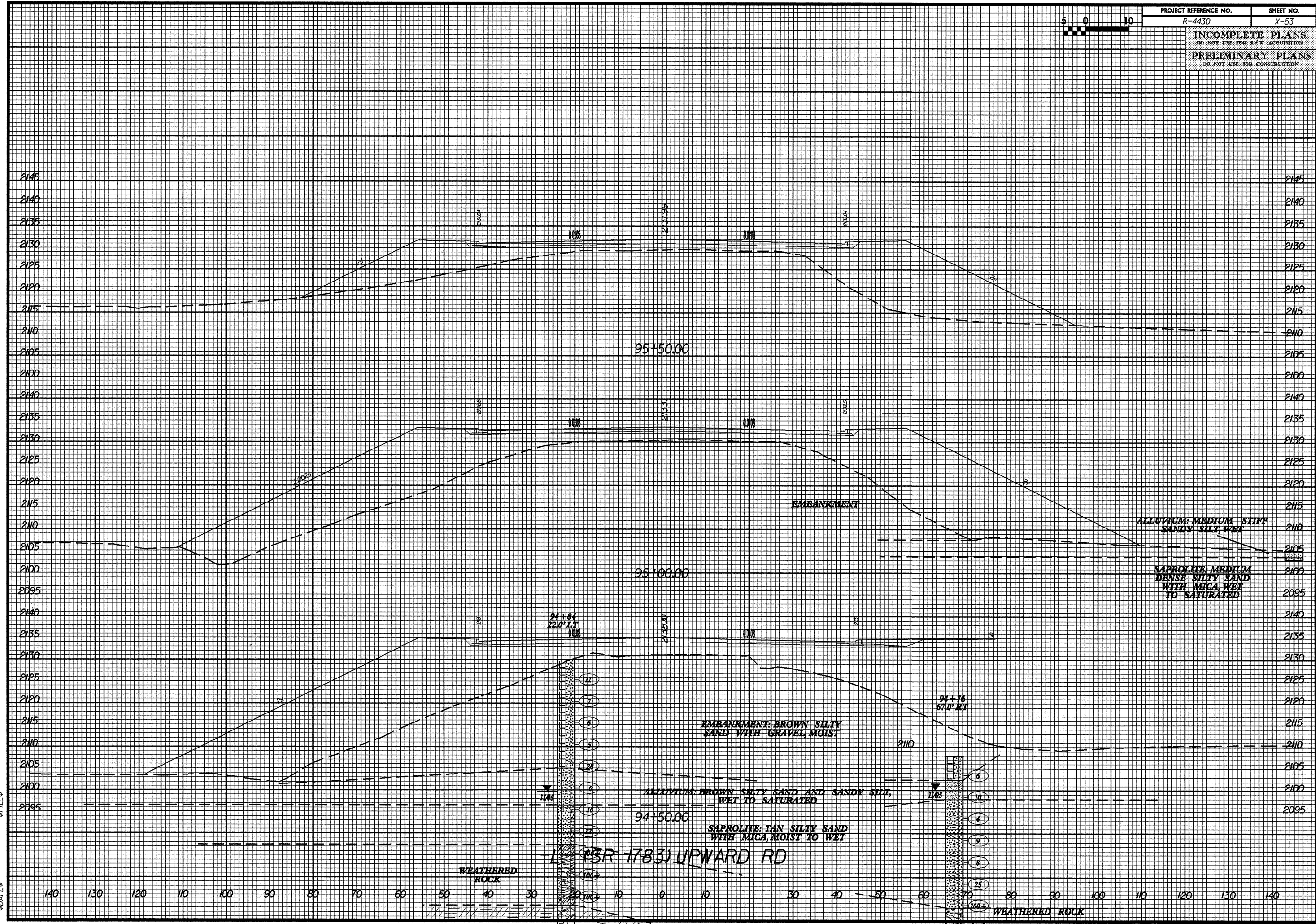
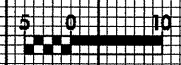
\$FILES  
\$DATE\$

91+50.00  
-L- (SR 1783) UPWARD RD

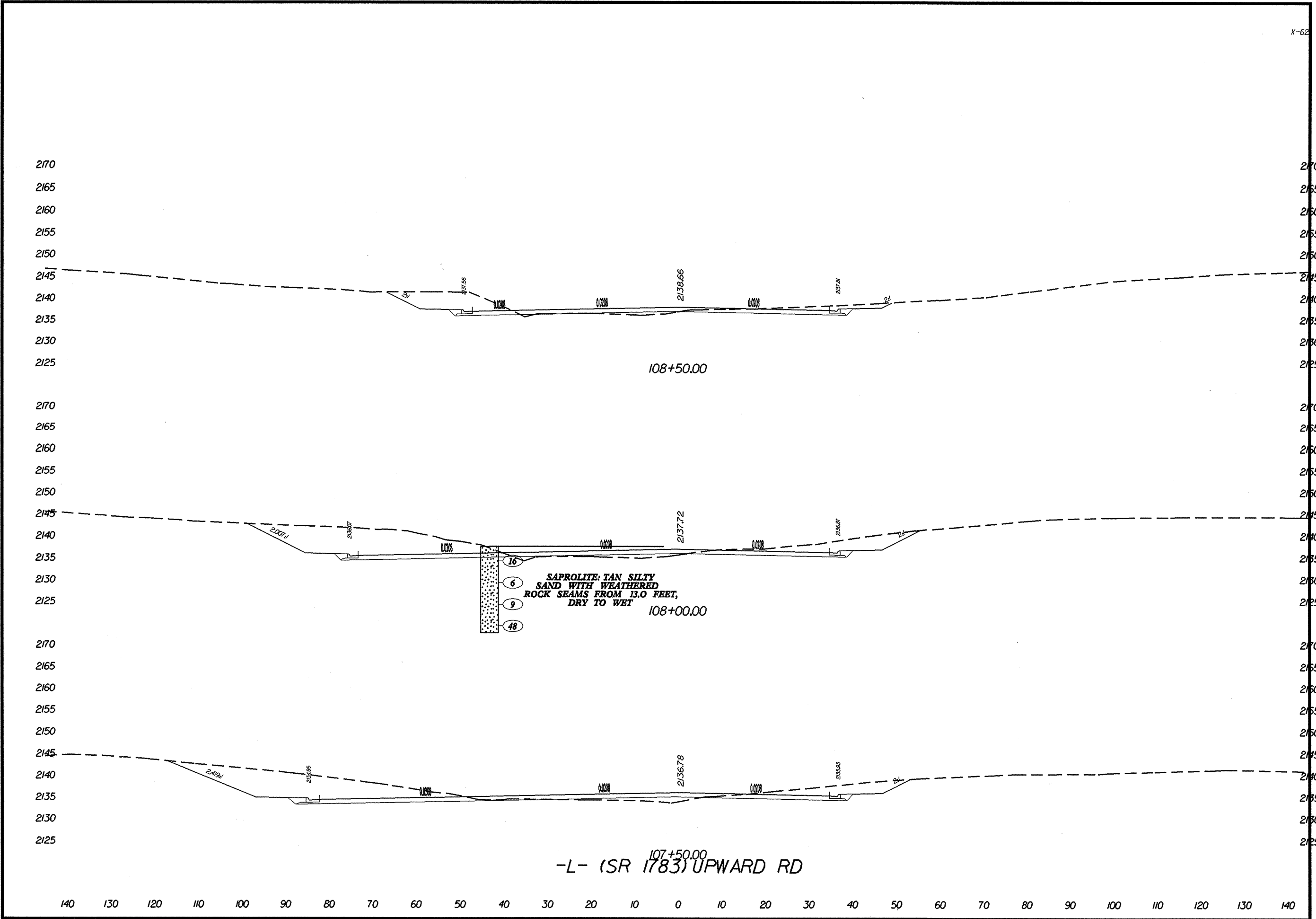


27150

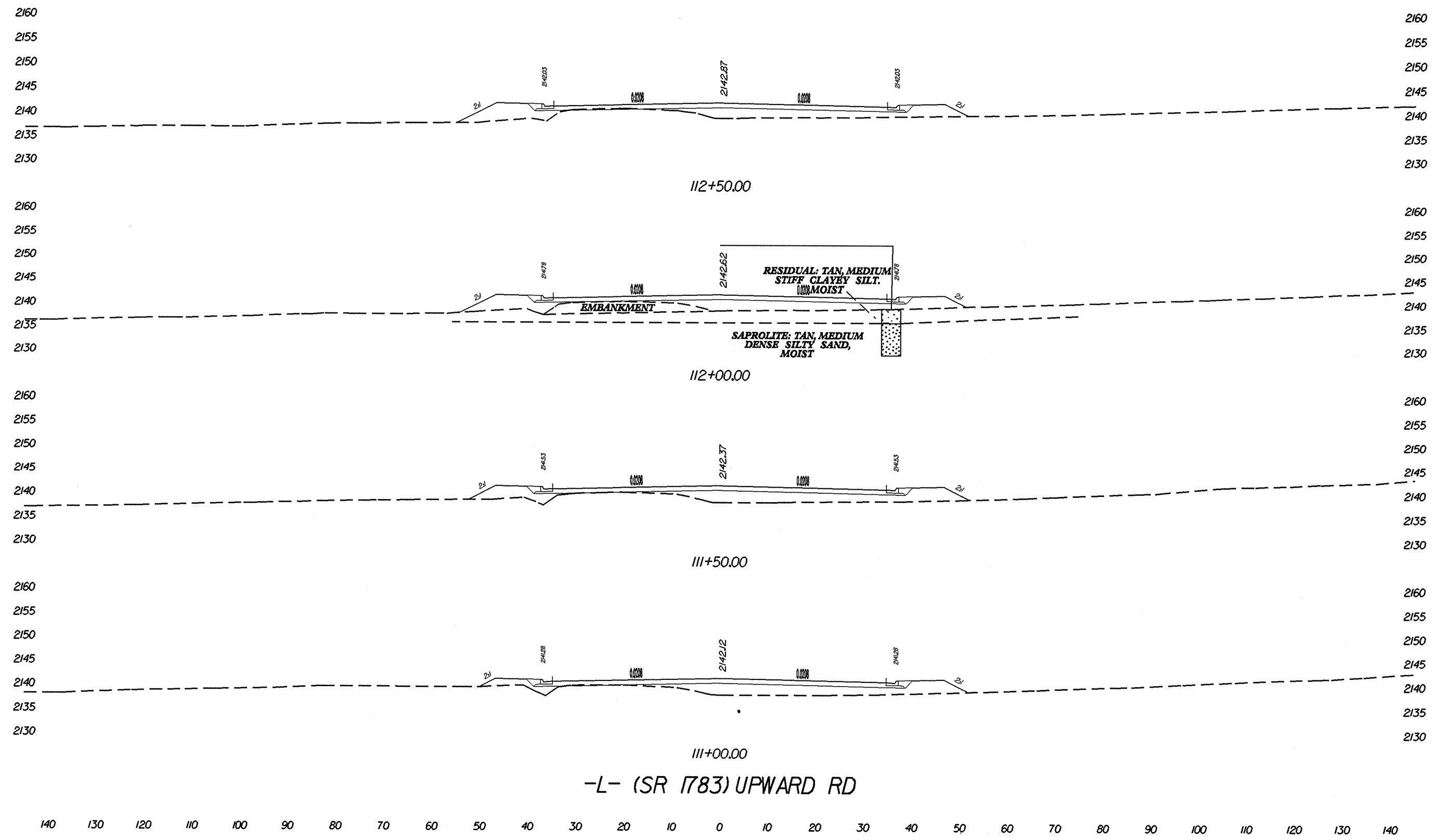
PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-53
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	





