

NOTE: SEE SHEET 1A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34518.1.3 R-2915B	1	56
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
	STP-0221(40)	P.E.	
		RAW & UTIL.	

CONTENTS

INVESTIGATION ALONG -L- AND -Y9-

- 1 TITLE
- 2 LEGEND
- 3 REPORT/DESC
- 3A EARTHWORK SUMMARY
- 4 - 8 PLANSHEETS
- 9 - 56 CROSS SECTIONS

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34518.1.3 R-2915B F.A. PROJ. STP-0221(40)
COUNTY ASHE
PROJECT DESCRIPTION US 221 FROM SR 1003 (IDLEWILD ROAD)
TO NORTH OF THE SOUTH FORK OF THE NEW RIVER

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

CONTRACT: 34518.1.3 ID: R-2915B

PERSONNEL
DC ELLIOTT

DO CHEEK

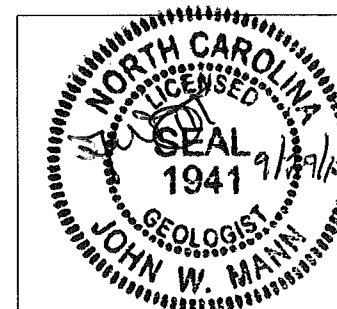
C COFFEY

INVESTIGATED BY JW MANN

CHECKED BY JC KUHNE

SUBMITTED BY JW MANN

DATE SEPTEMBER 2013



DRAWN BY: JW MANN

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

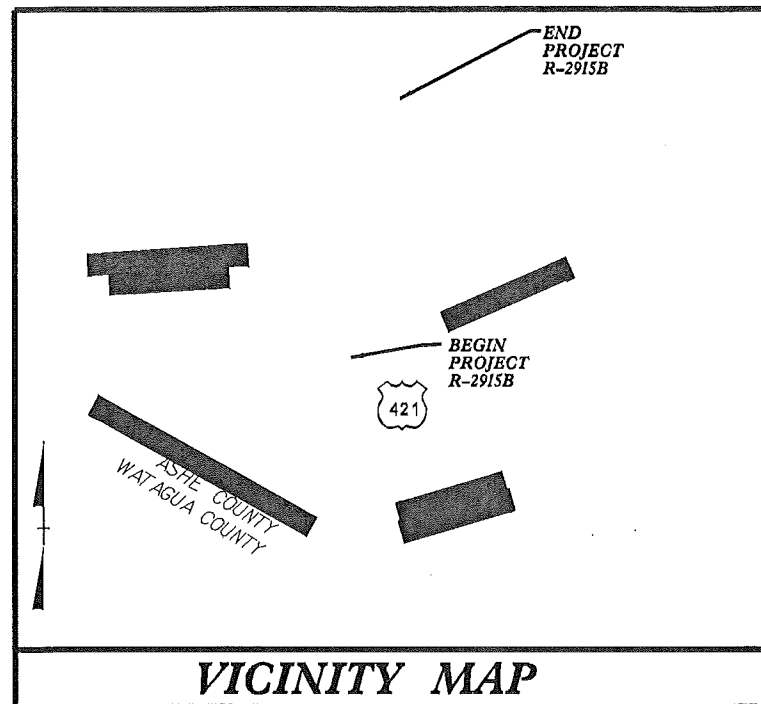
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

09/28/13
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 C:\Projects\2915B\2915B_GEO_RDWY_Ashe\CADD_GEO\TECH\Plan\Prof\N2915B_RDWY_TSH_01.dgn
 jwm
 AT GEA266093

TIP PROJECT: R-2915B

CONTRACT:

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



VICINITY MAP

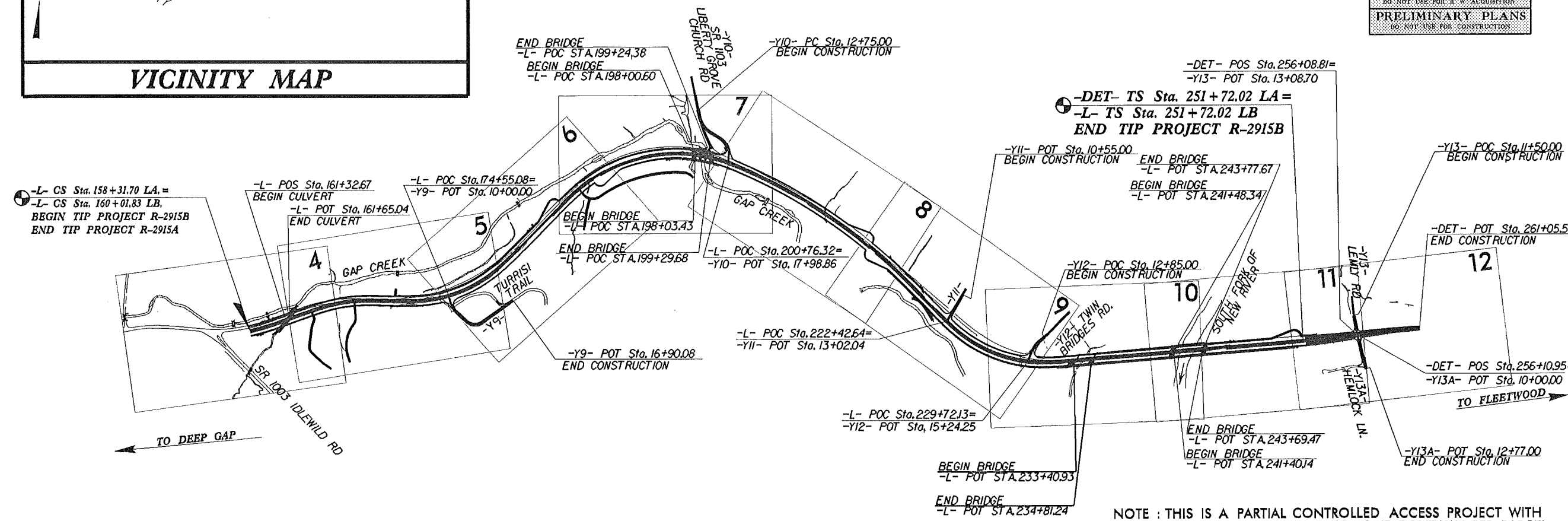
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

LOCATION: US 221 FROM SR 1003 (IDLEWILD ROAD)
TO NORTH OF SOUTH FORK NEW RIVER
TYPE OF WORK: GRADING, DRAINAGE, PAVING,
AND STRUCTURES

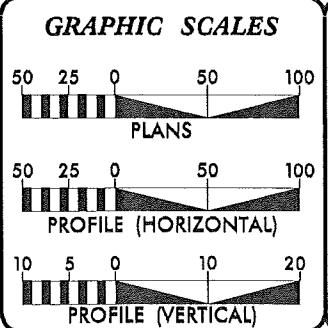
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915B	1A	56
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34518.1.3	STP-0221(40)	P.E.	

INCOMPLETE PLANS
DO NOT USE FOR ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTE : THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO ONE DRIVEWAY PER PARCEL. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD _____

NCDOT CONTACT: BRENDA L. MOORE, P.E.



DESIGN DATA

ADT 2015 =	12,089
ADT 2035 =	20,204
DHV =	10%
D =	65%
T =	9% *
V =	50 MPH
* TTST 2% DUAL 7%	
FUNC CLASS=ARTERIAL STATEWIDE TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915B =	1.675 MILES
LENGTH STRUCTURE TIP PROJECT R-2915B =	0.094 MILES
TOTAL LENGTH TIP PROJECT R-2915B =	1.769 MILES

Prepared In the Office of:
CDM Smith
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612

2012 STANDARD SPECIFICATIONS

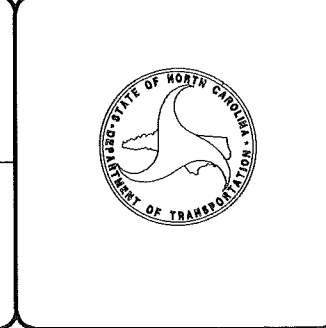
RIGHT OF WAY DATE: **DOUGLAS B. SAUNDERS, P.E.**
SEPTEMBER 27, 2013
PROJECT ENGINEER

LETTING DATE: **RICKY E. STATON**
SEPTEMBER 15, 2015
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



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 (AASHTO T208, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6			WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.			HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT 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 (CP) 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 - 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 (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						COMPRESSION						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.						SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50						FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI.) 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 (SLI.) 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. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.						PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILTS SILT - CLAY 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						GROUND WATER 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						WEATHERING					
% PASSING # 10 50 HX 30 HX 50 HX 10 HX # 40 15 HX 25 HX 10 HX # 200						GRANULAR SOILS SILT-CLAY SOILS MUCK, PEAT						GROUP INDEX						WEATHERING																							
LIQUID LIMIT PLASTIC INDEX						GROUP INDEX						USUAL TYPES OF MAJOR MATERIALS						GEN. RATING AS A SUBGRADE																							
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30						CONSENSITY OR DENSENESS						MISCELLANEOUS SYMBOLS						ROCK HARDNESS																							
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)						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						SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD						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 PIECES 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.						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 PIECES 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.																	
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						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 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 Y - UNIT WEIGHT Yd - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																							
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)						GRAIN SIZE MM IN. 305 12 75 3 2.0 0.25 0.05 0.005						EQUIPMENT USED ON SUBJECT PROJECT						FRACTURE SPACING						BEDDING																	
SOIL MOISTURE - CORRELATION OF TERMS						ADVANCING TOOLS:						HAMMER TYPE:						TERM SPACING						TERM THICKNESS																	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION						<input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST						<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> B <input type="checkbox"/> N <input type="checkbox"/> H HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST						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																	
LL LIQUID LIMIT (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE						<input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input checked="" type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE <input type="checkbox"/> STEEL TEETH <input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB. <input type="checkbox"/> CORE BIT						INDURATION						FRIBLE 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						INDURATION																							
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH						EQUIPMENT USED ON SUBJECT PROJECT						INDURATION						INDURATION																							
COLOR						EQUIPMENT USED ON SUBJECT PROJECT						INDURATION						INDURATION																							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.						EQUIPMENT USED ON SUBJECT PROJECT						INDURATION						INDURATION																							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.						EQUIPMENT USED ON SUBJECT PROJECT						INDURATION						INDURATION																							



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

September 23, 2013

STATE PROJECT: 34518.1.3 (R-2915B)
COUNTY: Ashe
DESCRIPTION: US 221 from SR 1003 (Idlewild Road) to North of the South Fork of
the New River
SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

This project starts at the southern tip of Ashe County and just below the border of Watauga County. The "B" project section begins at SR 1003, continues 1.8 miles in a northerly trend and terminates north of the South Fork New River. Proposed construction consists of widening two-lanes to four-lanes with minor vertical and horizontal alignment changes along existing -L-. It is anticipated that existing culverts and pipes will be extended. The terrain is mountainous but does not include unusually large cuts and fills. The following alignments were investigated:

-L- Stations 158+32 – 251+72
-Y9- Stations 10+00 – 16+90

The total length of lines investigated is 1.9 miles. The field investigation was conducted in June/July 2013. All borings were conducted with a CME-550 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

Crystalline Rock: Weathered to crystalline rock should be expected within 6' of grade in the following Station intervals:

162+50 – 170+00

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

176+00 – 180+00
184+00 – 187+00
191+00 – 195+00
213+00

SOIL PROPERTIES

Soils on the project are derived from amphibolite gneiss rock (Zabg) encountered within the project corridor. The dominant residual and saprolitic soil types encountered are silty sand and sandy silt with varying amounts of mica and manganese oxide. Weathered and crystalline rock may require blasting and is unlikely to produce durable stone for use on the project.

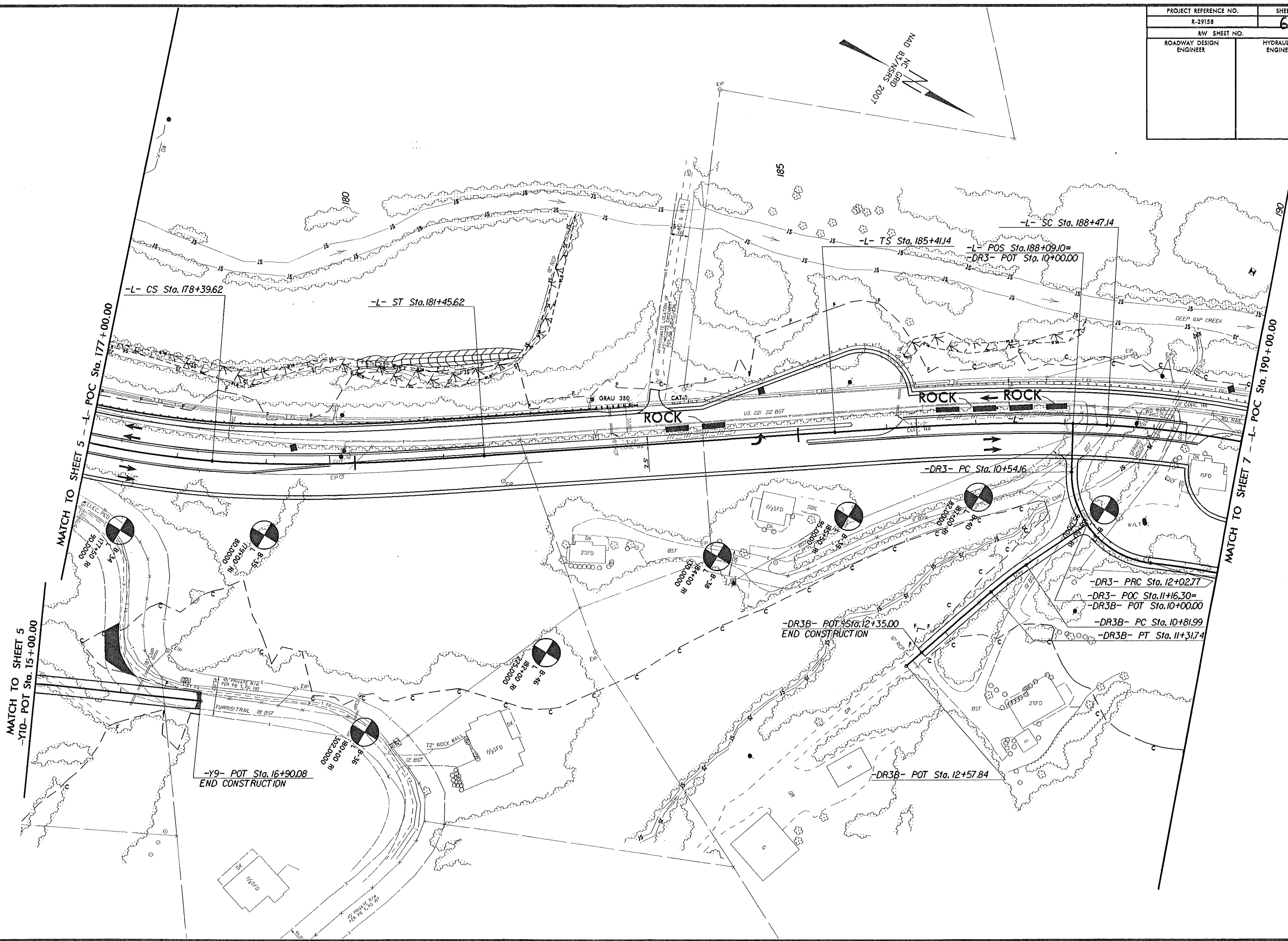
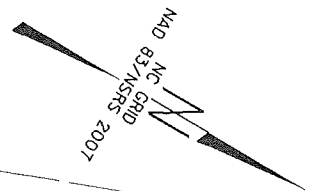
Respectfully submitted,

John Mann, PG
Project Geological Engineer

5/14/99

27-SEP-2013 13:29
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C:\GEO\RDW\PROJECTS\15B\GEO\15B.DWG

PROJECT REFERENCE NO. R-2915B	SHEET NO. 6/36
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



MATCH TO SHEET 5
-Y10- POT Sta. 15+00.00

MATCH TO SHEET 5
-L- POC Sta. 177+00.00

MATCH TO SHEET 7
-L- POC Sta. 190+00.00

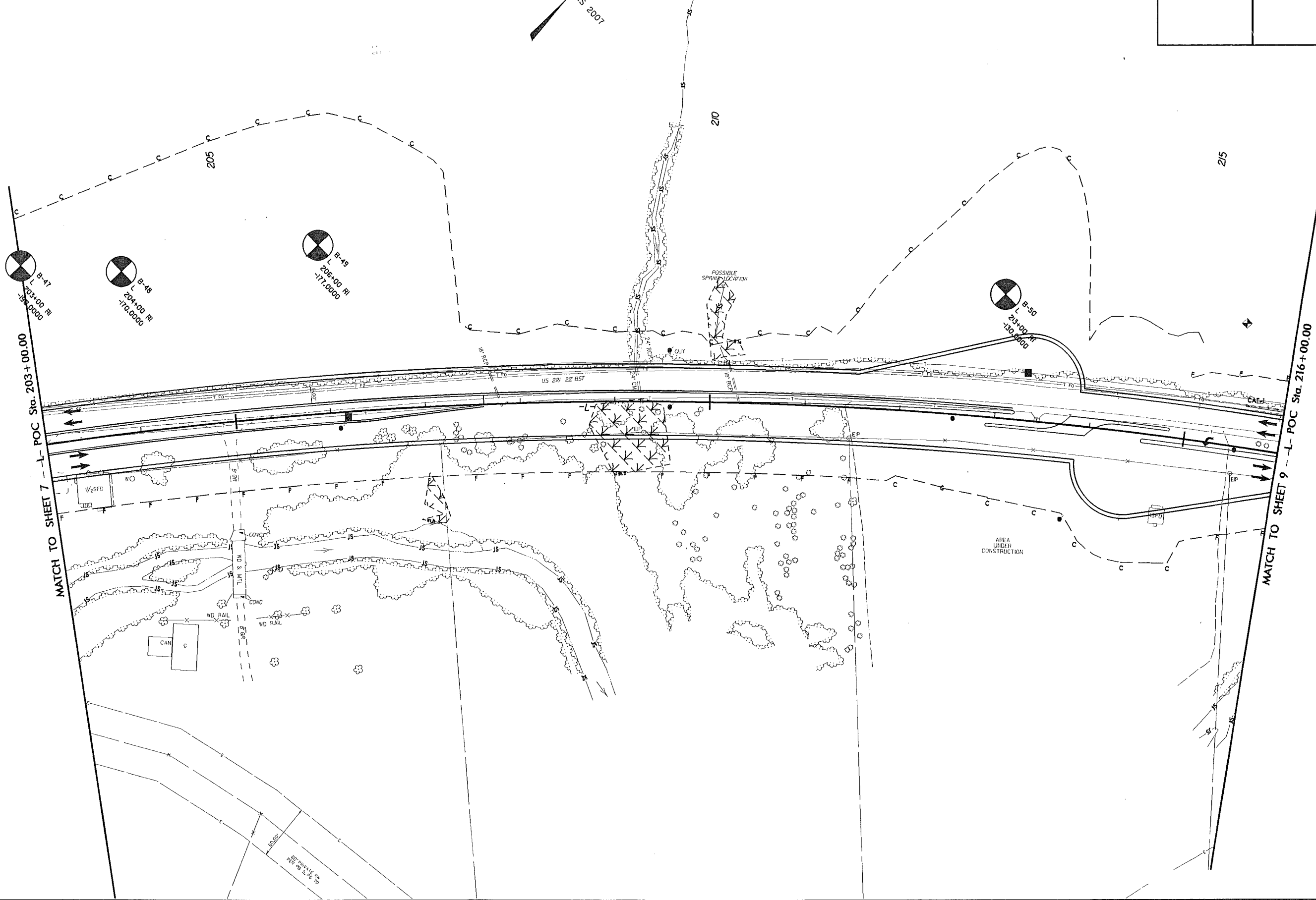
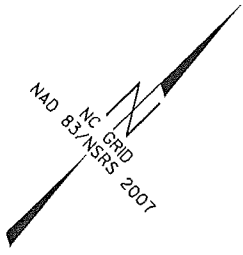
-Y9- POT Sta. 16+90.08
END CONSTRUCTION

