



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PURDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

November 27, 2012

MEMORANDUM TO: Jay Bennett, P.E.
State Roadway Design Engineer

ATTENTION: Burke Evans, P. E.
Project Engineer

FROM: Njoroge Wainaina, P.E.
State Geotechnical Engineer

STATE PROJECT: 36001.1.2 (R-2603)
FEDERAL PROJECT: STP-268(15)
COUNTY: Wilkes
DESCRIPTION: NC 268 from East of NC 18 to SR 1966 (Airport Road)

SUBJECT: Geotechnical Report - Design and Construction
Recommendations

The Geotechnical Engineering Unit has completed the investigation for this project and presents the following recommendations.

I. Slope/Embankment Stability

A. Slope Design

We recommend all roadway slopes not listed below to be constructed no steeper than 2:1(H:V).

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

TELEPHONE: 919-707-6850
Fax: 919-250-4237

www.ncdot.gov/doh/preconstruct/highway/geotech

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

B. Undercut

We recommend including a contingency quantity of 500 cubic yards of undercut in the contract to be used at the discretion of the Engineer.

C. Geotextile for Soil Stabilization

We recommend a quantity of 500 square yards of Geotextile for Soil Stabilization to be used at the discretion of the Engineer.

II. Subgrade Stability**A. Aggregate Subgrade**

We recommend the following quantities as contingency items to be used at the discretion of the Engineer.

Shallow Undercut	500 cubic yards
Geotextile for Soil Stabilization	1500 square yards
Class IV Subgrade Stabilization	1,000 tons

B. Subsurface Drainage - Underdrain

We recommend a contingency quantity of 500 linear feet of 6" perforated subdrain pipe to be used at the discretion of the Engineer. At the request of the Engineer, the Geotechnical Engineering Unit will assist with the design of underdrain systems. Rough grading for the project needs to be completed before evaluation of underdrain requirements.

III. Borrow Specifications**A. Shrinkage/Swell Factor**

We recommend using a shrinkage factor of 15%.

B. Common Borrow

The project is in the piedmont region of North Carolina. Any borrow source will adhere to the Statewide Criteria for Acceptance of Borrow Material (Section 1018 of the 2012 Standard Specifications). No exceptions to this Criterion are anticipated.

C. Select Granular Material

We recommend a quantity of 500 cubic yards of Select Granular Material to be used with the items discussed in Section I.B and I.C. The backfill material should be placed to a height of three (3) feet above geotextile for soil stabilization or water level. All select granular material shall meet the criteria outlined in the 2012 Standard Specifications, Article 1016-3.

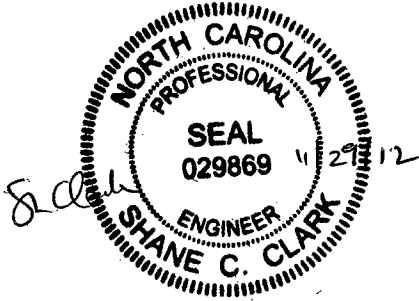
IV. Miscellaneous**A. Reduction of Unclassified Excavation**

We estimate a total Reduction of Unclassified Excavation due to clearing and grubbing at 6,500 cubic yards.

B. Crystalline Rock

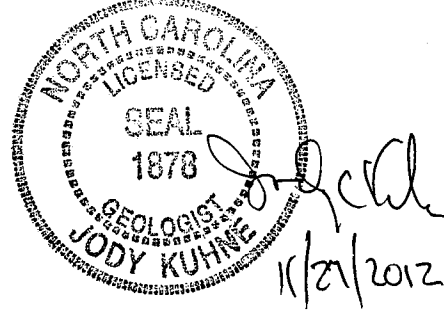
Crystalline rock was not encountered within 10' of grade.

Respectfully submitted,



Shane Clark, P.E.
Regional Design Engineer

Respectfully submitted,



Jody Kuhne, LG, PE
Project Geological Engineer

JCK



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL ENGINEERING UNIT
 Summary of Quantities**

WBS No.: 36001.1.2

County: WILKES

Project Engineer: _____

TIP No.: R-2603

Field Office: ASHEVILLE

Project Geologist: JC KUHNE

Description: NC 268 (ELKIN HWY) FROM EAST OF NC 18 TO SR 1966 (AIRPORT ROAD)

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	500	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	500	CY
Total Quantity of Undercut Excavation =							1,000	CY
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	500	CY
Total Quantity of Select Granular Material =							500	CY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	500	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. A	Contingency	N/A	N/A	1,500	SY
Total Quantity of Geotextile for Soil Stabilization =							2,000	SY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. A	Contingency	N/A	N/A	500	CY
Total Quantity of Shallow Undercut =							500	CY
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. A	Contingency	N/A	N/A	1,000	TON
Total Quantity of Class IV Subgrade Stabilization =							1,000	TON
1115000000-E	Geotextile for Pavement Stabilization	SP - Geotextile for Pavement Stabilization	II. A	Contingency	N/A	N/A	1,500	SY
Total Quantity of Geotextile for Pavement Stabilization =							1,500	SY
These Items Only Impact Earthwork Totals								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	6,500	CY
N/A	Shrinkage Factor	235 - Embankments	III. A	N/A	N/A	N/A	15	%

CONTRACT: 36001.1.2 ID: R-2603

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

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 36001.1.2 F.A. PROJ. STP-0268(15)
 COUNTY WILKES
 PROJECT DESCRIPTION NC 268 FROM MULTI-LANES EAST
OF NC 18 TO SR 1966 (AIRPORT ROAD)

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2603 36001.1.2	1	39
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

CAUTION NOTICE

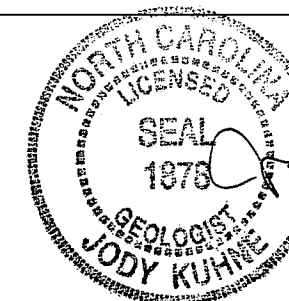
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING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

INVESTIGATED BY JC KUHNE
 CHECKED BY WD FRYE
 SUBMITTED BY JC KUHNE
 DATE 11/27/2012



DRAWN BY: JT WILLIAMS JC KUHNE

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

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: <i>VERY STIFF, GRAN. SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. 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) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CPI) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	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 - A NOTABLE 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 DISLOADED 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 - A FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
COMPRESSION	PERCENTAGE OF MATERIAL	GROUND WATER	
SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE	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	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP	
TEXTURE OR GRAIN SIZE	MISCELLANEOUS SYMBOLS	ROCK HARDNESS	
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053	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	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 GROUDED 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 GROUDED 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.	
CONSISTENCY OR DENSENESS	ABBREVIATIONS	FRACTURE SPACING	BEDDING
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HL - 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 _u - UNIT WEIGHT γ _d - DRY UNIT WEIGHT S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO	VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET	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
GENERALLY GRANULAR MATERIAL (NON-COHEIVE) VERY LOOSE 4 TO 10 MEDIUM DENSE 10 TO 30 DENSE 30 TO 50 VERY DENSE >50	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	MODERATELY HARD CAN BE GROUDED 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 GROUDED 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.	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.
GENERALLY SILT-CLAY MATERIAL (COHEIVE) VERY SOFT 2 TO 4 MEDIUM STIFF 4 TO 8 STIFF 8 TO 15 VERY STIFF 15 TO 30 HARD >30	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS - FOSSILIFEROUS FRAC - FRACTURED, FRACTURES FRAGS - FRAGMENTS HL - 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 _u - UNIT WEIGHT γ _d - DRY UNIT WEIGHT S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO	MODERATELY HARD CAN BE GROUDED 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 GROUDED 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.	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.
PLASTICITY	EQUIPMENT USED ON SUBJECT PROJECT	INDURATION	
NONPLASTIC PLASTICITY INDEX (PI) DRY STRENGTH LOW PLASTICITY 0-5 VERY LOW MED. PLASTICITY 6-15 SLIGHT HIGH PLASTICITY 16-25 MEDIUM 26 OR MORE HIGH	DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST B50-T 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 HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST	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			NOTES:
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.			BENCH MARK: NA ELEVATION: FT. NOTES:

See Sheet 1-A For Index of Sheets

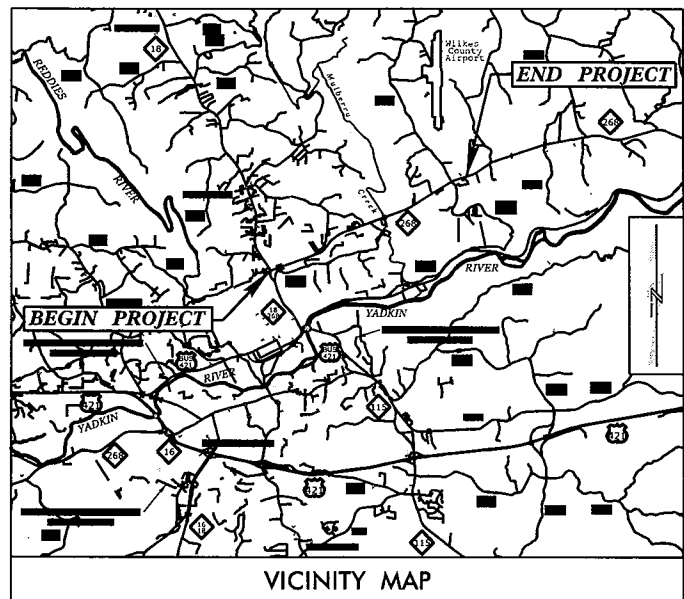
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

LOCATION: NC 268 FROM MULTI-LANES EAST OF NC 18 TO SR 1966 (AIRPORT ROAD)

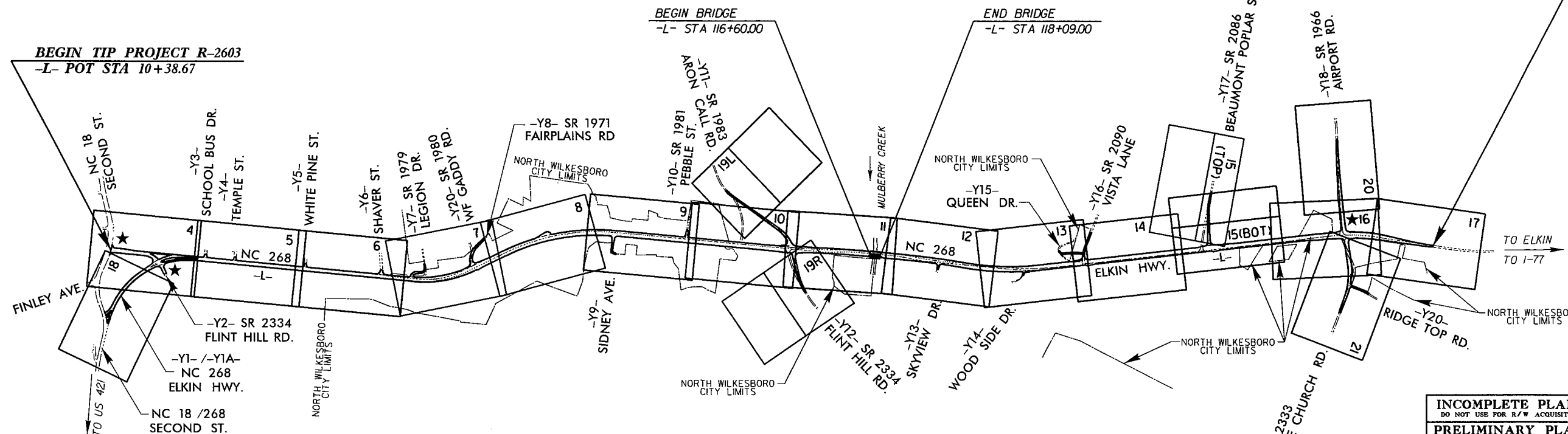
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB & GUTTER, SIGNALS, STRUCTURES, AND SIGNING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2603	2A	39
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
36001.1.2	STP-0268(15)	PE	



25% PLANS

TIP PROJECT: R-2603



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF NORTH WILKESBORO. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD _____.

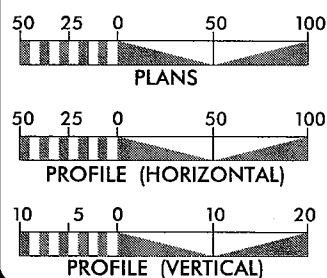
- ** 40 MPH FROM BEGINNING OF PROJECT TO FAIRPLAINS RD.
50 MPH FROM FAIRPLAINS RD. TO END OF PROJECT
- *** MINOR ARTERIAL FROM BEGINNING OF PROJECT TO MULBERRY CREEK
MAJOR COLLECTOR FROM MULBERRY CREEK TO END OF PROJECT

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

NCDOT CONTACT:
BRENDA MOORE, PE
PROJECT ENGINEER
ROADWAY DESIGN UNIT

★ - NEW / UPGRADED SIGNAL

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 20,540
ADT 2035 = 26,400
DHV = 10 %
D = 65 %
T = 6 % *
V = **
* TTST = 2 DUAL 4
FUNC CLASS = ***
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2603 = 3.468 mi.
LENGTH STRUCTURE PROJECT R-2603 = 0.028 mi.
TOTAL LENGTH OF TIP PROJECT R-2603 = 3.496 mi.
LENGTH OF PROJECT BASED ON -L-

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610

Prepared by:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 297-0220

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

APRIL 16, 2013

LETTING DATE:

MAY 19, 2015

BURKE EVANS, PE
PROJECT ENGINEER

K. S. HUTCHENS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER

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CONTRACT:



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PURDUE
GOVERNOR

Eugene A. Conti, Jr.
SECRETARY

November 27, 2012

STATE PROJECT: 36001.1.2 (R-2603)
FEDERAL PROJECT: STP-268(15)
COUNTY: Wilkes
DESCRIPTION: NC 268 from East of NC 18 to SR 1966 (Airport Road)
SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

This project is located in east-central Wiles County to the east of North Wilkesboro. The proposed project is upgrade of existing 4 lane within the town limits and upgrade of existing 2 lane continuing to SR 1966 (Airport Road). The highway traverses rolling terrain and crosses the wide floodplain of Mulberry Creek. The following alignment was investigated:

-L- Station 10+38.67 to 195+00 (3.47 miles)

The total length of lines investigated is 3.47 miles. The field investigation was conducted in October and November 2012. All borings were conducted with a Dietrich-D50-T drill machine with an automatic hammer. Standard Penetration Tests were performed utilizing Hollow Stem Augers with carbide insert teeth in the head stem.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Alluvial Soils: Mulberry Creek cuts perpendicular to the alignment at Sta. 117+20. This and a small related tributary have generated floodplain alluvial deposits up to 15' in depth with weak soils showing SPT blow counts of zero to low double digits. Groundwater is within 4' of the surface. No long term problems or settlement are occurring in the existing 8' deep embankment. These soils were encountered at the following location: Sta. 115+00 to 124+00.

SOIL PROPERTIES

Residual Soils

All residual soils on the project are derived from metamorphosed granite gneiss and schist (CZma₁) rocks encountered within the project corridor. They consist of micaceous sandy silt saprolite with a <6' top layer of residual sandy and clayey silt.

No weathered or crystalline rock was encountered within 10' of grade.

Respectfully submitted,

Jody C. Kuhne
Project Geological Engineer

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

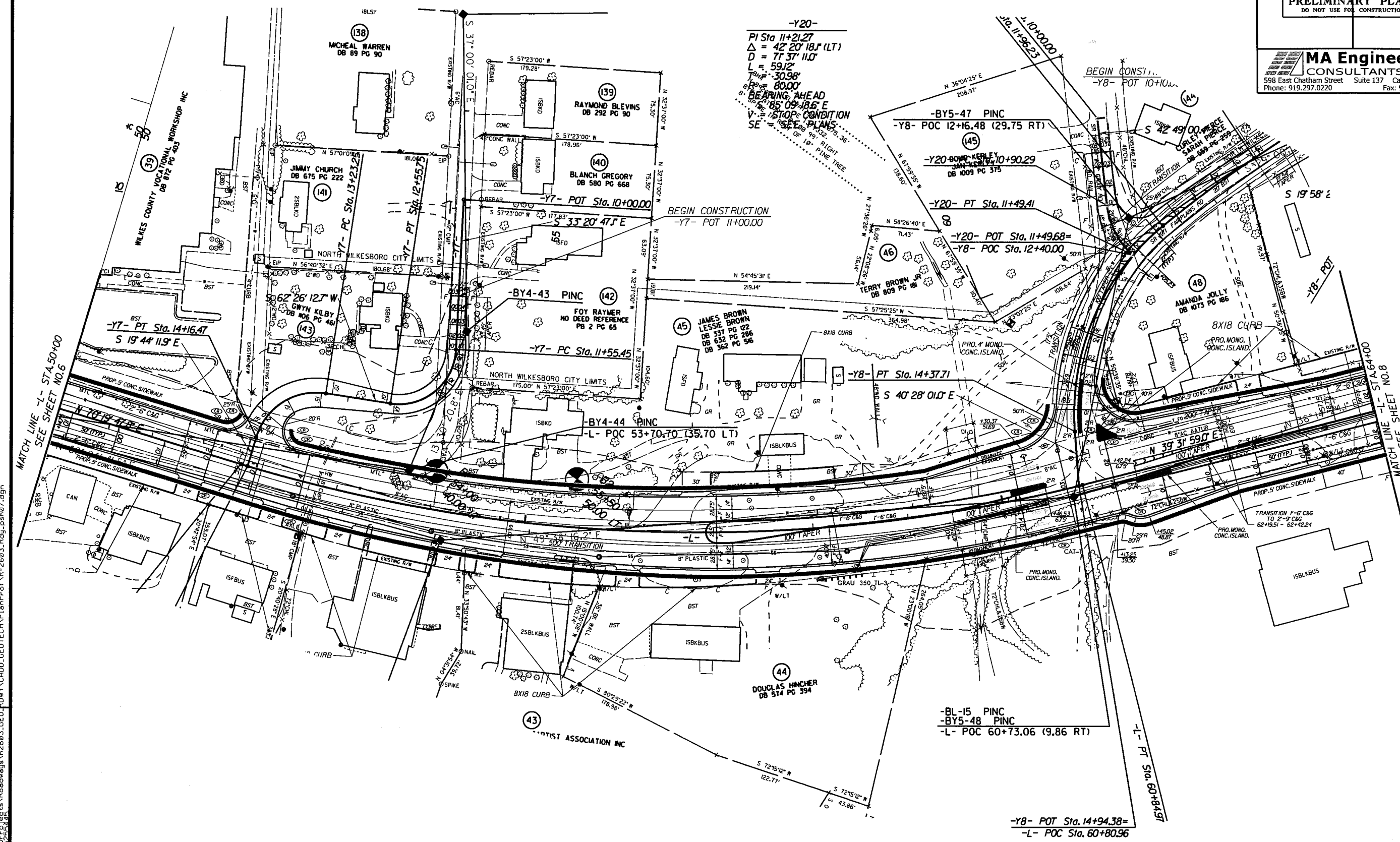
TELEPHONE: 919-707-6850
FAX: 919-250-4237
WEBSITE:
www.ncdot.gov/doh/preconstruct/highway/geotech