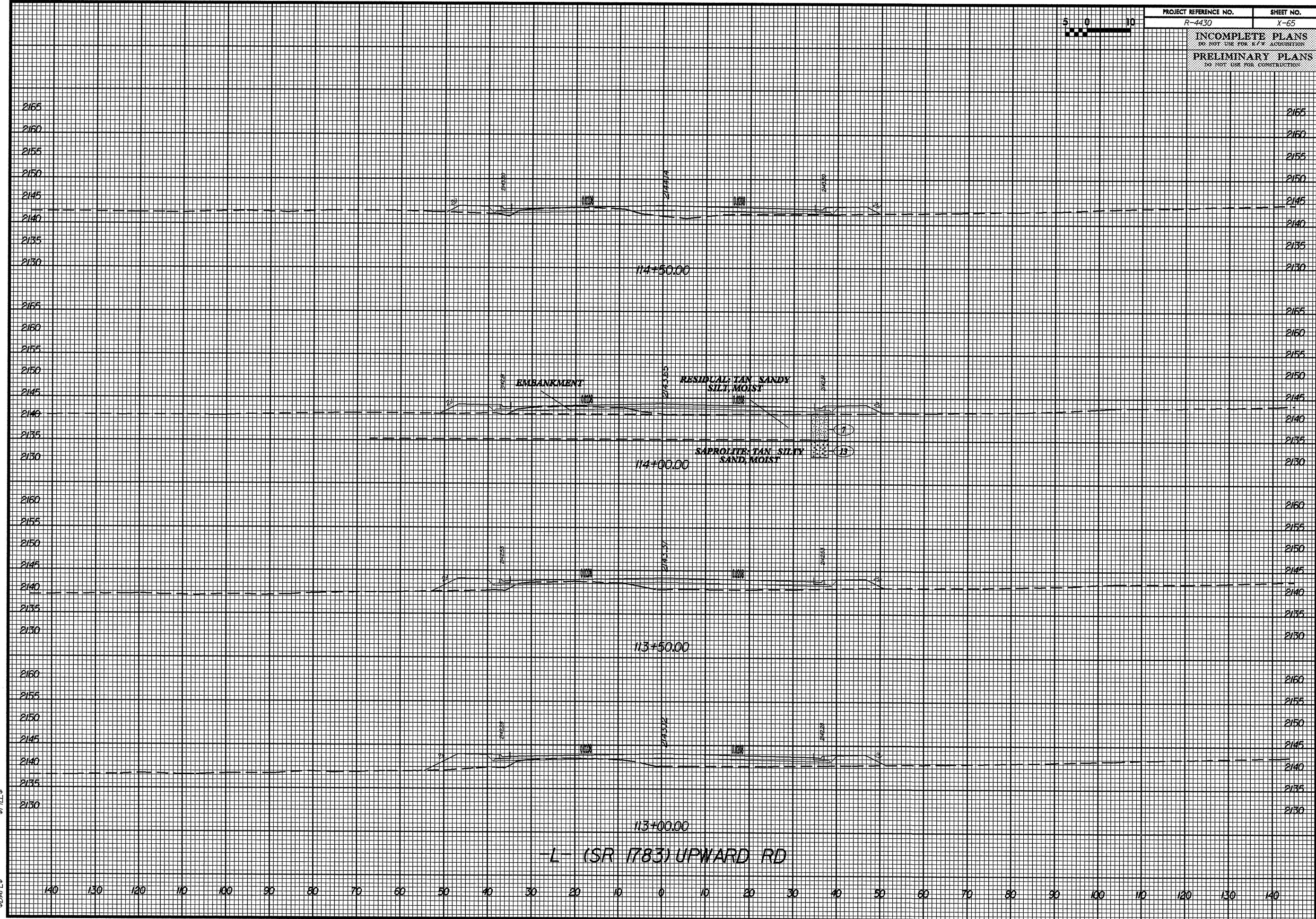


INCOMPLETE PLANS  
DO NOT USE FOR A/E/T ACQUISITION  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



-L- (SR 1783) UPWARD RD

PROJECT REFERENCE NO. R-4430	SHEET NO. X-65
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



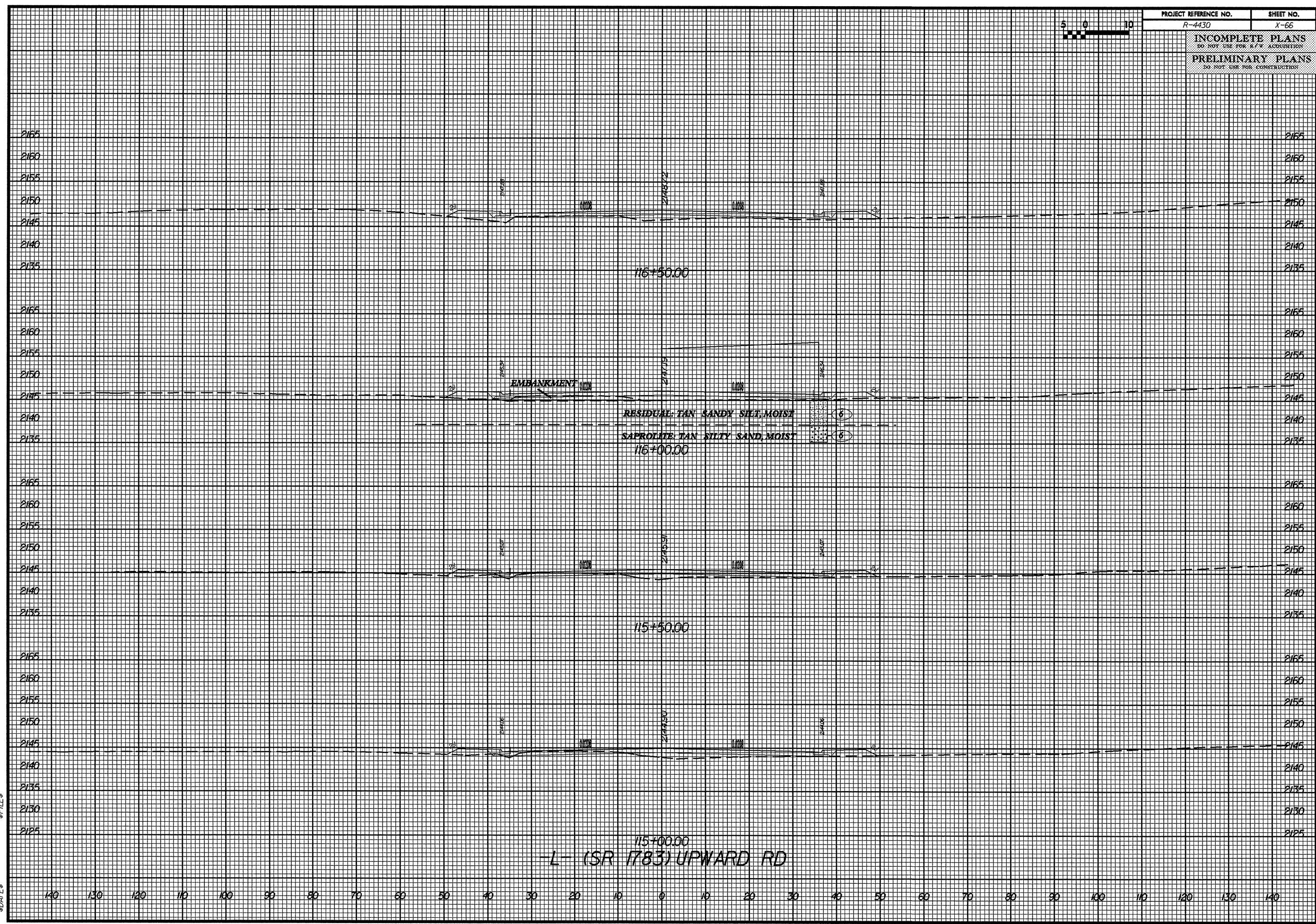
\$FILE\$

\$DATE\$



20/50

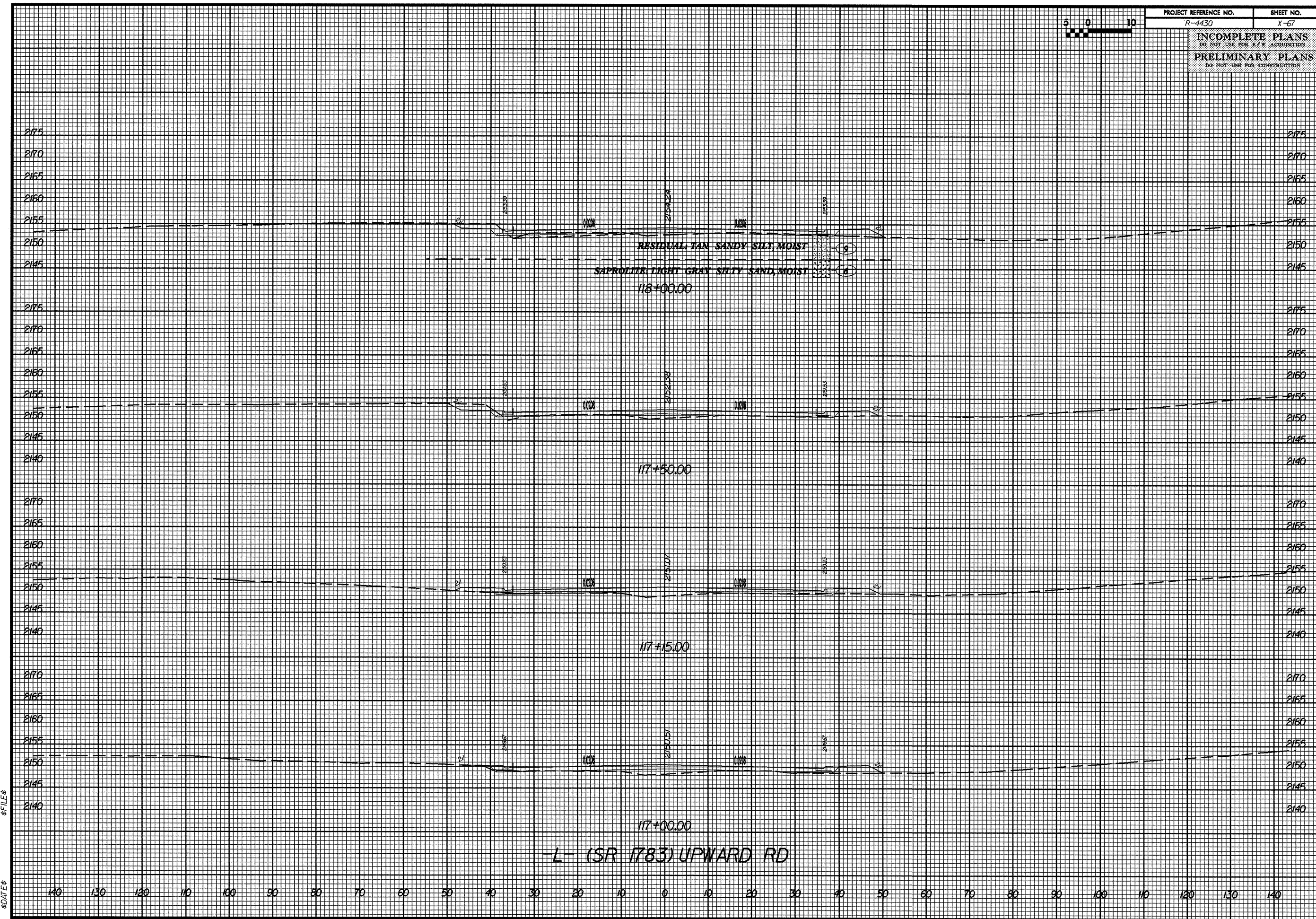
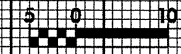
PROJECT REFERENCE NO. R-4430	SHEET NO. X-66
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