-DR3B- POT Sta. 12+35.00
END CONSTRUCTION

-DR3- PRC Sta. 12+02.77
-DR3- POC Sta. 11+16.30=
-DR3B- POT Sta. 10+00.00
-DR3B- PC Sta. 10+81.99
-DR3B- PT Sta. 11+31.74

-DR3B- POT Sta. 12+57.84

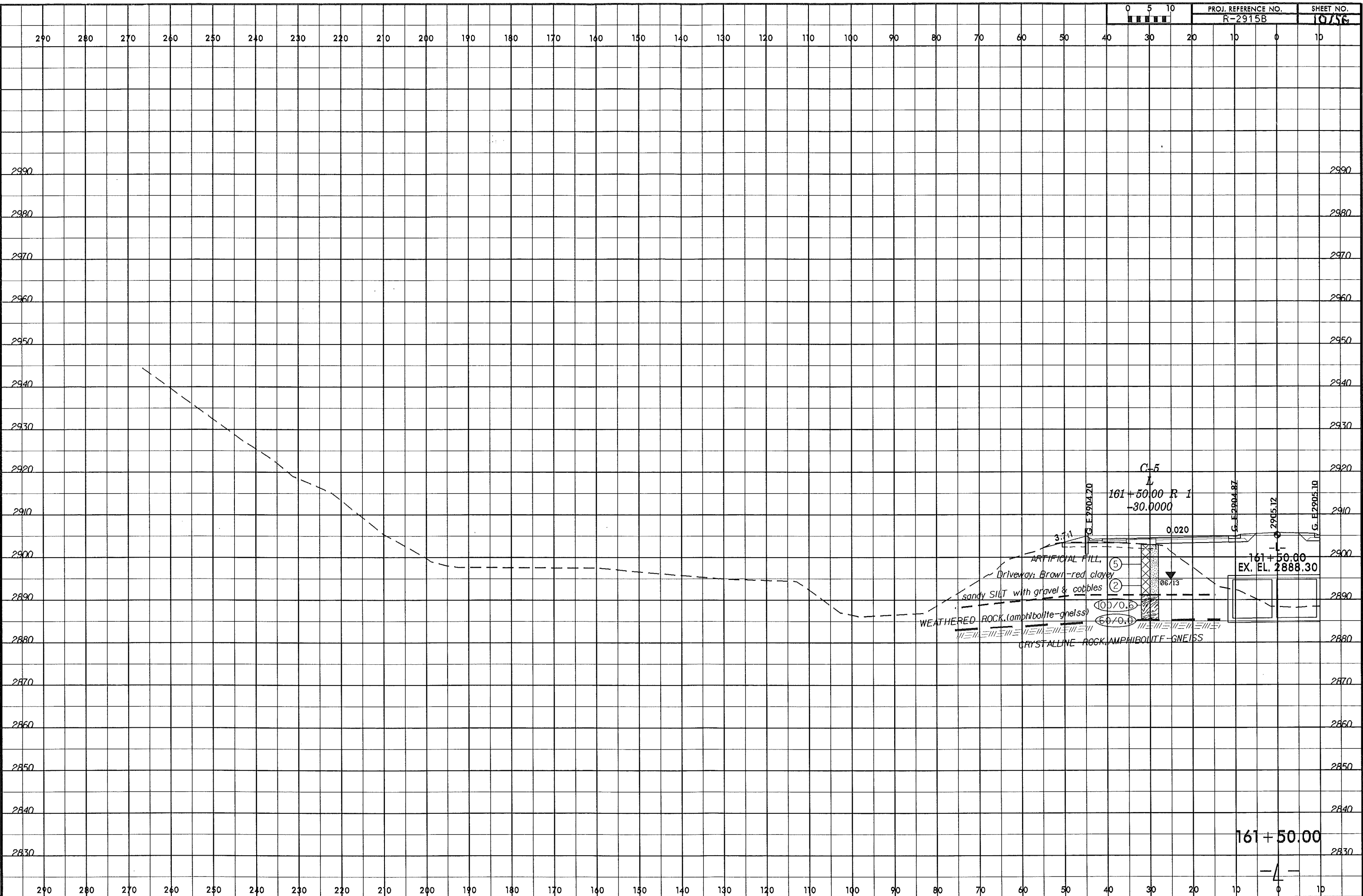
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



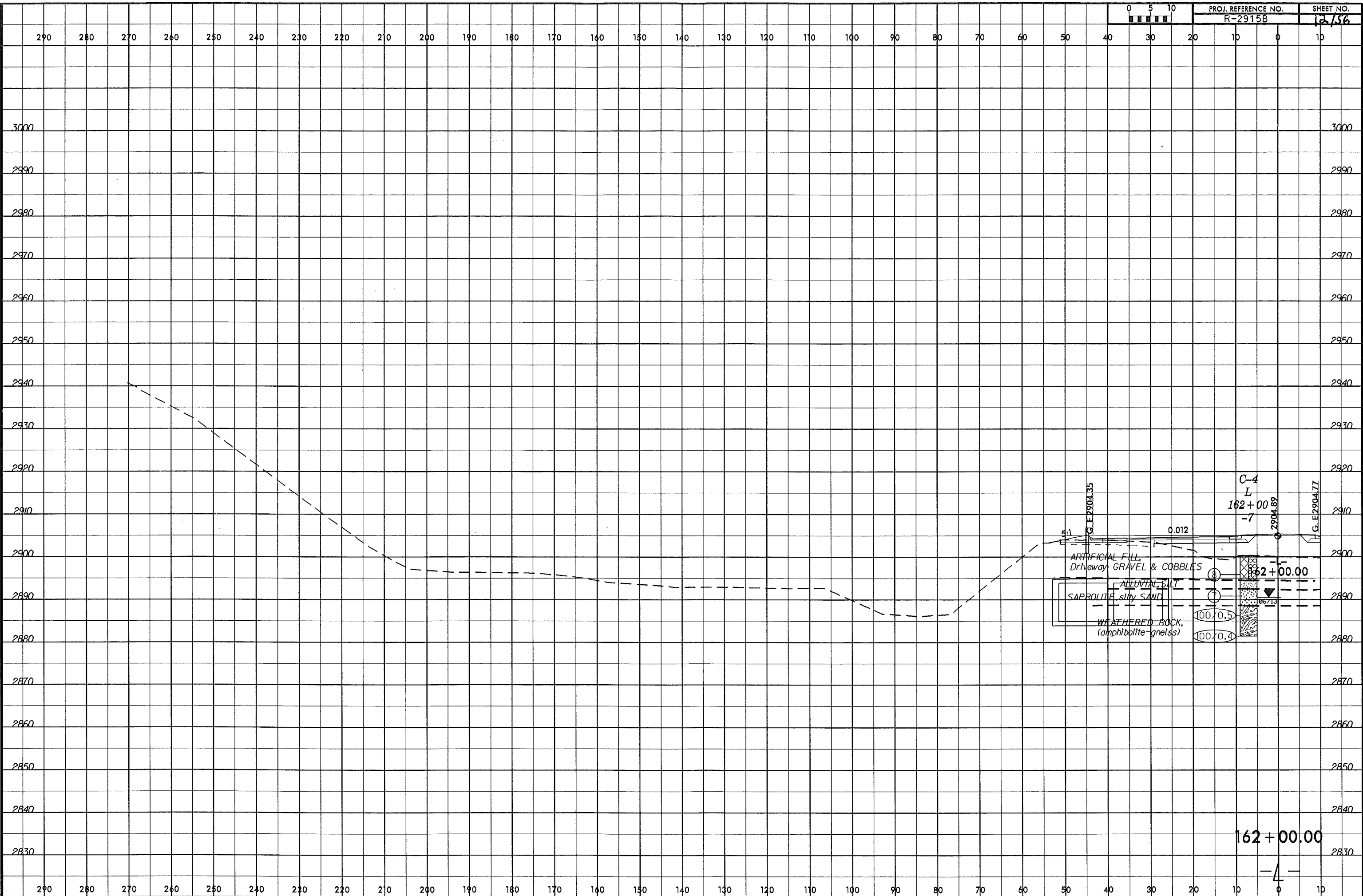
F/14/99

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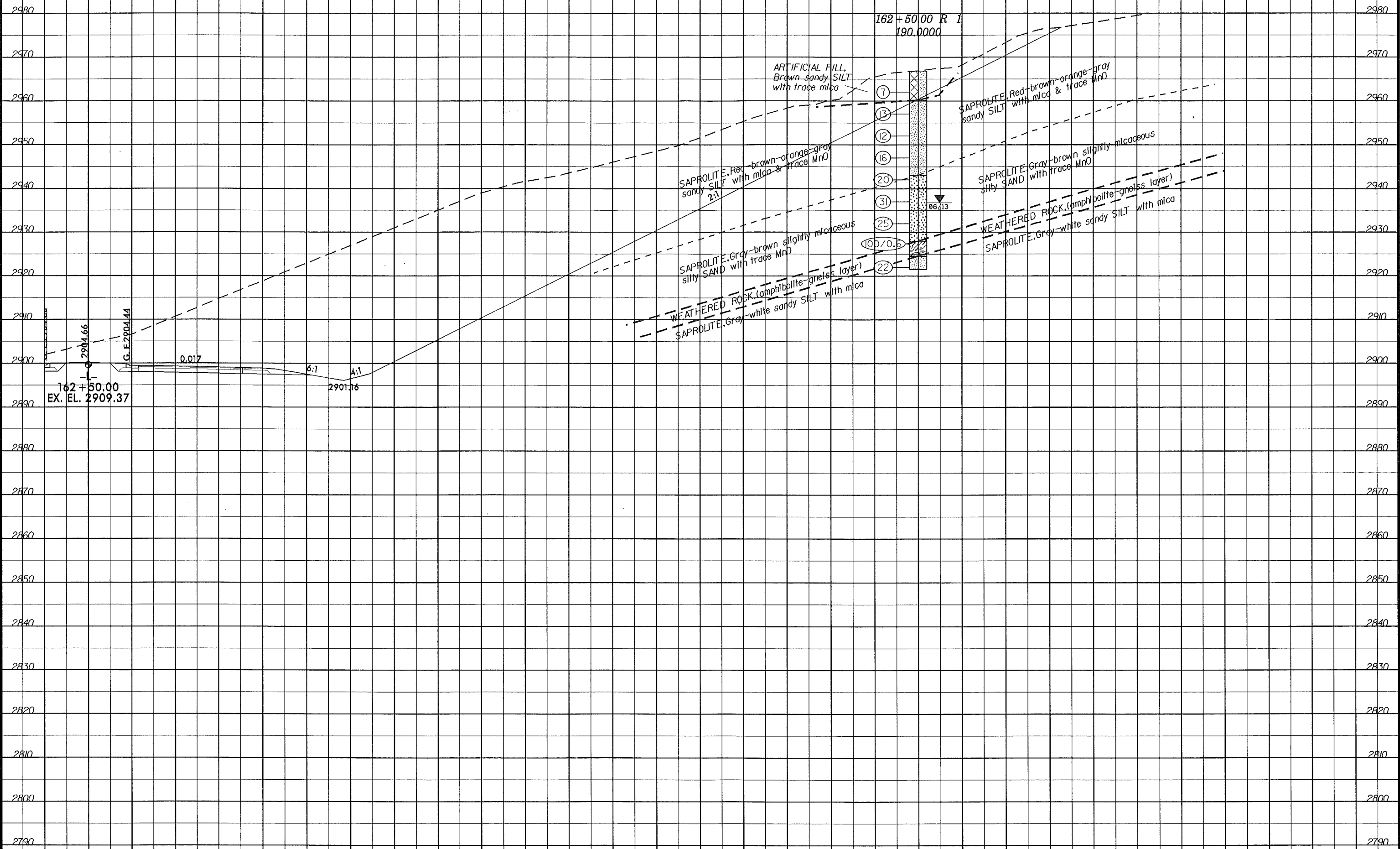
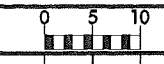
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162+00.00

-4-

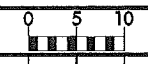
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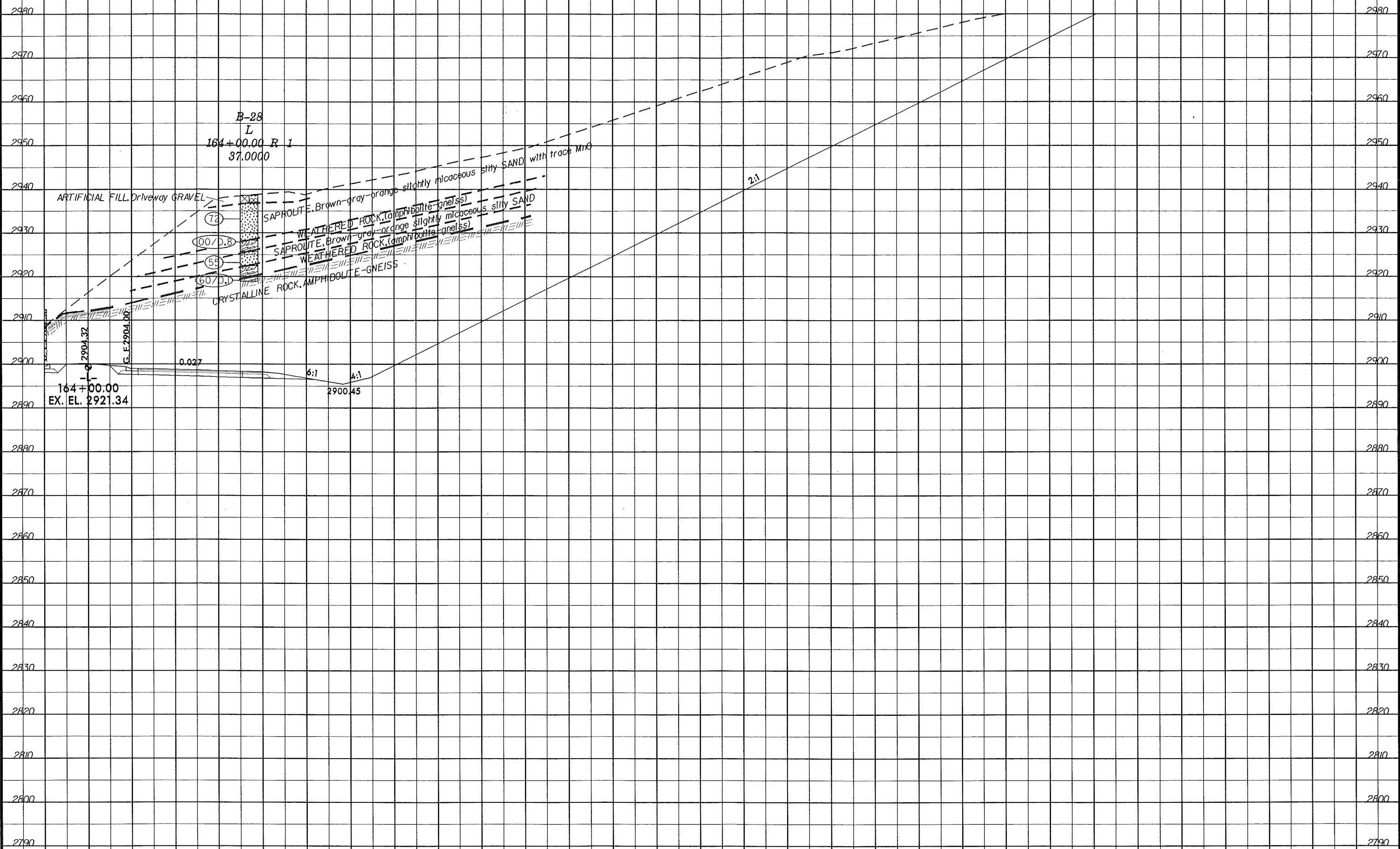
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-4-

8/23/99



PROJ. REFERENCE NO. R-2915B SHEET NO. 15/56



B-28
L
164+00.00 R 1
37.0000

ARTIFICIAL FILL, Driveway GRAVEL

(72)
(00/0.8)
(55)
(6070)

SAPROLITE, Brown-gray-orange slightly micaceous silty SAND with trace MnO
WEATHERED ROCK (amphibolite-gneiss)
SAPROLITE, Brown-gray-orange slightly micaceous silty SAND
WEATHERED ROCK (amphibolite-gneiss)
CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

164+00.00
EX. EL. 2921.34

2900.45

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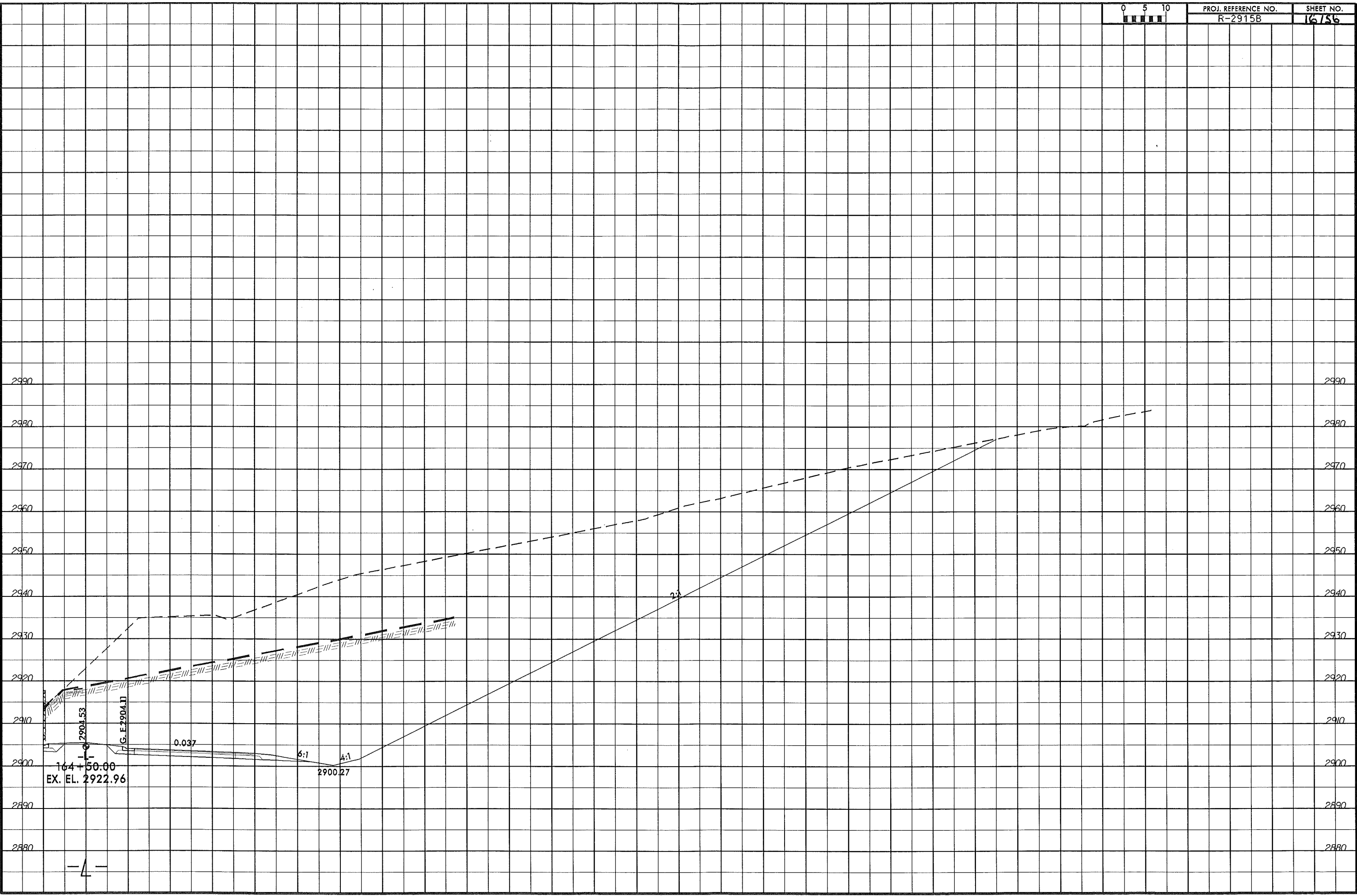
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8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2915B	16756