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

EARTHWORK BALANCE SHEET

EARTHWORK BALANCE SHEET

PROJECT REFERENCE NO.		SHEET NO.	
R-2603		4/37	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



-Y20-
 PI Sta 11+21.27
 $\Delta = 42^\circ 20' 18.1" (LT)$
 $D = 71' 37" 11.0"$
 $L = 59.12'$
 $ELEV = -30.98'$
 $8.000'$
 BEARING AHEAD
 $85^\circ 09' 18.6" E$
 STOP CONDITION
 SEE PLAN
 $9^\circ 19' 59.9" RIGHT$
 OF 18" PINE TREE

8/17/99
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REVISIONS

-L-
 PI Sta 73+85.60
 $\Delta = 30^\circ 40' 58.7''$ (RT)
 $D = 1^\circ 59' 46.9''$
 $L = 1536.94'$
 $T = 787.38'$
 $R = 2870.00'$
 $V = 50$ mph
 $SE = 0.03$

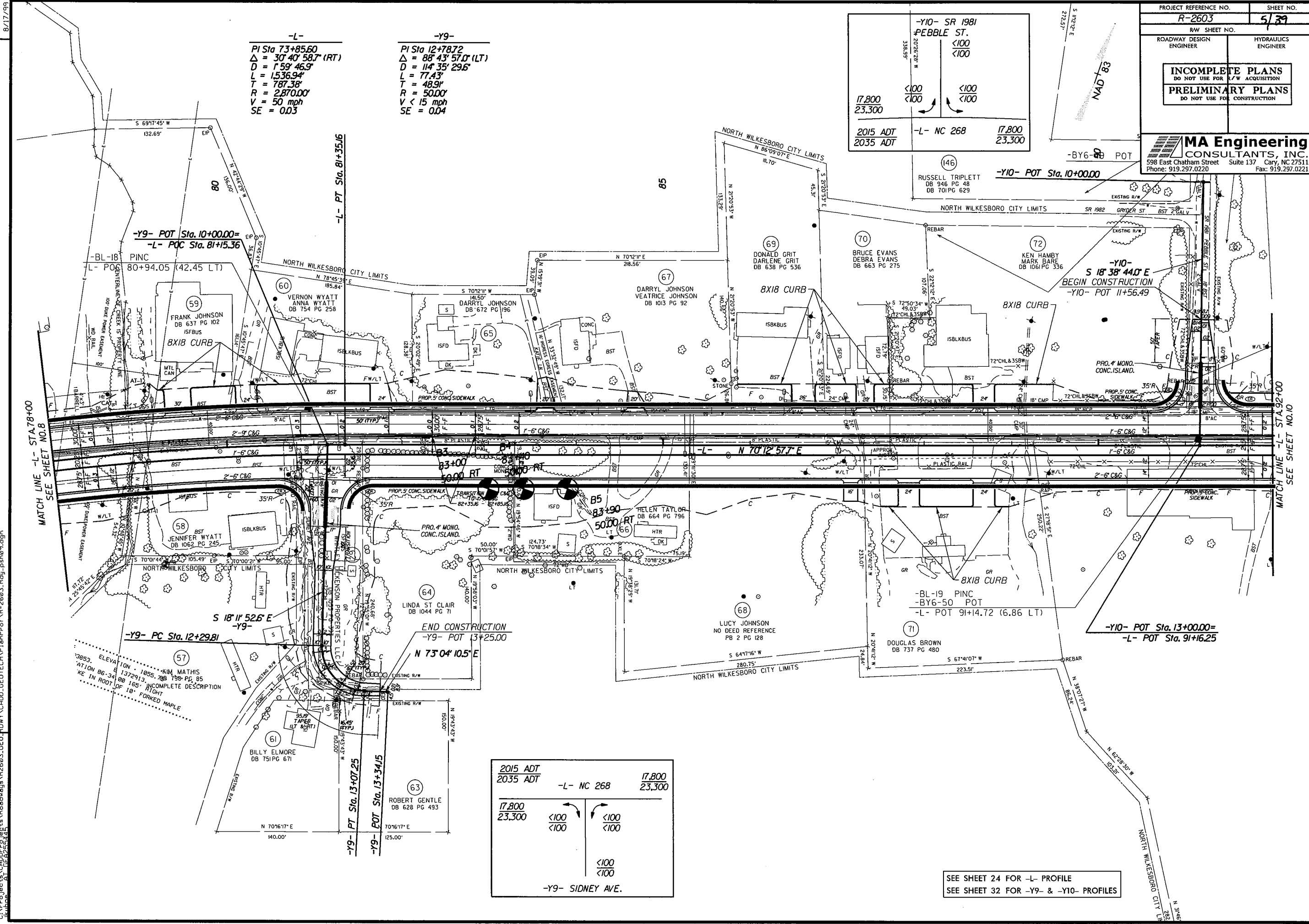
-Y9-
 PI Sta 12+78.72
 $\Delta = 88^\circ 43' 57.0''$ (LT)
 $D = 114^\circ 35' 29.6''$
 $L = 77.43'$
 $T = 48.91'$
 $R = 50.00'$
 $V < 15$ mph
 $SE = 0.04$

-Y10- SR 1981 PEBBLE ST. $\Delta < 100$ $\Delta < 100$	
$\frac{17.800}{23.300}$	$\frac{17.800}{23.300}$
2015 ADT	-L- NC 268
2035 ADT	

$\frac{17.800}{23.300}$		
	$\Delta < 100$	$\Delta < 100$
	$\Delta < 100$	$\Delta < 100$
		$\Delta < 100$
		$\Delta < 100$

-L- NC 268

-Y9- SIDNEY AVE.



MATCH LINE -L- STA 78+00
 SEE SHEET NO. 8

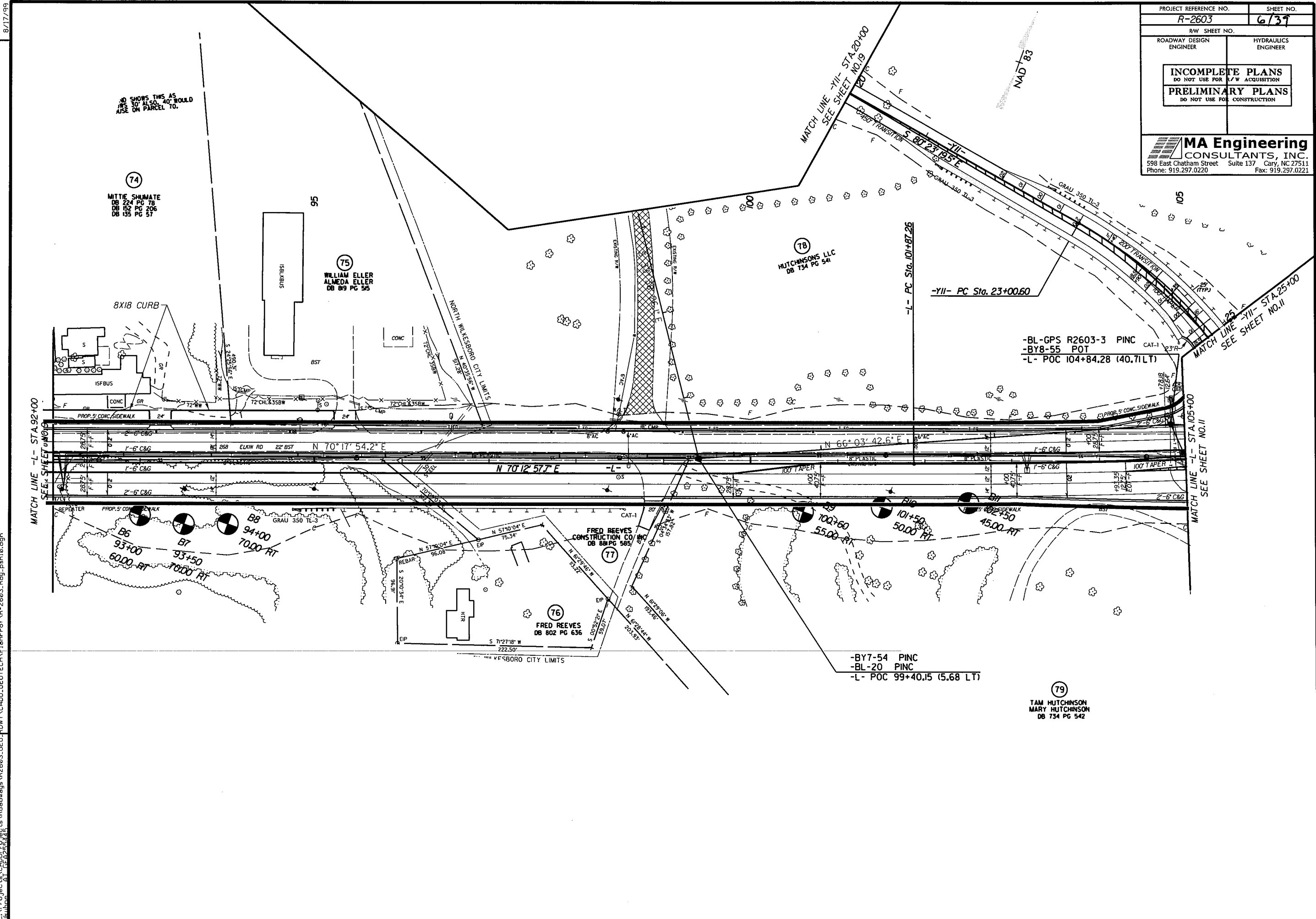
MATCH LINE -L- STA 92+00
 SEE SHEET NO. 10

SEE SHEET 24 FOR -L- PROFILE
 SEE SHEET 32 FOR -Y9- & -Y10- PROFILES

REVISIONS

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 8/17/99

PROJECT REFERENCE NO. R-2603	SHEET NO. 6/39
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



REVISIONS

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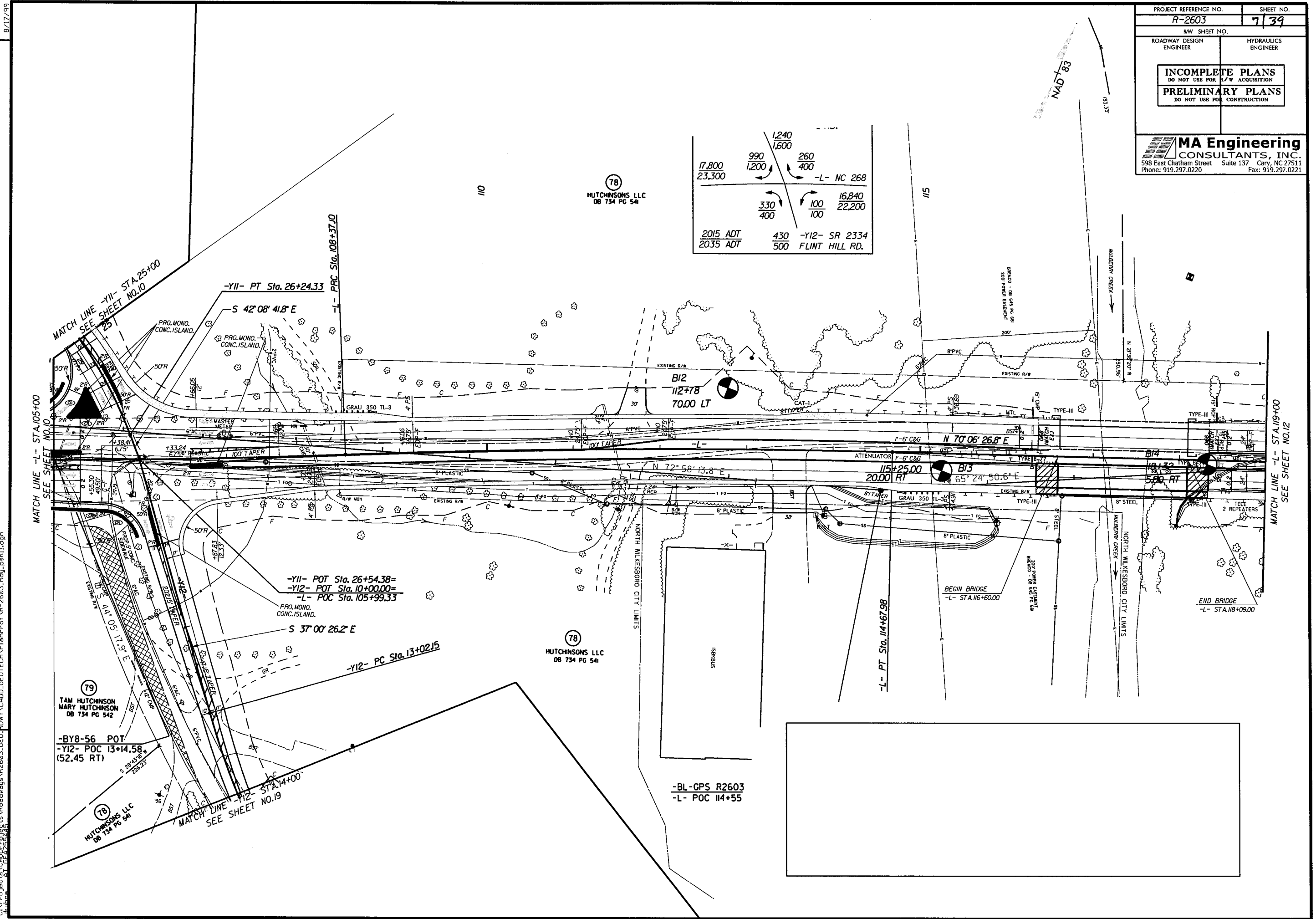
MATCH LINE -L- STA 92+00
SEE SHEET NO. 10.

MATCH LINE -L- STA 105+00
SEE SHEET NO. 11.

-BY7-54 PINC
-BL-20 PINC
-L- POC 99+40.15 (5.68 LT)

79
TAM HUTCHINSON
MARY HUTCHINSON
DB 734 PG 542

17,800	990	1,240	260	
23,300	1,200	1,600	400	-L- NC 268
	330		16,840	
	400		100	22,200
2015 ADT	430	-Y12- SR 2334		
2035 ADT	500	FLINT HILL RD.		



REVISIONS

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 8/17/99

79
 TAM HUTCHINSON
 MARY HUTCHINSON
 DB 734 PG 542

-BY8-56 POT
 -Y12- POC 13+14.58
 (52.45 RT)

78
 HUTCHINSONS LLC
 DB 734 PG 541

78
 HUTCHINSONS LLC
 DB 734 PG 541

-BL-GPS R2603
 -L- POC 114+55

MATCH LINE -L- STA. 119+00
 SEE SHEET NO. 12

MATCH LINE -L- STA. 105+00
 SEE SHEET NO. 10

MATCH LINE -Y11- STA. 25+00
 SEE SHEET NO. 10

-Y11- PT Sta. 26+24.33
 -L- POC Sta. 108+37.10

-Y11- POT Sta. 26+54.38
 -Y12- POT Sta. 10+00.00
 -L- POC Sta. 105+99.33

-Y12- PC Sta. 13+02.15

-L- PT Sta. 114+67.98

END BRIDGE
 -L- STA. 118+09.00

BEGIN BRIDGE
 -L- STA. 116+60.00

NORTH WILKESBORO CITY LIMITS

NORTH WILKESBORO CITY LIMITS

MILLBERRY CREEK

MILLBERRY CREEK

B12
 112+78
 70.00 LT

B13
 115+25.00
 20.00 RT

B14
 118+32
 5.00 RT


NAD 83

110

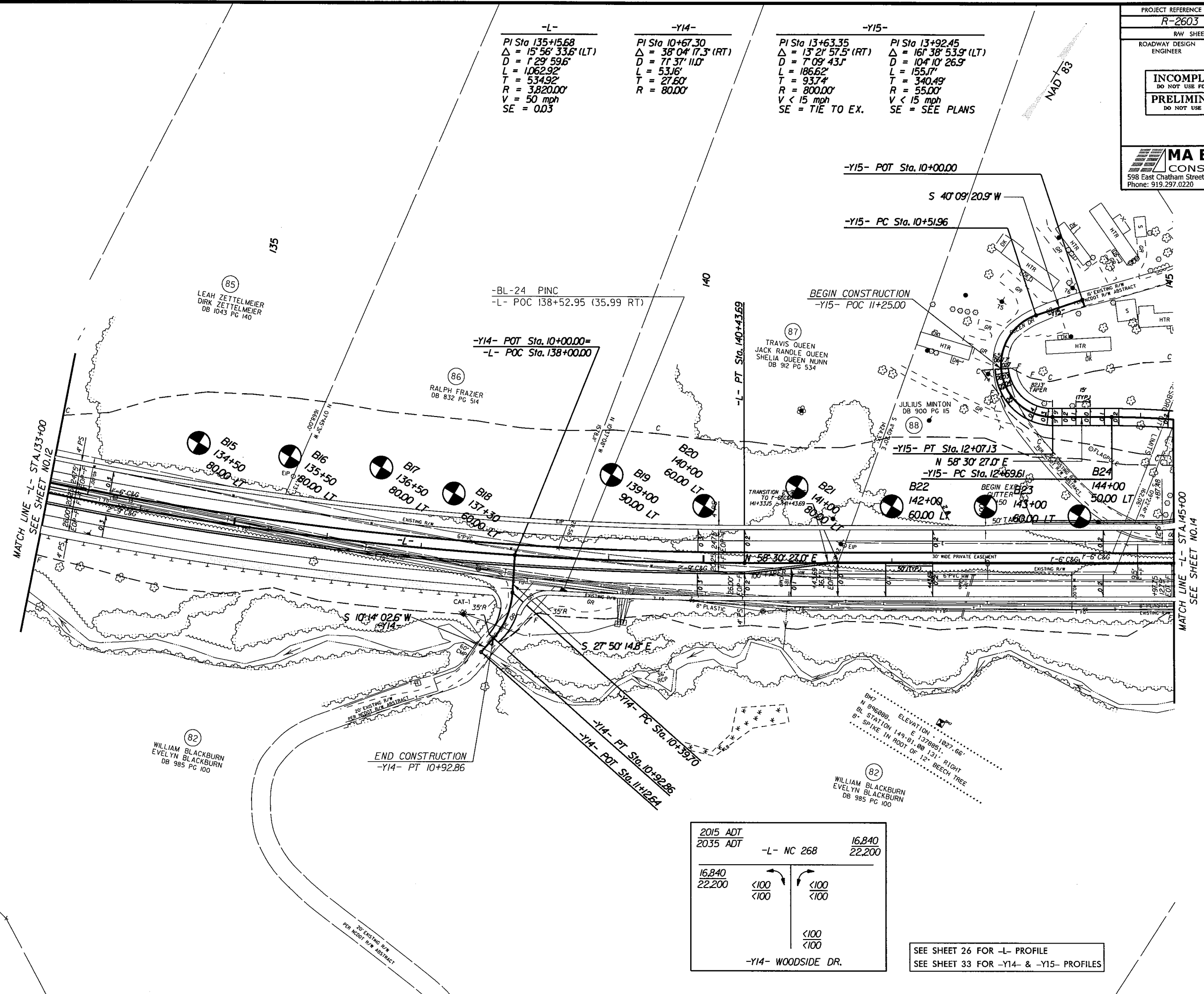
115



8/17/99

PROJECT REFERENCE NO. R-2603	SHEET NO. 8/39
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

<p align="center">-L-</p> <p>PI Sta 135+15.68 $\Delta = 15^\circ 56' 33.6"$ (LT) $D = 1' 29' 59.6"$ $L = 1062.92'$ $T = 534.92'$ $R = 3,820.00'$ $V < 15$ mph $SE = 0.03$</p>	<p align="center">-Y14-</p> <p>PI Sta 10+67.30 $\Delta = 38^\circ 04' 17.3"$ (RT) $D = 71' 37' 11.0"$ $L = 53.16'$ $T = 27.60'$ $R = 80.00'$</p>	<p align="center">-Y15-</p> <p>PI Sta 13+63.35 PI Sta 13+92.45 $\Delta = 13^\circ 21' 57.5"$ (RT) $\Delta = 161^\circ 38' 53.9"$ (LT) $D = 7' 09' 43.1"$ $D = 104' 10' 26.9"$ $L = 186.62'$ $L = 155.17'$ $T = 93.74'$ $T = 340.49'$ $R = 800.00'$ $R = 55.00'$ $V < 15$ mph $V < 15$ mph $SE = TIE TO EX.$ $SE = SEE PLANS$</p>
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REVISIONS

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2015 ADT	16,840
2035 ADT	22,200
-L- NC 268	
16,840	22,200
<100	<100
<100	<100
-Y14- WOODSIDE DR.	