\$FILE\$  
 \$DATE\$



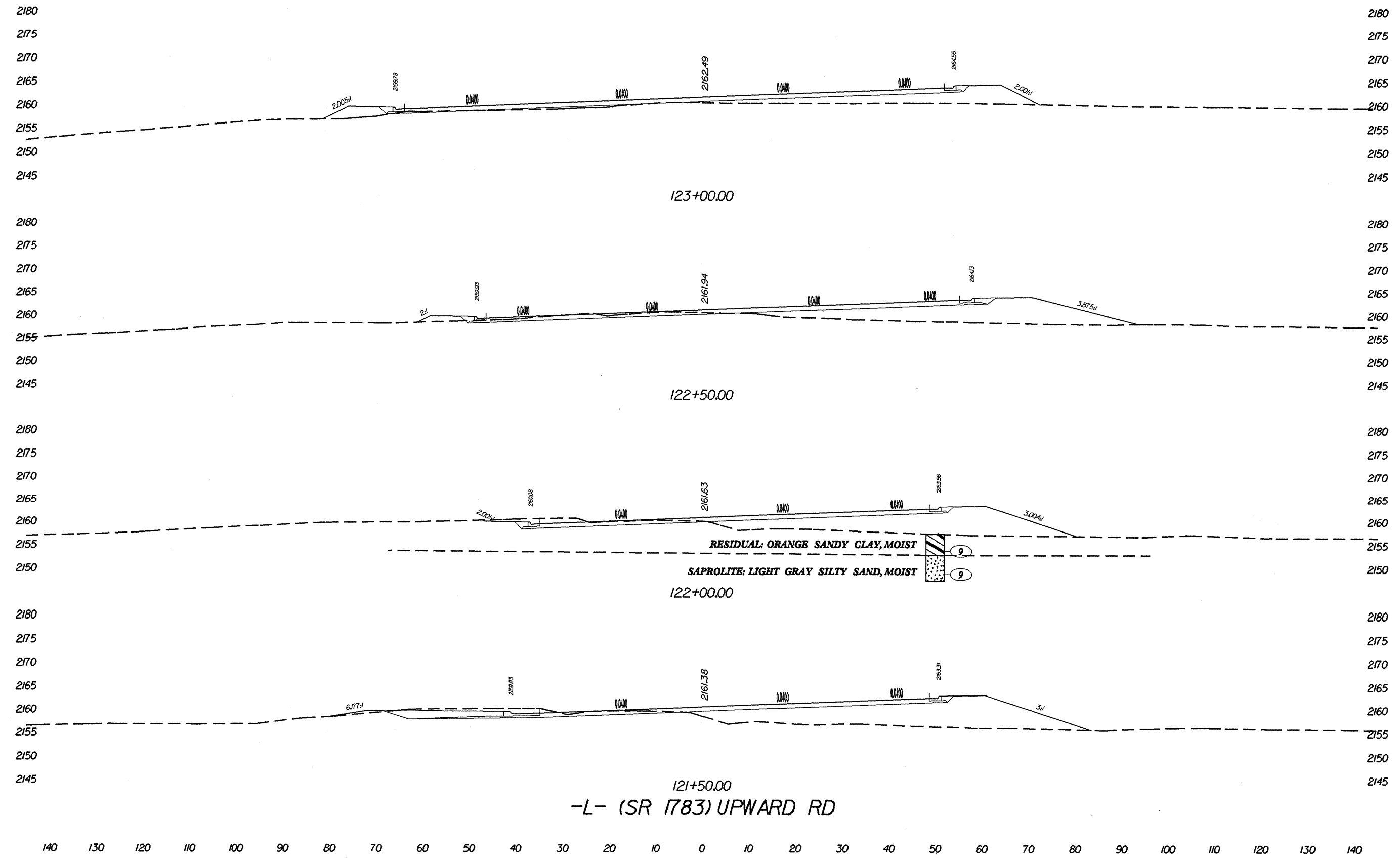
PROJECT REFERENCE NO. R-4430	SHEET NO. Y-67
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