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16756.dwg



2990
2980
2970
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2990
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2920
2910
2900
2890
2880

164+50.00
EX. EL. 2922.96

2904.53

P.G. E. 2904.11

0.037

6:1

4:1

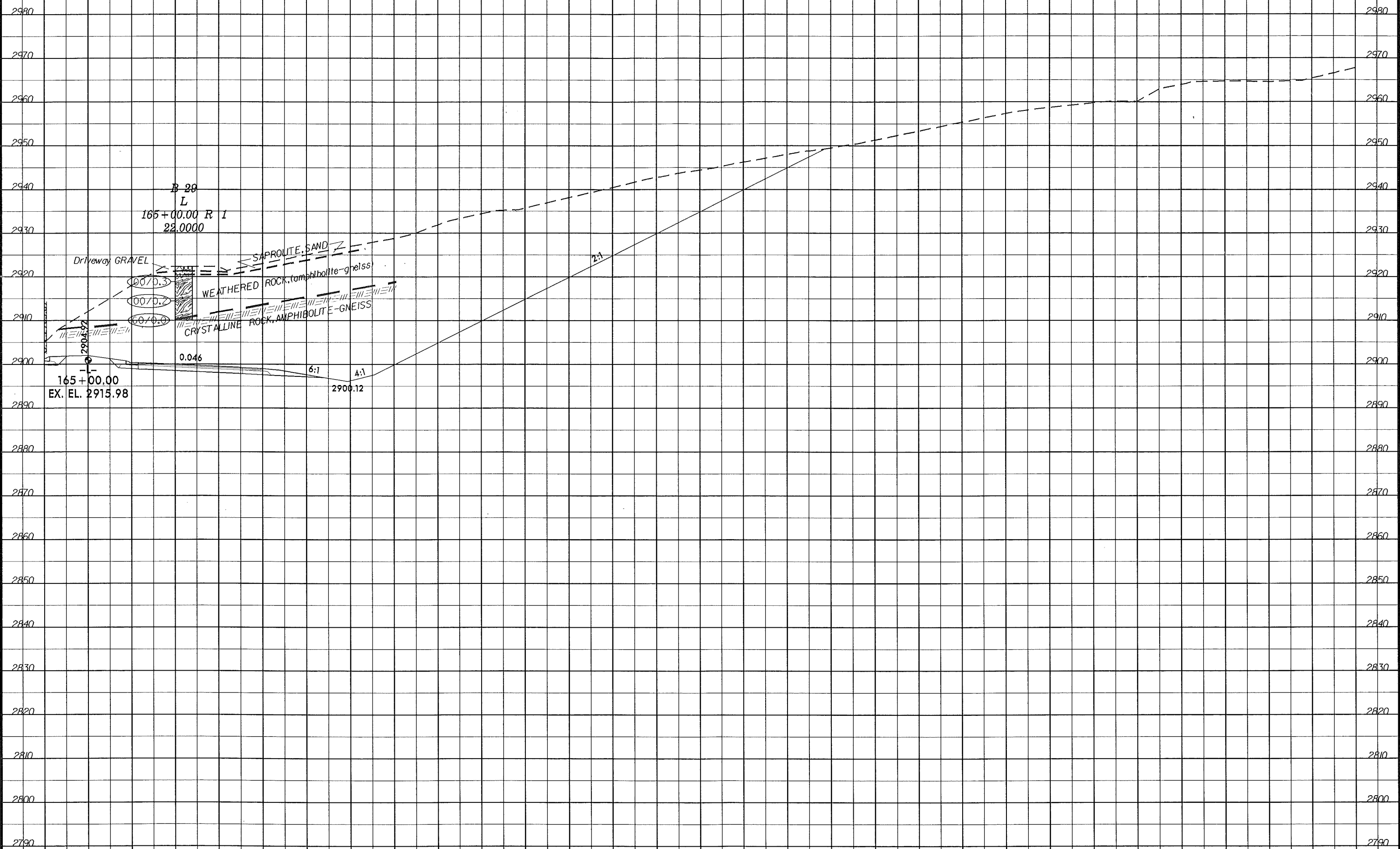
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8/23/99



PROJ. REFERENCE NO. R-2915B SHEET NO. 17/56



B 20
L
165+00.00 R 1
22.0000

Driveway GRAVEL

SAPROUITE SAND

WEATHERED ROCK (amphibolite-gneiss)

CRYSTALLINE ROCK (AMPHIBOLITE-GNEISS)

165+00.00
EX. EL. 2915.98

2900.12

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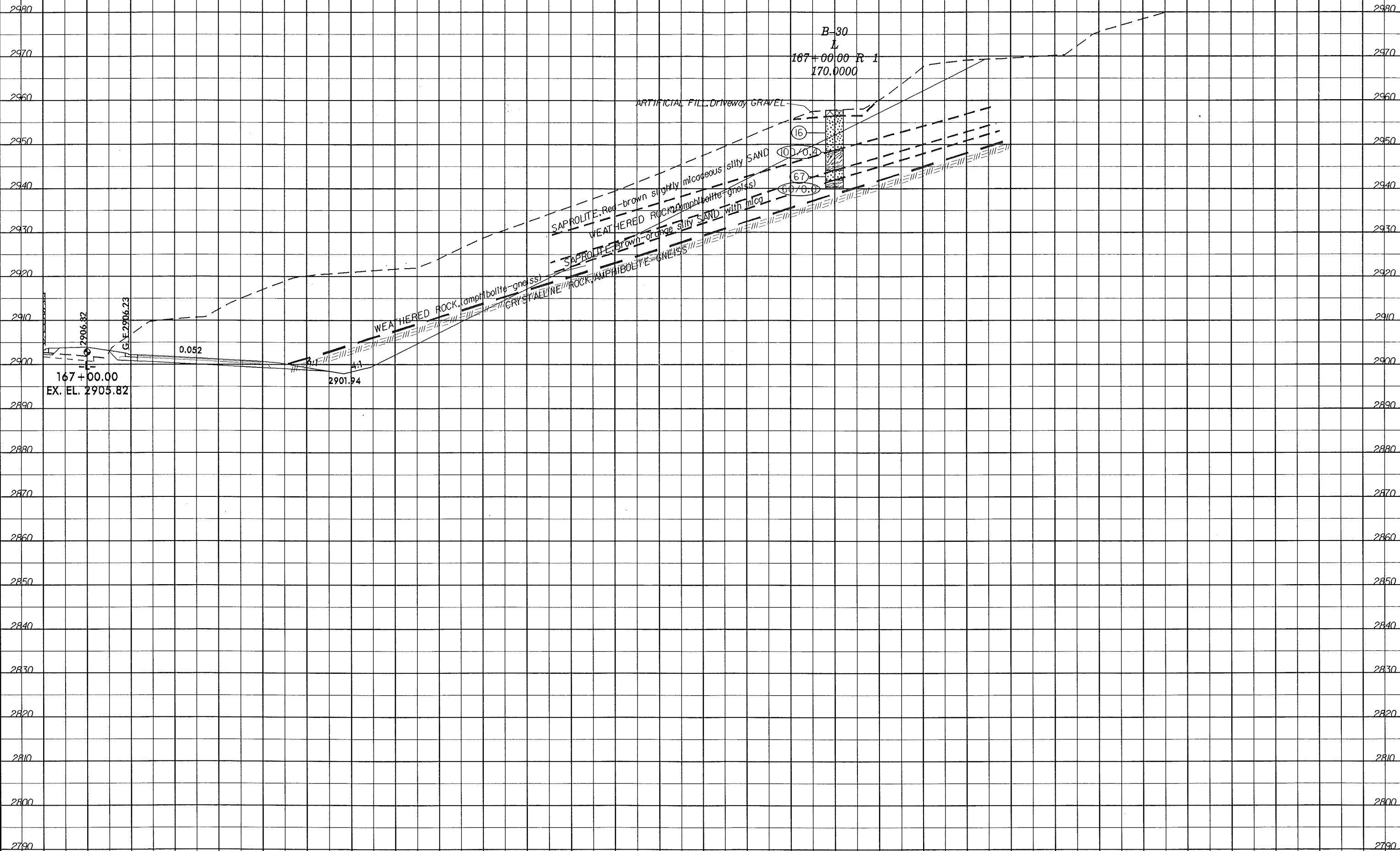
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0070.3
0070.2
0070.0

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-L-



167+00.00
EX. EL. 2905.82

2901.94

B-30
L
167+00.00 R 1
170.000

ARTIFICIAL FILL, Driveway GRAVEL

16

10.70.2

67

6.70.2

SAND

SAPROLITE, Red-brown slightly micaceous

WEATHERED ROCK (amphibole gneiss)

WEATHERED ROCK (amphibole gneiss)

SAPROLITE, Brown-orange silty SAND with mica

WEATHERED ROCK (amphibole gneiss)

CRYSTALLINE ROCK (AMPHIBOLE GNEISS)

WEATHERED ROCK (amphibole gneiss)

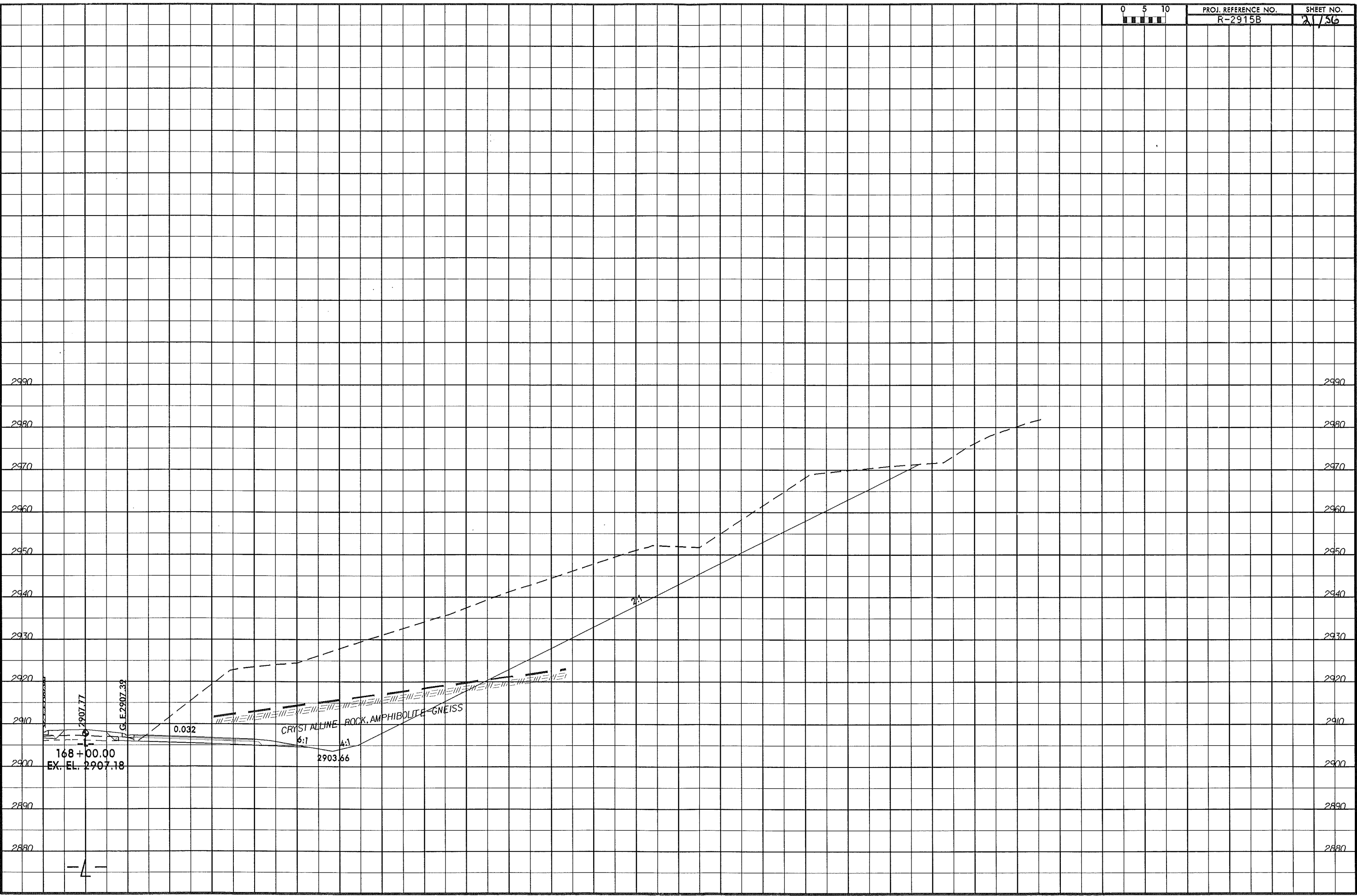
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8/23/99



PROJ. REFERENCE NO.
R-2915B

SHEET NO.
21/36



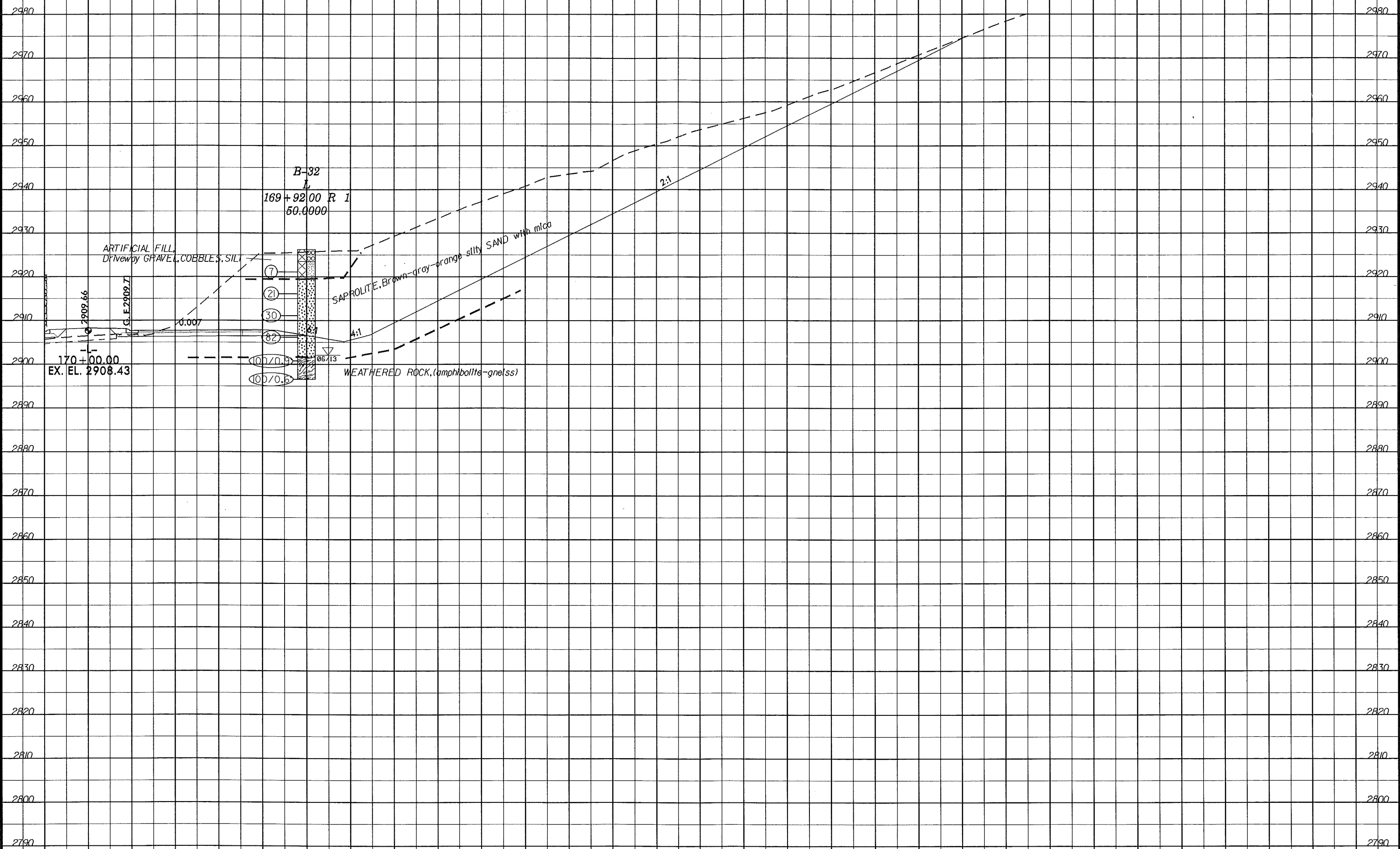
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8/23/99

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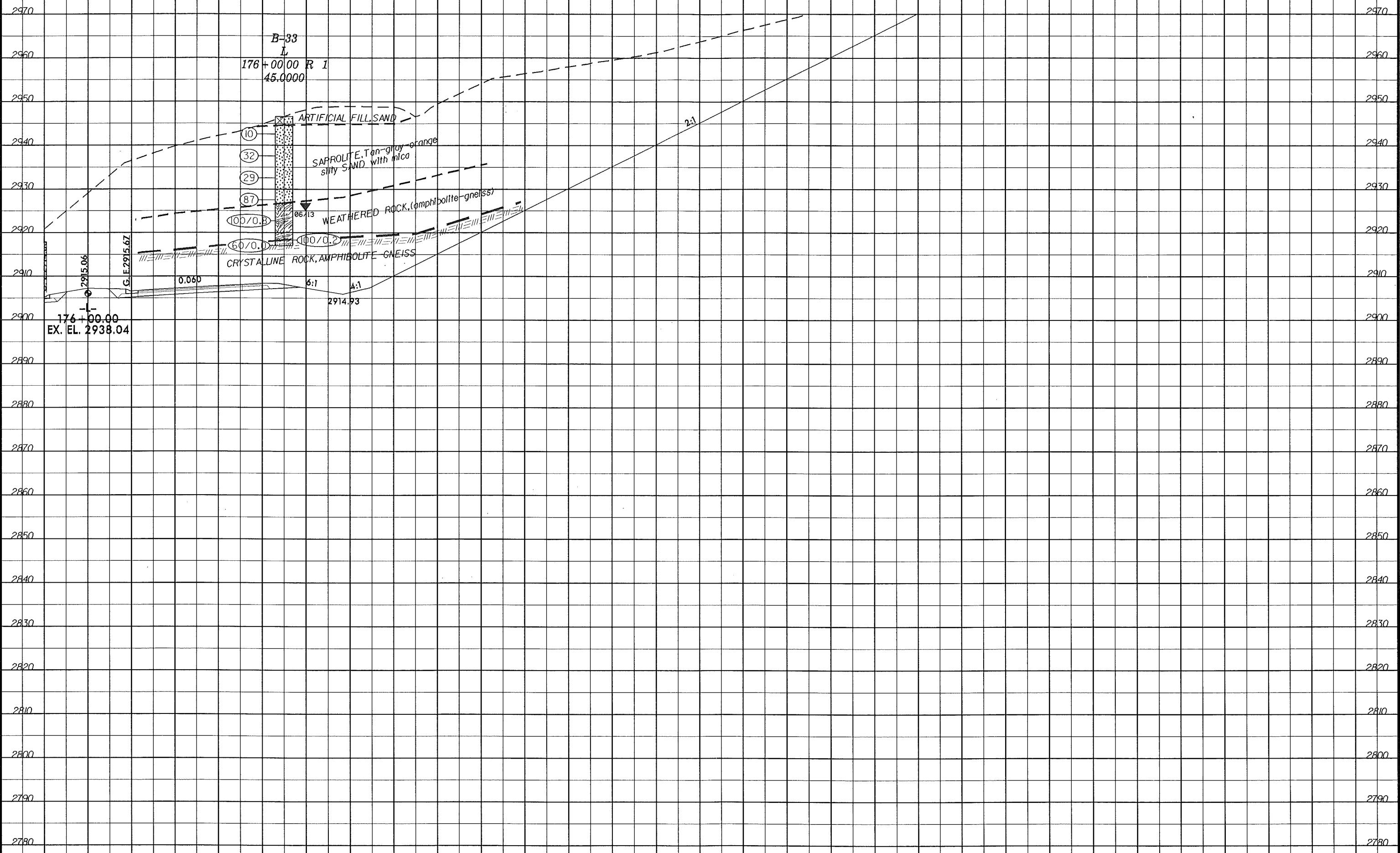
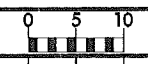
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23/56