SEE SHEET 26 FOR -L- PROFILE
 SEE SHEET 33 FOR -Y14- & -Y15- PROFILES

8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
R-2603		9/39	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
INCOMPLETE PLANS			
DO NOT USE FOR R/W ACQUISITION			
PRELIMINARY PLANS			
DO NOT USE FOR CONSTRUCTION			
MA Engineering			
CONSULTANTS, INC.			
598 East Chatham Street Suite 137 Cary, NC 27511			
Phone: 919.297.0220 Fax: 919.297.0221			

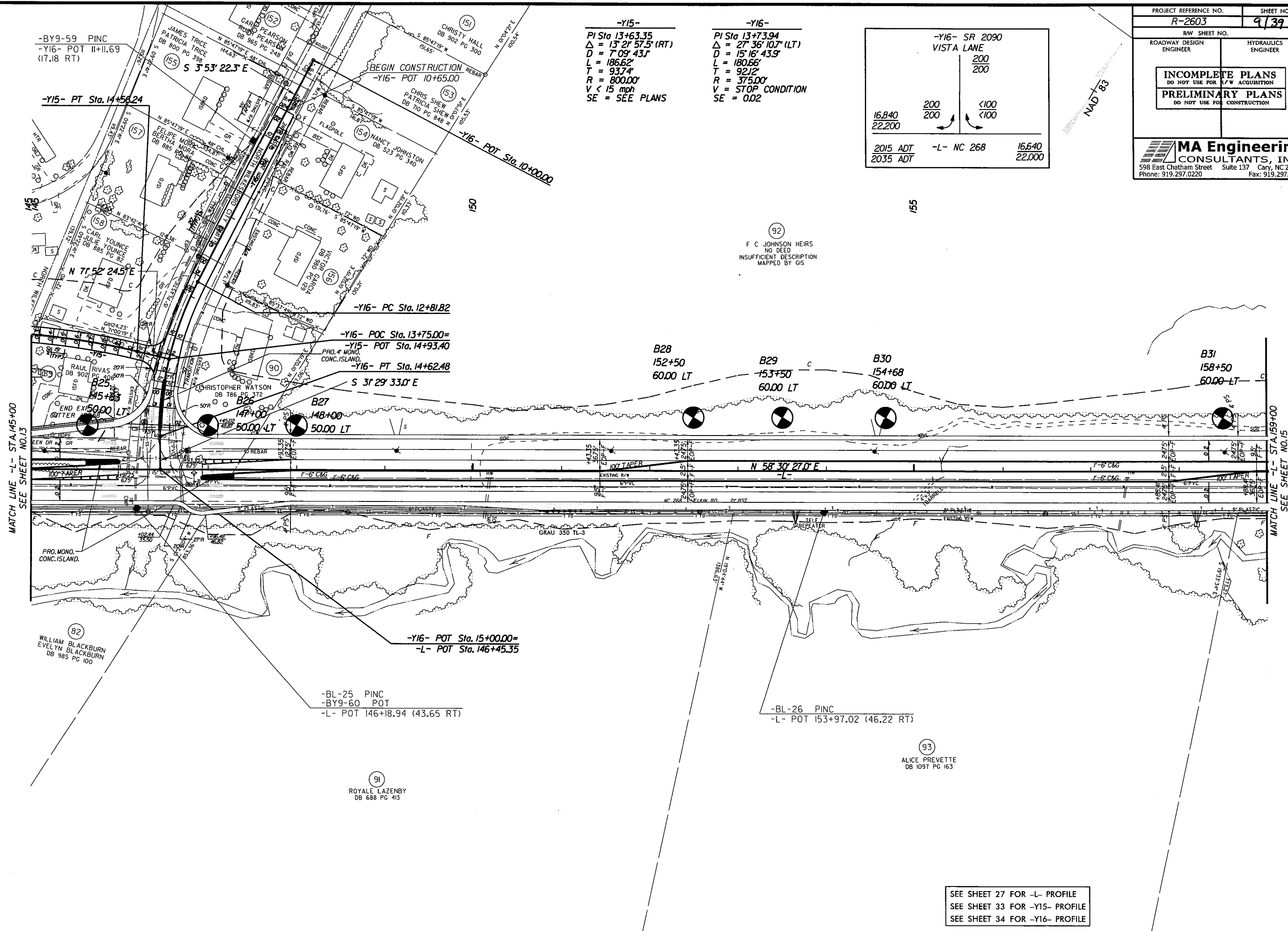
-Y16- SR 2090 VISTA LANE		
200	200	
200	200	<100
16,840	22,200	16,640
2015 ADT		2035 ADT
-L- NC 268		22,000

-Y15-

PI Sta 13+63.35
 $\Delta = 13' 21" 57.5" (RT)$
 $D = 7' 09" 43.7'$
 $L = 186.62'$
 $T = 93.74'$
 $R = 800.00'$
 $V < 15 \text{ mph}$
 SE = SEE PLANS

-Y16-

PI Sta 13+73.94
 $\Delta = 27' 36" 10.7" (LT)$
 $D = 15' 16" 43.9'$
 $L = 180.66'$
 $T = 92.12'$
 $R = 375.00'$
 $V = \text{STOP CONDITION}$
 SE = 0.02

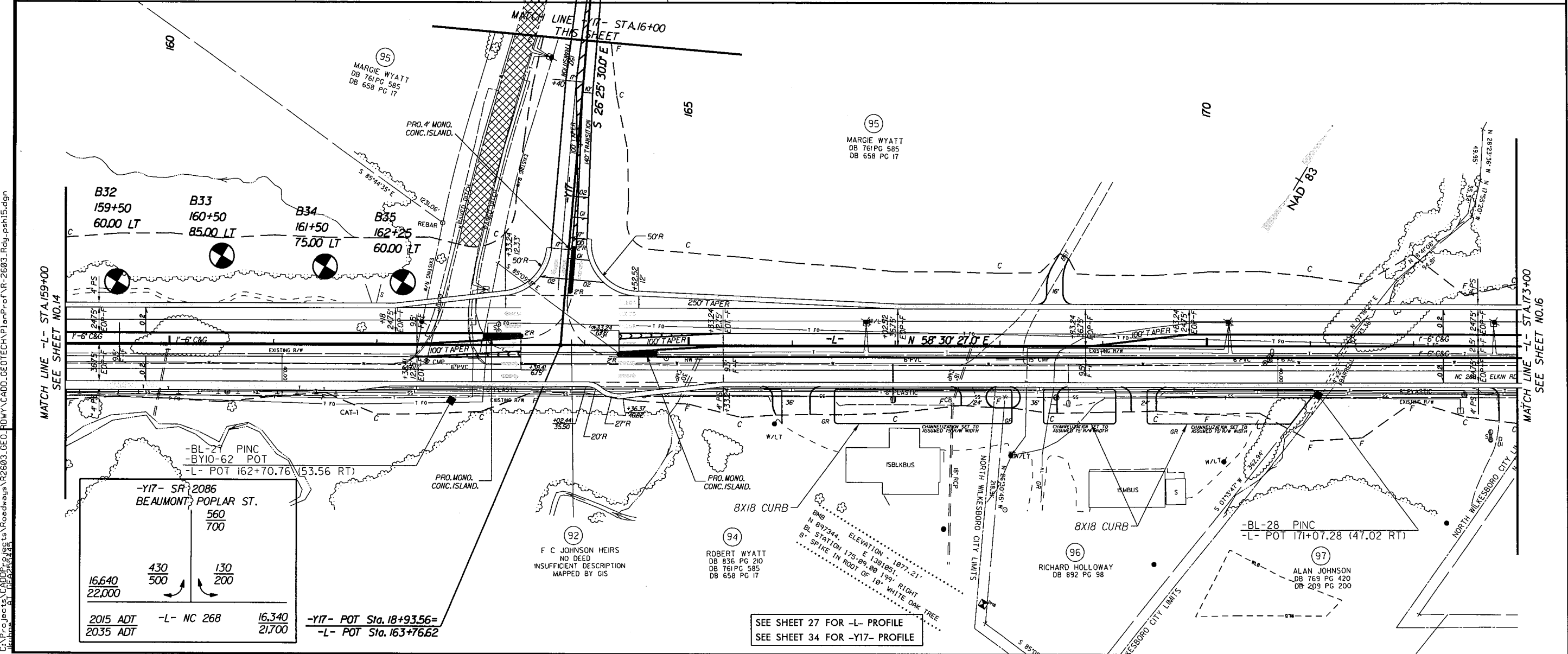
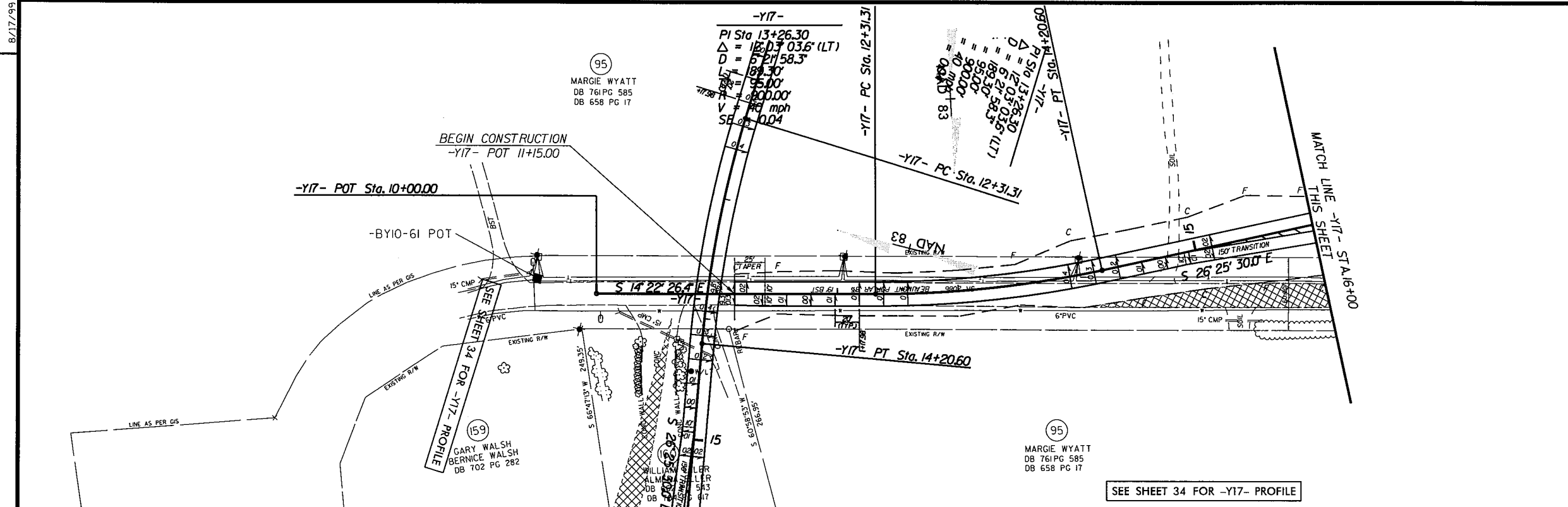


SEE SHEET 27 FOR -L- PROFILE
 SEE SHEET 33 FOR -Y15- PROFILE
 SEE SHEET 34 FOR -Y16- PROFILE

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REVISIONS

PROJECT REFERENCE NO. R-2603	SHEET NO. 10/39
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR P/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



-Y17- SR 2086
BEAUMONT POPLAR ST.

560	700
16.640	22.000
430	130
500	200
2015 ADT	-L- NC 268
2035 ADT	16.340
	21.700

-Y17- POT Sta. 18+93.56=
-L- POT Sta. 163+76.62

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 34 FOR -Y17- PROFILE

SEE SHEET 34 FOR -Y17- PROFILE

MATCH LINE -L- STA. 159+00
SEE SHEET NO. 14

MATCH LINE -L- STA. 173+00
SEE SHEET NO. 16

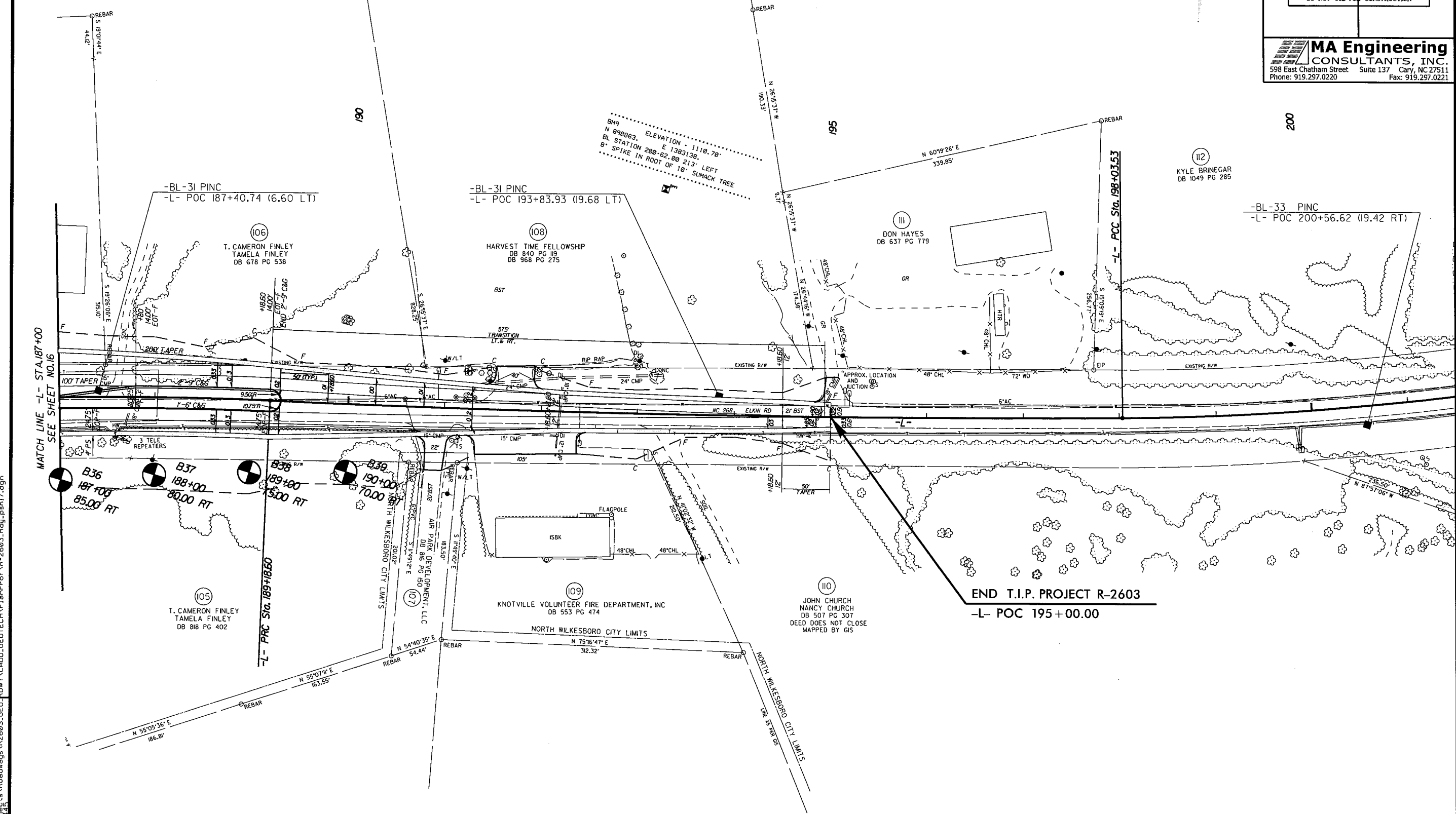
REVISIONS

8/17/99

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NAD 83

-L-		
PI Sta 184+05.55 $\Delta = 16^{\circ}55'17.5" (RT)$ $D = 138'13.3"$ $L = 1033.68'$ $T = 520.63'$ $R = 3500.00'$ $V = 50 \text{ mph}$ $SE = 0.04$	PI Sta 193+61.66 $\Delta = 2^{\circ}52'21.6" (LT)$ $D = 0'19'28.6"$ $L = 884.92'$ $T = 442.55'$ $R = 17,650.00'$	PI Sta 200+48.93 $\Delta = 9^{\circ}17'56.0" (LT)$ $D = 1'53'55.5"$ $L = 489.74'$ $T = 245.4'$ $R = 3017.55'$