\$DATE\$  
\$FILE\$

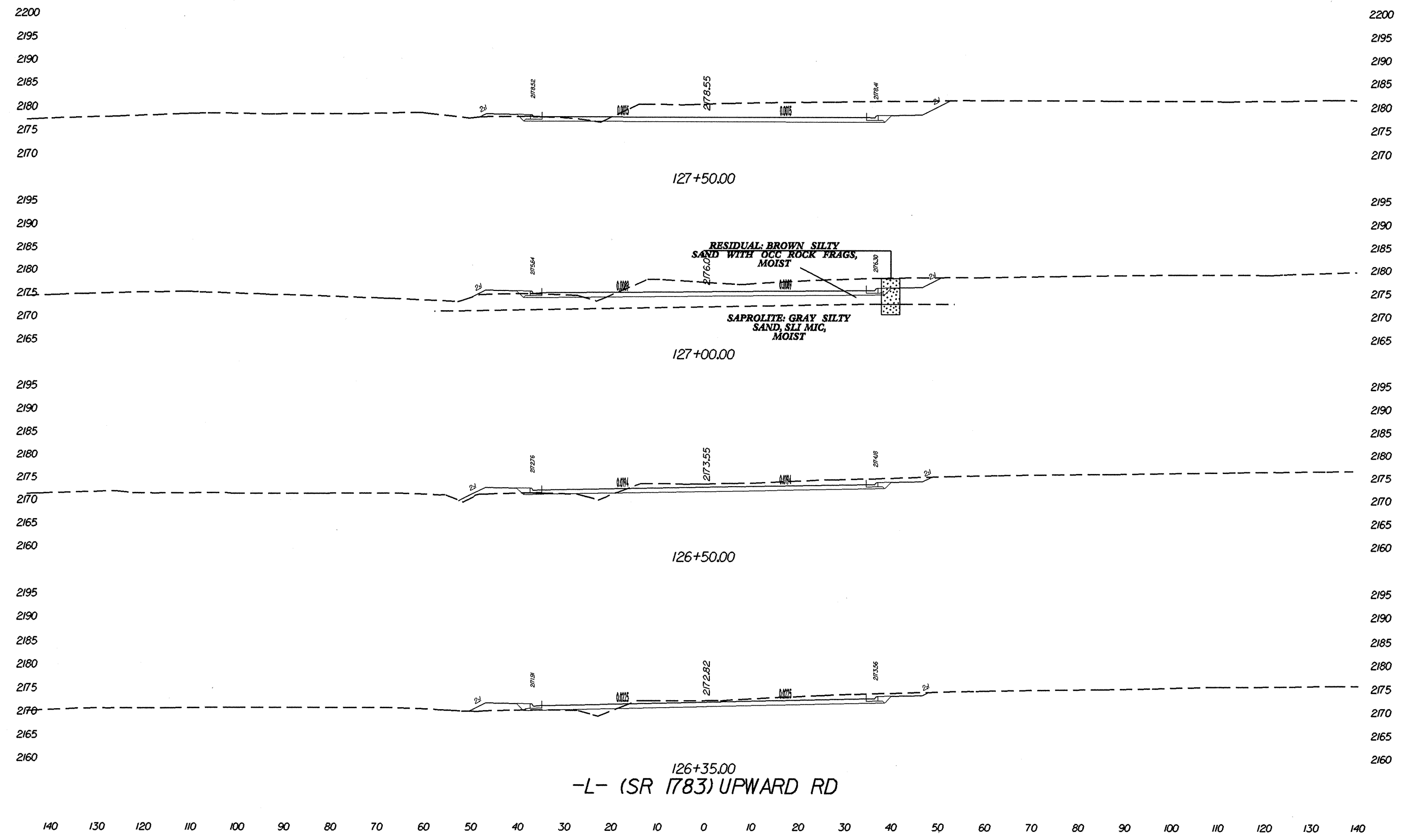
L (SR 1783) UPWARD RD

**INCOMPLETE PLANS**  
 DO NOT USE FOR R.F.V. ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

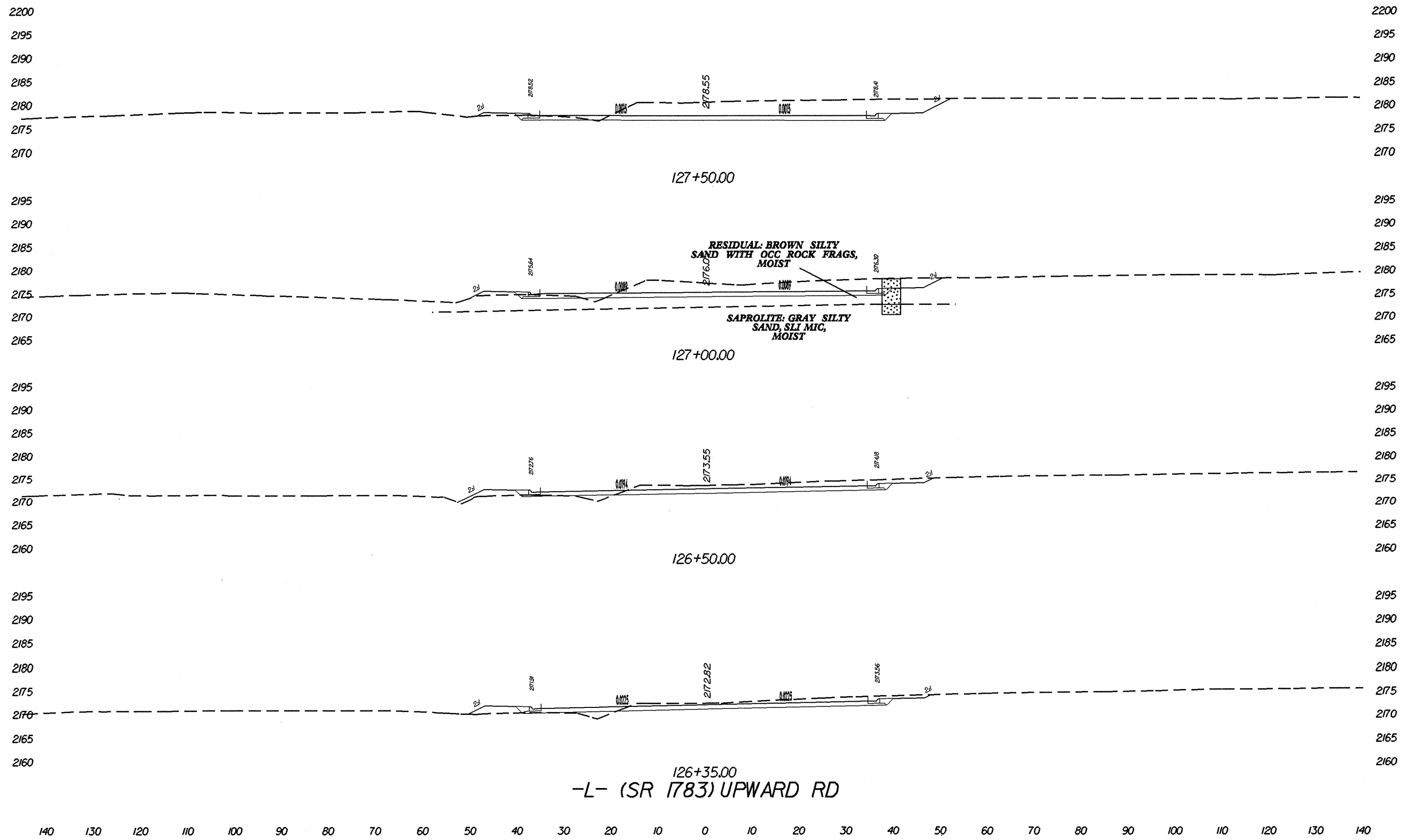




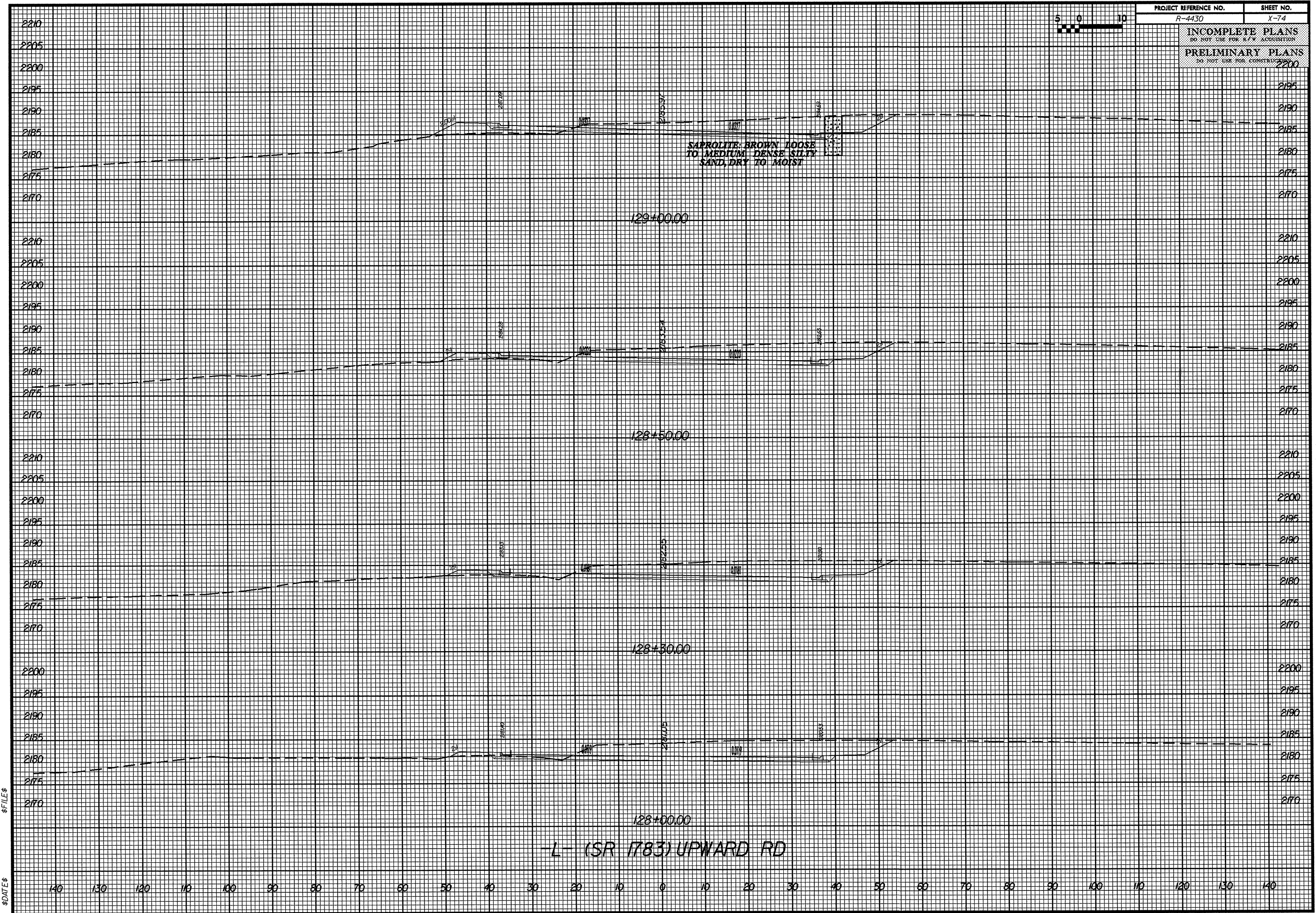
**INCOMPLETE PLANS**  
DO NOT USE FOR R.F.V. ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



**INCOMPLETE PLANS**  
 DO NOT USE FOR R.F.V. ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION



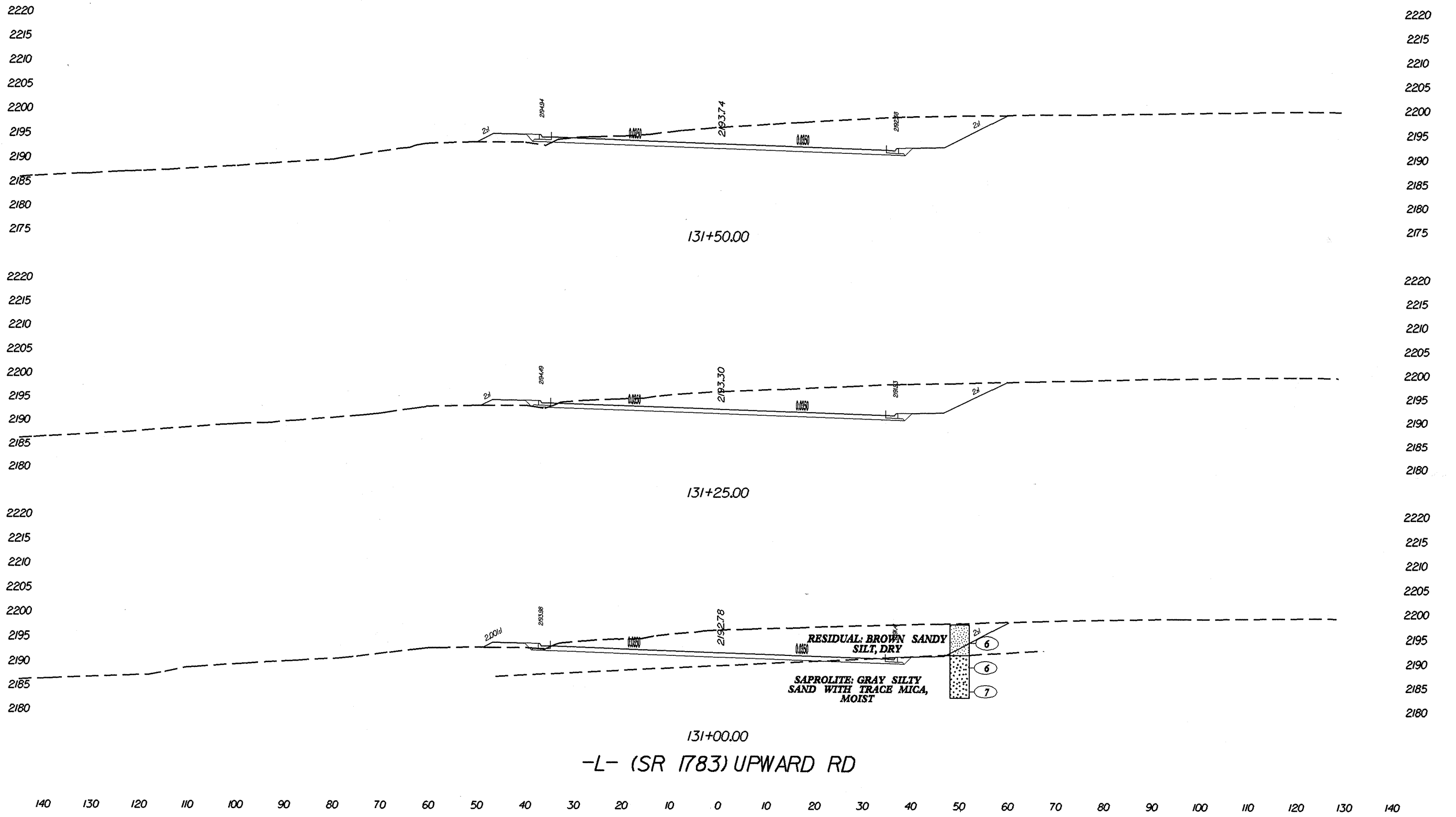
PROJECT REFERENCE NO.	SHEET NO.
R-4430	X-74
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



\$DATE\$

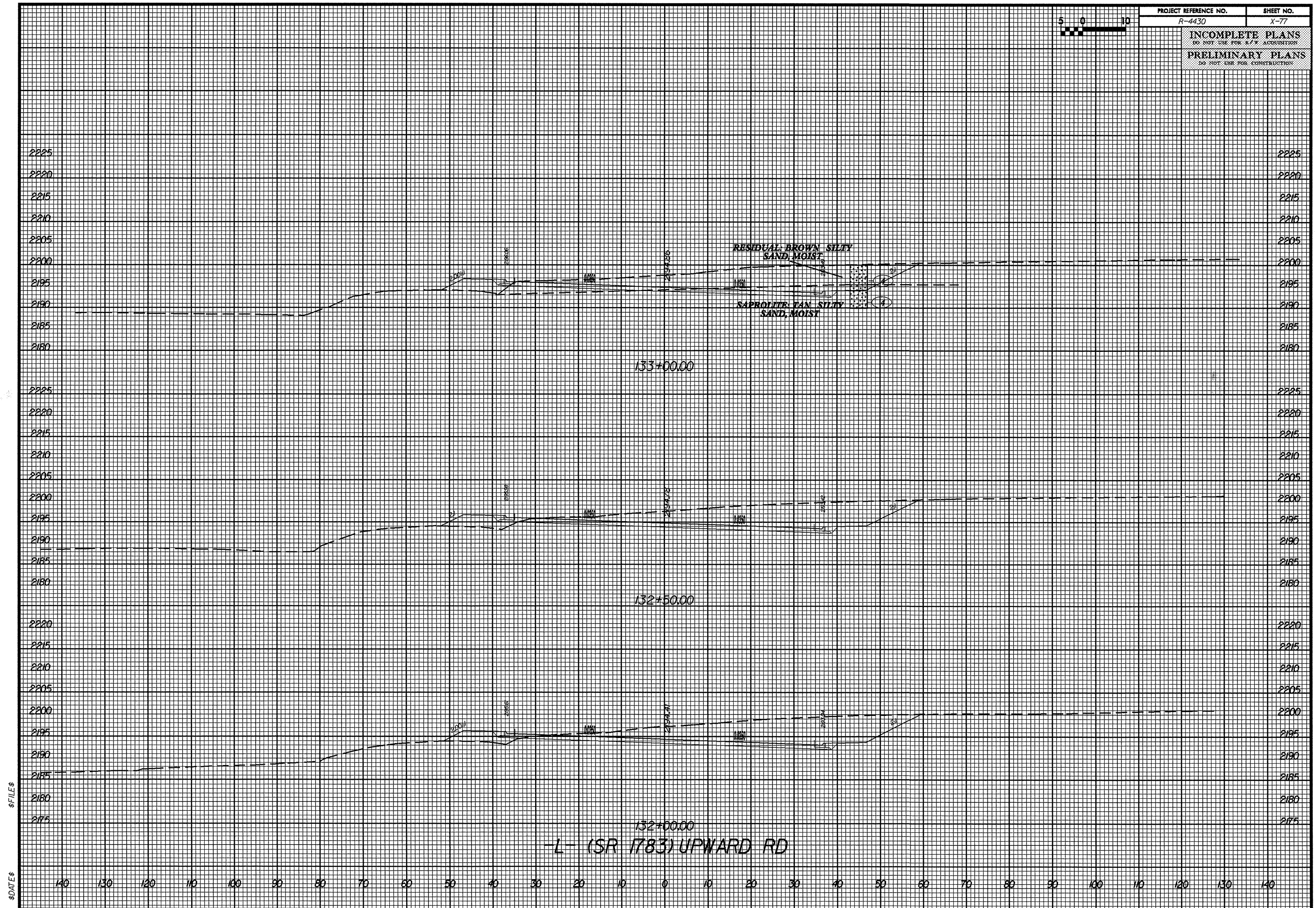
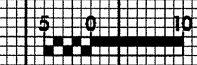
\$FILE\$