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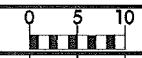
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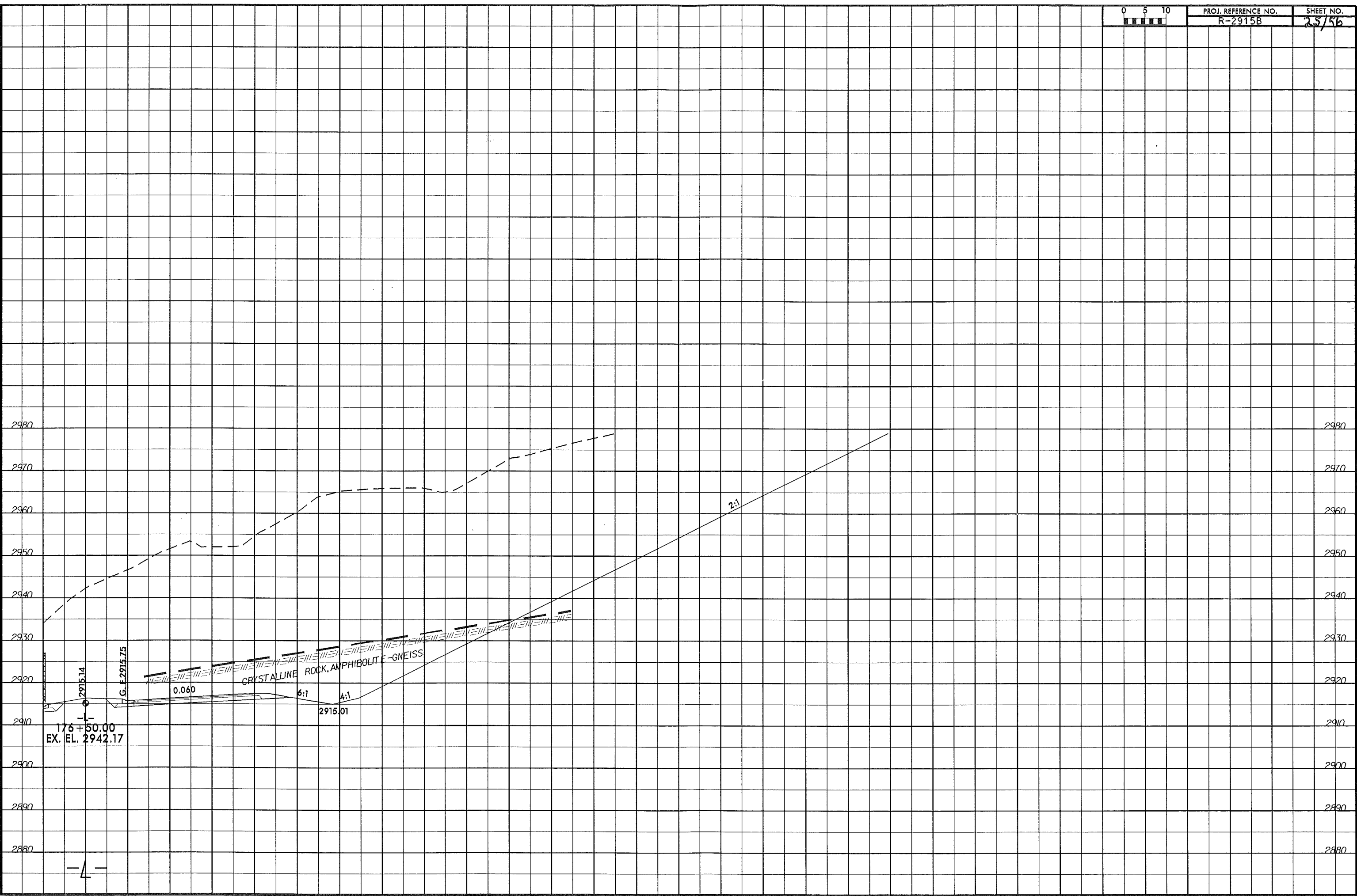
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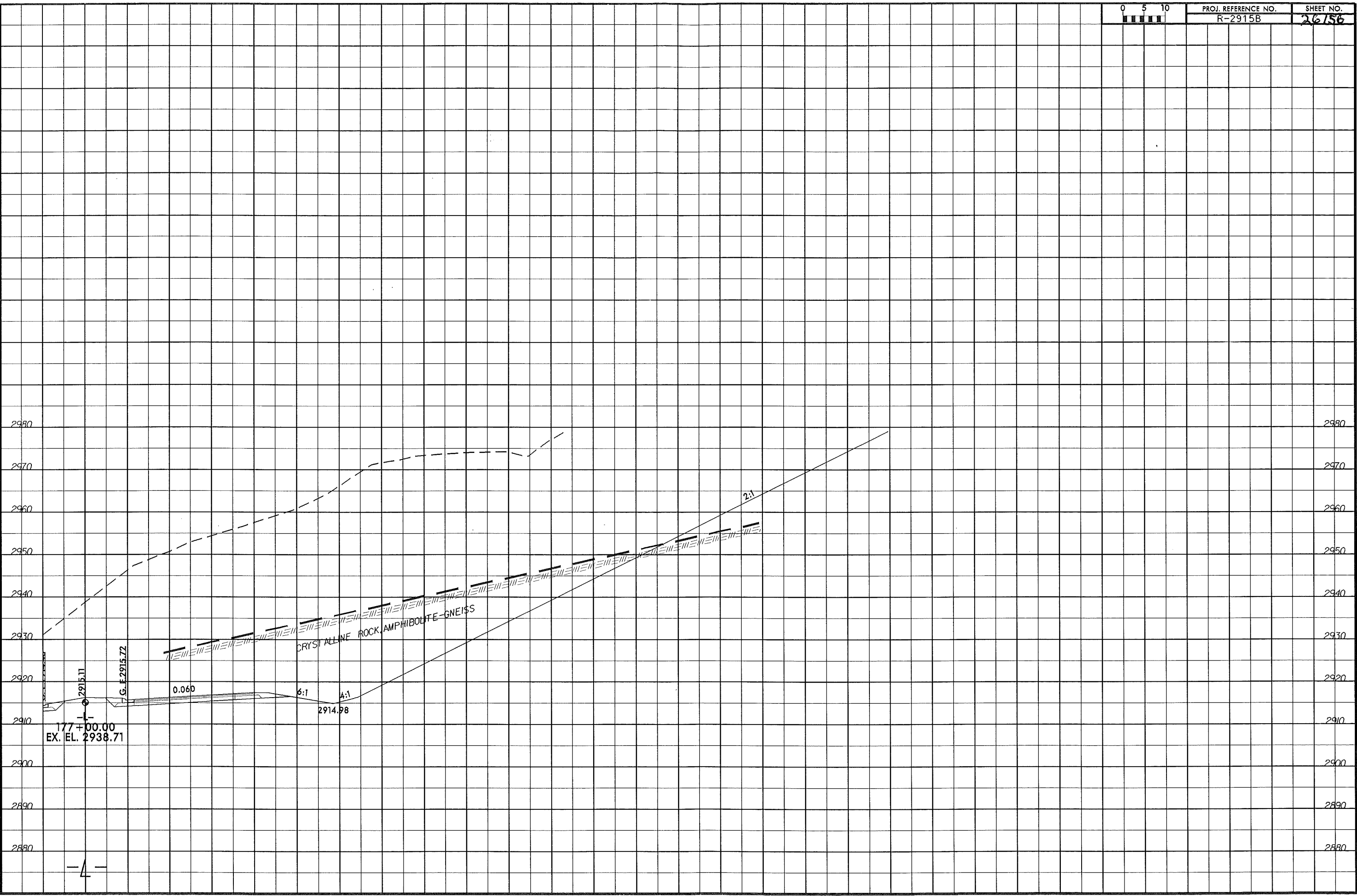


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2915.11

G. E. 2915.72

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4:1

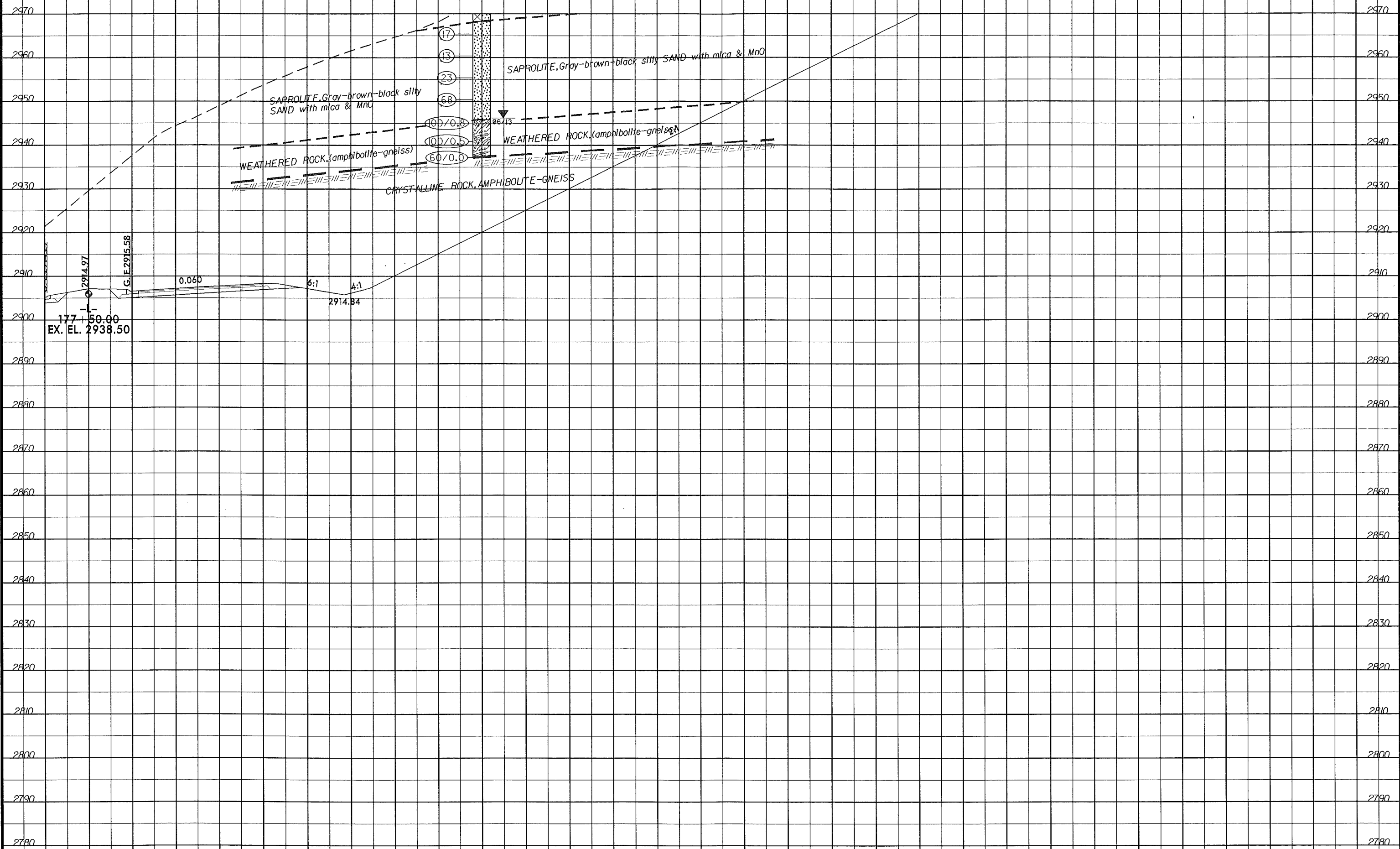
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CRYSTALLINE ROCK AMPHIBOLITE-GNEISS

-4-

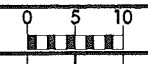
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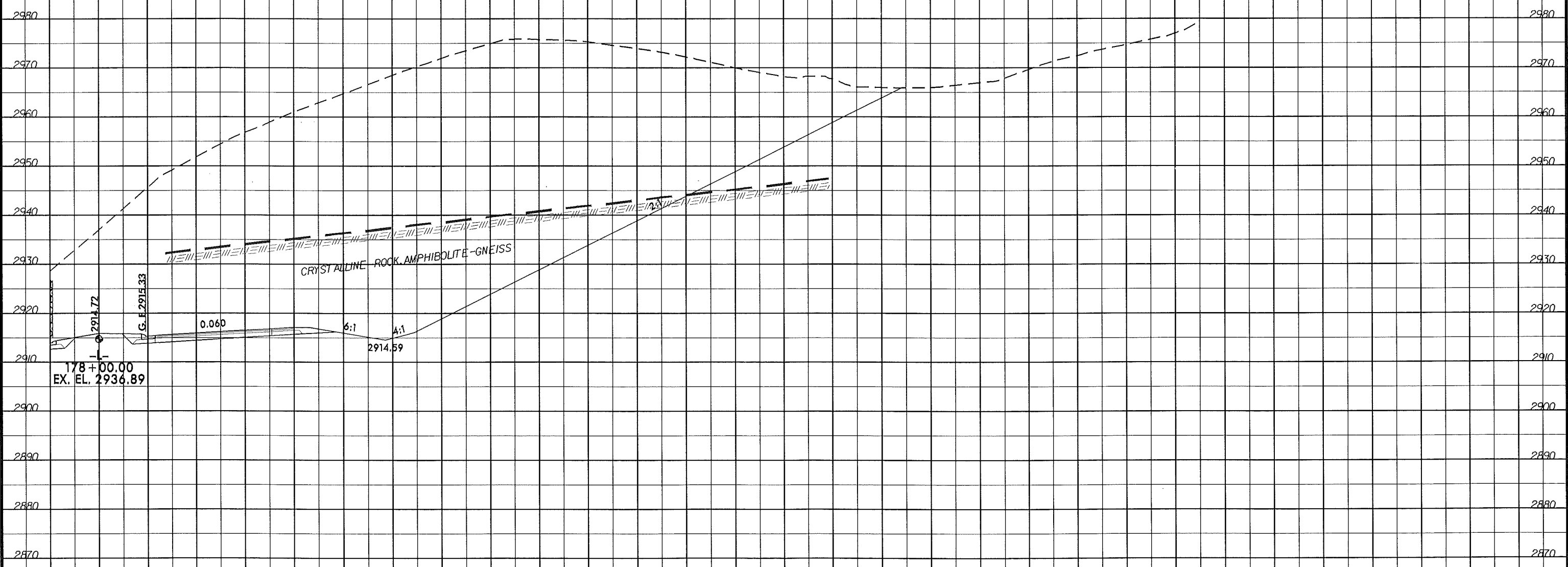
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PROJ. REFERENCE NO. R-2915B SHEET NO. 24/56



178+00.00
EX. EL. 2936.89

2914.72
P.G. R-2915.33

CRYSTALLINE ROCK AMPHIBOLITE-GNEISS

0.060

6:1

4:1

2914.59

-L-

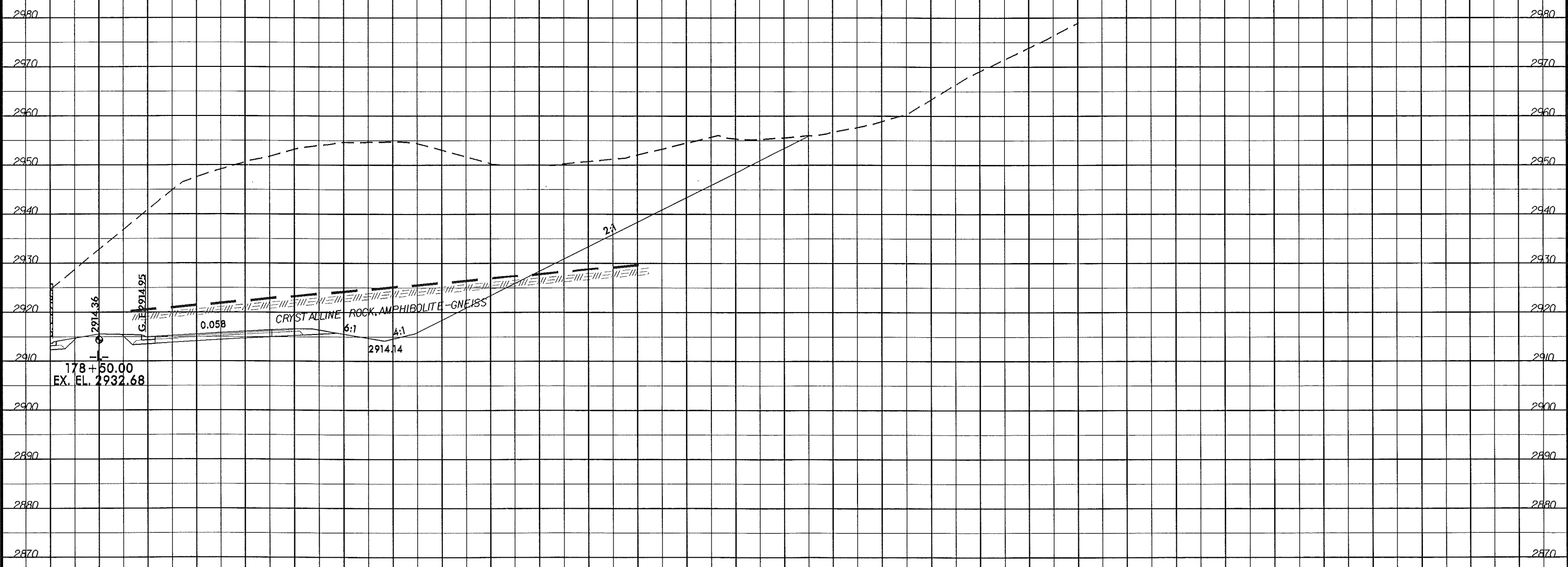
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PROJ. REFERENCE NO.
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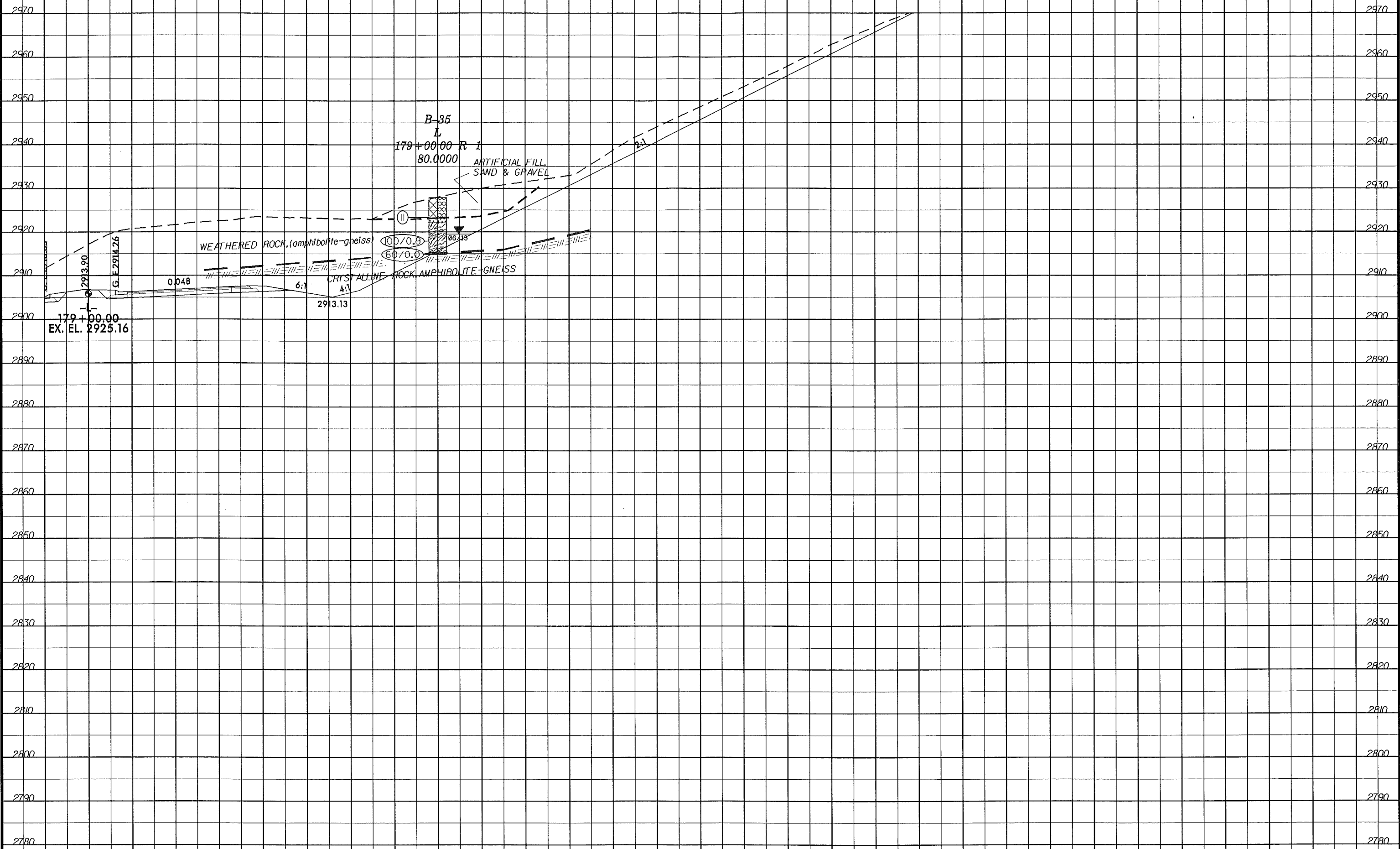
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8/23/99