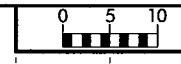
REVISIONS

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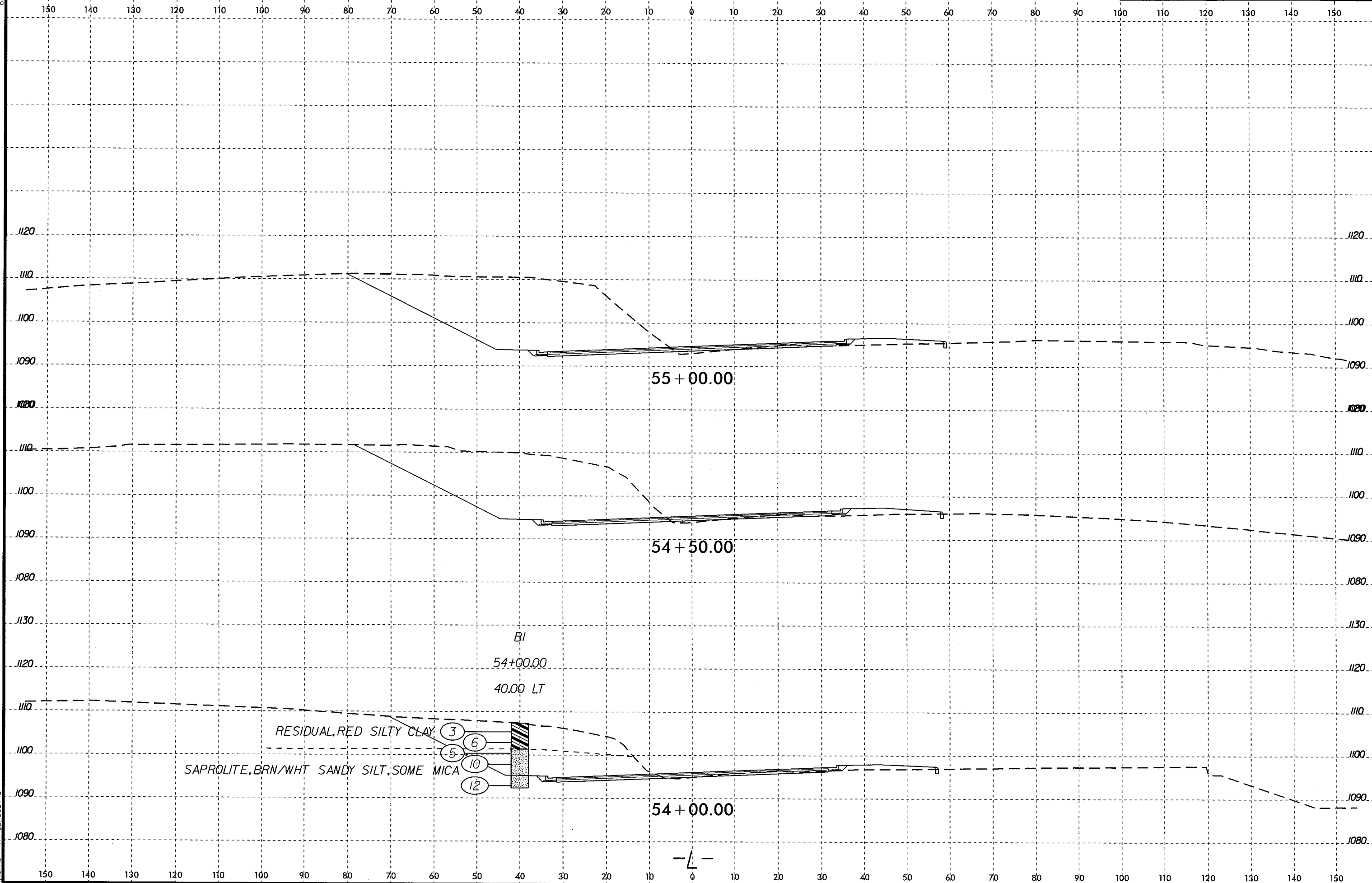
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SEE SHEET 28 FOR -L- PROFILE

8/23/99

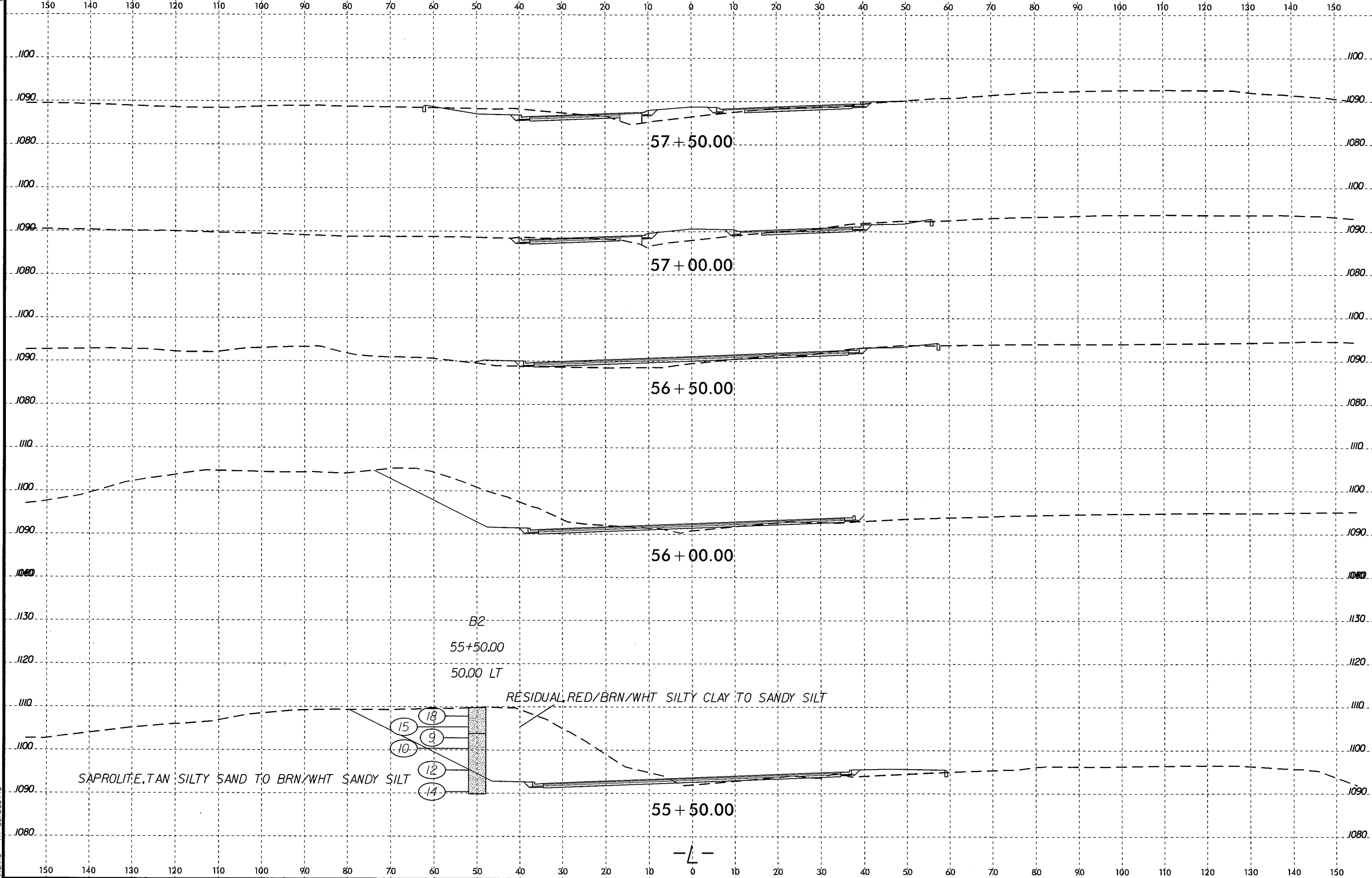


PROJ. REFERENCE NO.	SHEET NO.
R-2603	12/39



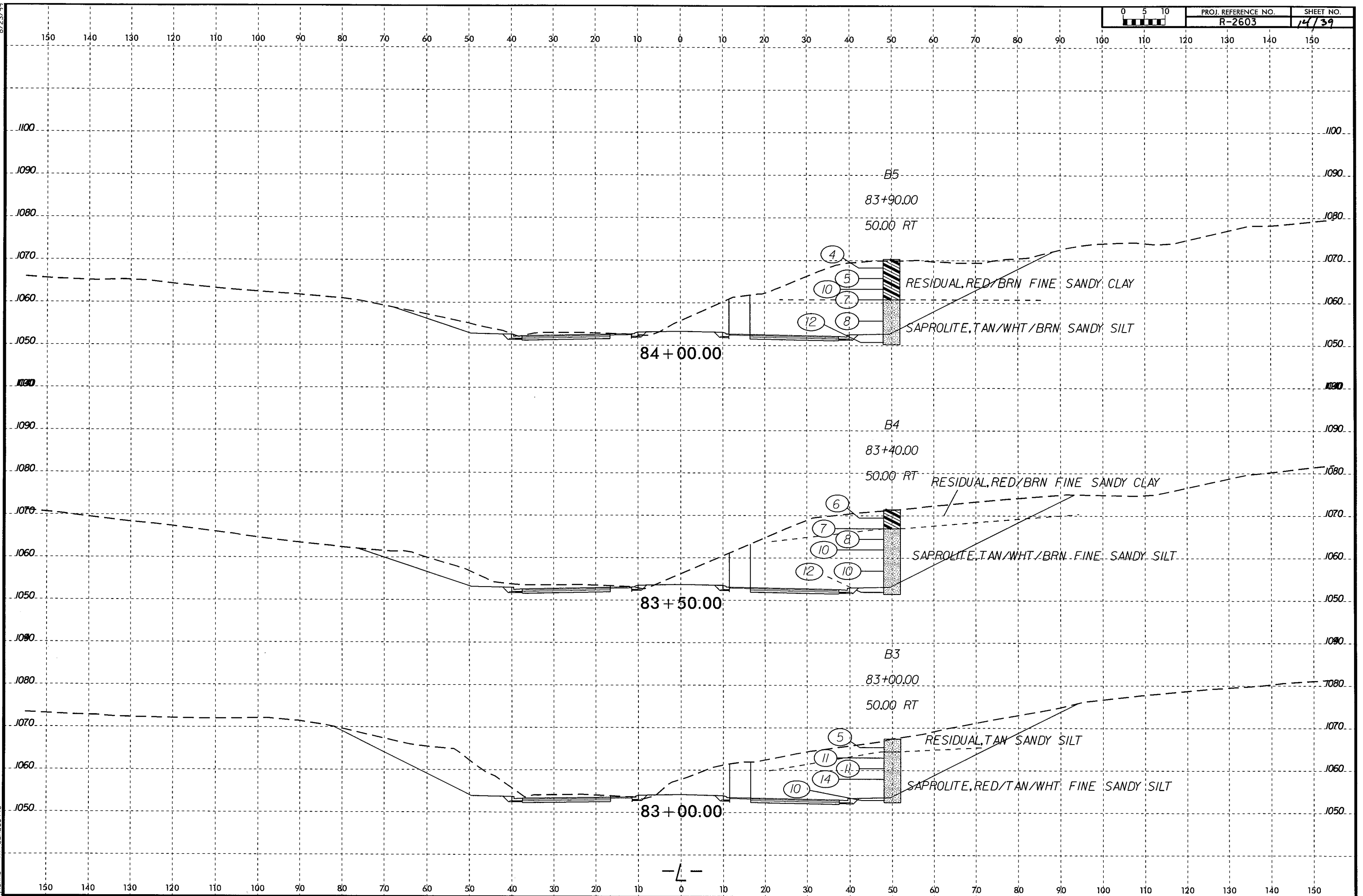
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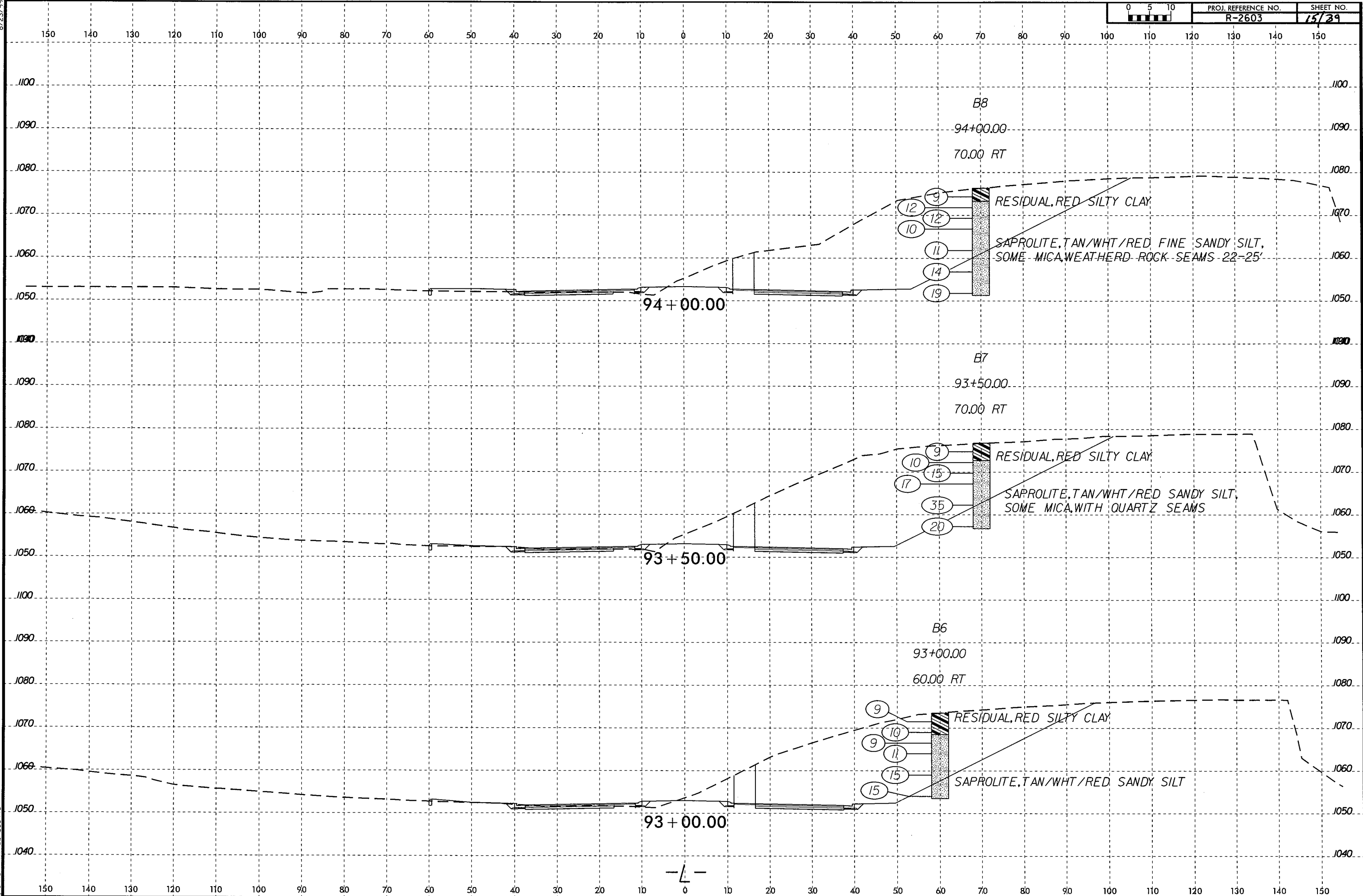
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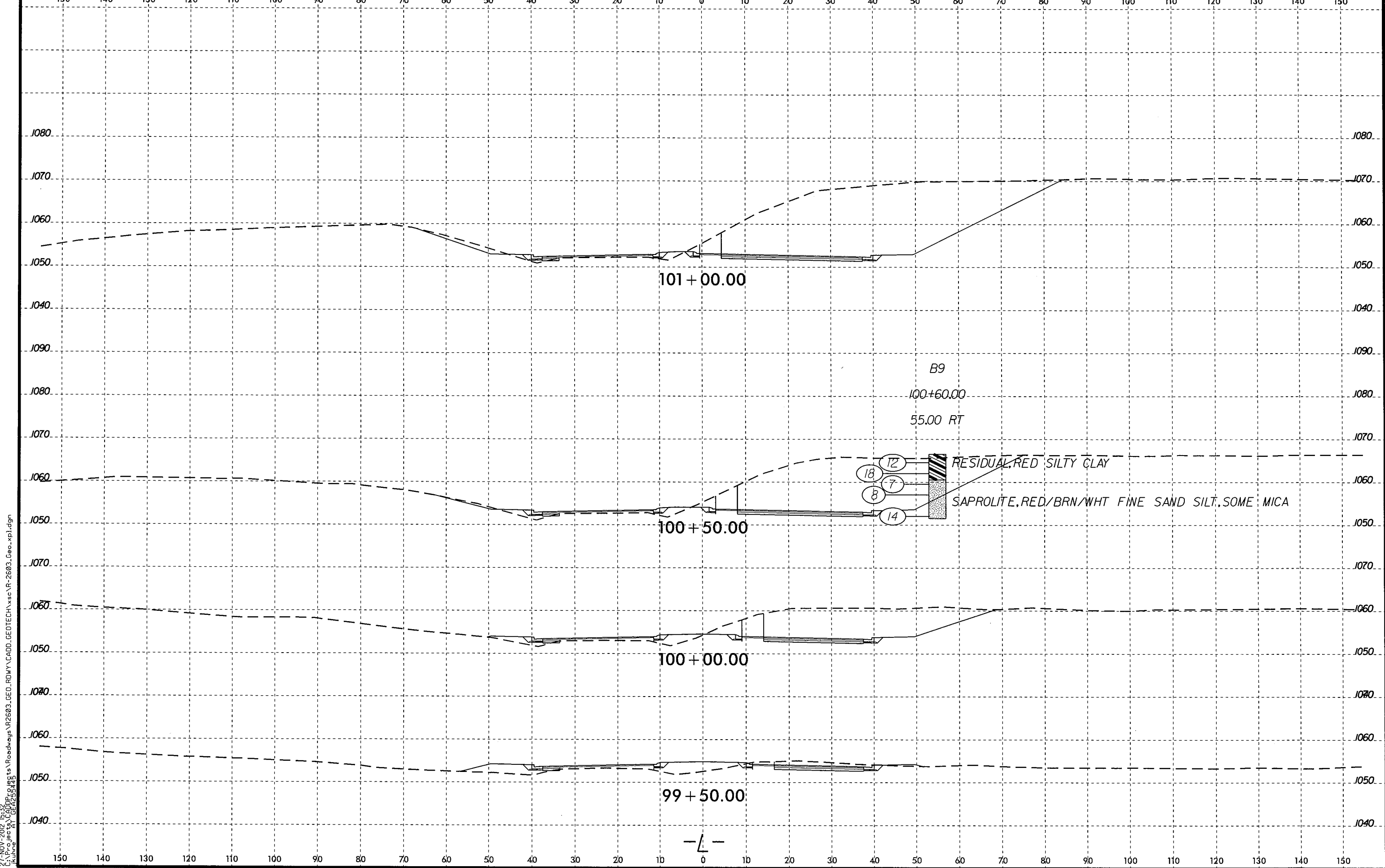
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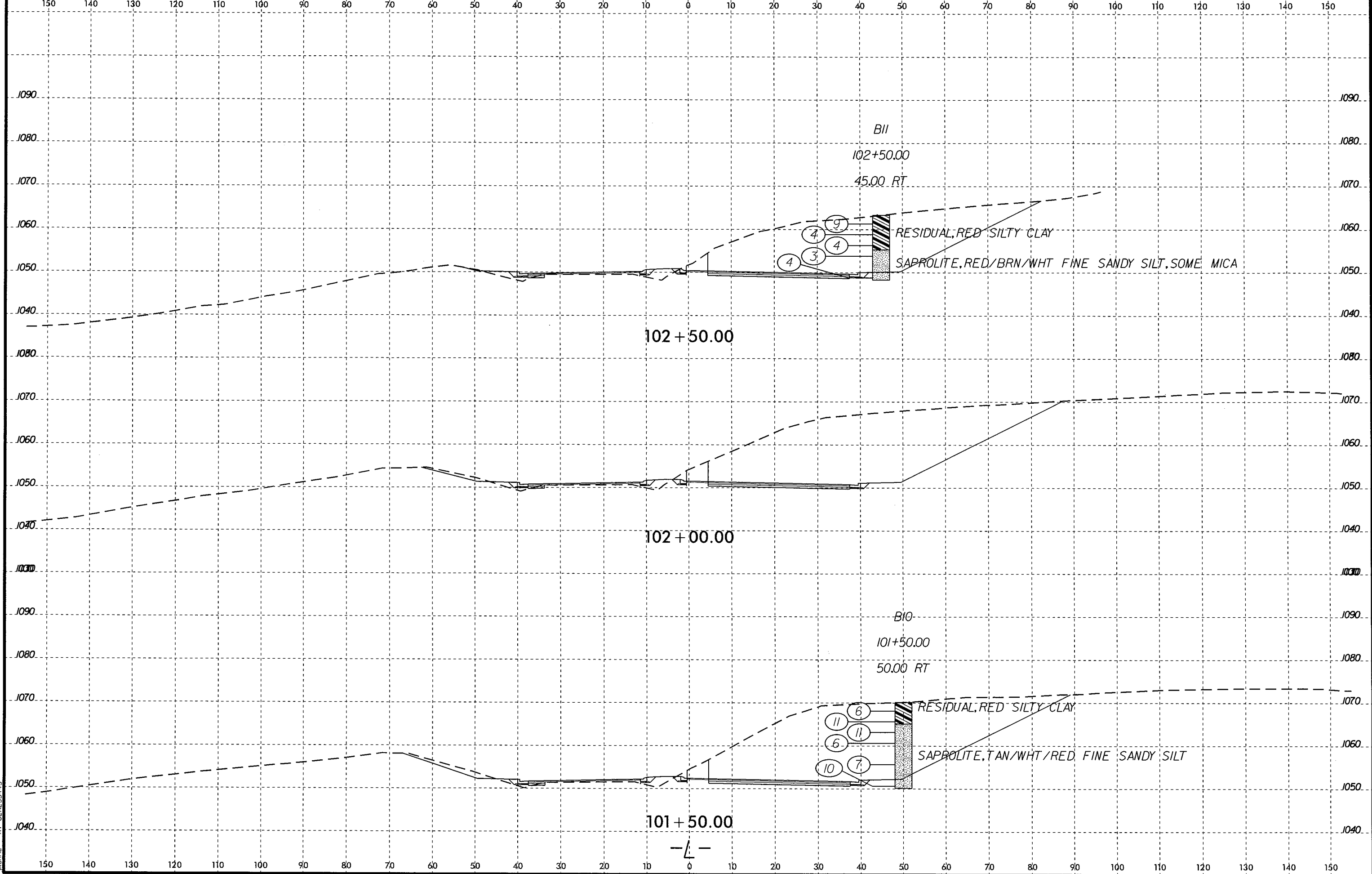




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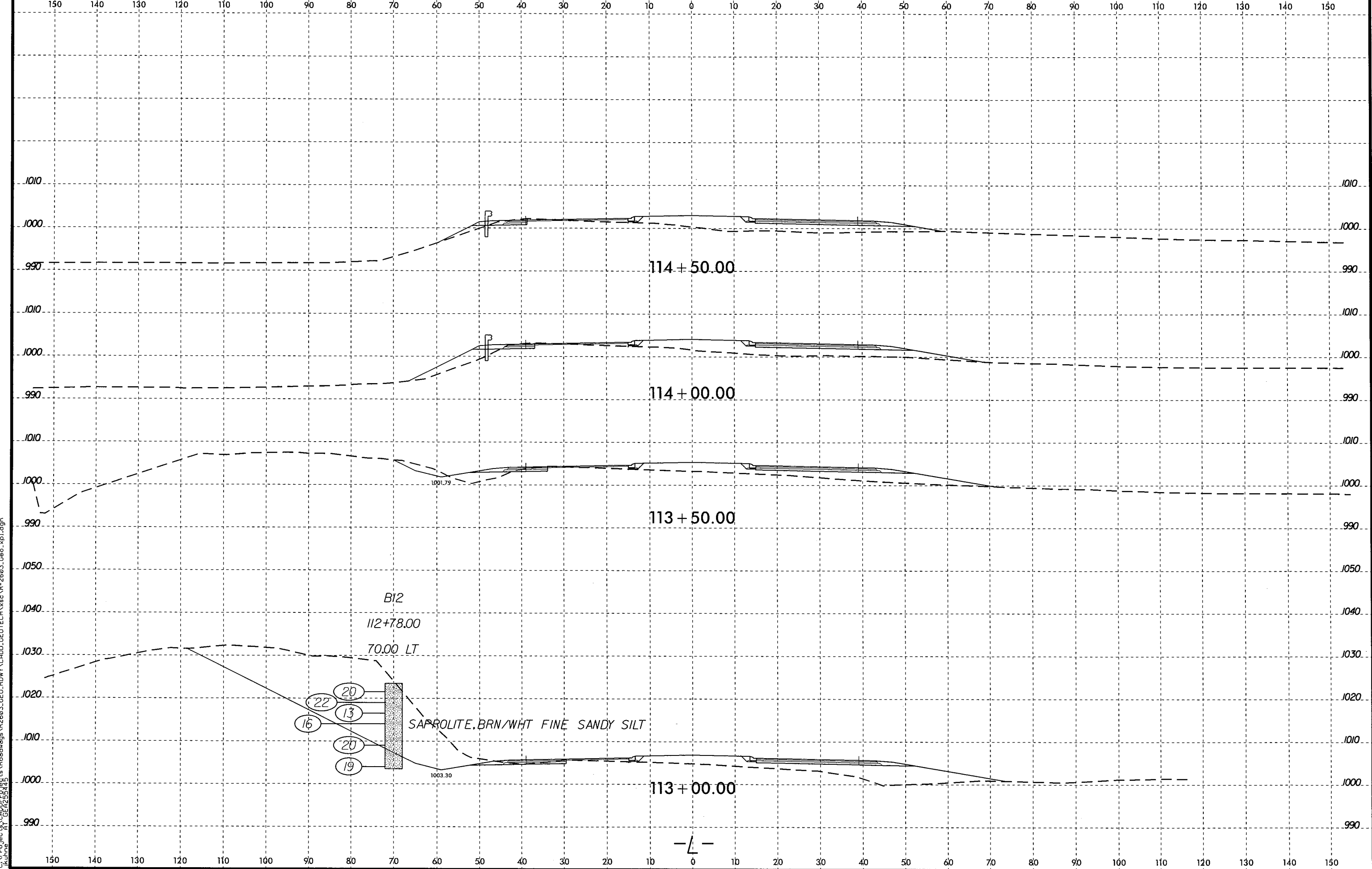


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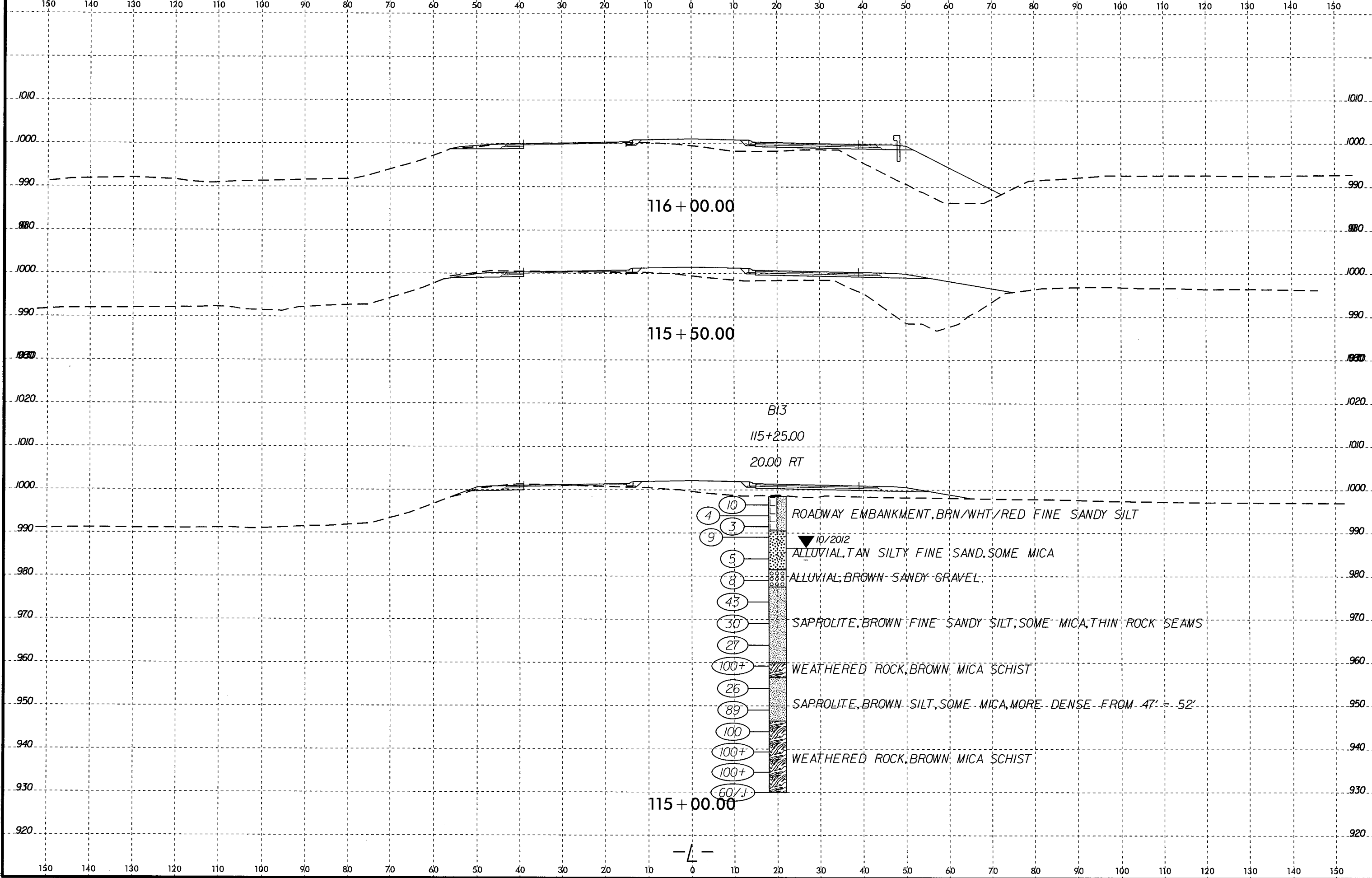
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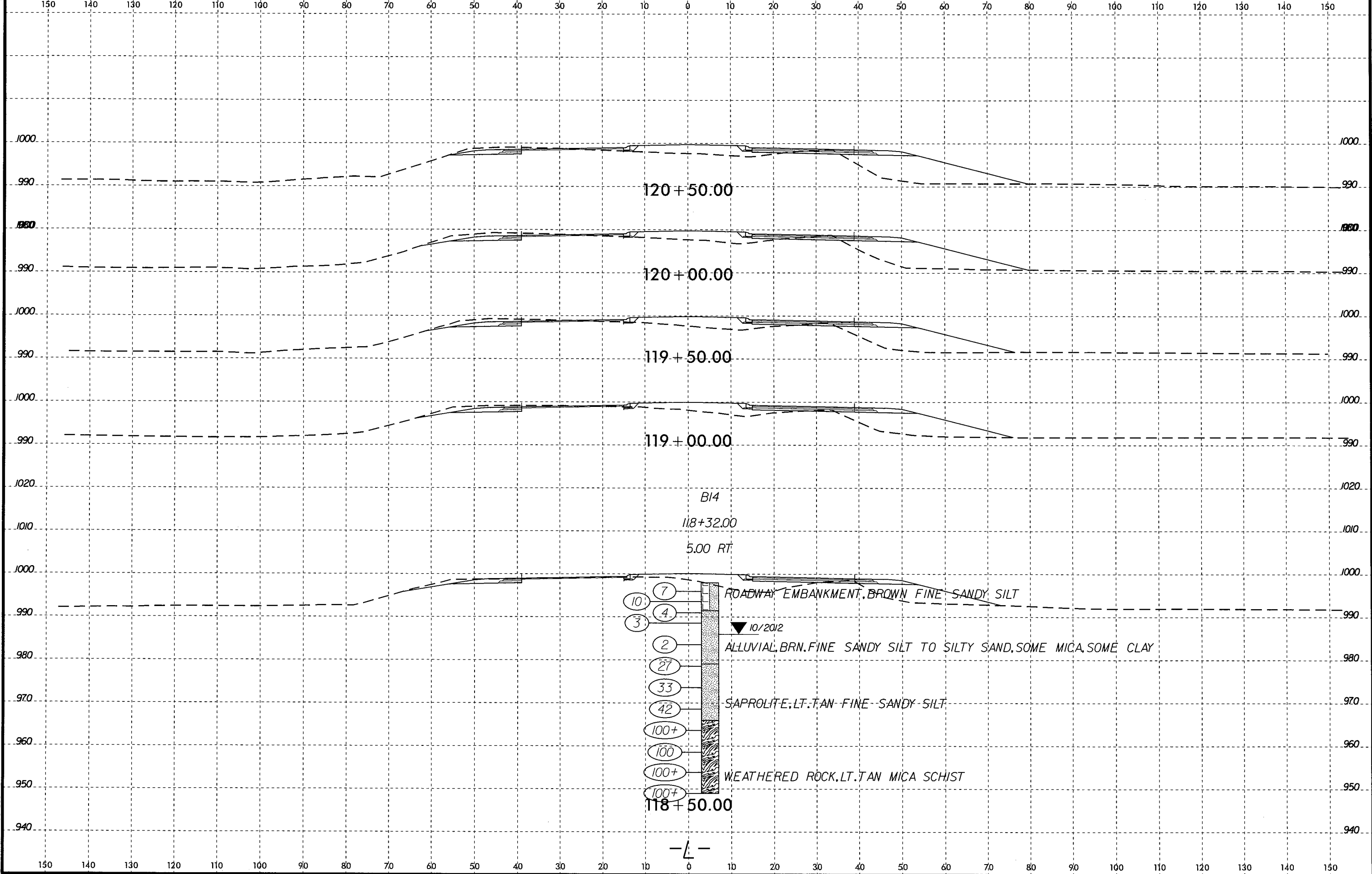
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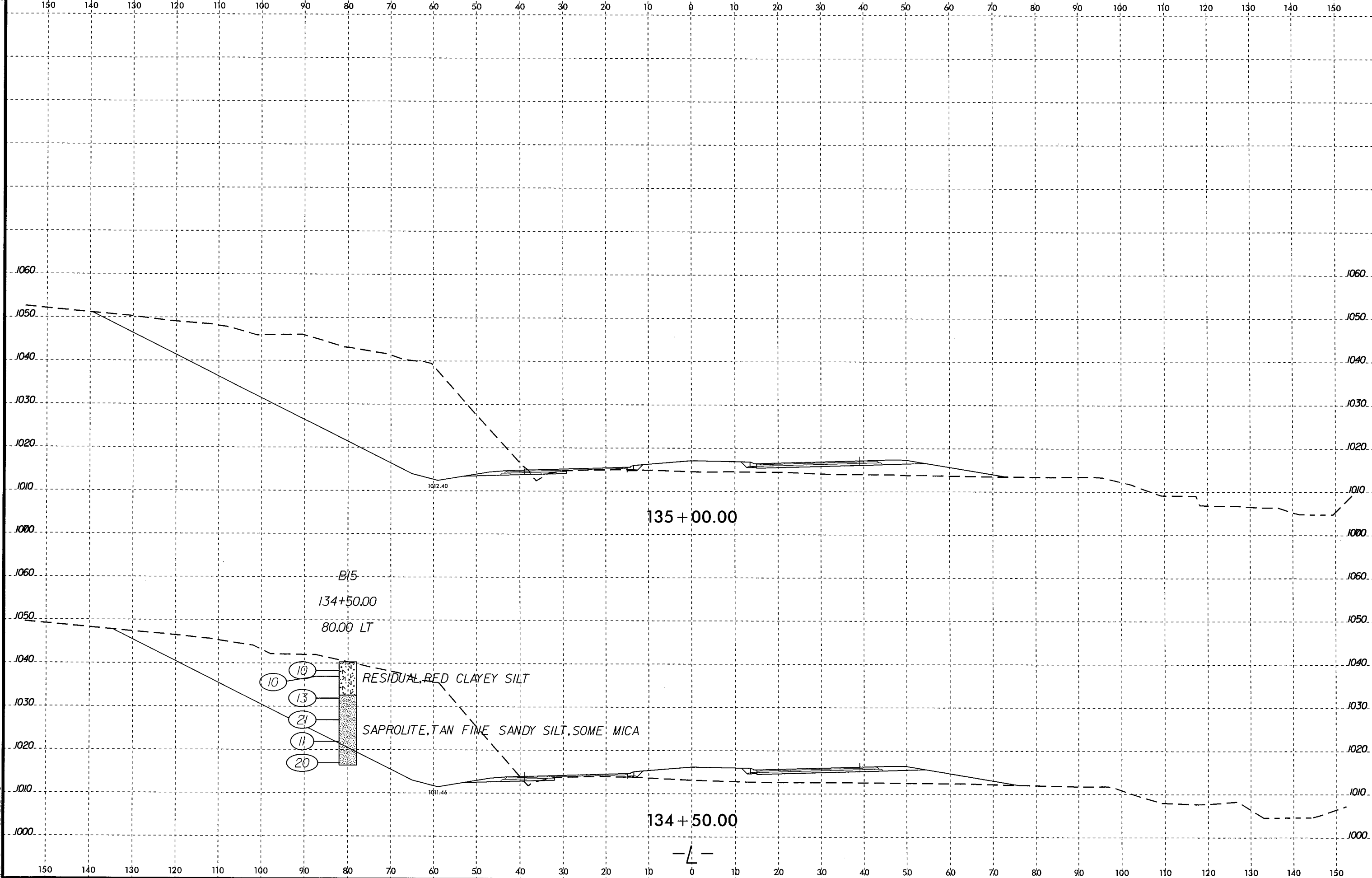


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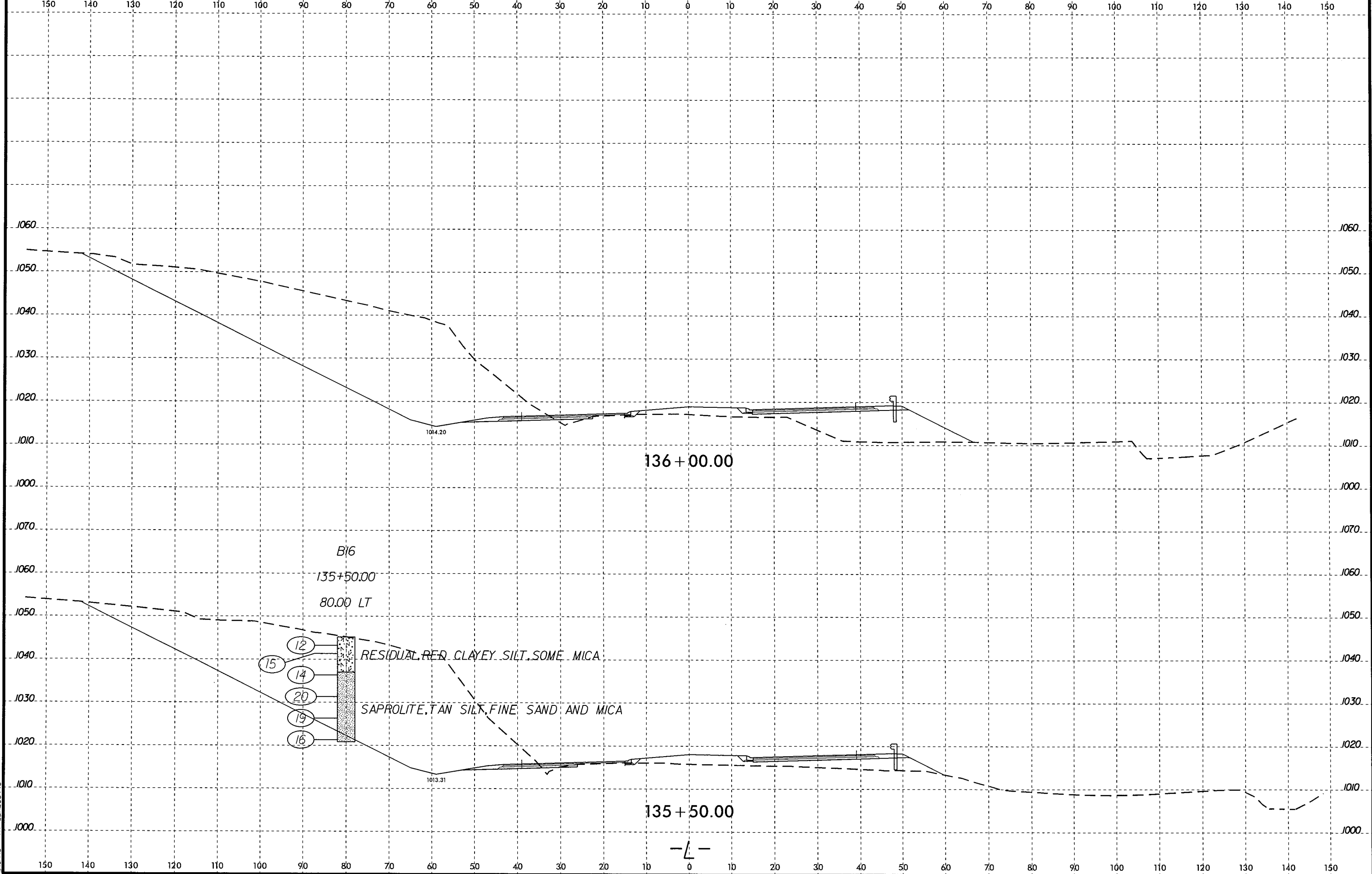


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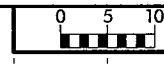
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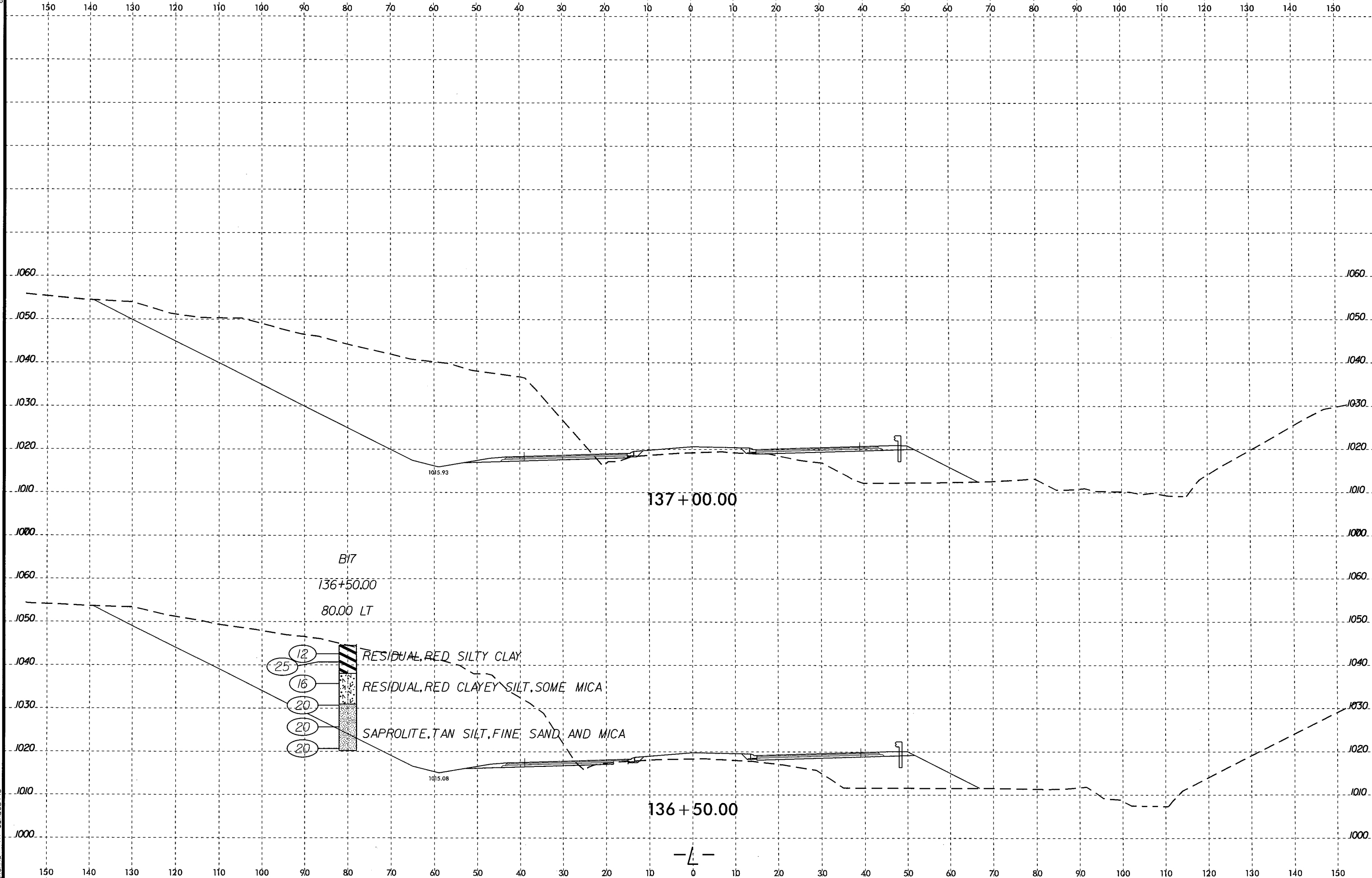


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8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2603	23/29



B17
 136+50.00
 80.00 LT

12' RESIDUAL, RED SILTY CLAY
 16' RESIDUAL, RED CLAYEY SILT, SOME MICA
 20' SAPROLITE, TAN SILT, FINE SAND, AND MICA
 20'

25'

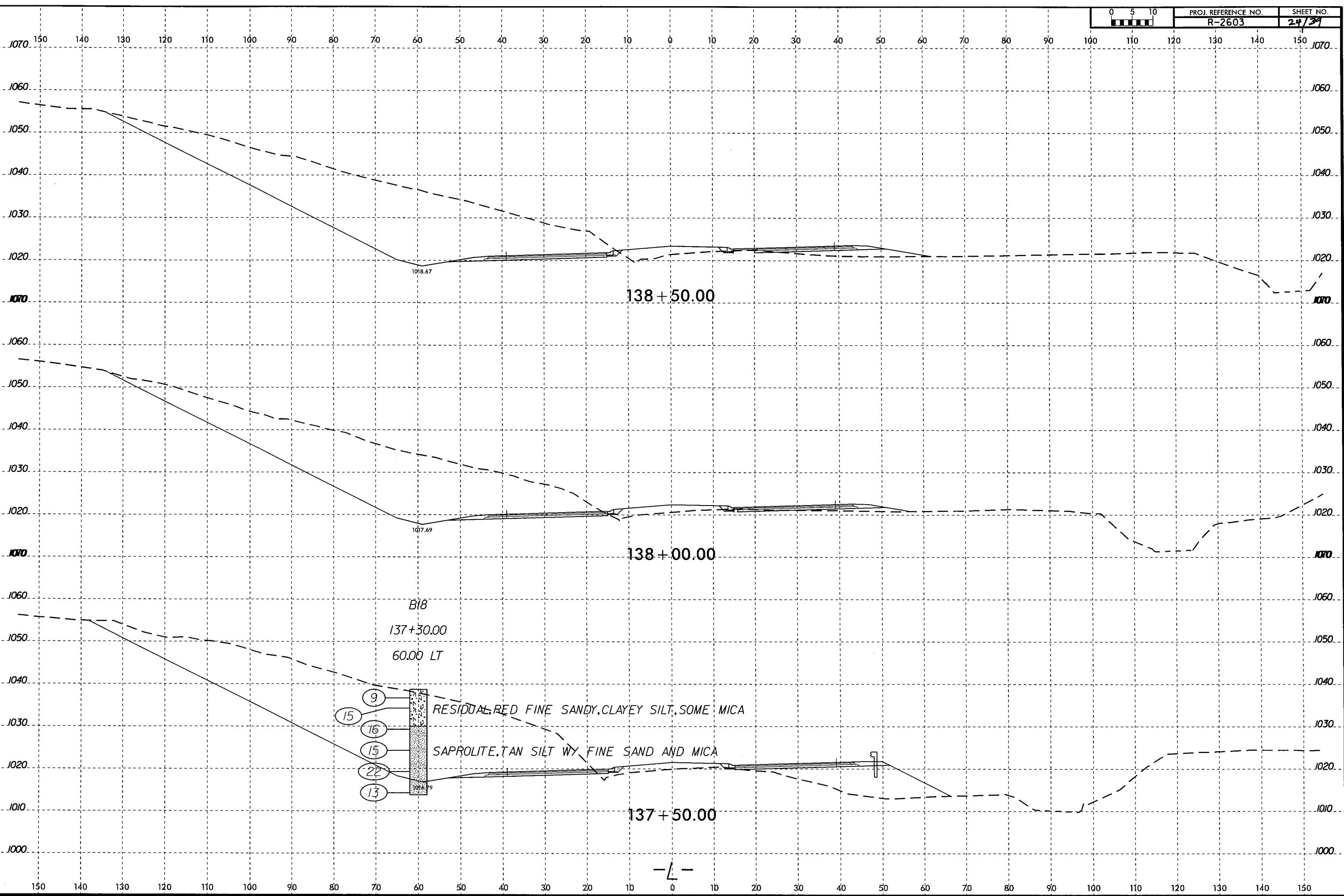
137+00.00

136+50.00

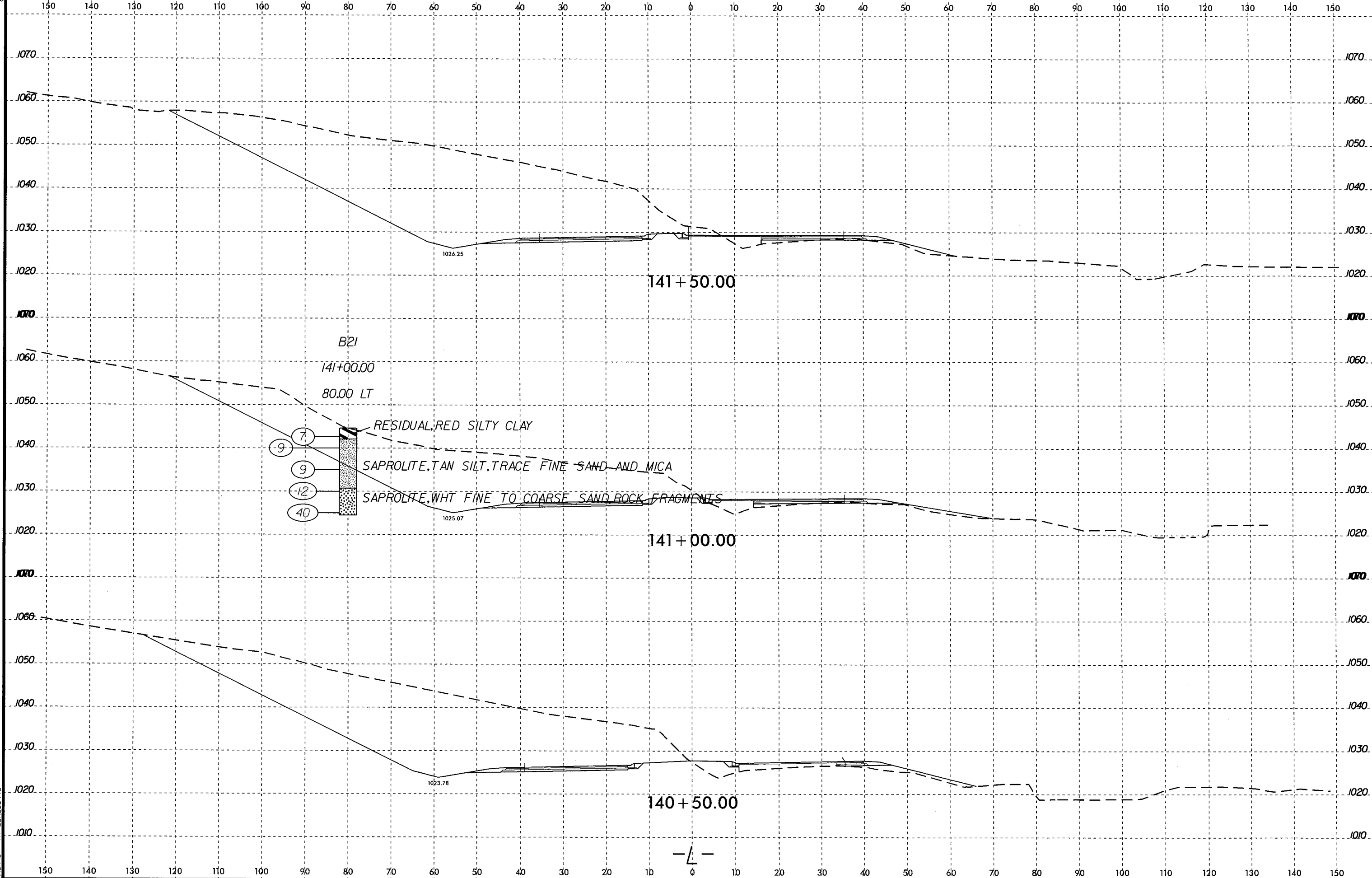
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1015.08

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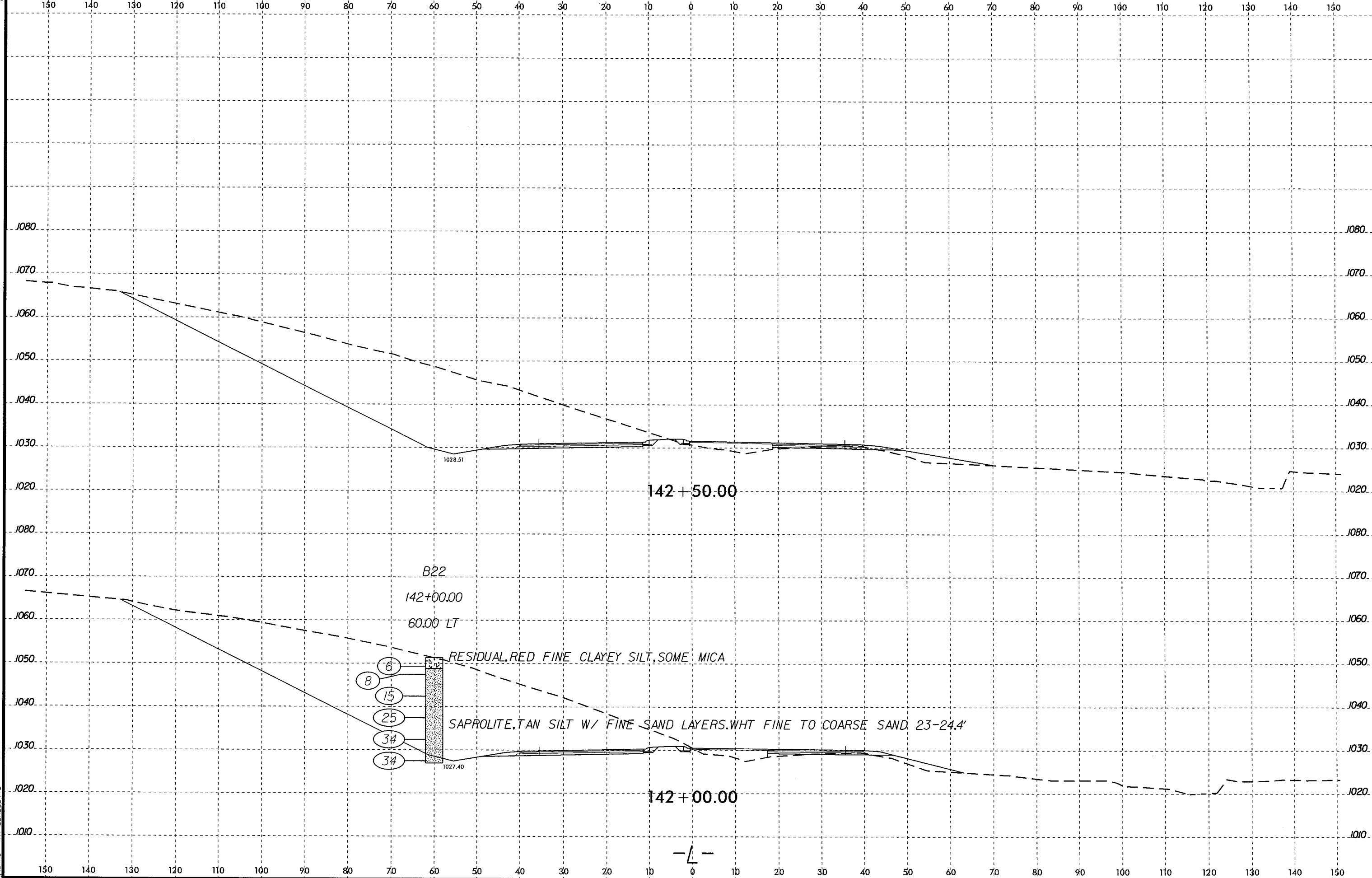


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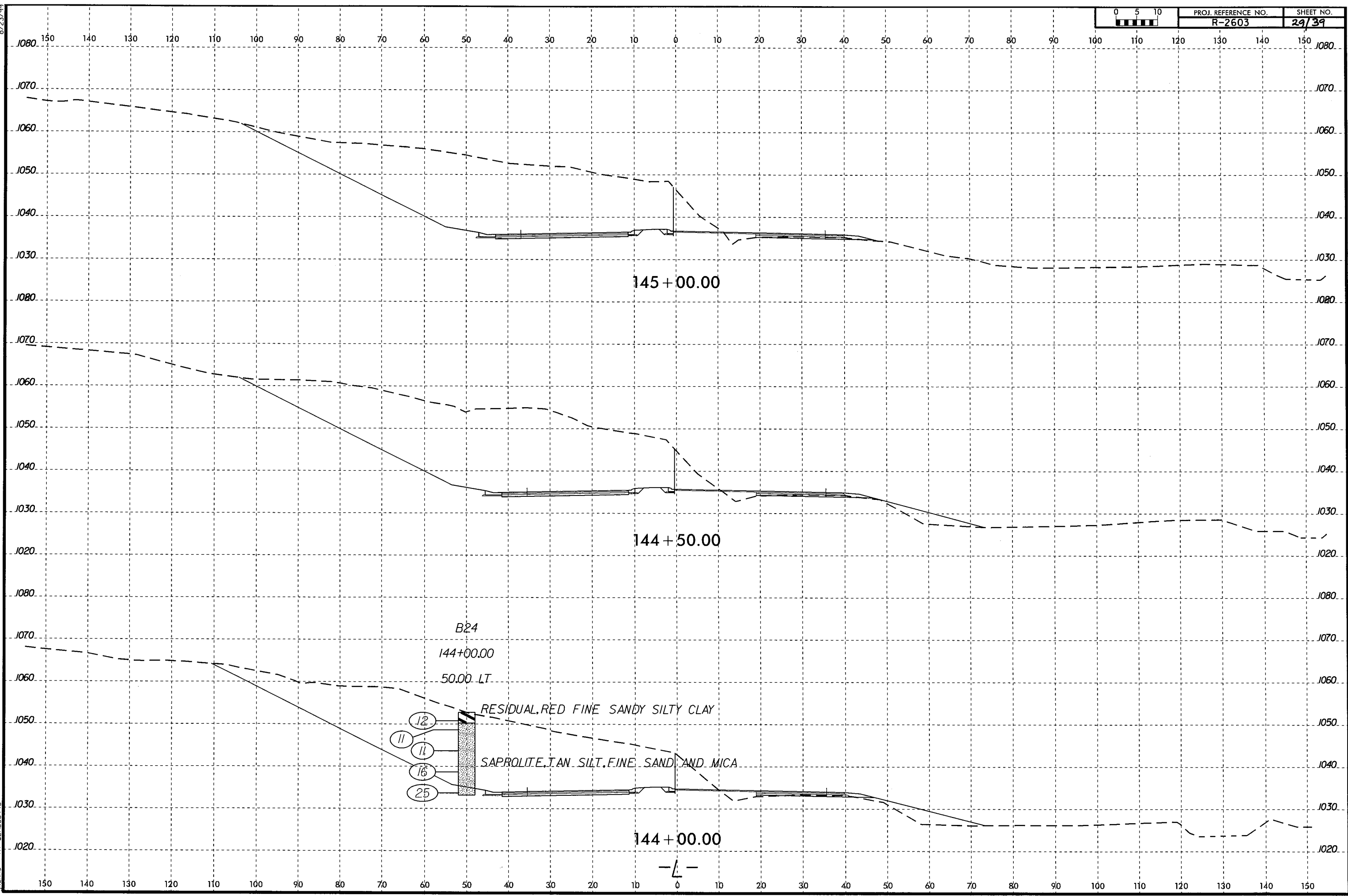
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145 + 00.00

144 + 50.00

144 + 00.00

B24

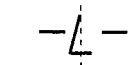
144+00.00

50.00 LT

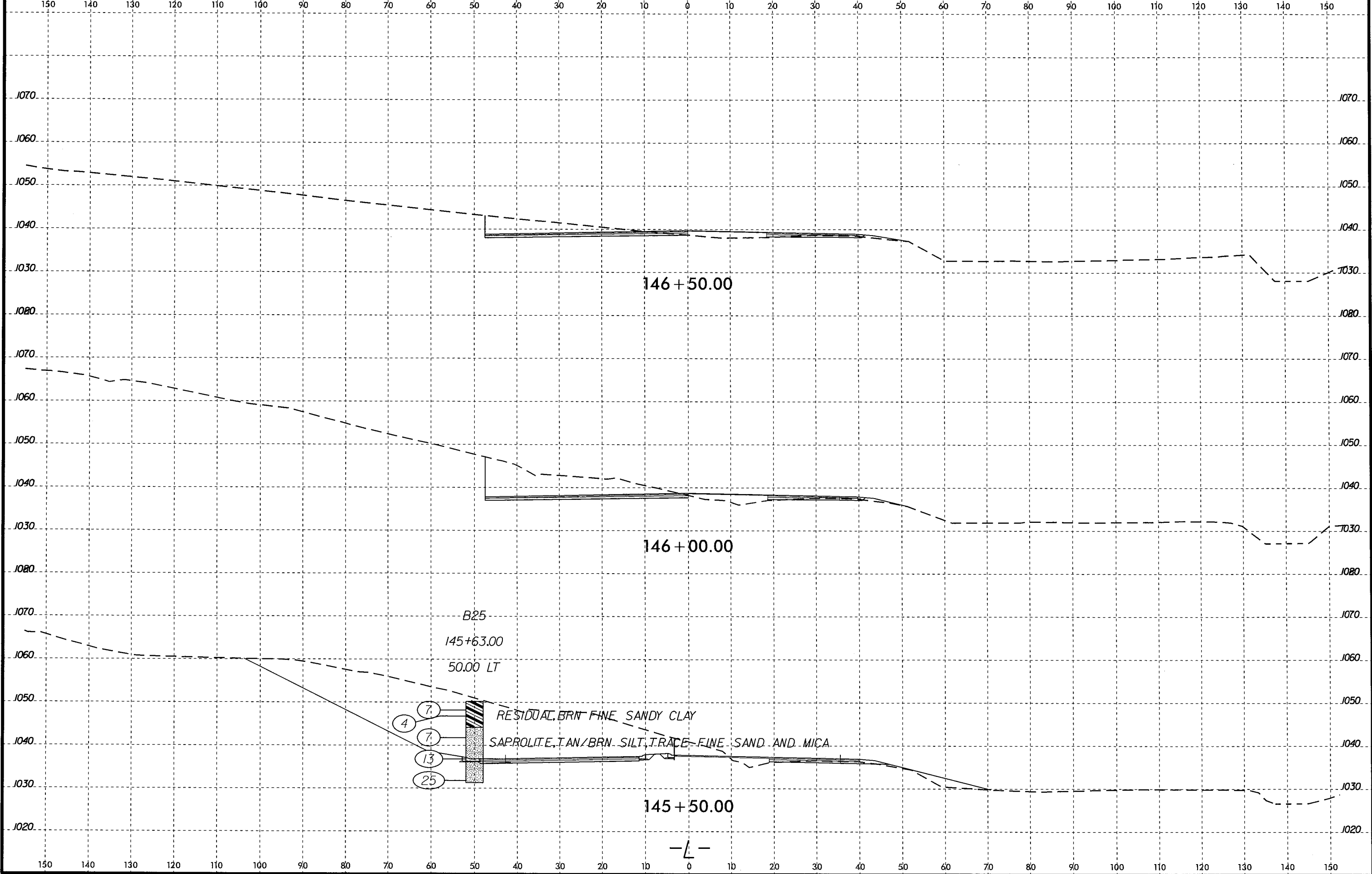
RESIDUAL, RED FINE SANDY SILTY CLAY

SAPROLITE, TAN SILT, FINE SAND, AND MICA

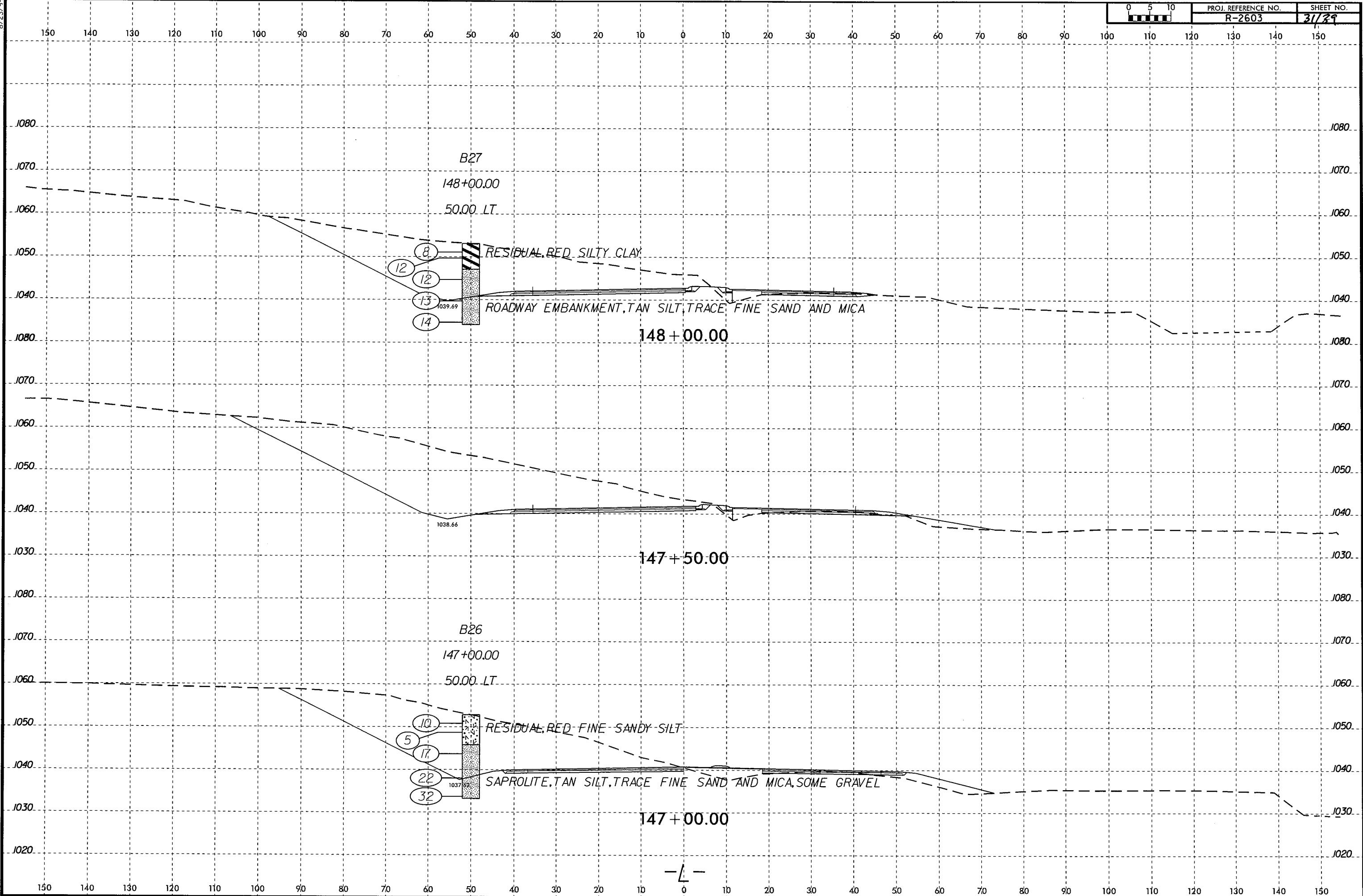
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- 11
- 16
- 25



8/23/99

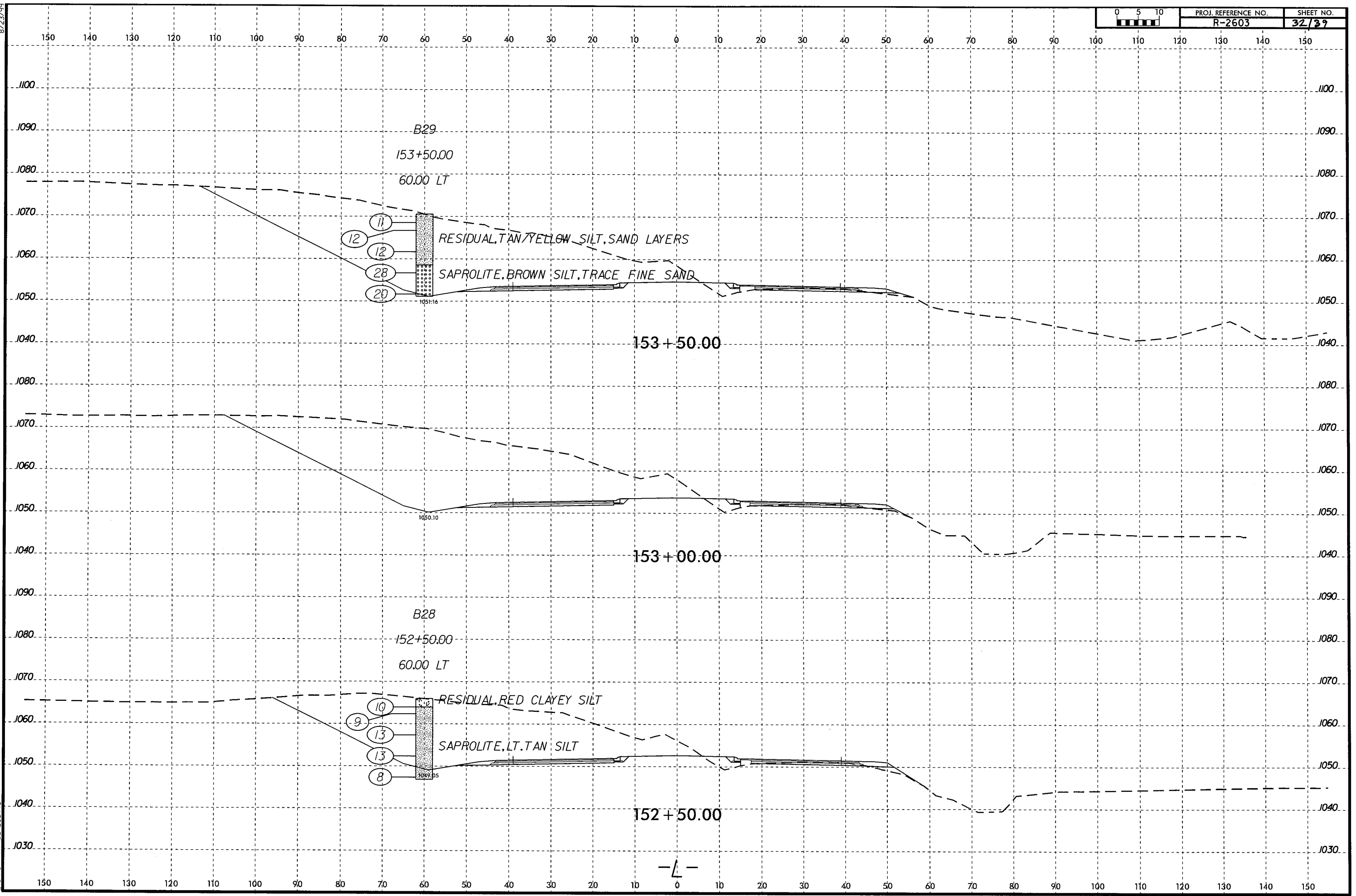


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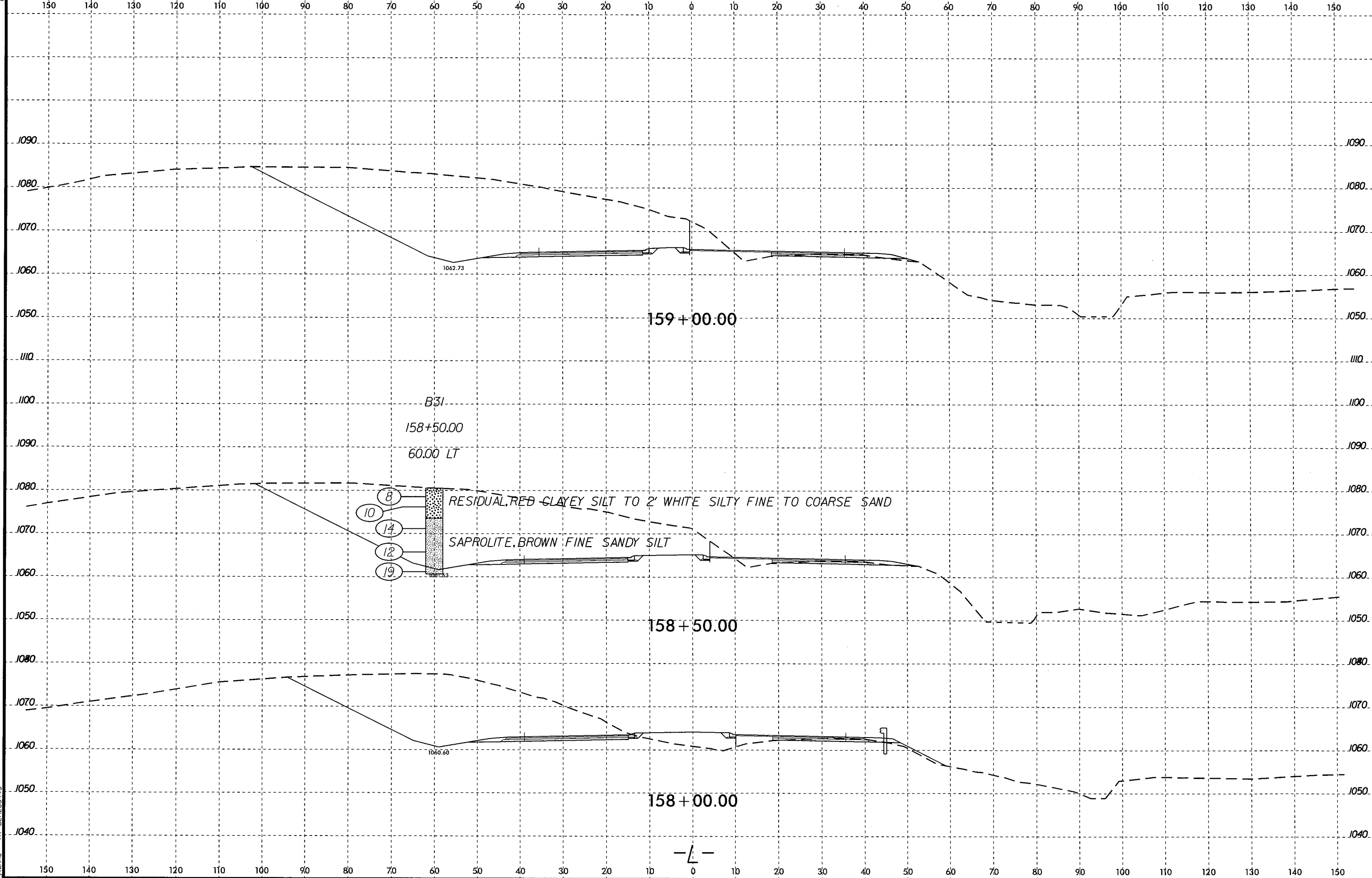


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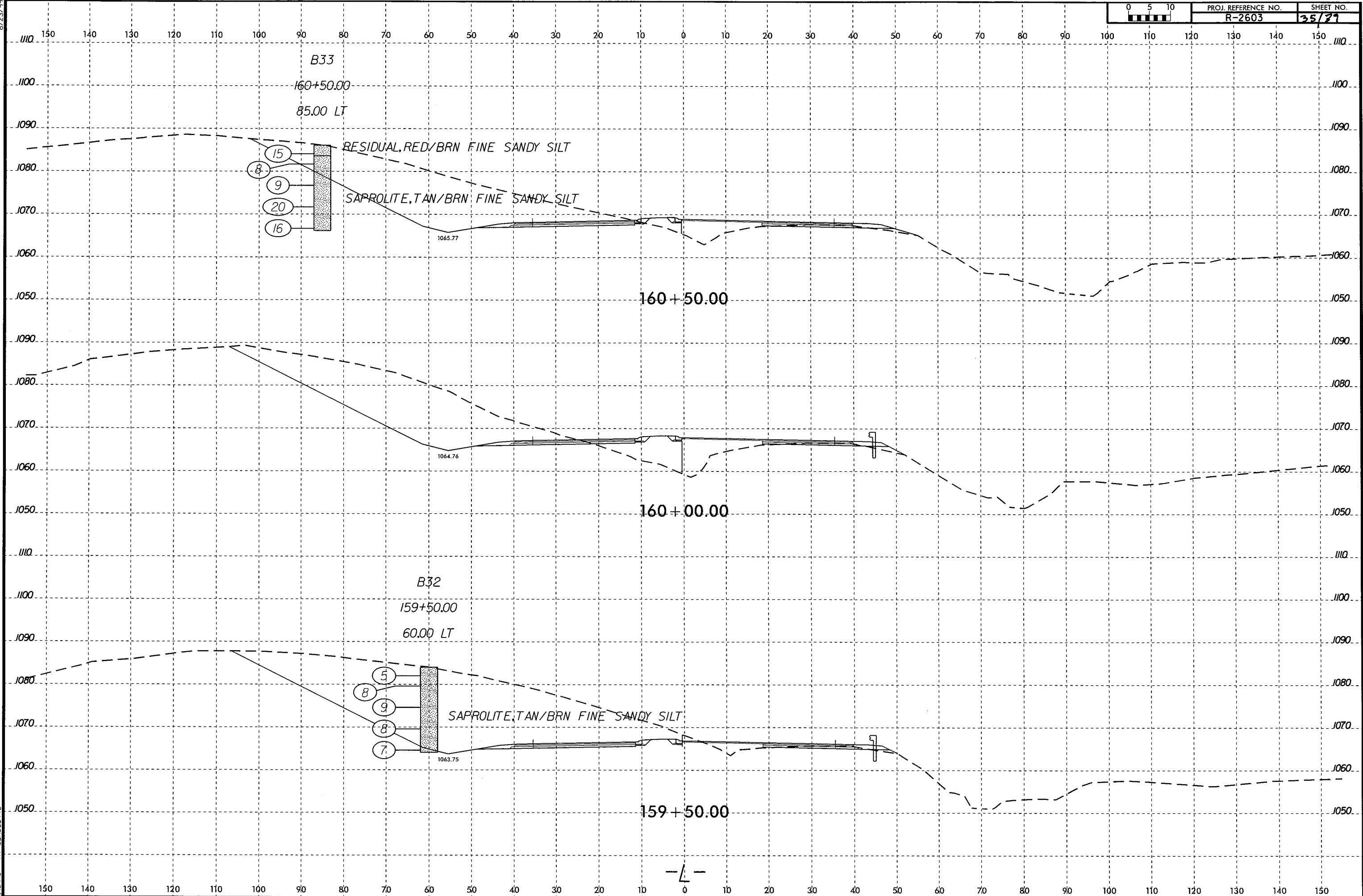
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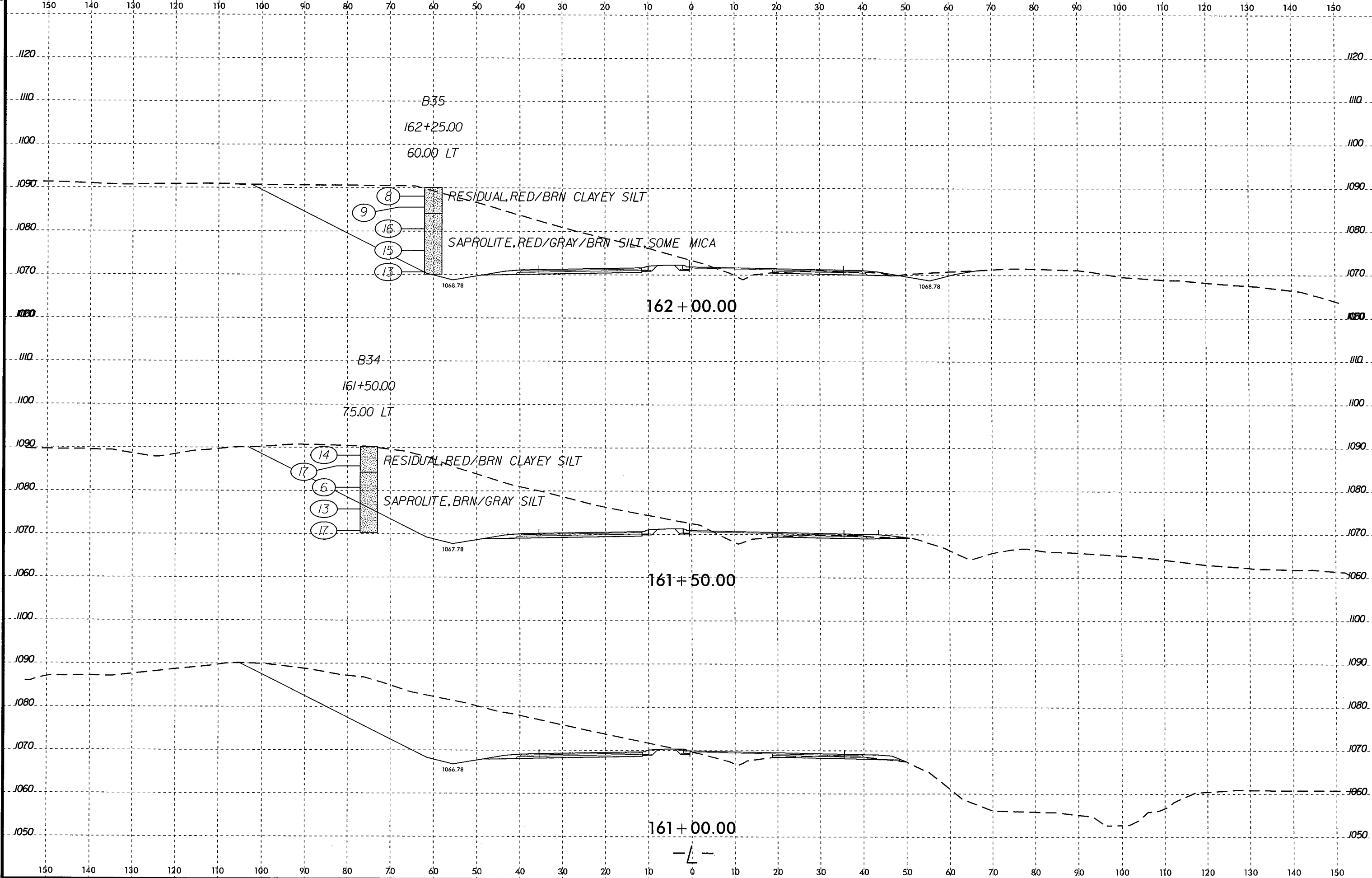
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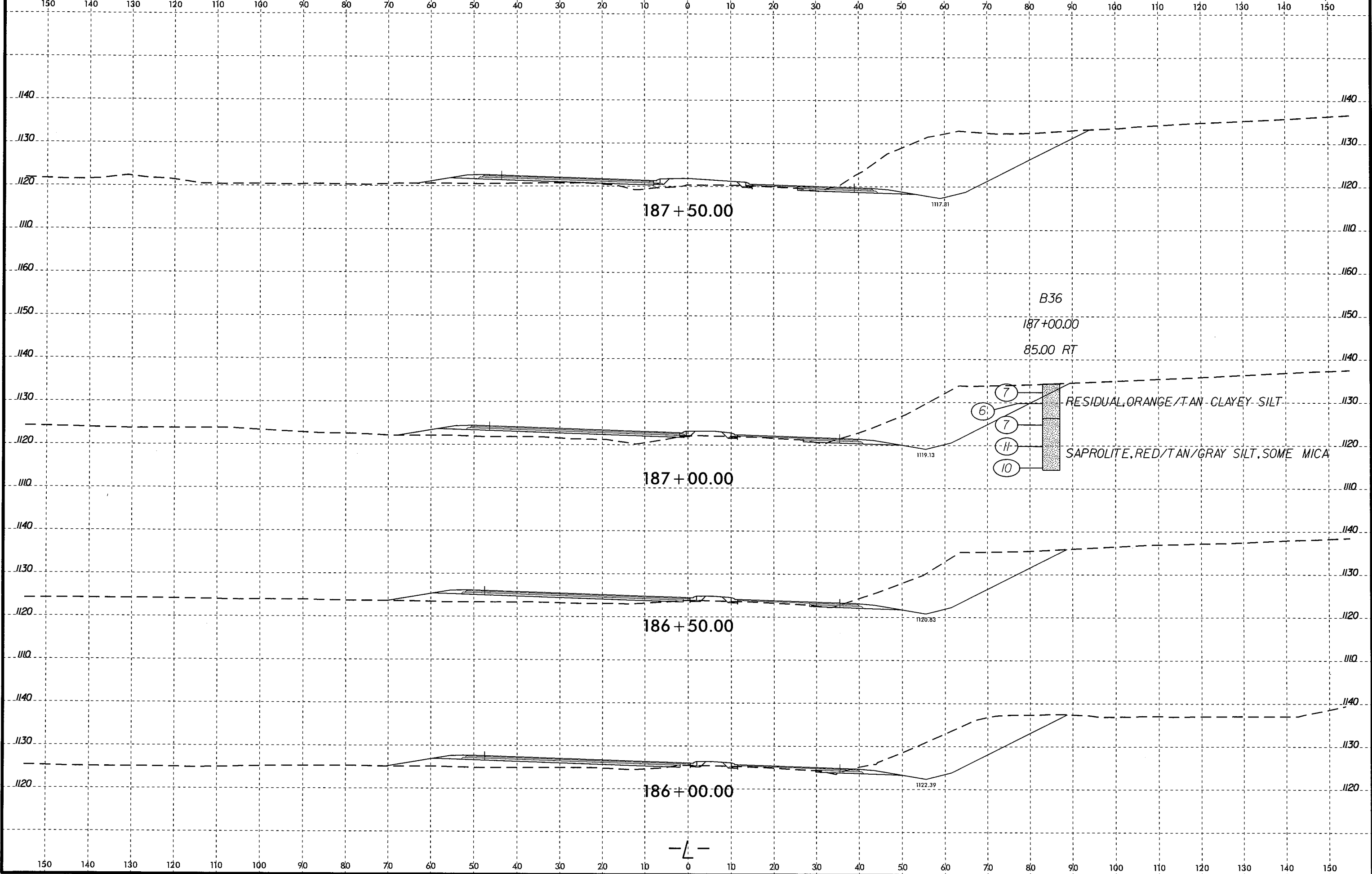


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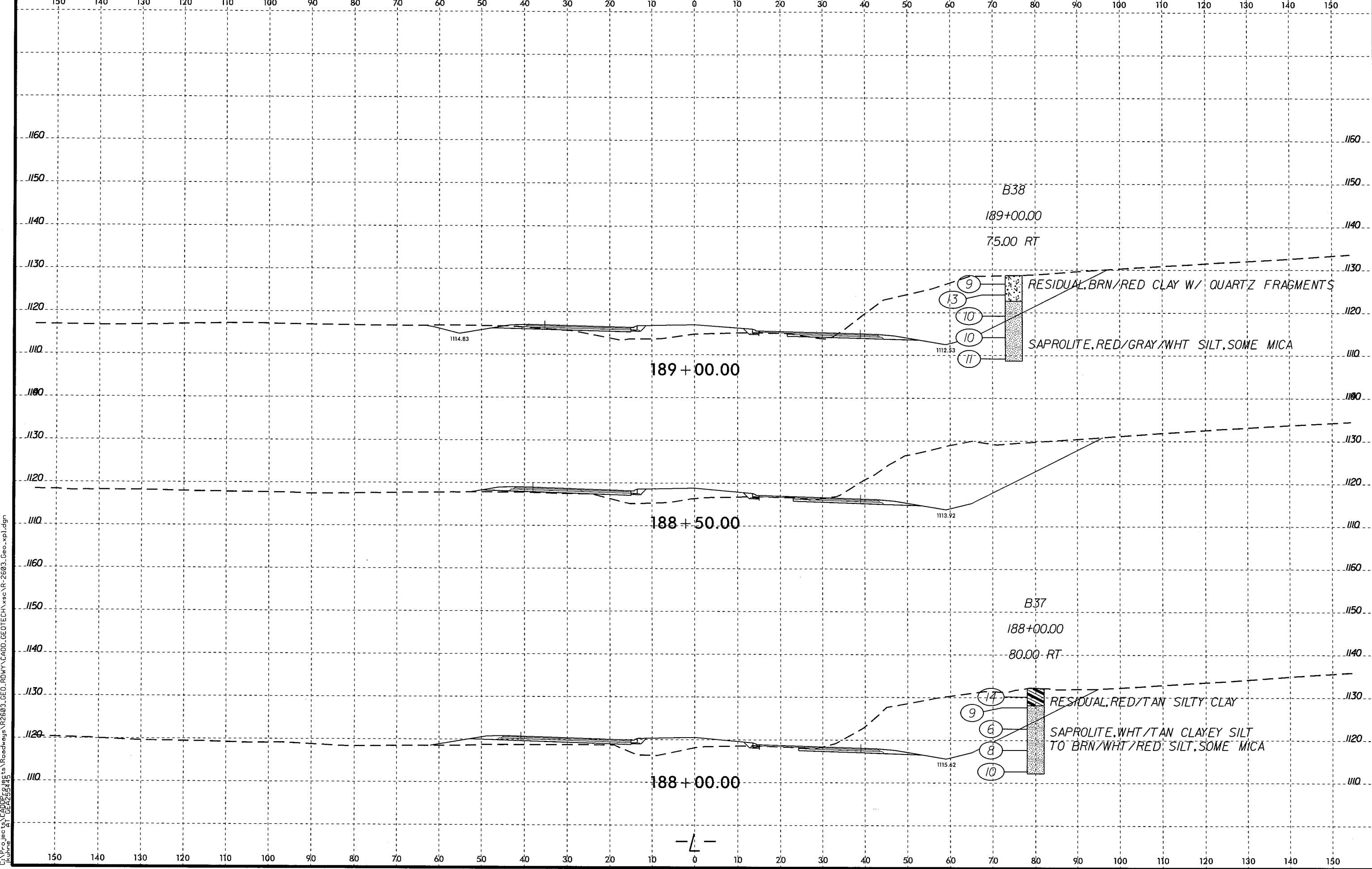
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