**INCOMPLETE PLANS**  
DO NOT USE FOR R.F.W. ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



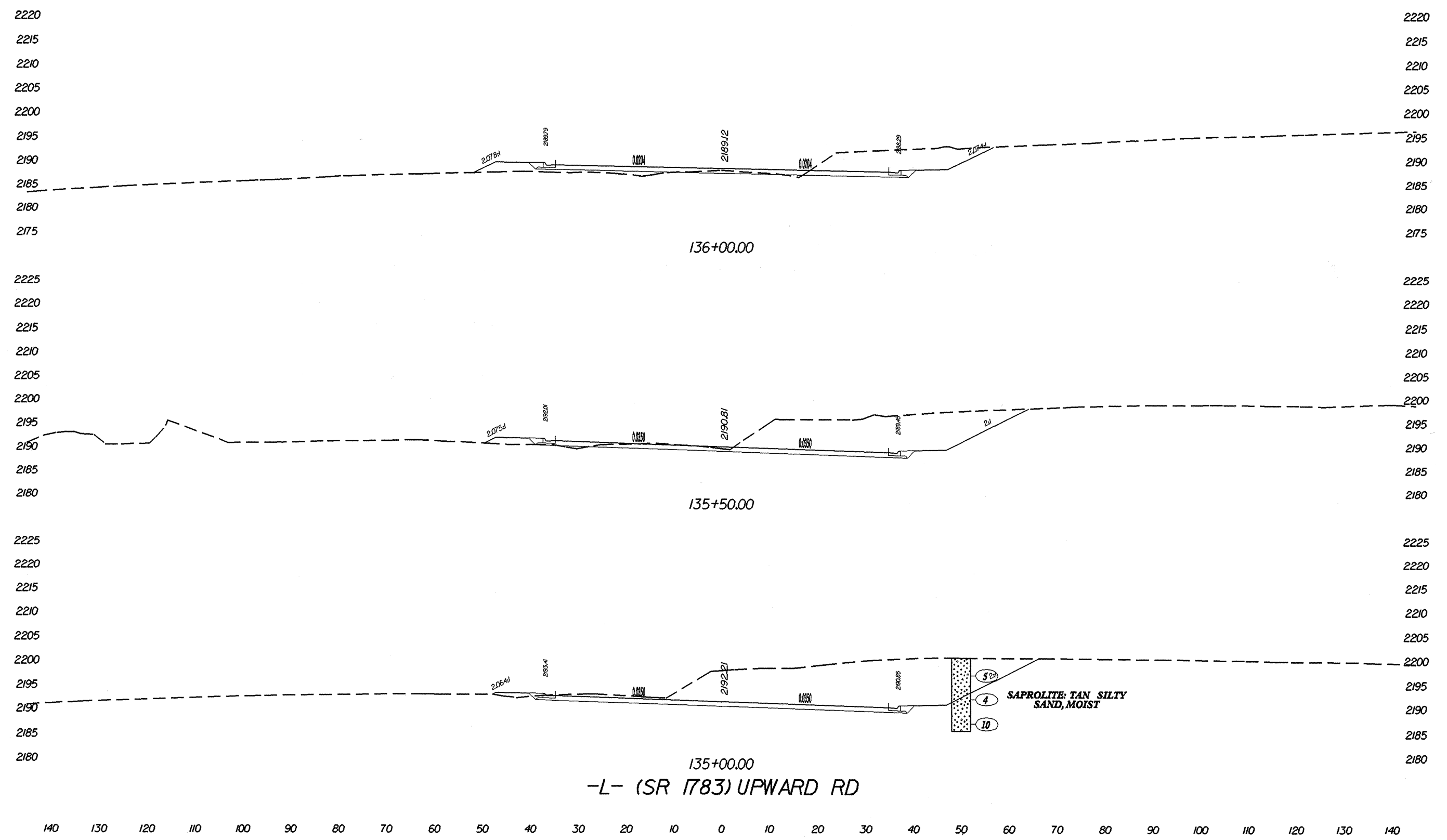


PROJECT REFERENCE NO. R-4430	SHEET NO. X-77
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