0 5 10

PROJ. REFERENCE NO.
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SHEET NO.
30/56



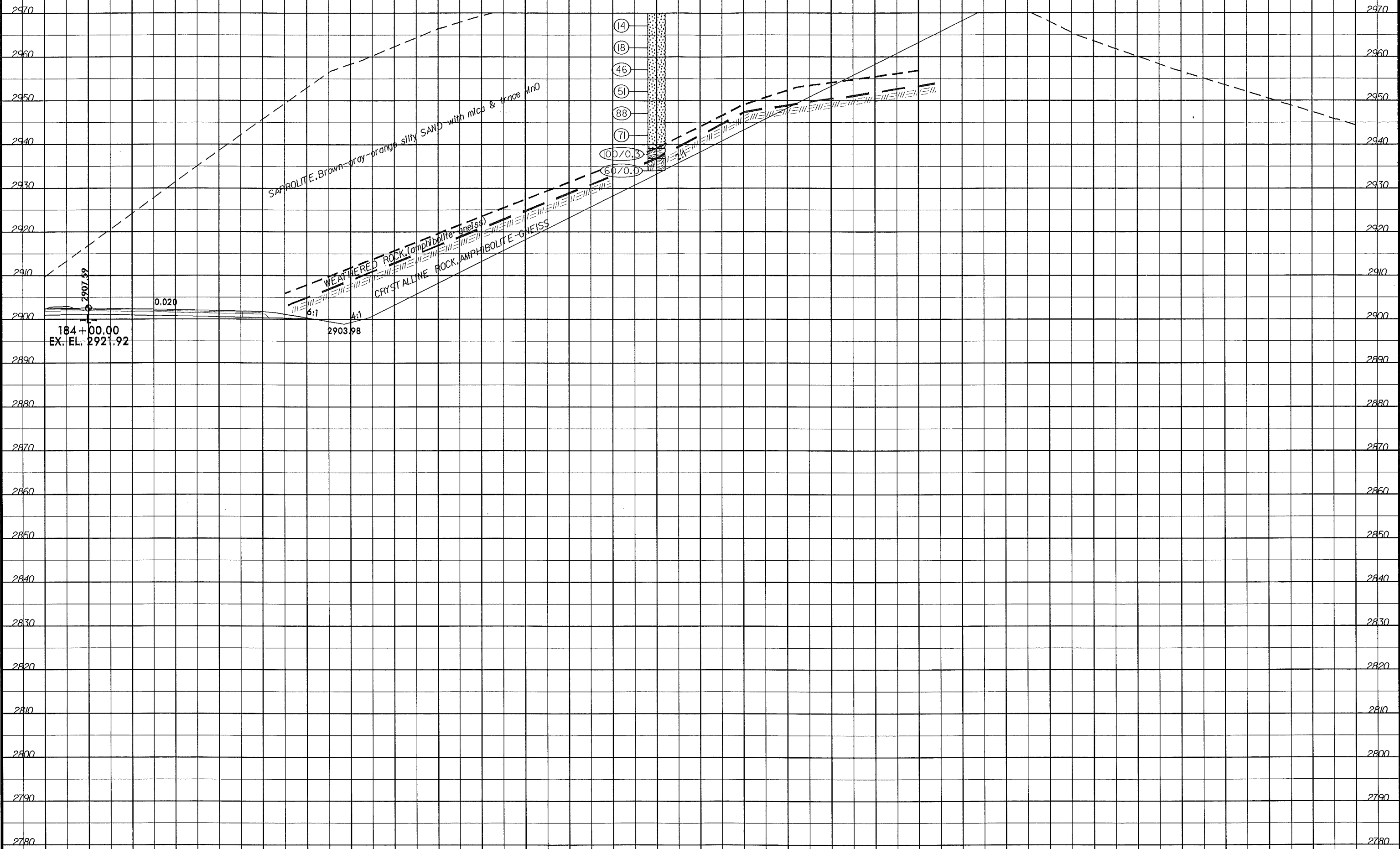
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-4-

8/23/99



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 kumar

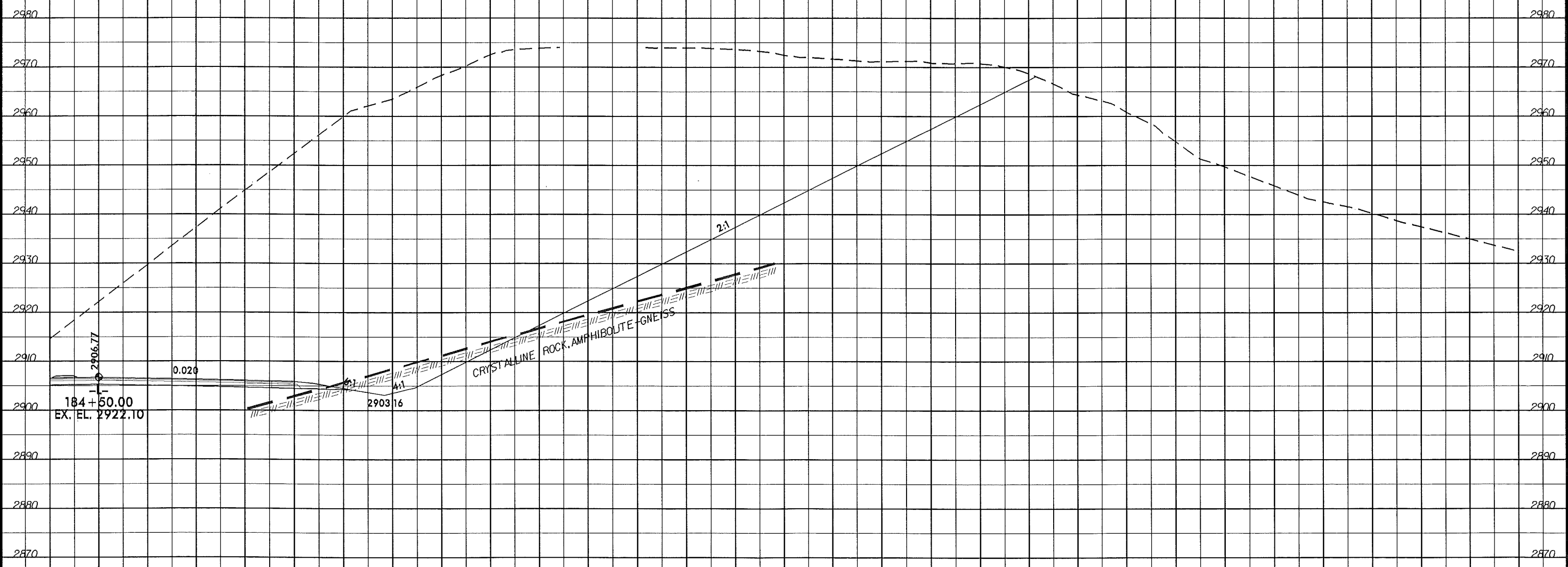
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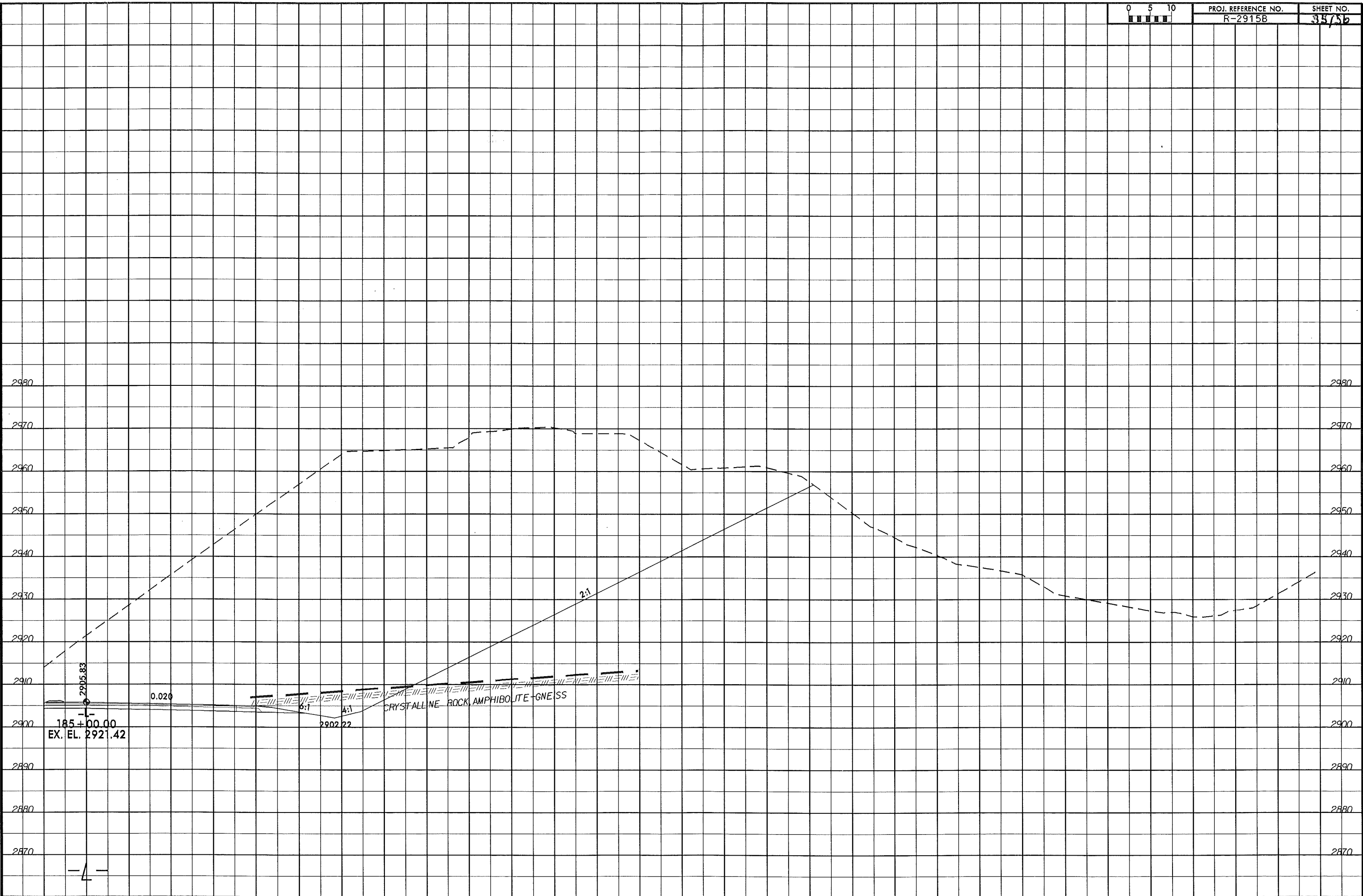
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R-2915B

SHEET NO.
34/36



- 4 -

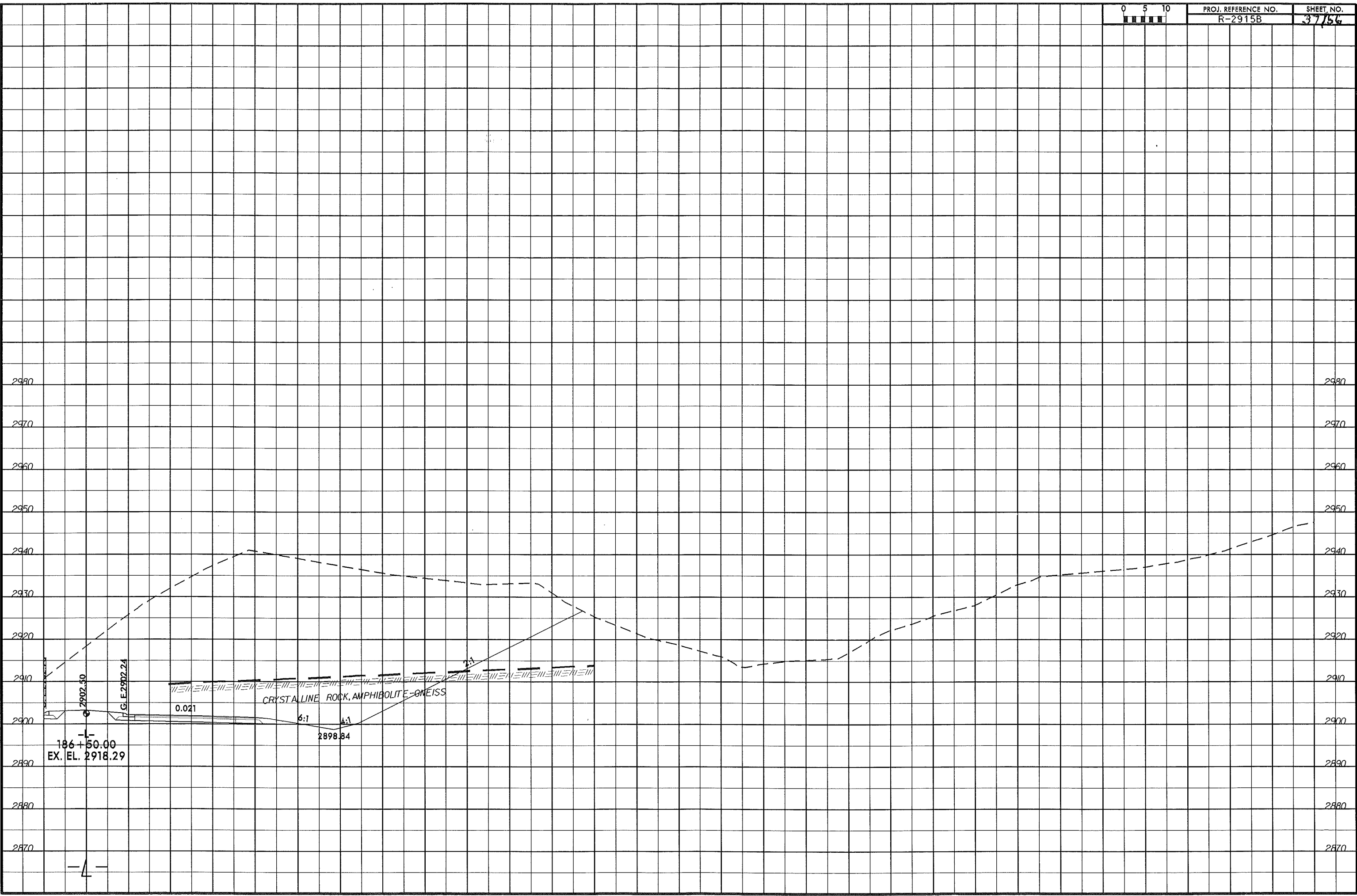
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8/23/99



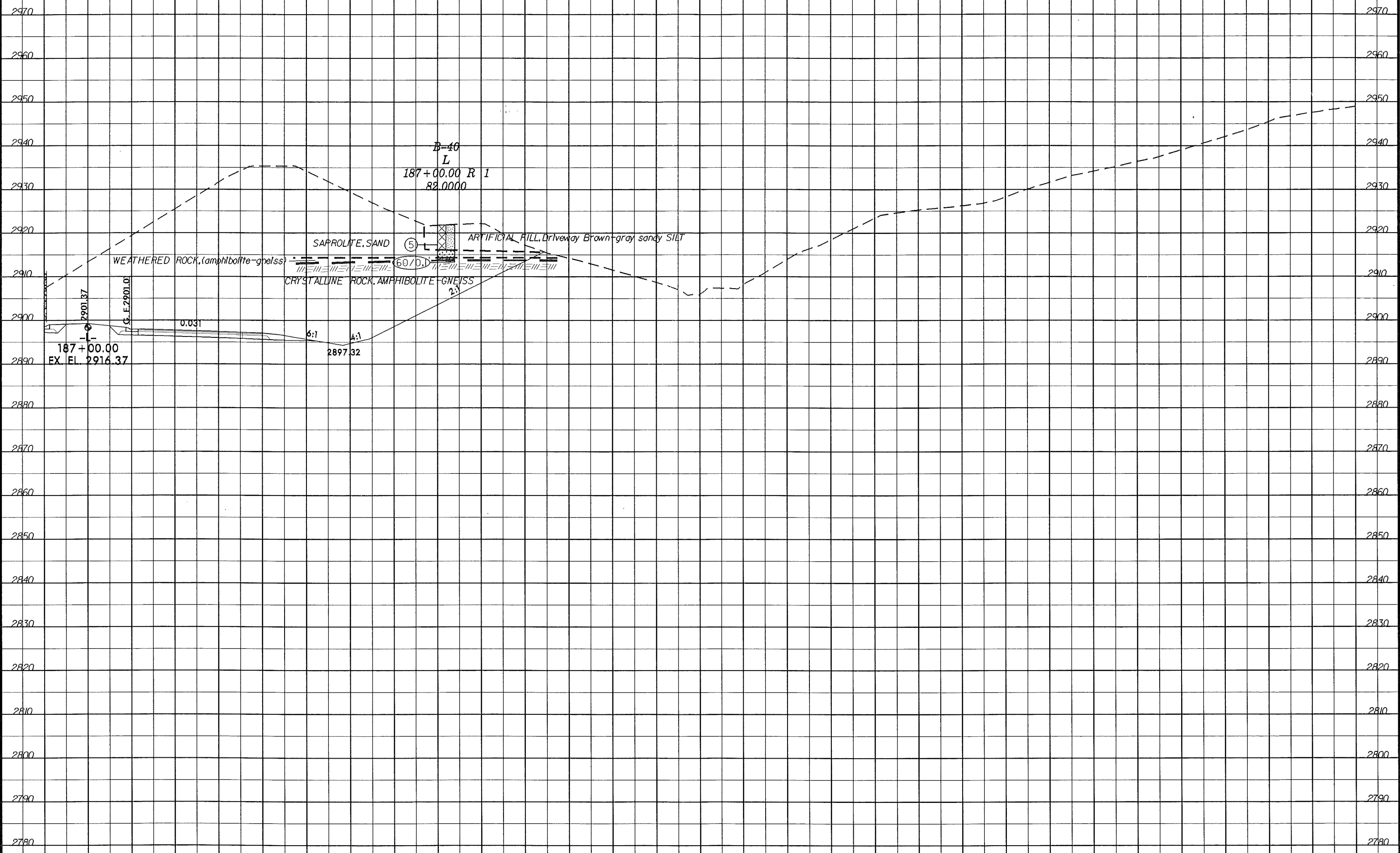
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8/23/99



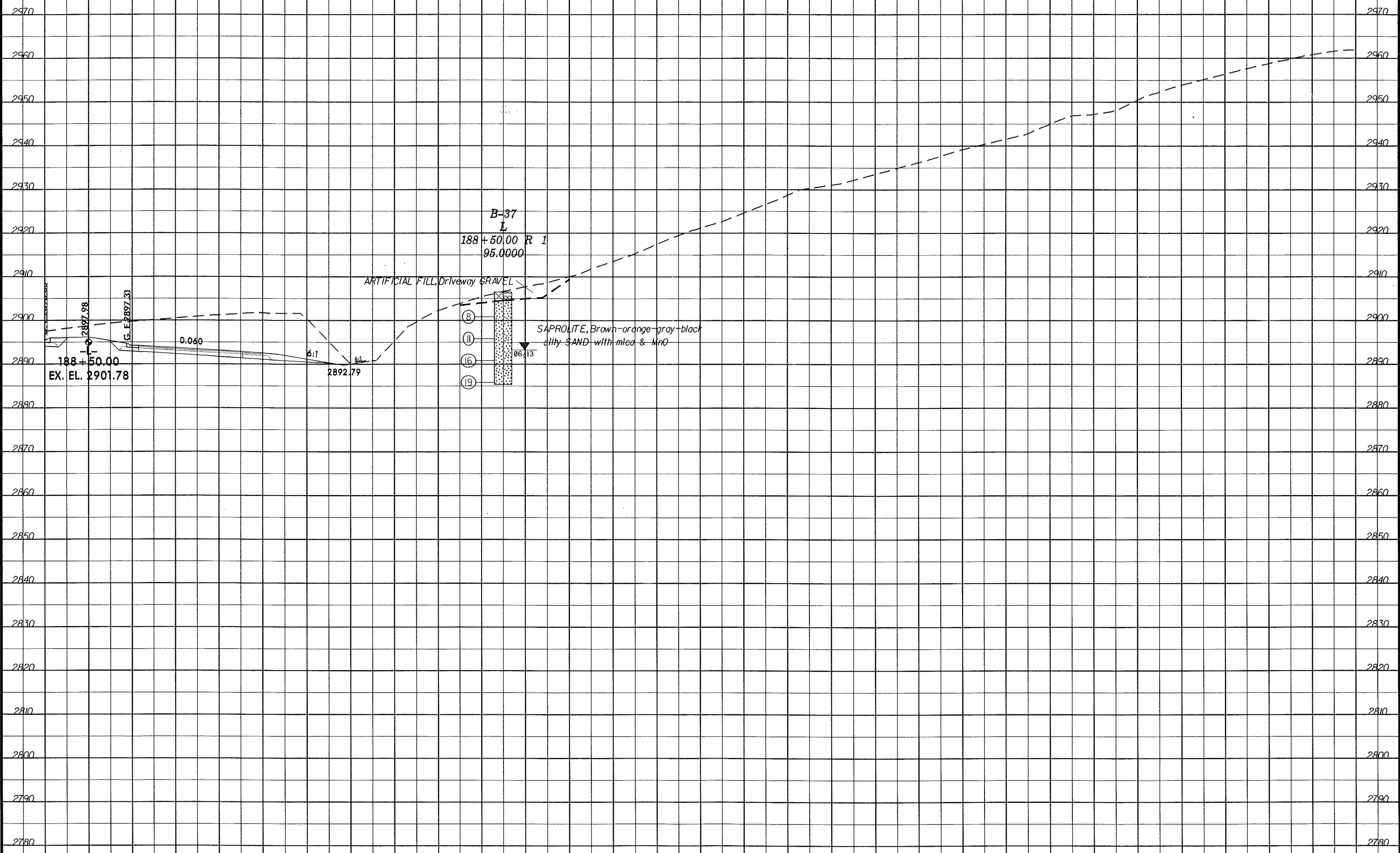
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-L-

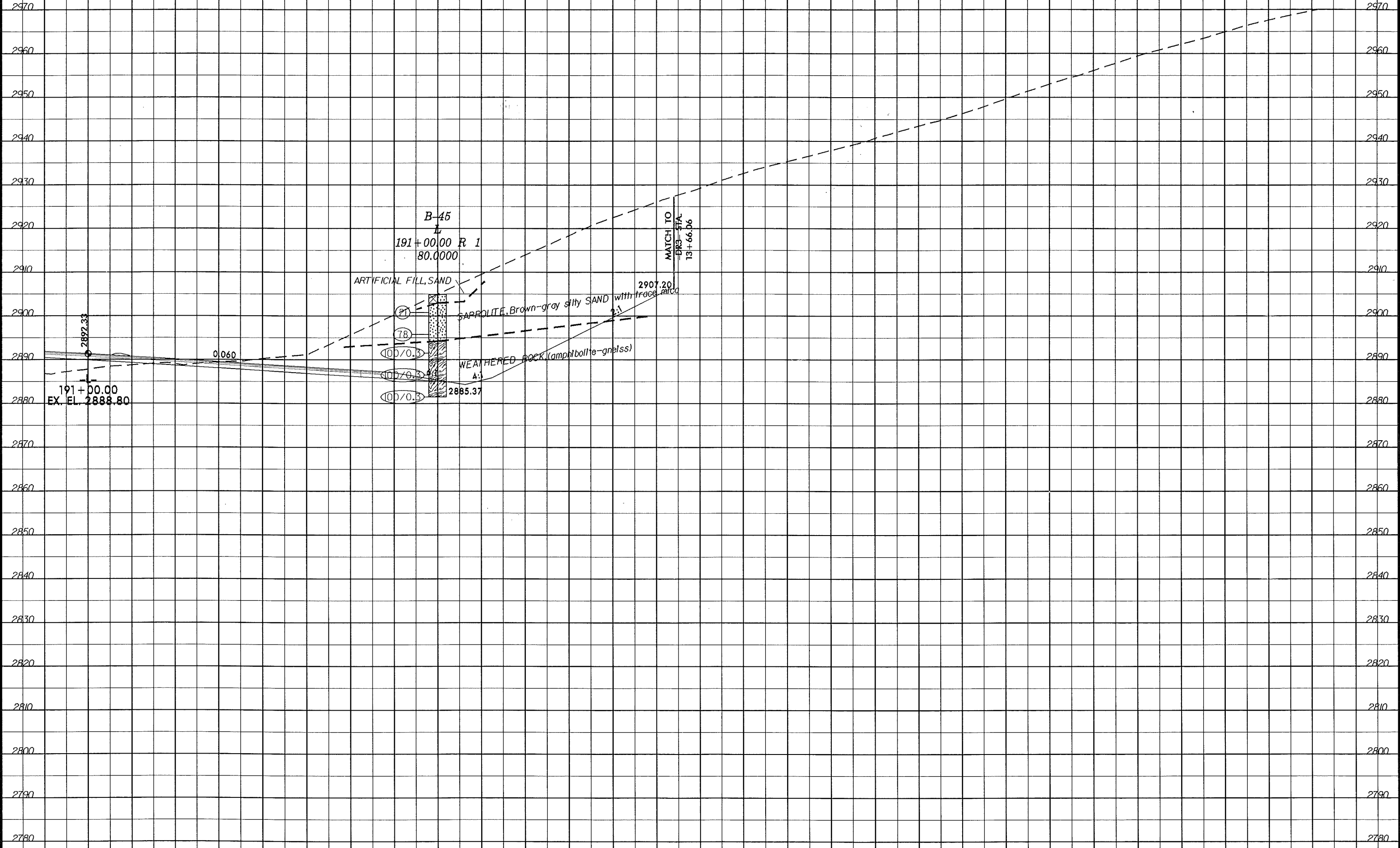
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8/23/99



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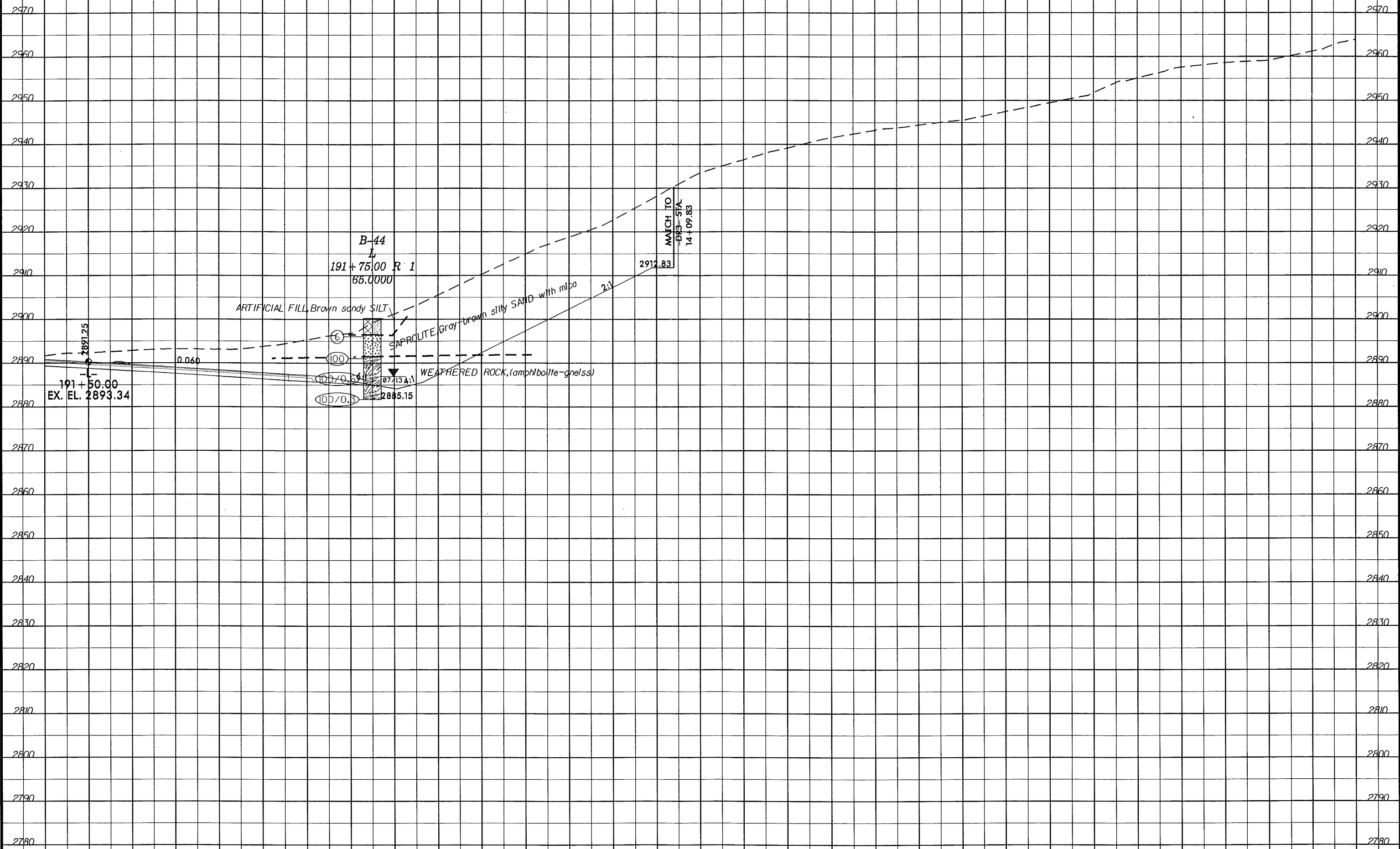
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8/23/99

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R-2915B

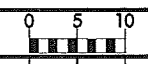
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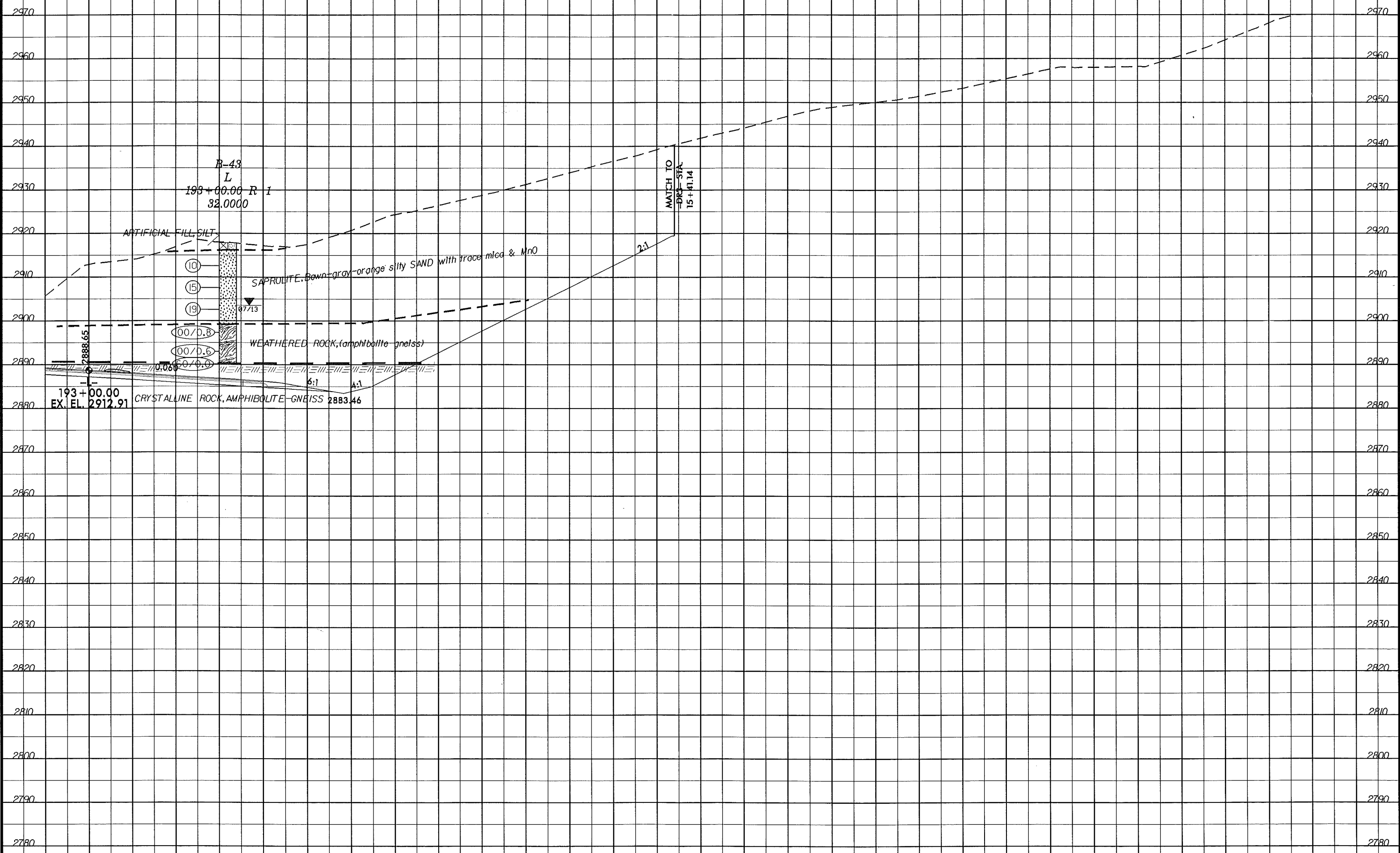
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-4-

8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2915B	42/56



R-43
L
193+00.00 R 1
32.0000

ARTIFICIAL FILL, SILT

- (10)
- (15)
- (19)

SAPROLITE, brown-gray-orange silty SAND with trace mica & MnO

2897.13

WEATHERED ROCK, (amphibolite gneiss)