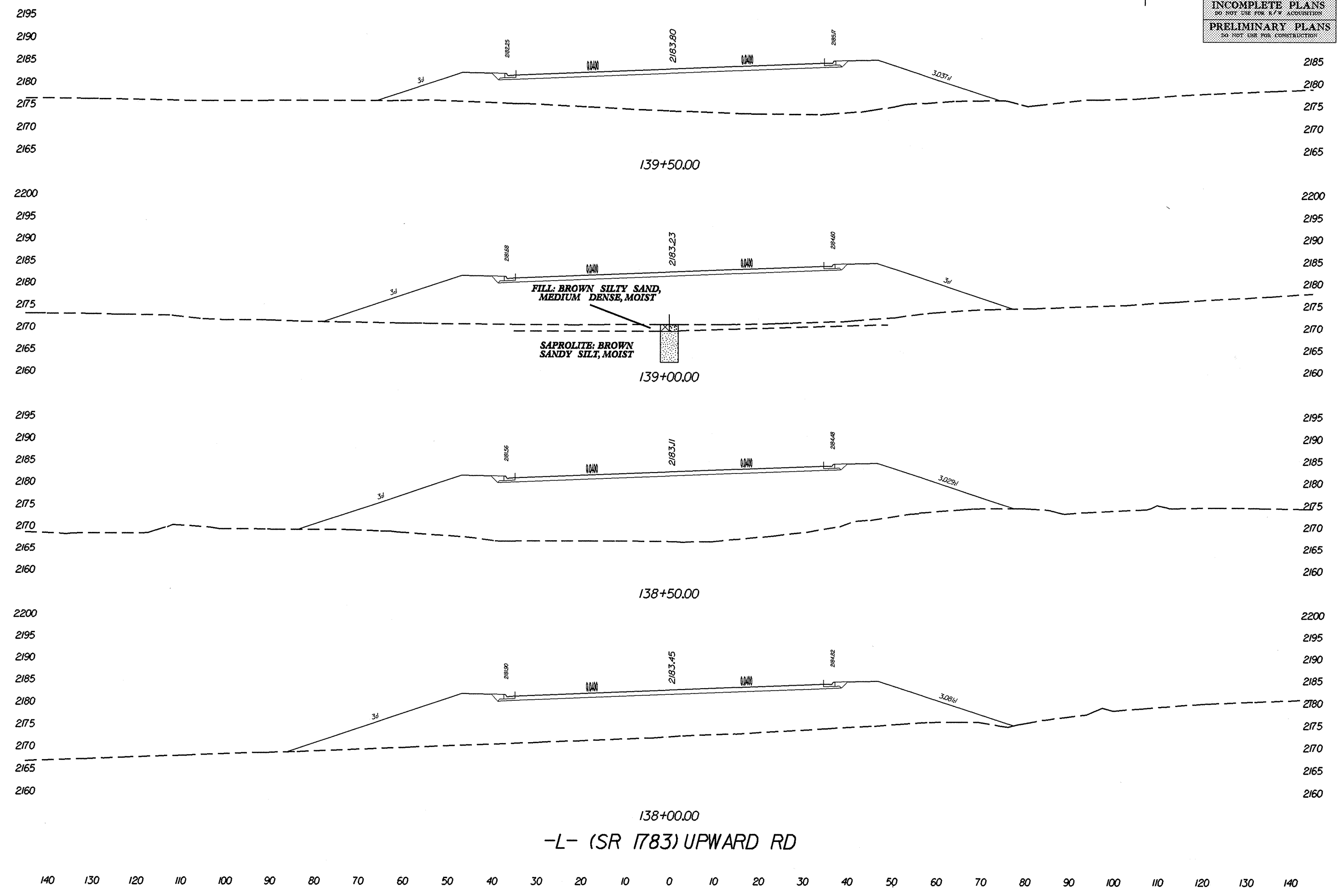
\$DATE\$

**INCOMPLETE PLANS**  
DO NOT USE FOR A/E/CONSTRUCTION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

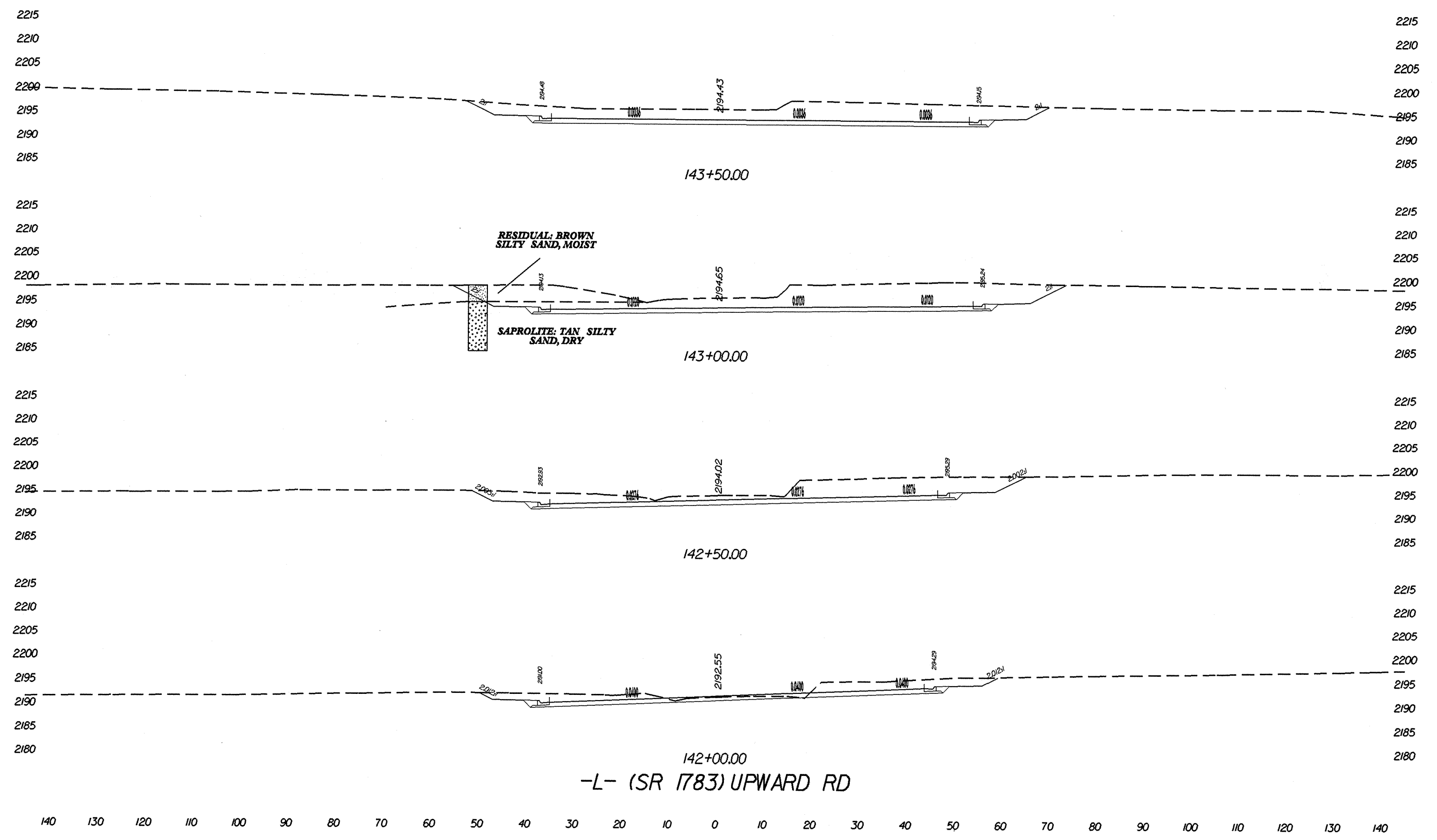




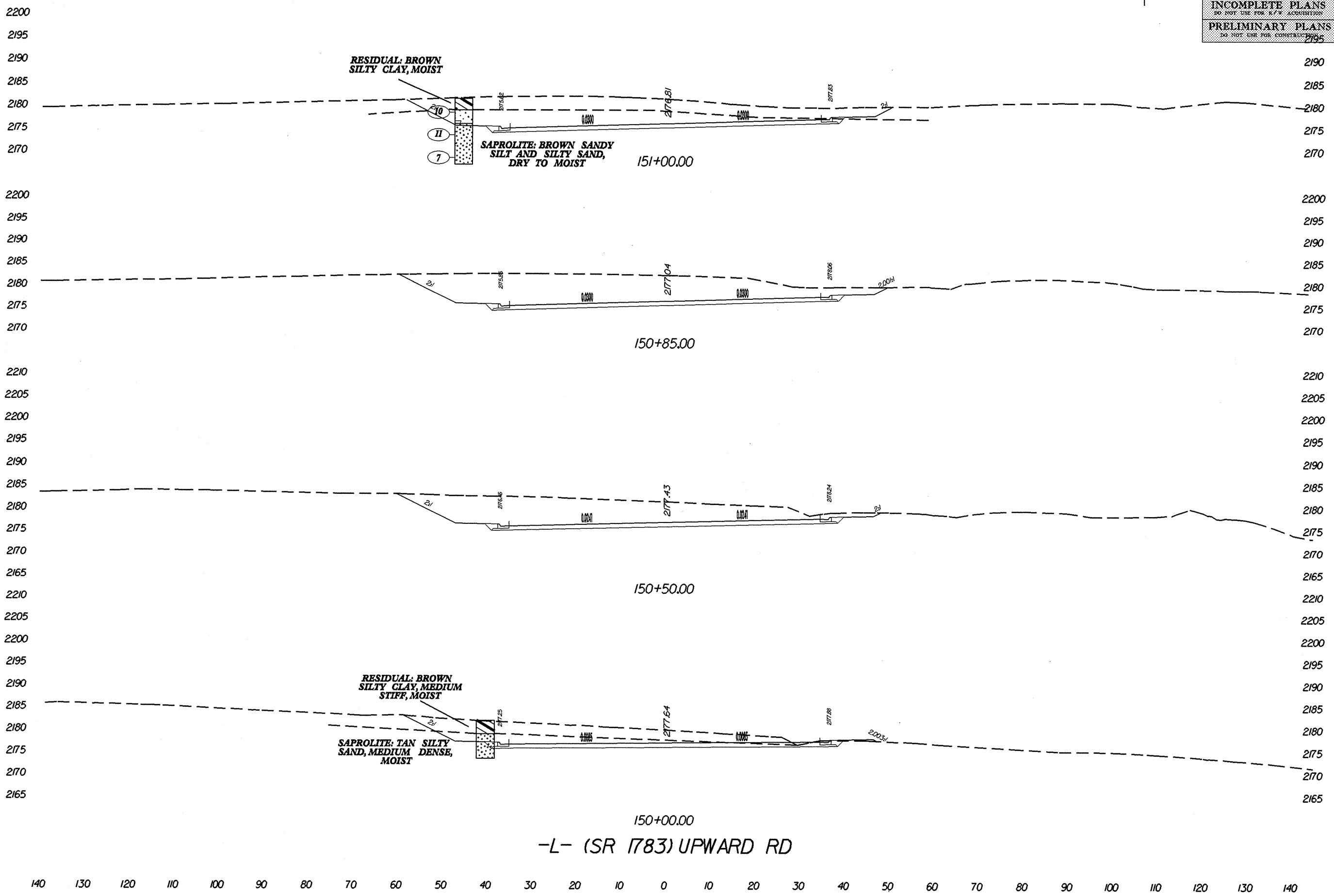
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/F W ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION



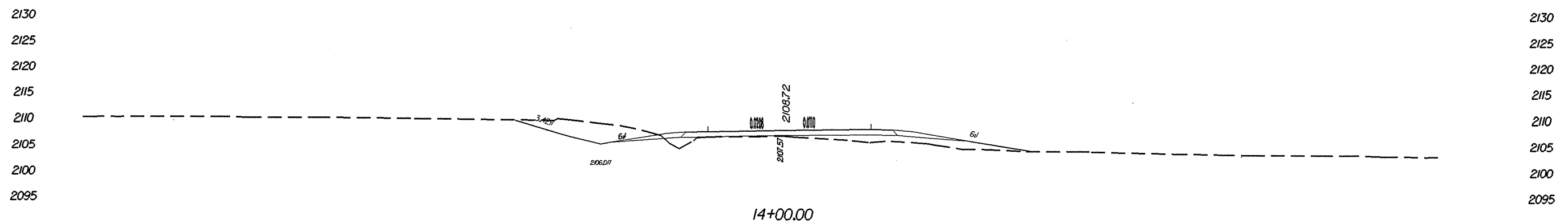
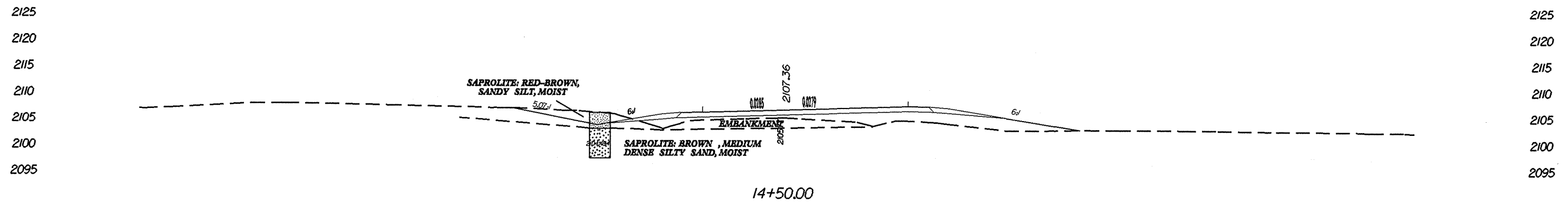
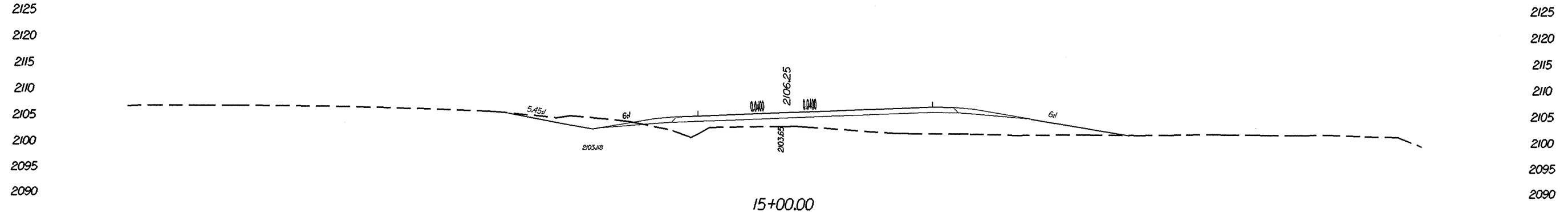
**INCOMPLETE PLANS**  
 DO NOT USE FOR R/F ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION



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



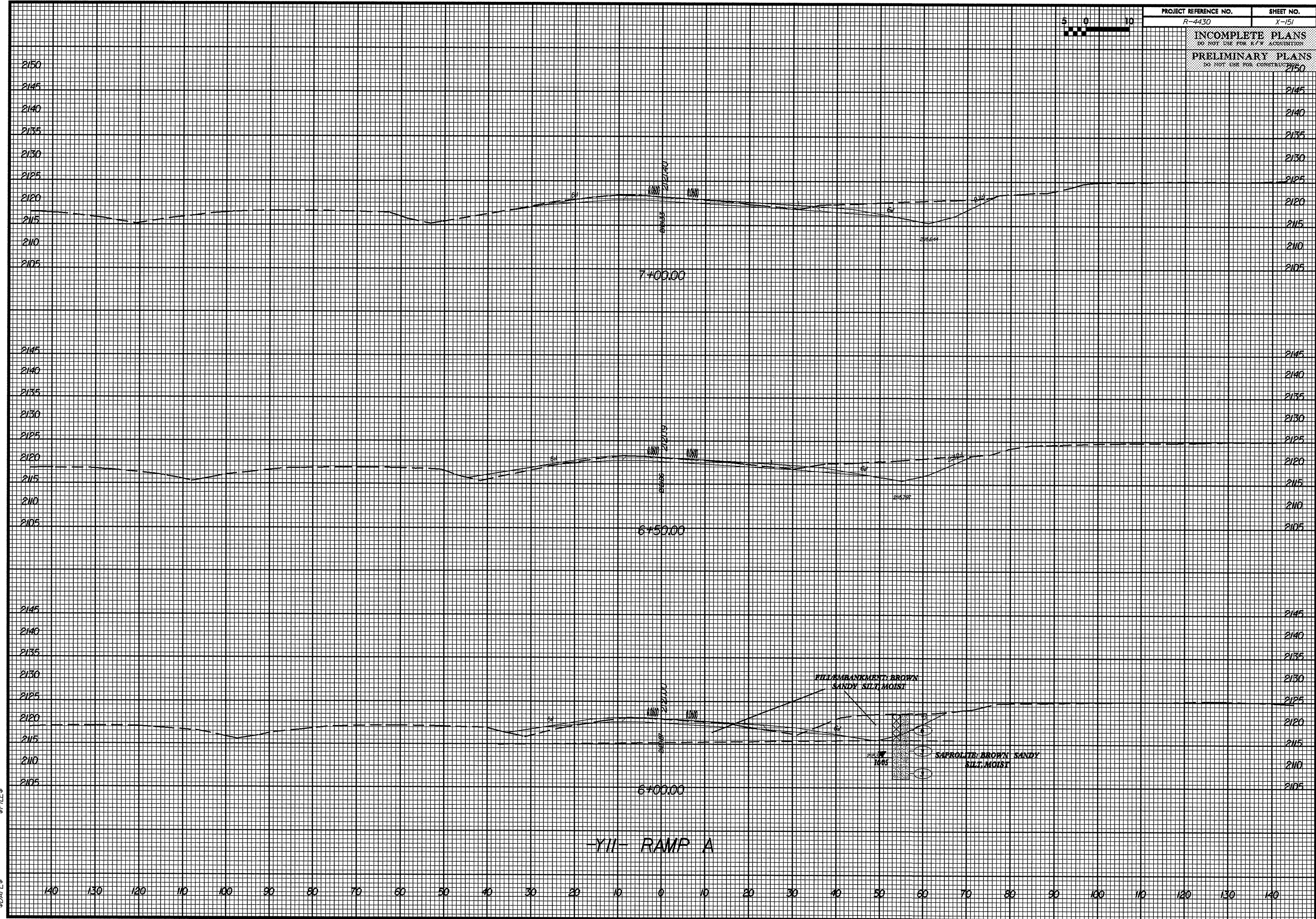
**INCOMPLETE PLANS**  
DO NOT USE FOR A/E/ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



-Y7- (SR 1756) SOUTH ALLEN RD

PROJECT REFERENCE NO. R-4430 SHEET NO. X-151

INCOMPLETE PLANS  
DO NOT USE FOR A/FW ACQUISITION  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



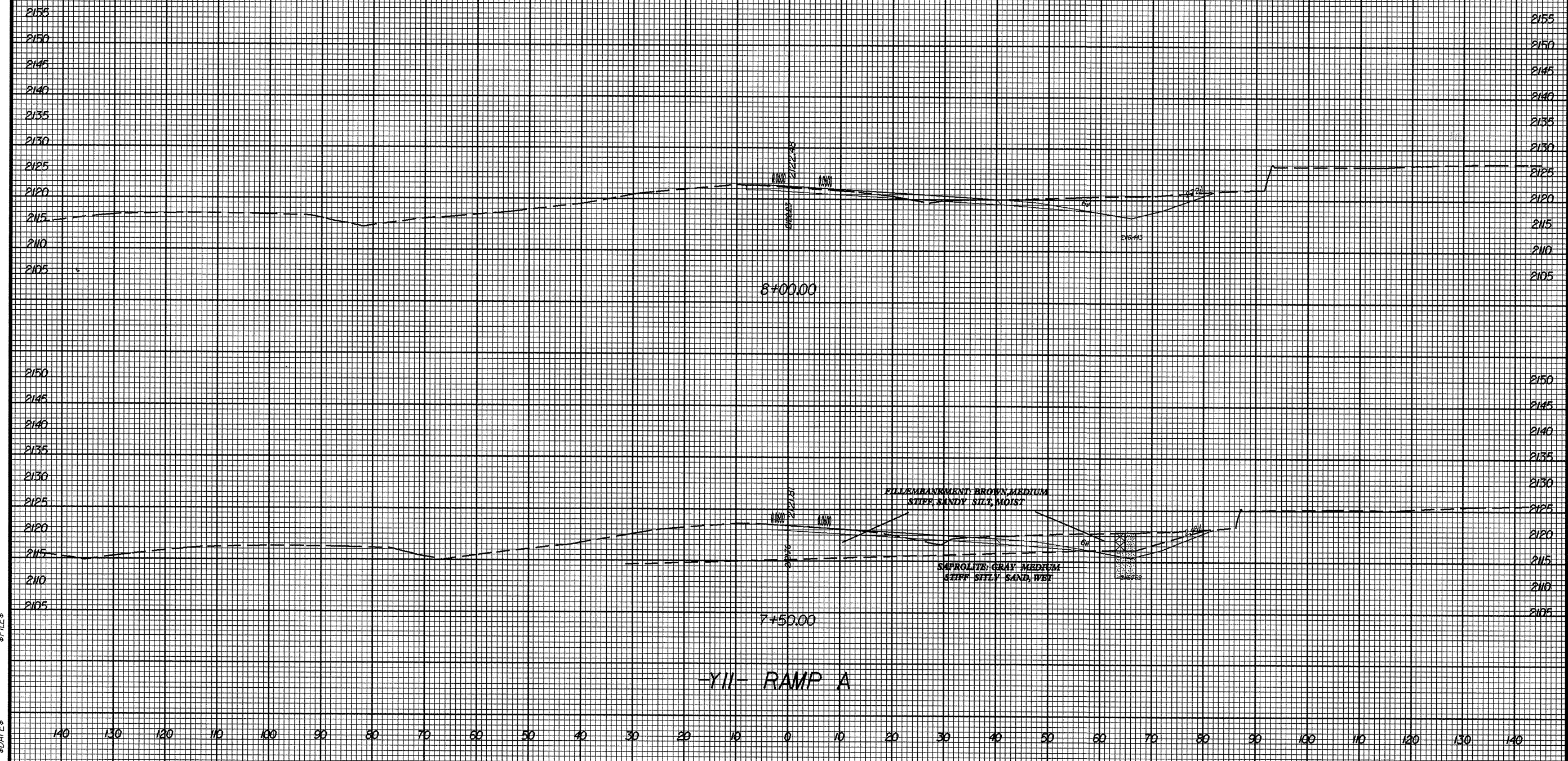
-YII- RAMP A

\$ ELEVATION

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140



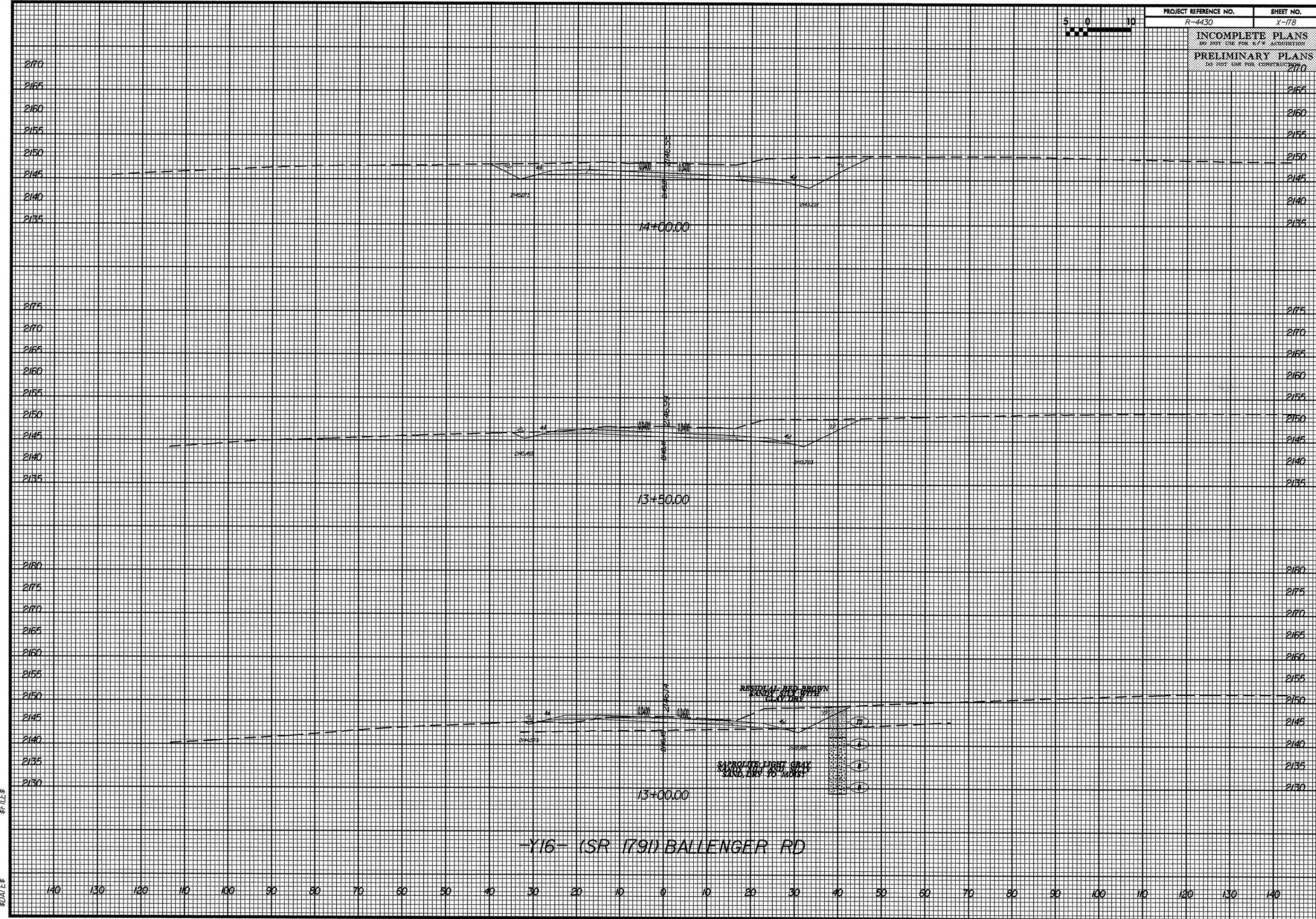
PROJECT REFERENCE NO. R-4430	SHEET NO. X-152
INCOMPLETE PLANS DO NOT USE FOR R.F.W. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



\$ FILE \$



PROJECT REFERENCE NO. R-4430	SHEET NO. X-7B
INCOMPLETE PLANS DO NOT USE FOR R.F.W. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



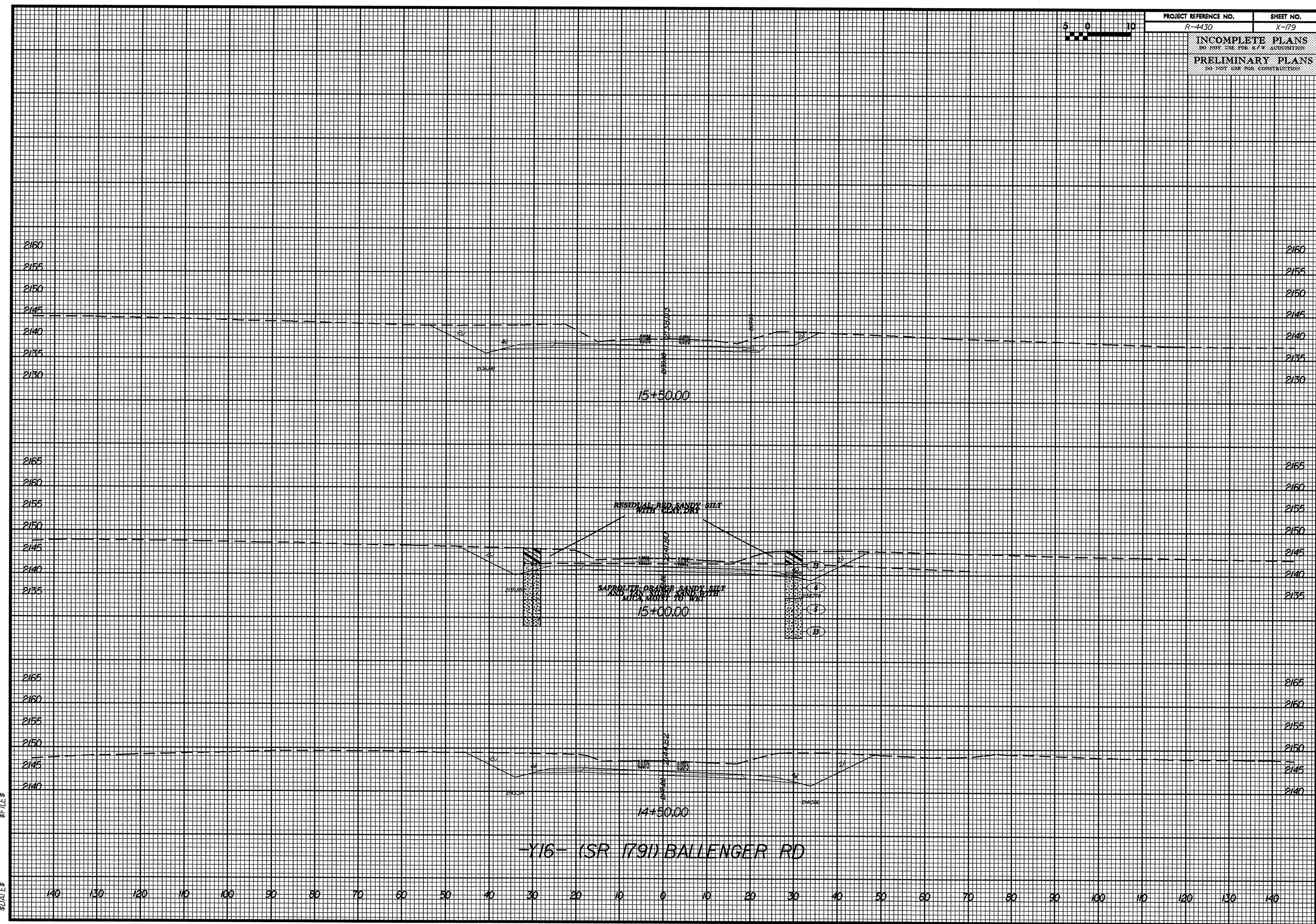
-Y16- (SR 1791) BALLENGER RD

\$FILES\$

\$DATE\$



PROJECT REFERENCE NO. R-4430	SHEET NO. X-179
INCOMPLETE PLANS DO NOT USE FOR R.F.V. ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



\$ FILE \$

\$ DATE \$

JCS  
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT**  
**SOILS TEST REPORT-SOILS LABORATORY**

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.10.05	DATE RECEIVED:	10.12.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-1	SS-2	SS-3Q	SS-4	SS-5	SS-6	SS-7	SS-8
Lab Sample No. A	150747	150748	150749	150751	150752	150753	150754	150755
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	89	93	91	97	100	92	100	97
Passing #40 Sieve %	83	75	77	76	83	86	95	93
Passing #200 Sieve %	64	46	45	17	25	42	35	40

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	13	27	24	42	36	16	13	12
Fine Sand - Ret. #270	19	32	31	45	45	47	67	61
Silt 0.05-0.005 mm %	15	27	19	11	13	27	18	23
Clay < 0.005 mm %	53	14	26	2	6	10	2	4
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	53	29	32	36	33	41	39	38
Plastic Index	6	NP	4	NP	NP	NP	NP	NP
AASHTO Classification	A-5 (8)	A-4 (2)	A-4 (2)	A-2-4 (0)	A-2-4 (0)	A-5 (1)	A-2-4 (0)	A-4 (1)
Quantity								
Texture								
Station	19+50	19+50	26+50	26+50	72+00	66+94	66+94	66+94
Hole No.								
Depth (ft) From:	0.0	3.0	3.4	8.4	3.8	3.4	13.4	18.4
To:	3.0	8.4	4.9	9.9	5.3	4.9	14.9	19.9

**Remarks:**

A-150747 - 150755 ; Moisture Content for SS-3M = 20.1%

**CC:**

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS  
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT**  
**SOILS TEST REPORT-SOILS LABORATORY**

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1 ( cont. )	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.10.05	DATE RECEIVED:	10.12.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-9							
Lab Sample No. A	150756							
HiCAMS Sample #	--							
Retained #4 Sieve %	--							
Passing #10 Sieve %	93							
Passing #40 Sieve %	78							
Passing #200 Sieve %	30							