00/0.8

00/0.6

00/0.6

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS 2883.46

193+00.00
EX. EL. 2912.91

MATCH TO
DRG STA
15+41.14

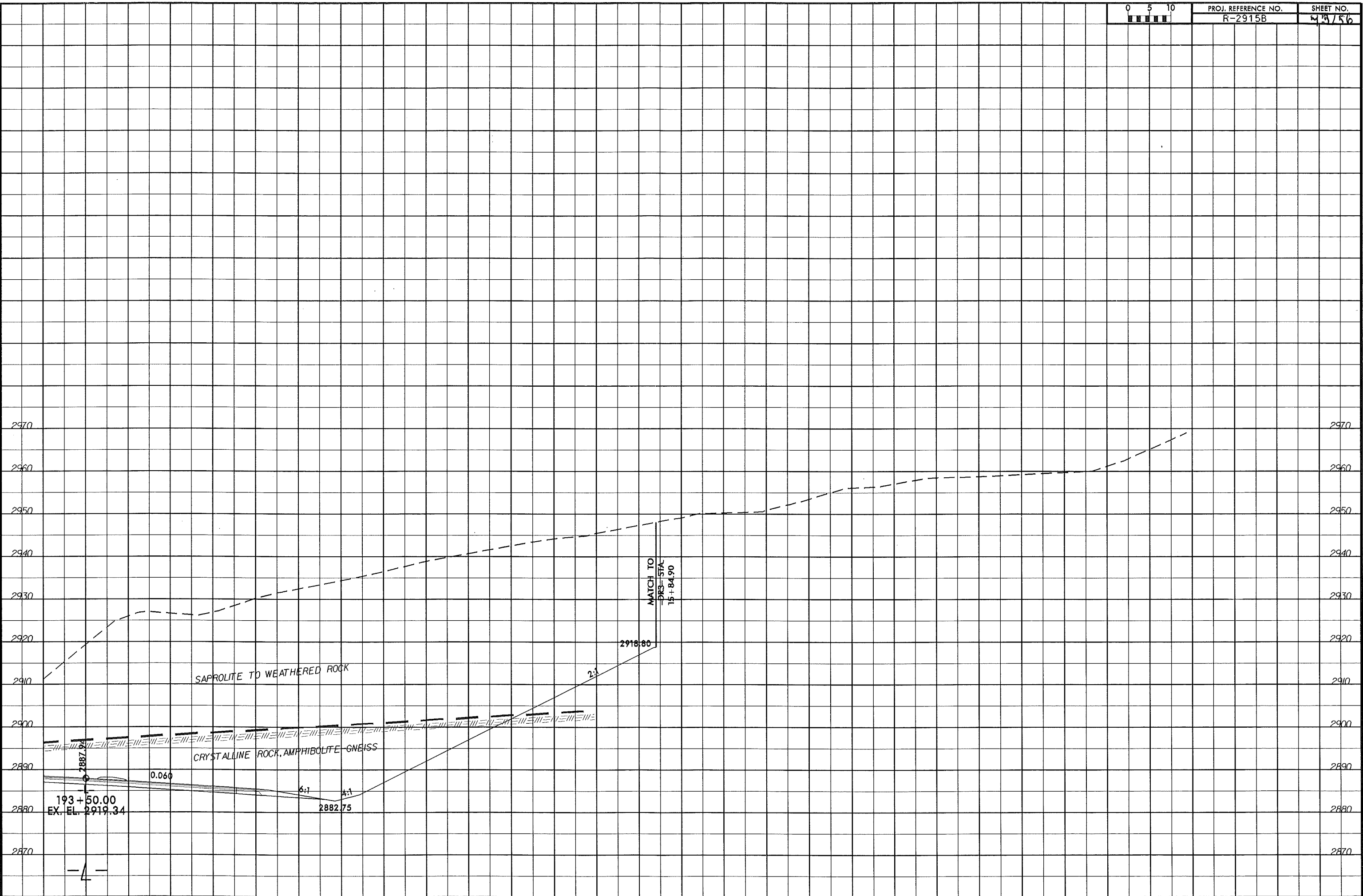
2:1

6:1 4:1

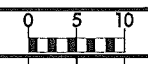
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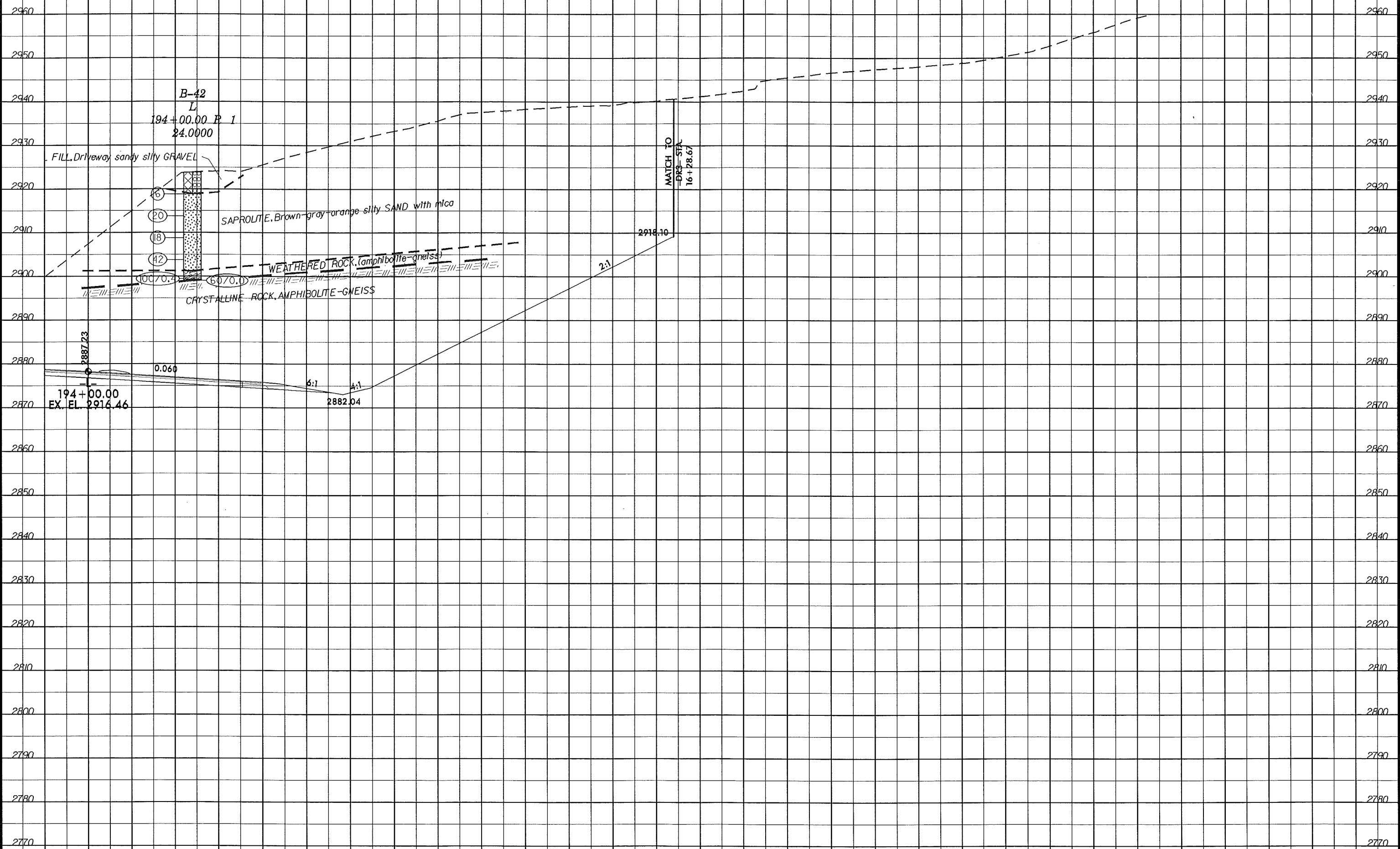
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B/23/99



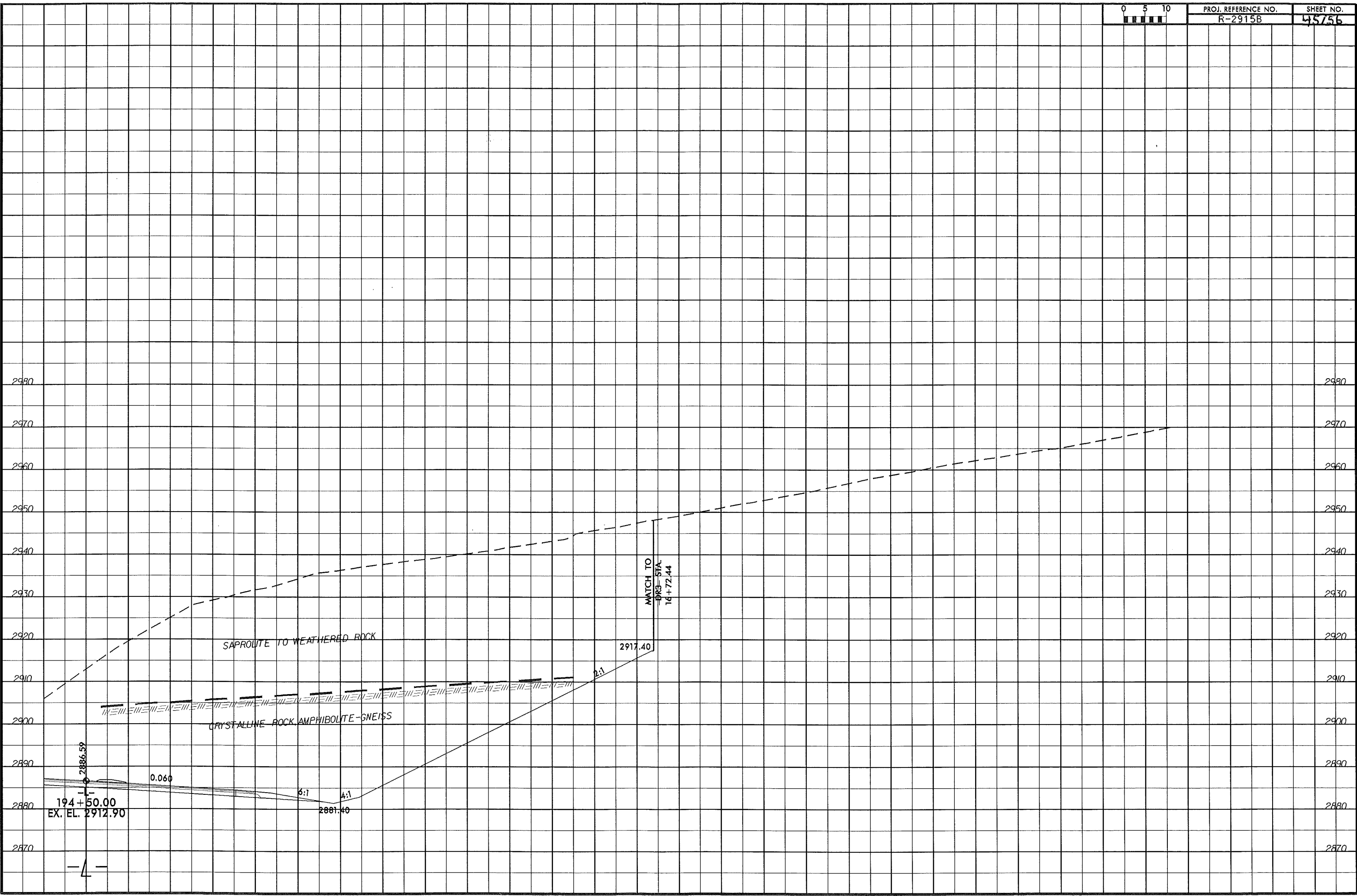
PROJ. REFERENCE NO.	SHEET NO.
R-2915B	47/56



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-L-

18-SEP-2013 11:34 C:\Program Files\Autodesk\AutoCAD 2011\AutoCAD.exe R:\Projects\18-SEP-2013\18-SEP-2013\18-SEP-2013.dwg



2980
2970
2960
2950
2940
2930
2920
2910
2900
2890
2880
2870

2980
2970
2960
2950
2940
2930
2920
2910
2900
2890
2880
2870

SAPROLITE TO WEATHERED ROCK

CRYSTALLINE ROCK AMPHIBOLITE-GNEISS

2917.40

2881.40

194+50.00
EX. EL. 2912.90

0.060

6:1

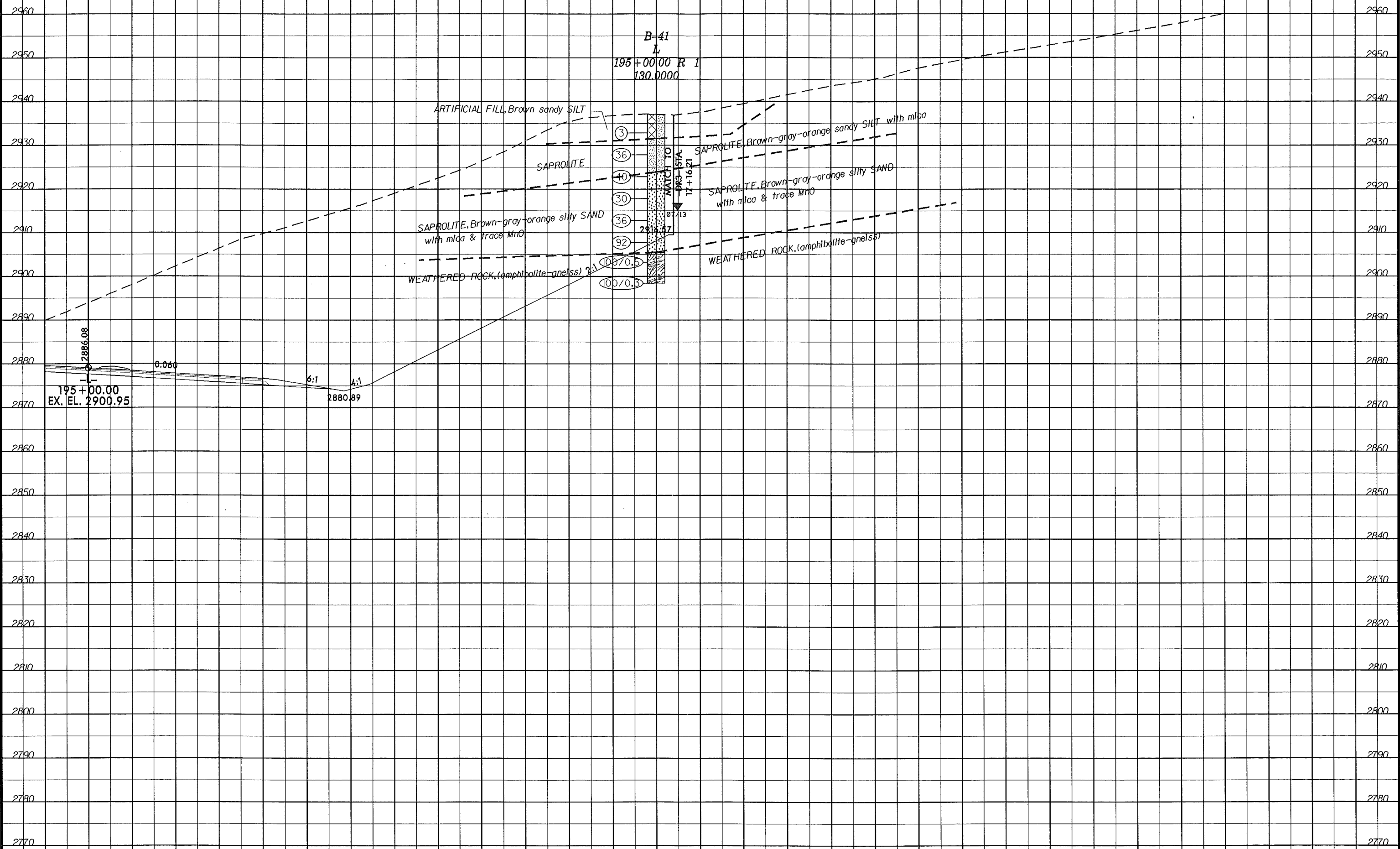
4:1

2:1

MATCH TO
164+72.44

— L —

8/23/99



B-41
195+00.00 R 1
130.0000

ARTIFICIAL FILL, Brown sandy SILT

SAPROLITE

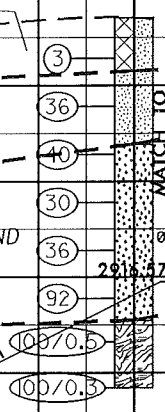
SAPROLITE, Brown-gray-orange silty SAND
with mica & trace MnO

WEATHERED ROCK, (amphibolite-gneiss) 2:1

SAPROLITE, Brown-gray-orange sandy SILT with mica

SAPROLITE, Brown-gray-orange silty SAND
with mica & trace MnO

WEATHERED ROCK, (amphibolite-gneiss)



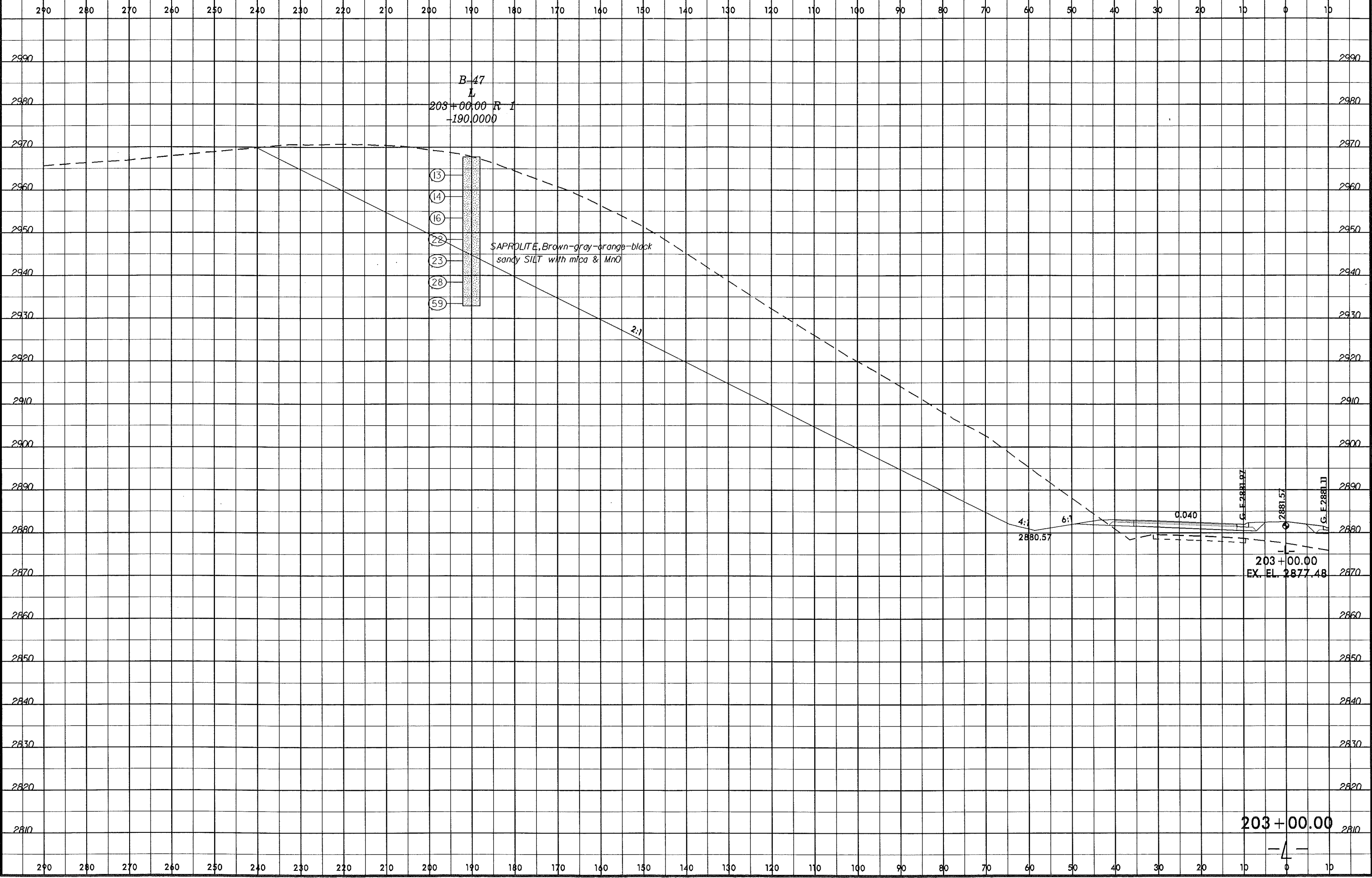
195+00.00
EX. EL. 2900.95

2880.89

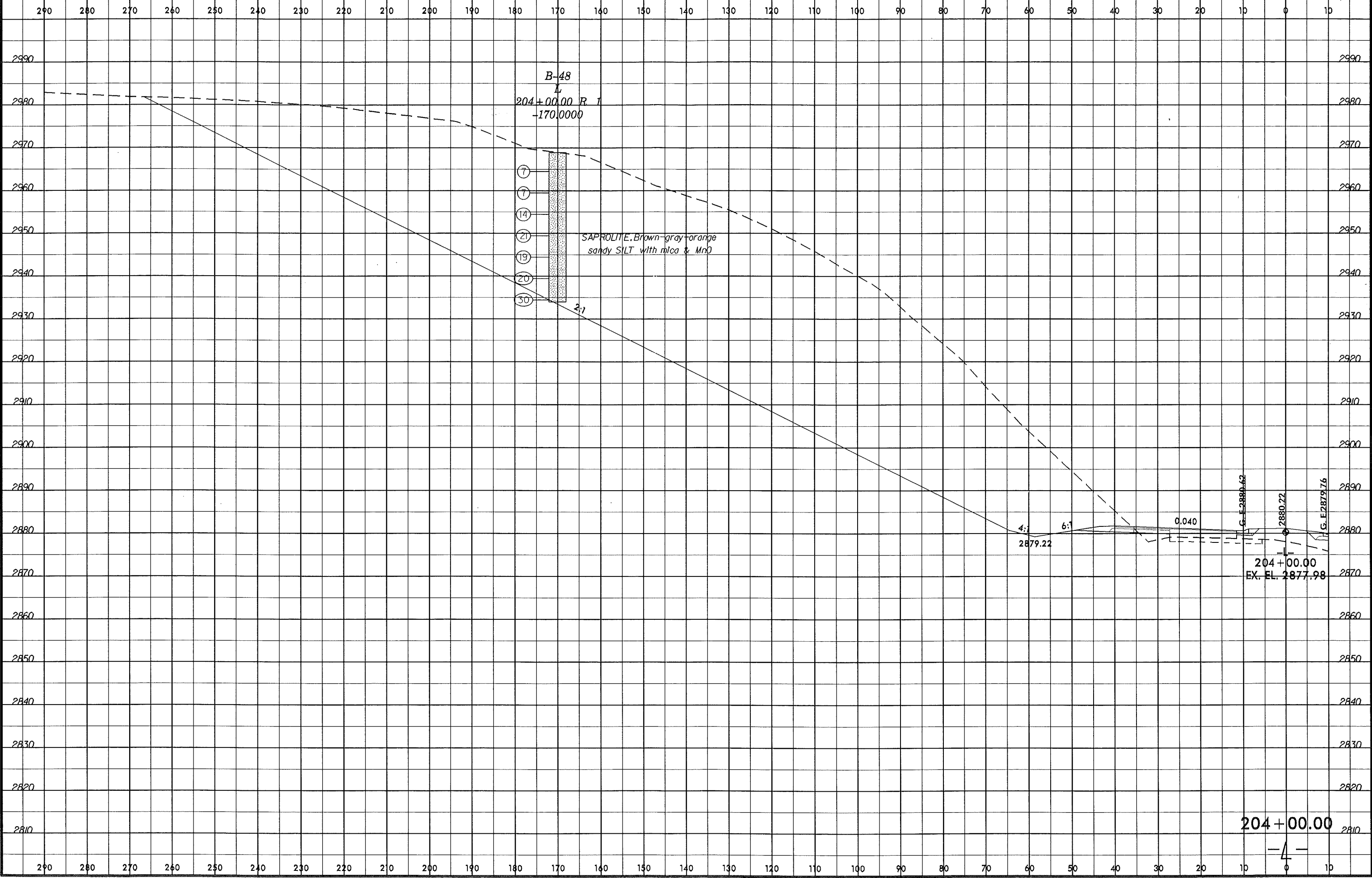
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-L-

19-SEP-2013 14:38 C:\Projects\19-2915B\2915B_GEO_ROWY_Ashhe\CADD\DEOTECH\2915B_Geo_xpl1.LL.t.dgn



9-SEP-2013 14:40 C:\Program Files\AutoCAD\AutoCAD LT\acad.dwg



204 + 00.00

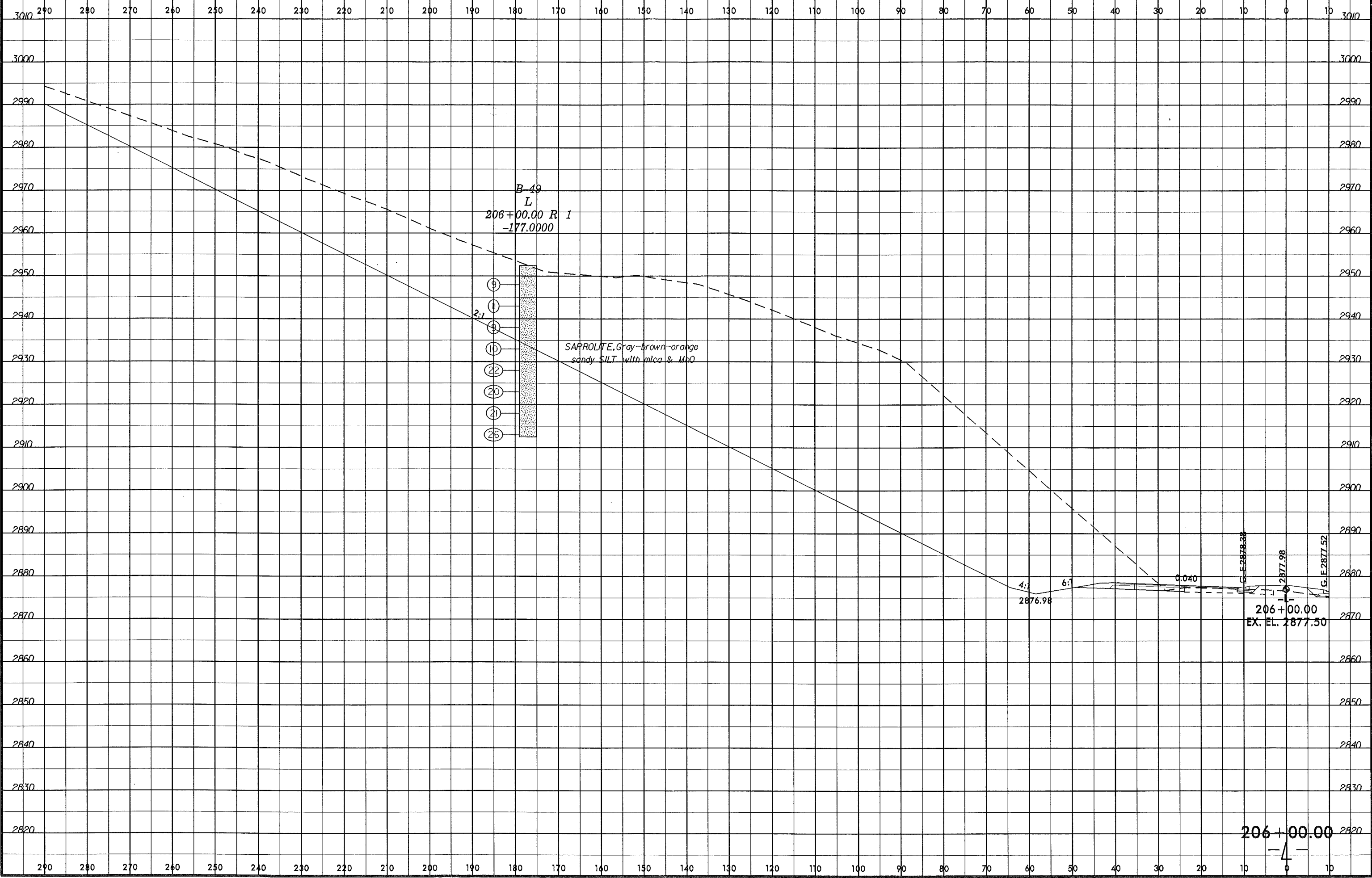
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B/23/99

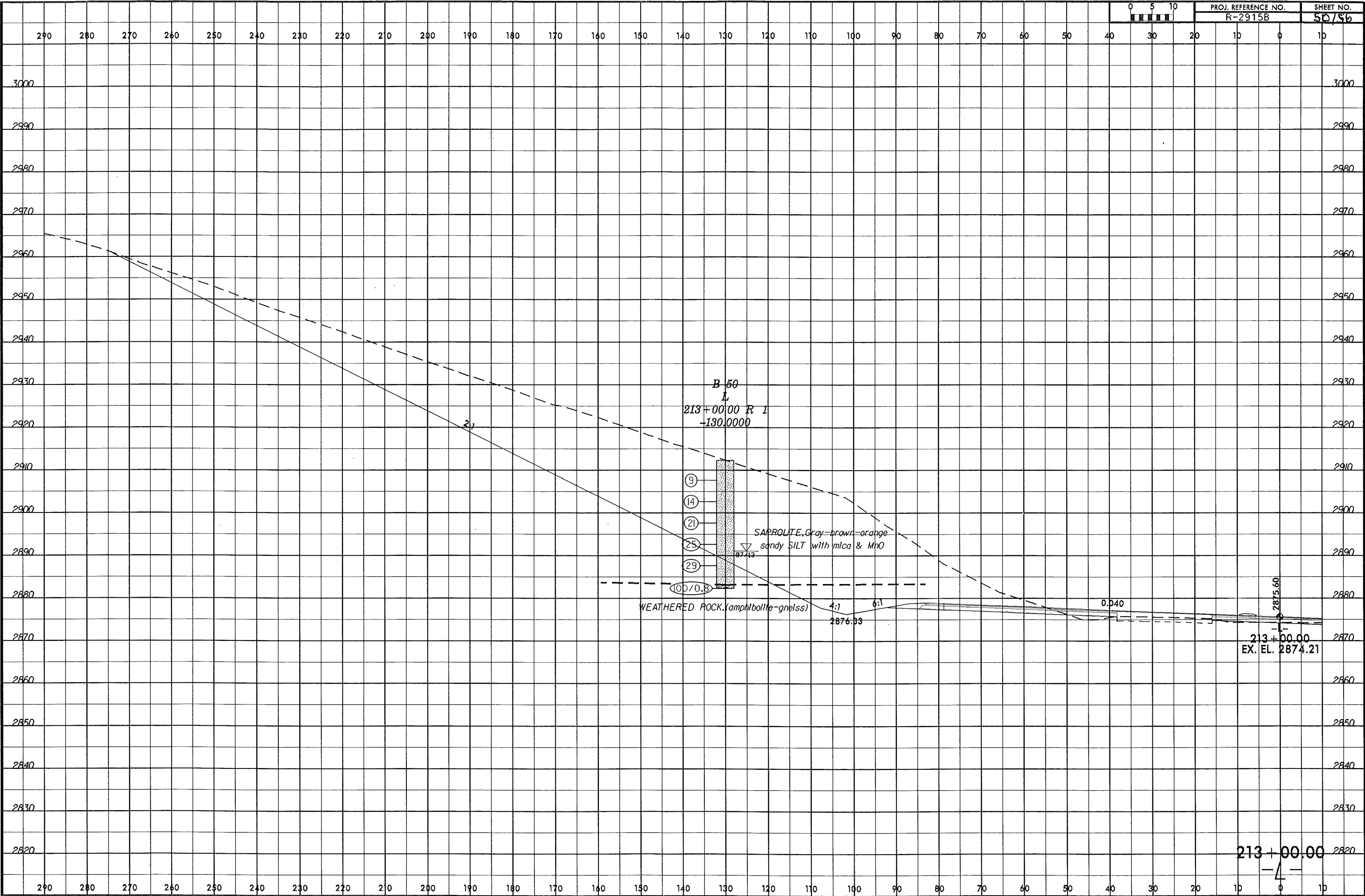


PROJ. REFERENCE NO.
R-2915B

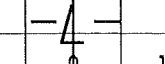
SHEET NO.
49/56



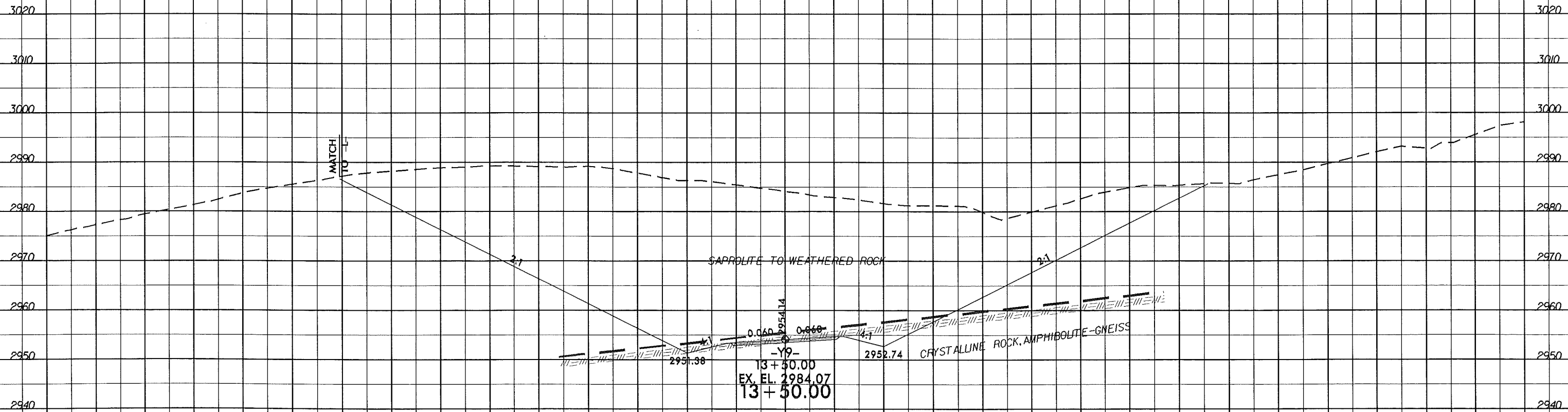
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213+00.00



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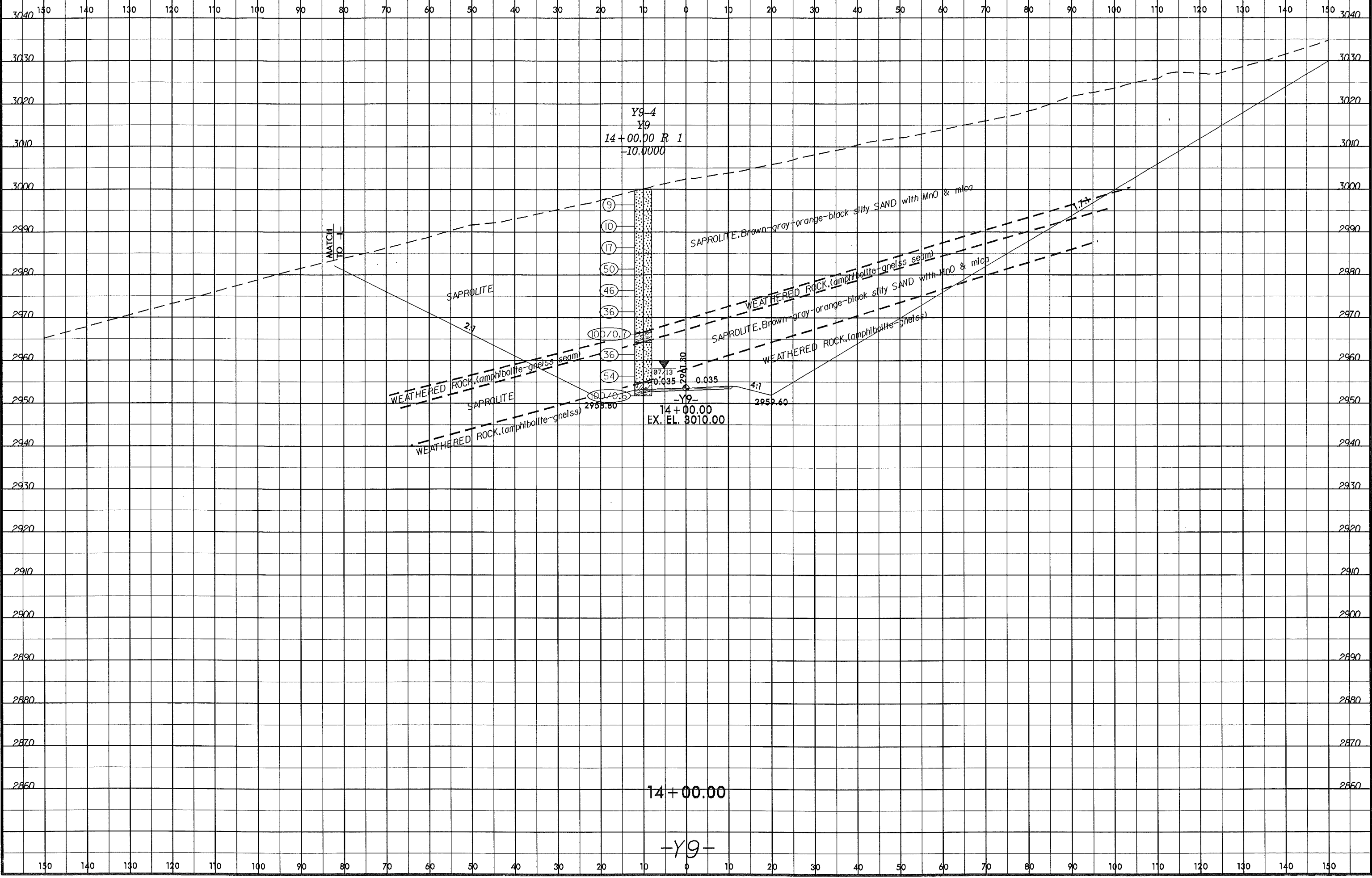


-Y9-

8/23/99



PROJ. REFERENCE NO. R-2915B SHEET NO. 55/56

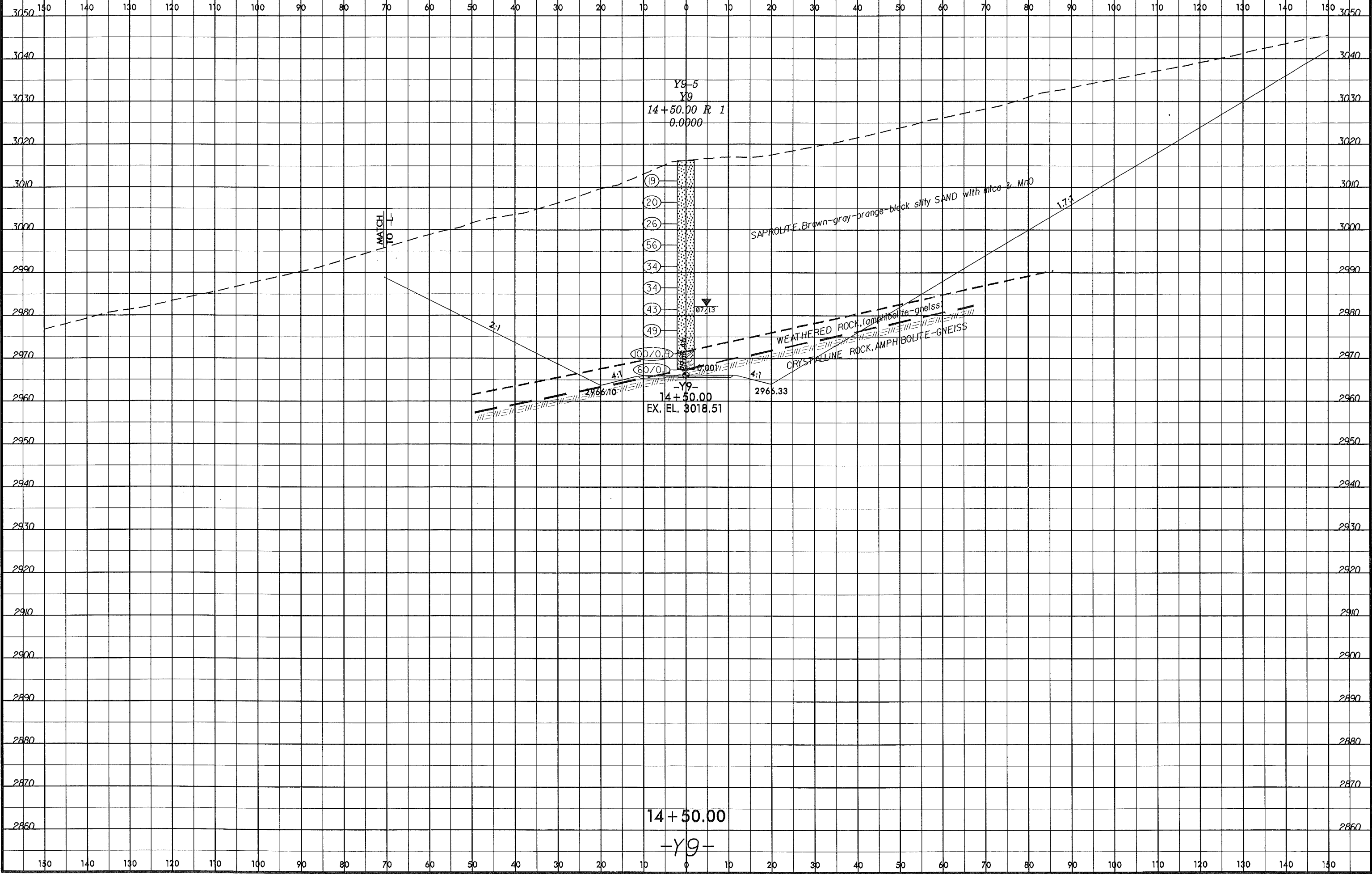


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8/23/99



PROJ. REFERENCE NO. R-2915B SHEET NO. 54/56



Y9-5
Y9
14+50.00 R 1
0.0000

MATCH
TO L

SAPROLITE, Brown-gray-orange-black silty SAND with mica & MnO

1.7:1

WEATHERED ROCK, Amphibolite-gneiss

CRYSTALLINE ROCK, AMPHIBOLITE-GNEISS

-Y9-
14+50.00
EX. EL. 3018.51

14+50.00
-Y9-

09-SEP-2003 14:38
C:\Projects\14+50.00\15B\15B.R2915B.GEO.ROWY.Ashe\CADD_GEO\TECH\15B.R2915B.Geo.xst.Y9.dgn
Imann AT GE2266033