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	29							
Fine Sand - Ret. #270	50							
Silt 0.05-0.005 mm %	17							
Clay < 0.005 mm %	4							
Passing # 40 Sieve %	--							
Passing # 200 Sieve %	--							

Liquid Limit	32							
Plastic Index	NP							
AASHTO Classification	A-2-4 (0)							
Quantity								
Texture								
Station	66+94							
Hole No.								
Depth (ft) From:	23.4							
To:	24.9							

**Remarks:**

A-150756

**CC:**

C. A. Dunnagan	
File	

SOILS ENGINEER:



JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.12.05	DATE RECEIVED:	10.13.05	DATE REPORTED:	10.18.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-10Q	SS-11	SS-12	SS-13	SS-14	SS-15		
Lab Sample No. A	150758	150760	150761	150762	150763	150764		
HiCAMS Sample #	--	--	--	--	--	--		
Retained #4 Sieve %	--	--	--	--	--	--		
Passing #10 Sieve %	88	72	91	70	99	87		
Passing #40 Sieve %	87	67	88	45	96	81		
Passing #200 Sieve %	61	23	54	8	37	32		

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	3	19	10	59	11	17		
Fine Sand - Ret. #270	37	62	38	32	69	59		
Silt 0.05-0.005 mm %	32	15	28	7	16	20		
Clay < 0.005 mm %	28	4	24	2	4	4		
Passing # 40 Sieve %	--	--	--	--	--	--		
Passing # 200 Sieve %	--	--	--	--	--	--		

Liquid Limit	37	30	29	20	43	30		
Plastic Index	8	NP	5	NP	NP	NP		
AASHTO Classification	A-4 (5)	A-2-4 (0)	A-4 (4)	A-1-b (0)	A-5 (0)	A-2-4 (0)		
Quantity								
Texture								
Station	66+27	66+27	65+94	65+94	65+94	65+94		
Hole No.								
Depth (ft) From:	8.6	18.6	8.7	9.2	9.7	13.7		
To:	10.1	23.9	9.2	9.7	10.2	15.2		

Remarks:  
 A-150758 - 150764; Moisture Content for SS-10M = 28.6%

CC:  
 C. A. Dunnagan  
 File

SOILS ENGINEER:

JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.19.05	DATE RECEIVED:	10.19.05	DATE REPORTED:	10.24.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

**TEST RESULTS**

Project Sample No.	SS-16	SS-17	SS-18	SS-19	SS-20			
Lab Sample No. A	150831	150832	150833	150834	150835			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	86	90	90	98	97			
Passing #40 Sieve %	76	81	82	92	89			
Passing #200 Sieve %	37	25	30	48	37			

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	25	27	24	14	21			
Fine Sand - Ret. #270	39	50	52	47	52			
Silt 0.05-0.005 mm %	22	17	22	23	21			
Clay < 0.005 mm %	14	6	2	16	6			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	29	24	28	35	33		
Plastic Index	NP	NP	NP	NP	NP		
AASHTO Classification	A-4 (0)	A-2-4 (0)	A-2-4 (0)	A-4 (3)	A-4 (0)		
Quantity							
Texture							
Station	EB1-C	EB1-C	EB1-C	6+00	6+00		
Hole No.							
Depth (ft) From:	3.9	8.9	13.9	3.6	8.6		
To:	5.4	10.4	14.5	5.1	10.1		

Remarks:  
 A-150831 - 150835

CC:  
 C. A. Dunnagan  
 File

SOILS ENGINEER:



JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.27.05	DATE RECEIVED:	11.1.05	DATE REPORTED:	11.7.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-21	SS-22	SS-23	SS-24	SS-25	SS-26	SS-27	SS-28
Lab Sample No. A	150931	150932	150933	150934	150935	150936	150937	150938
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	97	96	100	93	96	100	98	100
Passing #40 Sieve %	78	72	86	65	78	87	89	94
Passing #200 Sieve %	38	27	20	22	40	34	45	49

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	35	41	40	47	31	28	18	22
Fine Sand - Ret. #270	30	38	43	34	33	47	45	36
Silt 0.05-0.005 mm %	15	17	15	15	18	23	27	16
Clay < 0.005 mm %	20	4	2	4	18	2	10	26
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	33	38	42	37	44	33	35	31
Plastic Index	3	NP	NP	NP	4	NP	NP	NP
AASHTO Classification	A-4 (1)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-5 (1)	A-2-4 (0)	A-4 (2)	A-4 (3)
Quantity								
Texture								
Station	114+00	114+00	108+00	108+00	15+00	15+00	15+00	131+00
Hole No.								
Depth (ft) From:	4.0	9.0	3.8	8.8	4.0	9.0	14.0	3.4
To:	5.0	10.0	4.8	9.8	5.0	10.0	15.0	4.9

Remarks:  
 A150931 - 150938

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1 (cont.)	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	10.31.05	DATE RECEIVED:	11.1.05	DATE REPORTED:	11.7.05
SAMPLED FROM:	Roadway	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-29	SS-30	SS-31	SS-32	SS-33			
Lab Sample No. A	150939	150940	150941	150942	150943			
HiCAMS Sample #	--	--	--	--	--			
Retained #4 Sieve %	--	--	--	--	--			
Passing #10 Sieve %	100	93	91	96	81			
Passing #40 Sieve %	85	81	78	76	63			
Passing #200 Sieve %	33	53	49	44	26			

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	33	24	26	32	38			
Fine Sand - Ret. #270	40	23	24	26	37			
Silt 0.05-0.005 mm %	19	21	20	18	19			
Clay < 0.005 mm %	8	32	30	24	6			
Passing # 40 Sieve %	--	--	--	--	--			
Passing # 200 Sieve %	--	--	--	--	--			

Liquid Limit	31	38	35	41	31			
Plastic Index	NP	7	13	5	NP			
AASHTO Classification	A-2-4 (0)	A-4 (4)	A-6 (4)	A-5 (2)	A-2-4 (0)			
Quantity								
Texture								
Station	131+00	139+00	151+00	151+00	151+00			
Hole No.								
Depth (ft) From:	8.4	1.5	1.0	3.0	8.0			
To:	9.9	6.0	2.5	4.5	9.5			

Remarks:  
 A-150939 - 150943

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS  
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT**  
**SOILS TEST REPORT-SOILS LABORATORY**

<b>T.I.P. ID #:</b>	R-4430
---------------------	--------

<b>REPORT ON SAMPLES OF:</b>	Soils for Classification
------------------------------	--------------------------

<b>PROJECT:</b>	34505.1.1	<b>COUNTY:</b>	Henderson	<b>Owner:</b>	--
<b>DATE SAMPLED:</b>	11.1.05	<b>DATE RECEIVED:</b>	11.1.05	<b>DATE REPORTED:</b>	11.7.05
<b>SAMPLED FROM:</b>	Bridge	<b>SAMPLED BY:</b>	C. A. Dunnagan		
<b>SUBMITTED BY:</b>	W. D. Frye	<b>2002</b>	<b>STANDARD SPECIFICATION</b>		
<b>LABORATORY:</b>	Asheville				

**TEST RESULTS**

Project Sample No.	SS-34	SS-35	SS-36	SS-37				
Lab Sample No. A	150969	150970	150971	150972				
HiCAMS Sample #	--	--	--	--				
Retained #4 Sieve %	--	--	--	--				
Passing #10 Sieve %	77	81	76	97				
Passing #40 Sieve %	66	72	66	75				
Passing #200 Sieve %	34	40	32	23				

**MINUS #10 FRACTION**

Soil Mortar - 100%								
Coarse Sand -Ret. #60	24	21	27	40				
Fine Sand - Ret. #270	39	38	36	43				
Silt 0.05-0.005 mm %	25	23	27	15				
Clay < 0.005 mm %	12	18	10	2				
Passing # 40 Sieve %	--	--	--	--				
Passing # 200 Sieve %	--	--	--	--				

<b>Liquid Limit</b>	38	32	39	35				
<b>Plastic Index</b>	NP	NP	NP	NP				
<b>AASHTO Classification</b>	A-2-4 (0)	A-4 (1)	A-2-4 (0)	A-2-4 (0)				
<b>Quantity</b>								
<b>Texture</b>								
<b>Station</b>	94+48	94+48	94+48	94+48				
<b>Hole No.</b>								
<b>Depth (ft) From:</b>	4.6	14.6	29.6	34.6				
<b>To:</b>	6.1	16.1	31.1	36.1				

**Remarks:**  
A-150969 - 150972

**CC:**  
**C. A. Dunnagan**  
**File**

**SOILS ENGINEER:**

JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.3.05	DATE RECEIVED:	11.4.05	DATE REPORTED:	11.10.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-38	SS-39	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45
Lab Sample No. A	151019	151020	151021	151022	151023	151024	151025	151026
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	98	100	98	100	97	98	97	97
Passing #40 Sieve %	86	97	93	92	72	89	79	86
Passing #200 Sieve %	35	35	25	21	22	33	24	28

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	27	14	21	25	44	21	34	24
Fine Sand - Ret. #270	45	64	62	63	40	57	50	57
Silt 0.05-0.005 mm %	16	18	15	10	14	20	14	17
Clay < 0.005 mm %	12	4	2	2	2	2	2	2
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	43	41	42	43	36	35	38	35
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-2-5 (0)	A-2-5 (0)	A-2-5 (0)	A-2-5 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	91+75	91+75	91+75	91+75	91+75	91+75	91+75	91+75
Hole No.								
Depth (ft) From:	4.5	9.5	14.5	19.5	24.5	29.5	34.5	39.5
To:	6.0	11.0	16.0	21.0	26.0	31.0	36.0	41.0

Remarks:

A-151019 - 151026

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.3.05	DATE RECEIVED:	11.4.05	DATE REPORTED:	11.10.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-46							
Lab Sample No. A	151027							
HiCAMS Sample #	--							
Retained #4 Sieve %	--							
Passing #10 Sieve %	94							
Passing #40 Sieve %	77							
Passing #200 Sieve %	28							

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	30							
Fine Sand - Ret. #270	48							
Silt 0.05-0.005 mm %	18							
Clay < 0.005 mm %	4							
Passing # 40 Sieve %	--							
Passing # 200 Sieve %	--							

Liquid Limit	34							
Plastic Index	NP							
AASHTO Classification	A-2-4 (0)							
Quantity								
Texture								
Station	91+75							
Hole No.								
Depth (ft) From:	44.5							
To:	46.0							

Remarks:

A-151027

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER:

JCS  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT  
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #: R-4430

REPORT ON SAMPLES OF: Soils for Classification

PROJECT:	34623.1.1	COUNTY:	Henderson	Owner:	--
DATE SAMPLED:	11.8.05	DATE RECEIVED:	11.10.05	DATE REPORTED:	11.21.05
SAMPLED FROM:	Bridge	SAMPLED BY:	C. A. Dunnagan		
SUBMITTED BY:	W. D. Frye		2002	STANDARD SPECIFICATION	
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-47	SS-48					
Lab Sample No. A	151099	151135					
HiCAMS Sample #	--	--					
Retained #4 Sieve %	--	--					
Passing #10 Sieve %	90	89					
Passing #40 Sieve %	74	74					
Passing #200 Sieve %	45	37					

MINUS #10 FRACTION

Soil Mortar - 100%							
Coarse Sand -Ret. #60	28	30					
Fine Sand - Ret. #270	26	33					
Silt 0.05-0.005 mm %	22	27					
Clay < 0.005 mm %	24	10					
Passing # 40 Sieve %	--	--					
Passing # 200 Sieve %	--	--					

Liquid Limit	32	37					
Plastic Index	12	NP					
AASHTO Classification	A-6 (3)	A-4 (0)					
Quantity							
Texture							
Station	93+48	94+76					
Hole No.							
Depth (ft) From:	4.5	5.4					
To:	6.0	5.9					

Remarks:

A-151099 & 151135

CC:

C. A. Dunnagan	
File	

SOILS ENGINEER: