

PROJECT: McCRIMMON PARKWAY EXTENSION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	012108004	1	60

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY WAKE
PROJECT DESCRIPTION McCRIMMON PARKWAY
EXTENSION FROM NC 54 /CHAPEL HILL ROAD
TO AVIATION PARKWAY

INVENTORY

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 - 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.

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DATE NOVEMBER 2014





SIGNATURE _____ DATE _____

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: <i>VERY STIFF, GRAY, 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. 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 (CPS)		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 DISLODGED 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 (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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.					
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, CRYSTALLINE SHELL, 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. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		COMPRESSIONIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. 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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			
PERCENTAGE OF MATERIAL		GROUND WATER		ROCK HARDNESS							
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		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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. 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		MISCELLANEOUS SYMBOLS		ABBREVIATIONS							
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		TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD		VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT DWT - DRY UNIT WEIGHT S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO					
GENERALY GRANULAR MATERIAL (NON-COHESSIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		GENERALY SILT-CLAY MATERIAL (COHESSIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		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					
TEXTURE OR GRAIN SIZE		EQUIPMENT USED ON SUBJECT PROJECT		FRACTURE SPACING		BEDDING					
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053		DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-550, PORTABLE HOIST, D-50 (TER346), D-50 (TER255)		TERM SPACING 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		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					
SOIL MOISTURE - CORRELATION OF TERMS		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		INDURATION		NOTES:					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST		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.		BENCH MARK: BORING ELEVATIONS ESTIMATED USING PROJECT TIN FILE ELEVATION: N/A FT.					
LL LIQUID LIMIT PL PLASTIC LIMIT OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT		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		INDURATION		BENCH MARK: BORING ELEVATIONS ESTIMATED USING PROJECT TIN FILE ELEVATION: N/A FT.					
PLASTICITY		INDURATION		INDURATION		NOTES:					
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH		INDURATION		INDURATION		NOTES:					
COLOR		INDURATION		INDURATION		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.		INDURATION		INDURATION		NOTES:					

Kimley-Horn & Associates, Inc.
3001 Weston Parkway
Cary, North Carolina 27513

Attn: Mr. Matthew West, PE, AVS

Re: **Geotechnical Report – Roadway Inventory**

County: Wake
Description: McCrimmon Parkway Extension between NC 54 / Chapel Hill Road and Aviation Parkway

Project Description

This project consists of a proposed 2.1 mile, four-lane divided roadway (-L-) between NC 54 / Chapel Hill Road (-Y2-) and Aviation Parkway (-Y8-). Portions of the project have been previously constructed (between approximately -L- Stations 35+35 and 55+55), while the remainder of the alignment is on new location. The project is proposed to be constructed in phases as development progresses along the corridor. The initial phase will consist of the construction of a new four-lane roadway between NC 54 / Chapel Hill Road and the existing portion of McCrimmon Parkway and the construction of a new two-lane divided roadway between Airport Boulevard (-Y4-) and Aviation Parkway. Grading will be performed during the initial phase to accommodate the proposed ultimate design consisting of a four-lane divided roadway between NC 54 / Chapel Hill Road and Aviation Parkway.

All roadway design data presented in this report is based on the preliminary design provided to Terracon by Kimley-Horn & Associates in June through November of 2014. The geotechnical investigation of the -L- alignment was performed during June and July of 2014. Three borings were performed later along the Southport Drive (-Y7-) alignment in October 2014. Two track mounted Diedrich D-50T drill machines equipped with automatic hammers were used during the investigation. Standard Penetration Tests were performed in the boreholes and samples were collected for visual classification in the field. Select samples were submitted for laboratory analysis.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station</u>
-L-	23+75 to 35+35
-L-	55+55 to 143+00
-Y7-	20+00 to 24+84

Areas of Special Geotechnical Interest

1) Artificial Fills: Artificial fills were encountered on the project at the following locations:

<u>Line</u>	<u>Station</u>
-L-	26+41 to 27+52
-L-	28+85 to 29+88
-L-	30+12 to 34+74
-L-	68+24 to 70+96

Cross sections of the areas where artificial fills will impact construction are attached.

2) Alluvial Soils: Alluvial soils were encountered on the project at the following location:

<u>Line</u>	<u>Station</u>
-L-	27+06 to 28+64

3) High Plasticity Clays: High plasticity clays (PI > 25) were encountered on the project at the following locations:

<u>Line</u>	<u>Station</u>
-L-	69+60 to 72+95
-L-	93+55 to 98+35
-L-	112+50 to 114+00
-L-	119+70 to 121+85
-L-	124+50 to 126+50
-Y7-	19+75 to 22+85

A discussion of high plasticity clay soils is located in the section titled "Soil Properties." Cross sections of areas where high plasticity clays were encountered near proposed grades are attached.

4) Non-Crystalline Rock: The non-crystalline rock on this project includes Triassic siltstone and sandstone. Rock occurs within 6 feet below proposed grade at the following location:

<u>Line</u>	<u>Station</u>
-L-	92+00 to 93+00

5) Degradable Rock: Degradable rock is defined as rock material (including weathered rock) which exhibits high slaking characteristics when exposed to air and water (see Rock Properties for further explanation). Degradable rock occurs within the proposed unclassified excavation in the following areas:



<u>Line</u>	<u>Station</u>
-L-	59+70 to 62+85
-L-	72+10 to 76+50
-L-	81+40 to 89+25
-L-	90+75 to 95+60
-L-	123+75 to 128+60

Cross sections of areas where degradable rock was encountered near proposed grades are attached.

6) Groundwater: Groundwater was encountered near proposed grade at the following location:

<u>Line</u>	<u>Station</u>
-L-	91+00
-L-	69+00 to 70+00

6) Ponds: A pond was encountered within close proximity to the right of way at the proposed location:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>
-L-	68+40 to 70+80	80 RT

Physiography and Geology

The terrain along the project corridor is comprised of gently rolling hills with steep-sided drainage areas. One flowing creek was observed along the sewer easement behind the landscape supply yard at approximately -L- Station 27+50. Lake Crabtree and several tributaries are also located nearby outside the project limits. No other flowing creeks or streams were observed during the investigation within the project limits. The corridor winds through wooded and recently logged areas located between business parks.

The project is located within the Piedmont Physiographic Province. More specifically, the project is located within the Durham Sub-Basin of the Triassic Basin. The soils along the project were created from weathering of the underlying sedimentary Triassic-age rock. The rock in the Triassic Basin consists of interbedded sandstone, siltstone, and mudstone with scattered diabase dike intrusions.

Soil Properties

Soils within the project area include roadway embankment fill, artificial fill, alluvial, and Triassic residual soils.

Roadway embankment fill soils are present along the existing roadways on the project. These soils are similar to and derived from the Triassic residual soils encountered elsewhere on the project.

Artificial fill soils were encountered behind the existing landscape supply and construction laydown yards located approximately between -L- Stations 27+90 and 34+80. Artificial fill used as trench backfill should be anticipated along the sewer easement near -L- Station 28+00. Soils were observed piled in the wooded area at the rear of the landscape supply yard and at the rear of the construction laydown yard. The soil piles were observed to contain construction debris, topsoil, strippings, and a mix of sandy and clayey soils. Some artificial fill was placed at the rear of the construction laydown yard to level site grades. Where encountered in the borings, these soils consist of moist, sandy clay (A-6).

Alluvial soils are present near the surface in the creek along the sewer easement near -L- Station 28+00. These soils consist predominately of silts (A-4), although the bed of the creek appeared to be recently disturbed and lined with new rip rap prior to the field investigation.

Triassic residual soils are derived from the weathering of underlying sedimentary rock. These soils consist of orange, gray, and red-brown sandy silt (A-4), sandy clay (A-6), and silty clay (A-7). The near surface residual soils are generally soft to very stiff and become hard with depth. Most of the residual soils encountered along the project were moist when sampled although some near surface soils in the low lying areas were wet. Based on the laboratory testing performed, the clay soils at the site exhibit medium to high plasticity. The Triassic residual soils transition into weathered rock within the range of boring depths along a majority of the project.

Degradable Rock

Weathered rock was encountered near proposed grades along the portions of the site mentioned herein. Triassic siltstone and weathered rock derived from Triassic siltstone typically exhibits high slaking characteristics when excavated or exposed to weather. Based on the weathered rock recovered in the split spoons taken along the project corridor, the weathered rock along the project is highly degradable.

Non-crystalline sedimentary Triassic rock underlies the project at depth, however none was encountered within 6 feet of proposed finished grade.

Groundwater

A majority of the borings performed at the site remained open for a minimum of 24 hours to measure groundwater levels after drilling. The open boreholes were dry or groundwater was encountered well below proposed grades with the exception of the locations listed in "Areas of Special Geotechnical Interest." However, the potential for a perched water table is high along the project where soft soils are present above impermeable hard material such as weathered rock.

Ponds

One pond is located adjacent to the project between approximately -L- Stations 68+40 and 70+80. The overflow is due northeast and drainage flows toward the project. The pond is up gradient from the natural surface and should not be affected by runoff from the project. No flowing water was observed draining from the pond. However, the soils down gradient from the dam between approximately -L-

Project Reference No.	Sheet No.
012108004	3B

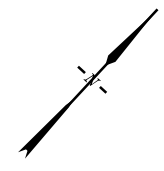
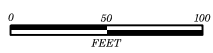
Stations 68+80 and 70+00 were very wet and soft possibly due to seepage beneath the existing earth dam.

Respectfully Submitted,
Terracon Consultants, Inc.

Matthew J. Alexander, PE
Geotechnical Project Engineer

R. L. "Levi" Denton, II, PE
Principal, Geotechnical
Department Manager

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



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JOSEPH M. WILKERSON
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N/F
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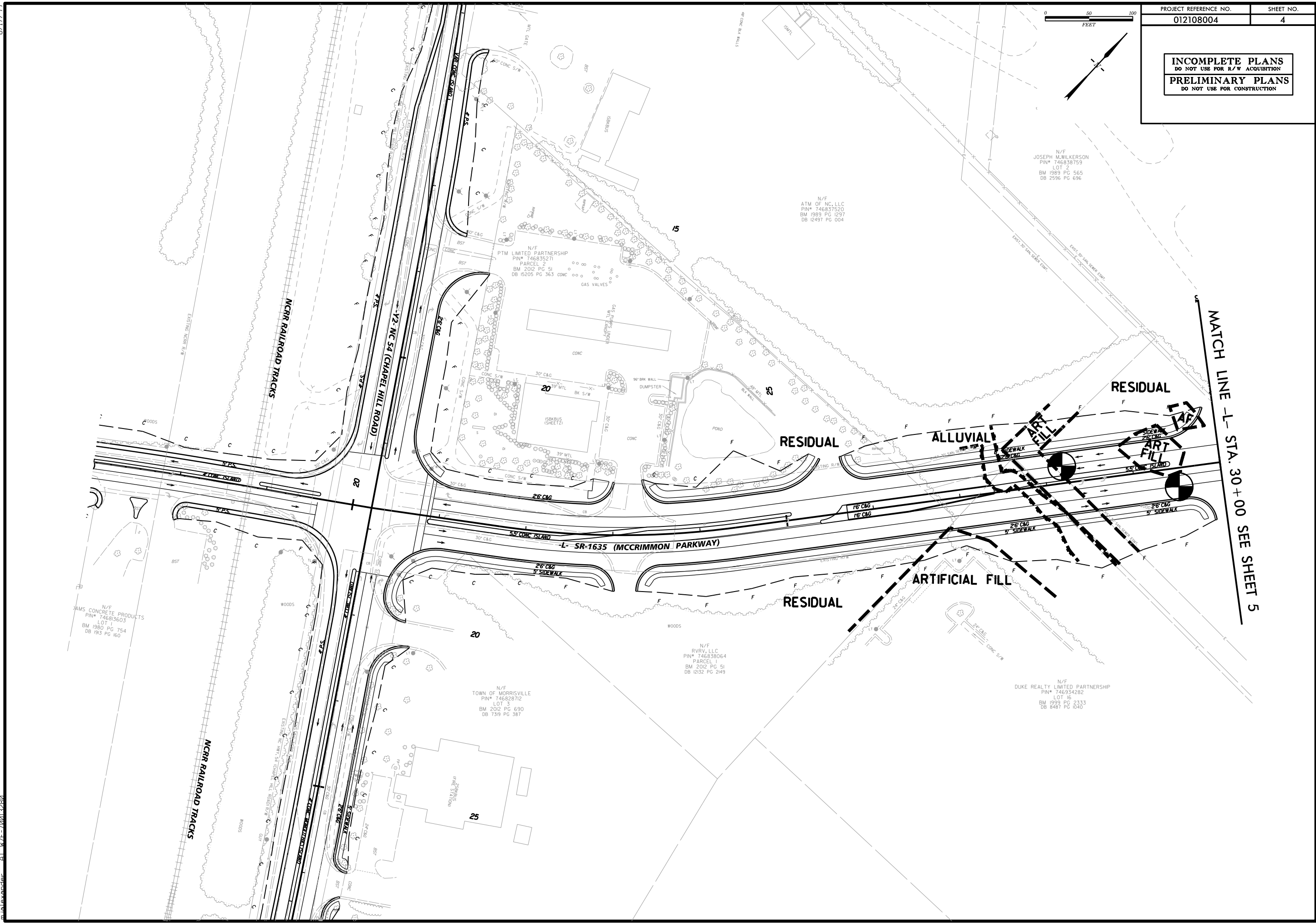
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LOT 3
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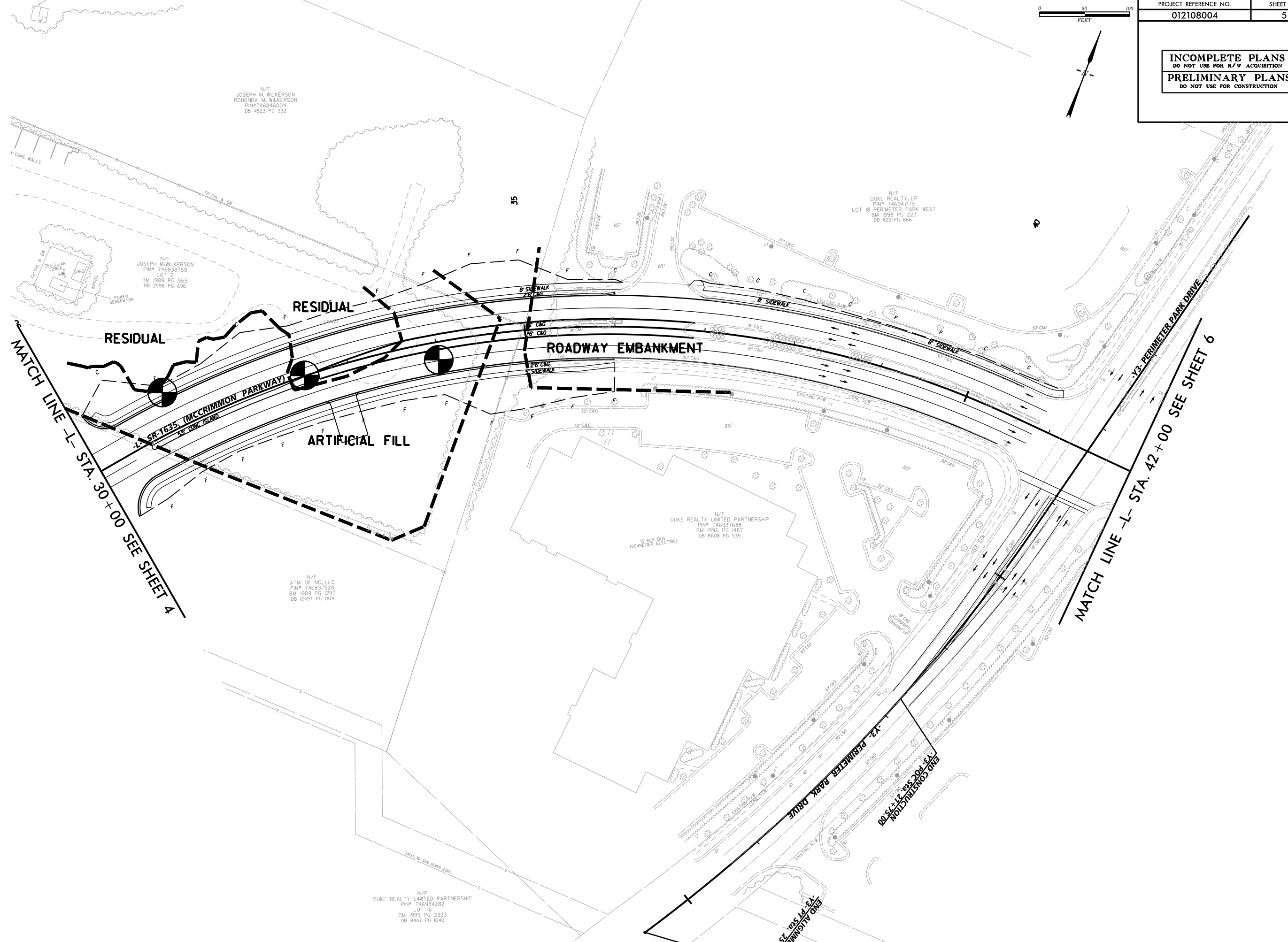
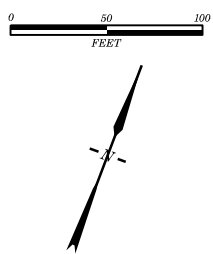
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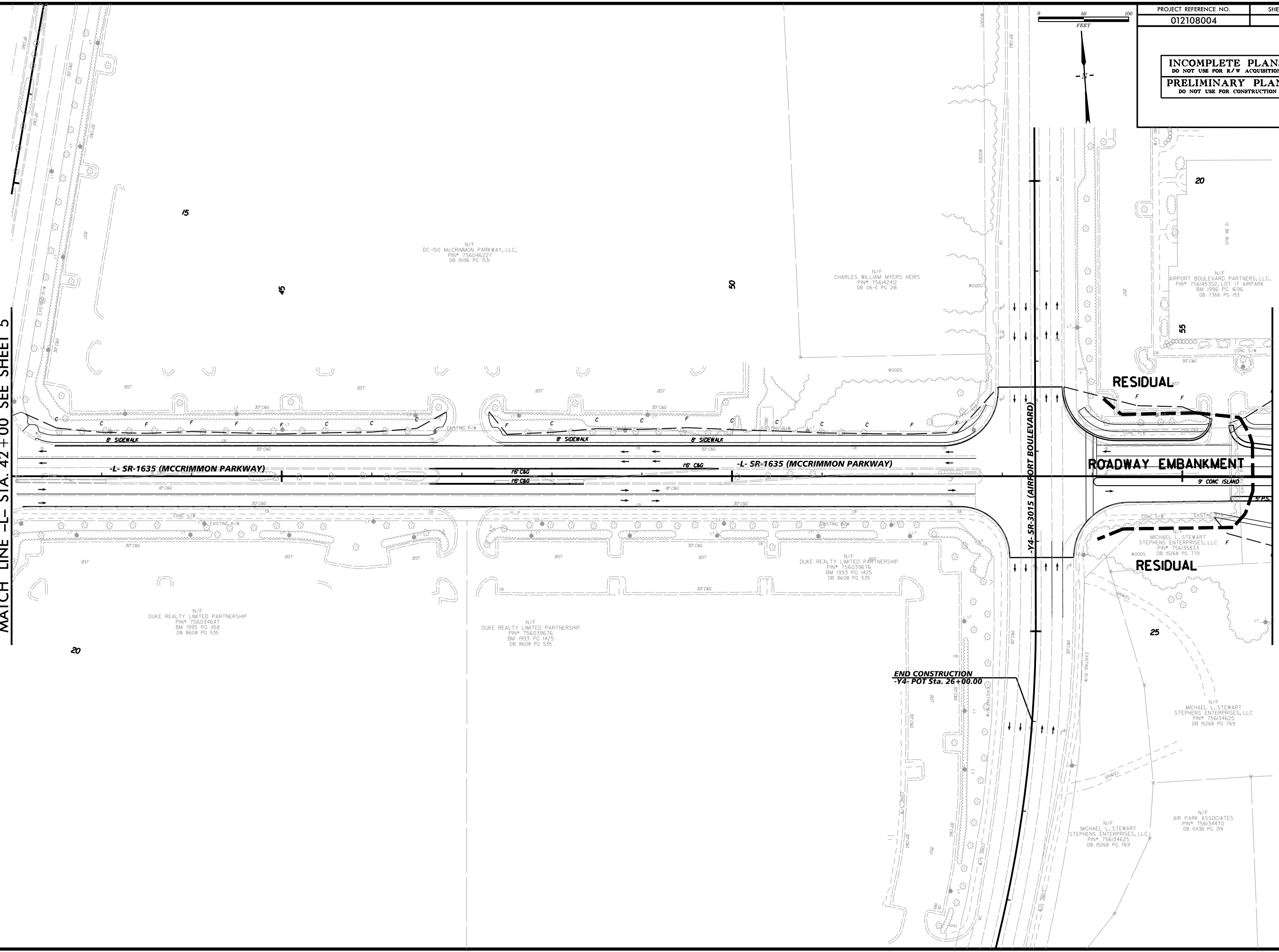
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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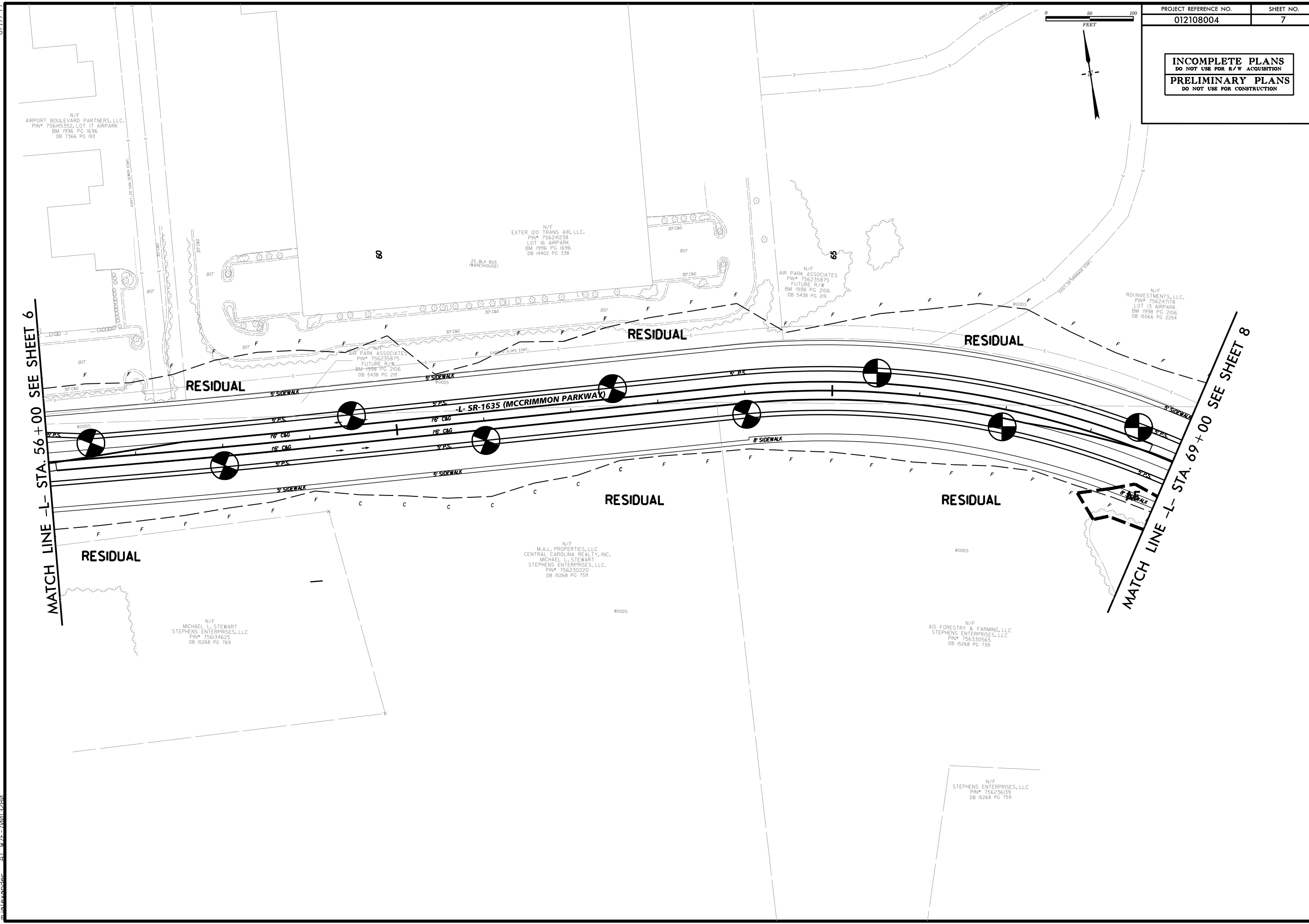
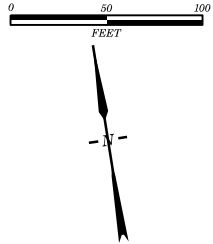
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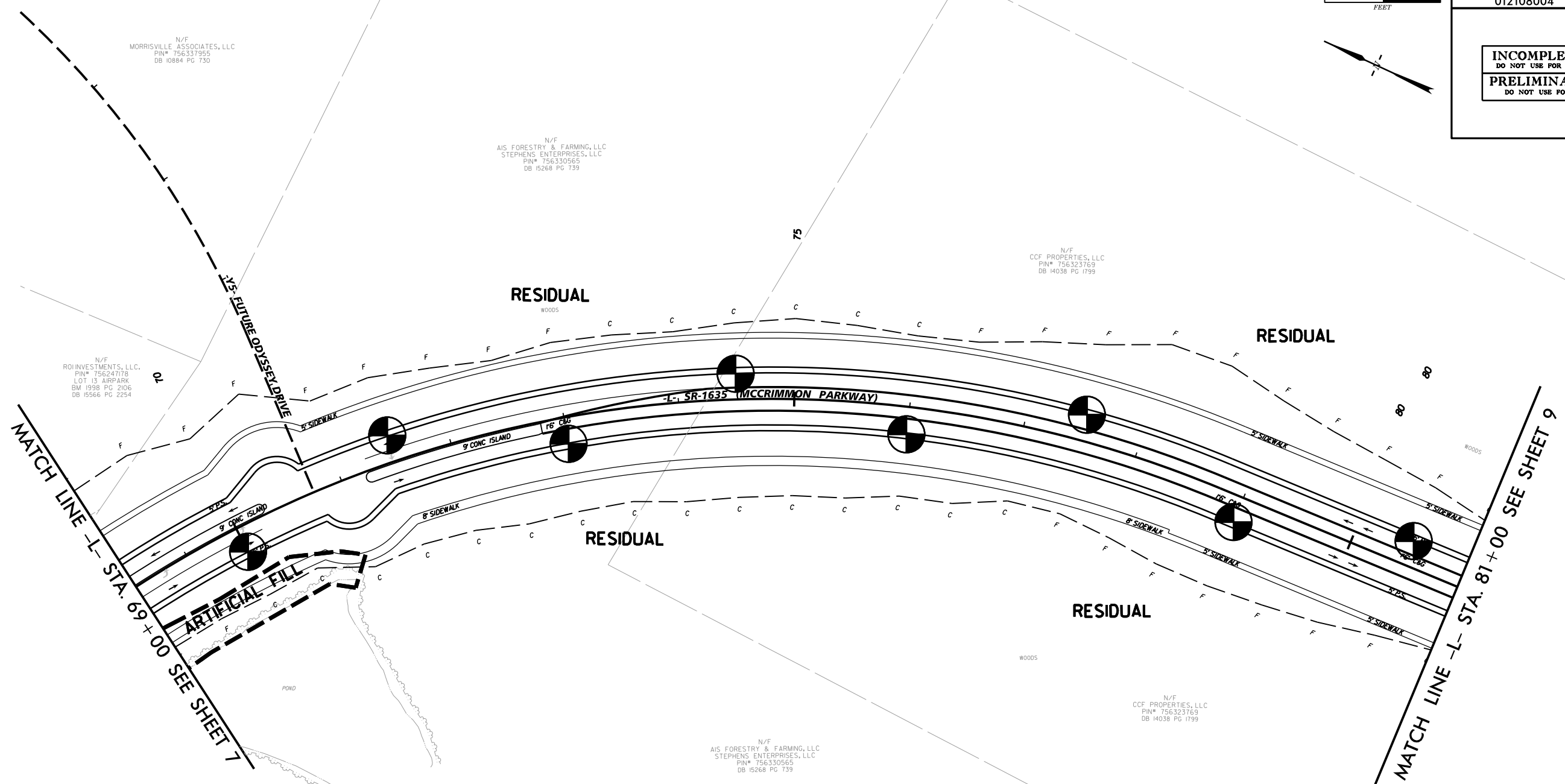
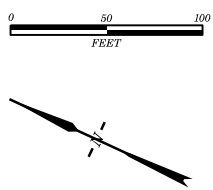


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MATCH LINE -L- STA. 69 + 00 SEE SHEET 8

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 N/F
 MORRISVILLE ASSOCIATES, LLC
 PIN# 756337985
 DB 10884 PG 130

N/F
 ROI INVESTMENTS, LLC.
 PIN# 756247178
 LOT 13 AIRPARK
 BM 1998 PG 2106
 DB 15566 PG 2254

N/F
 AIS FORESTRY & FARMING, LLC
 STEPHENS ENTERPRISES, LLC
 PIN# 756330565
 DB 15268 PG 739

N/F
 CCF PROPERTIES, LLC
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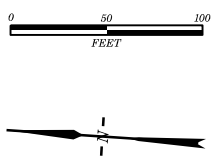
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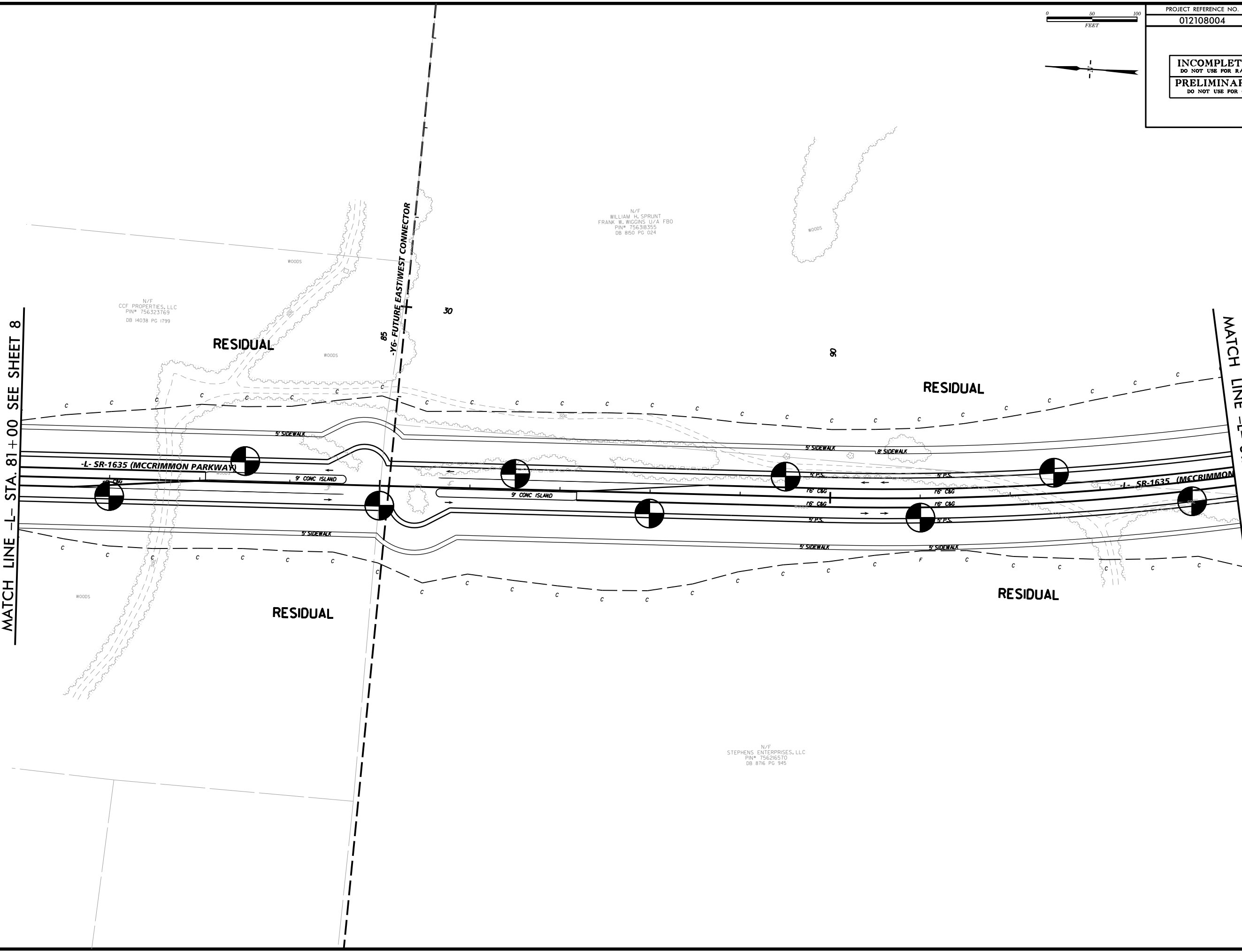
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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

MATCH LINE -L- STA. 81+00 SEE SHEET 8

MATCH LINE -L- STA. 94+50 SEE SHEET 10



N/F
CCF PROPERTIES, LLC
PIN# 756323769
DB 14038 PG 1799

N/F
WILLIAM H. SPRUNT
FRANK W. WIGGINS U/A FBO
PIN# 756318355
DB 8150 PG 024

N/F
STEPHENS ENTERPRISES, LLC
PIN# 756216570
DB 8716 PG 945

8/17/99

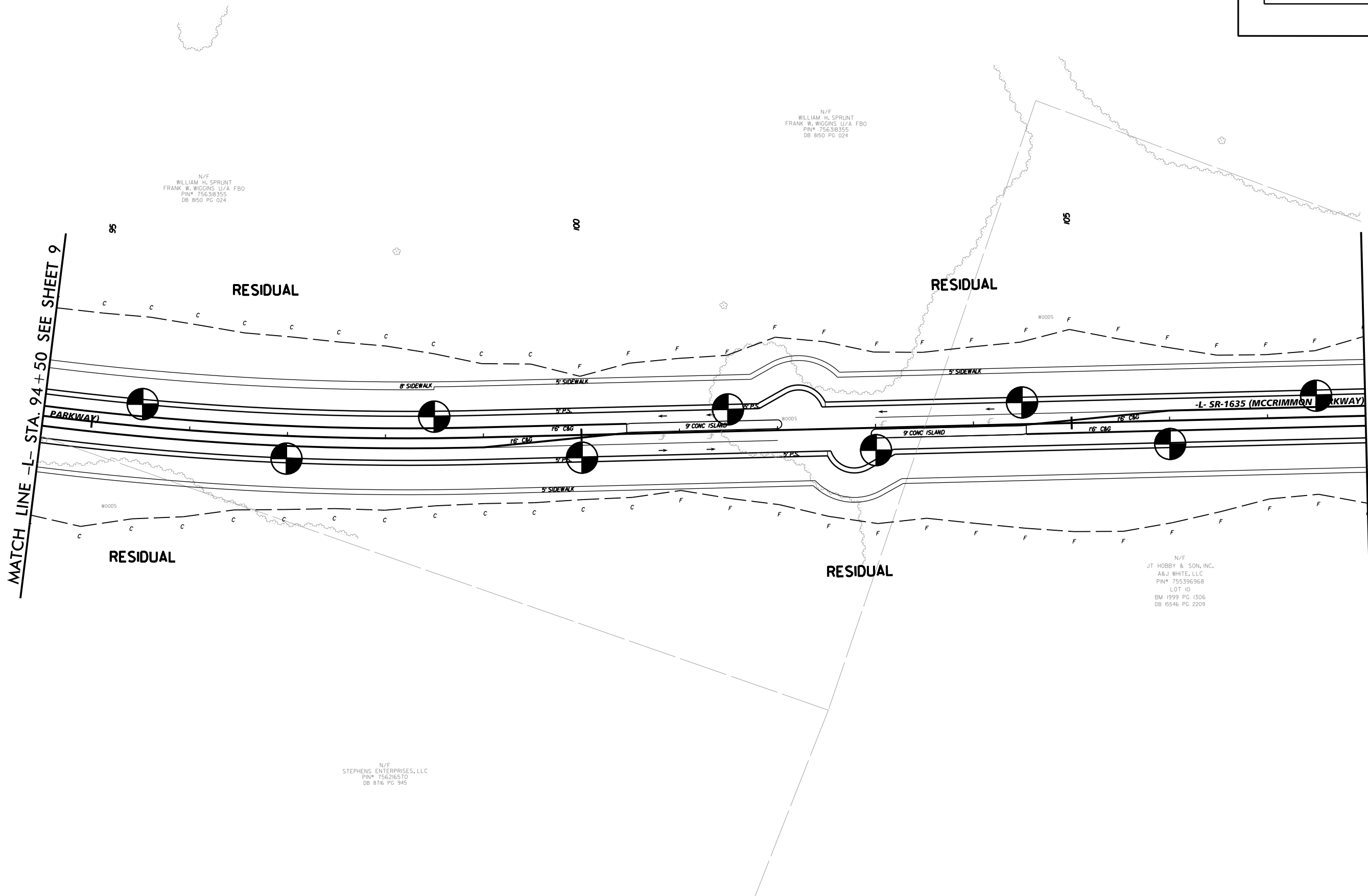


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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCH LINE -L- STA. 94+50 SEE SHEET 9

MATCH LINE -L- STA. 108+00 SEE SHEET 11



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FRANK W. WIGGINS U/A FBO
PIN# 756318355
DB 850 PG 024

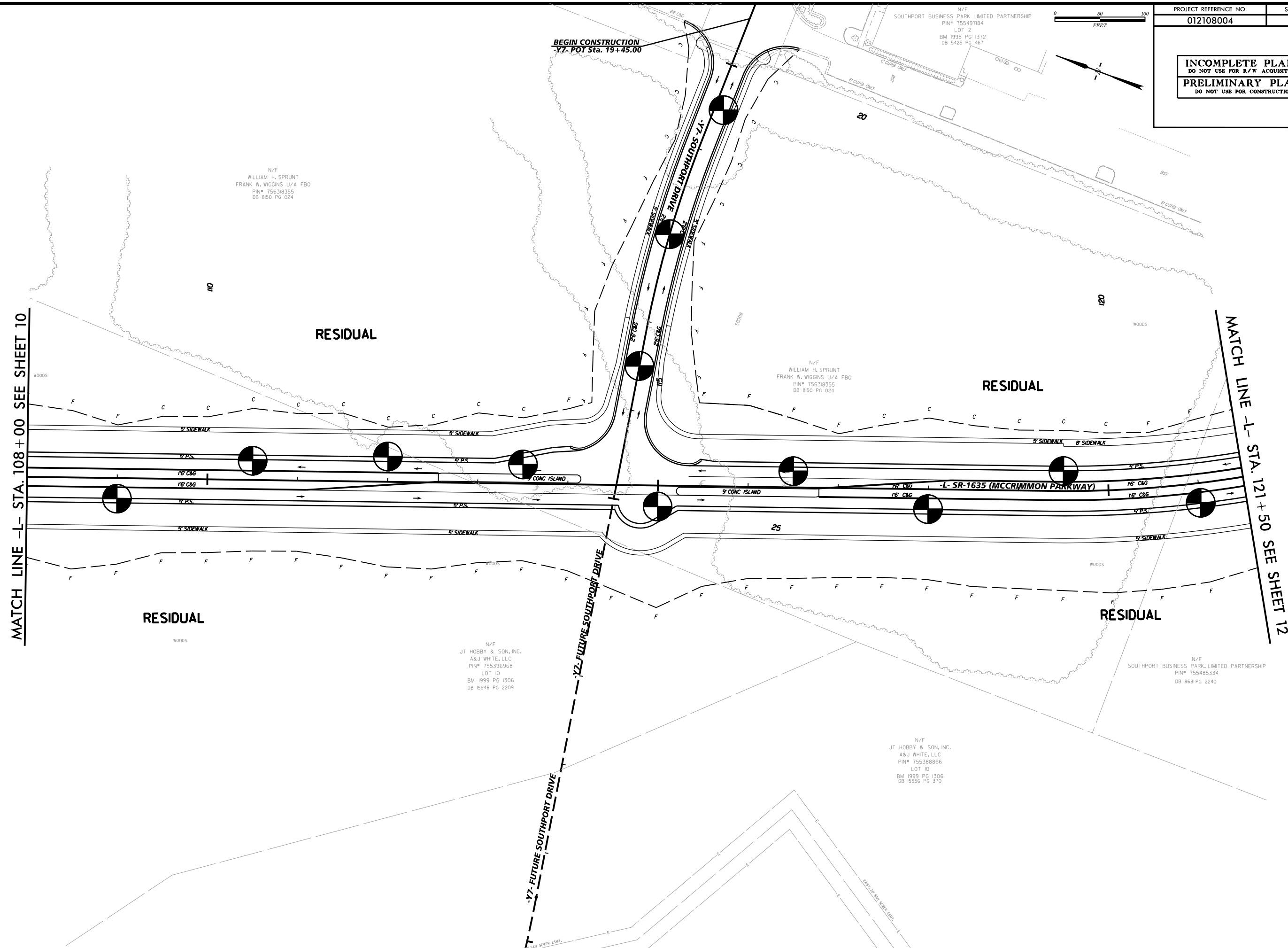
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PIN# 75626570
DB 876 PG 945

N/F
JT HOBBY & SON, INC.
A&J WHITE, LLC
PIN# 755396968
LOT 10
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DB 8546 PG 2209

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DO NOT USE FOR R/W ACQUISITION
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MATCH LINE -L- STA. 121+50 SEE SHEET 12

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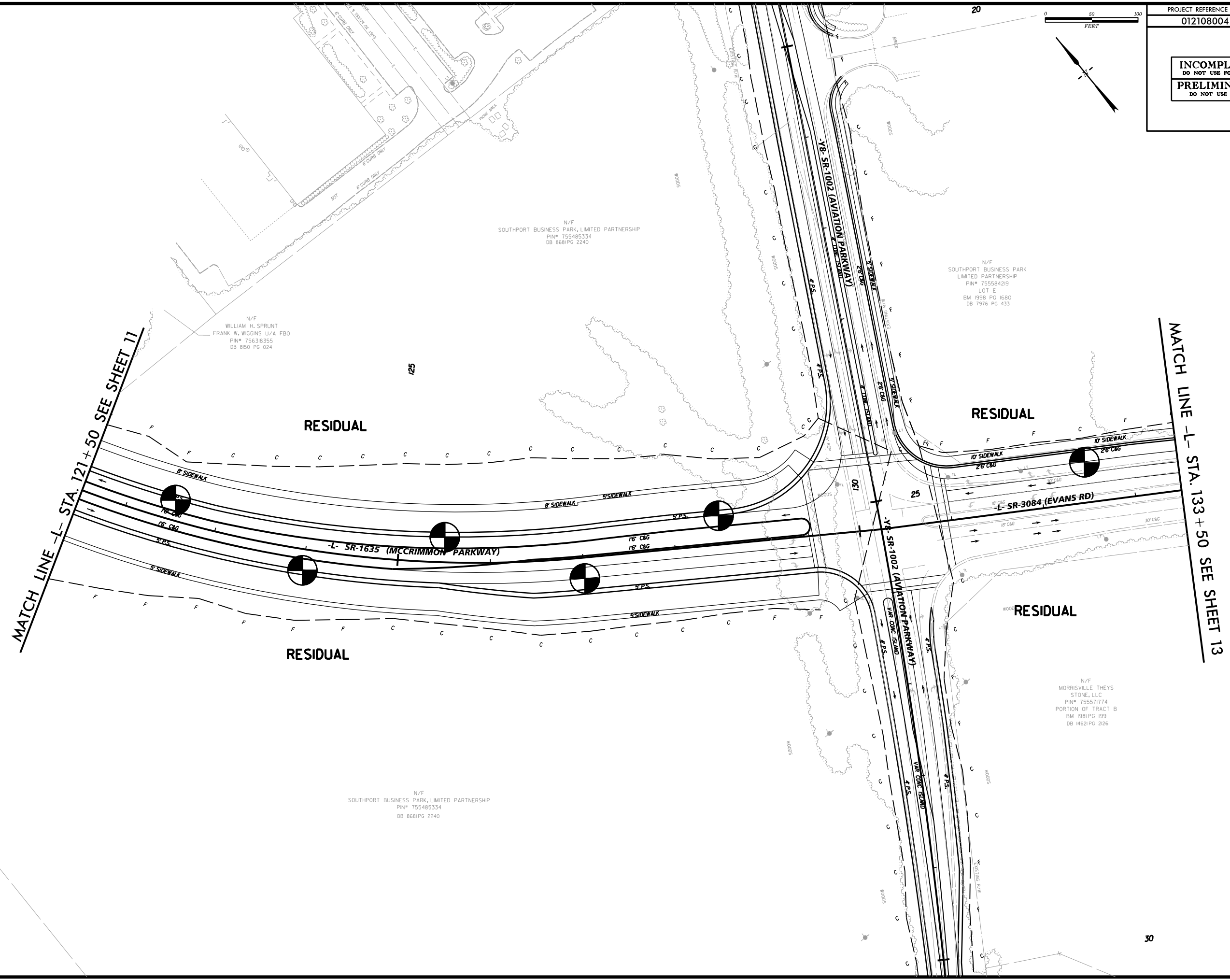
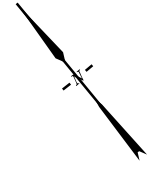
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A&J WHITE, LLC
PIN# 755396968
LOT 10
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N/F
JT HOBBY & SON, INC.
A&J WHITE, LLC
PIN# 755388866
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N/F
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PIN# 755485334
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FRANK W. WIGGINS U/A FBO
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DB 8150 PG 024

N/F
SOUTHPORT BUSINESS PARK, LIMITED PARTNERSHIP
PIN# 755485334
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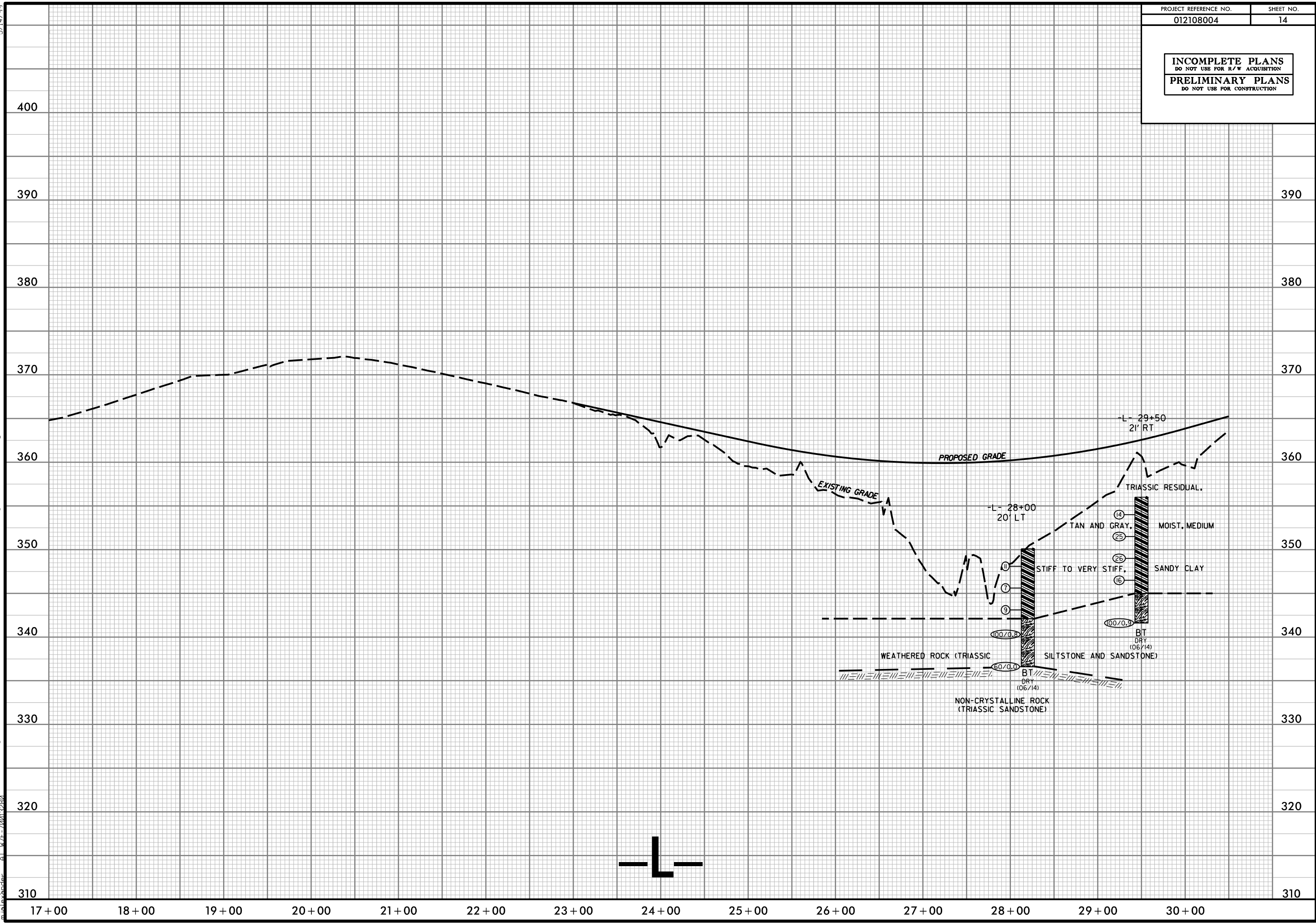
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STONE, LLC
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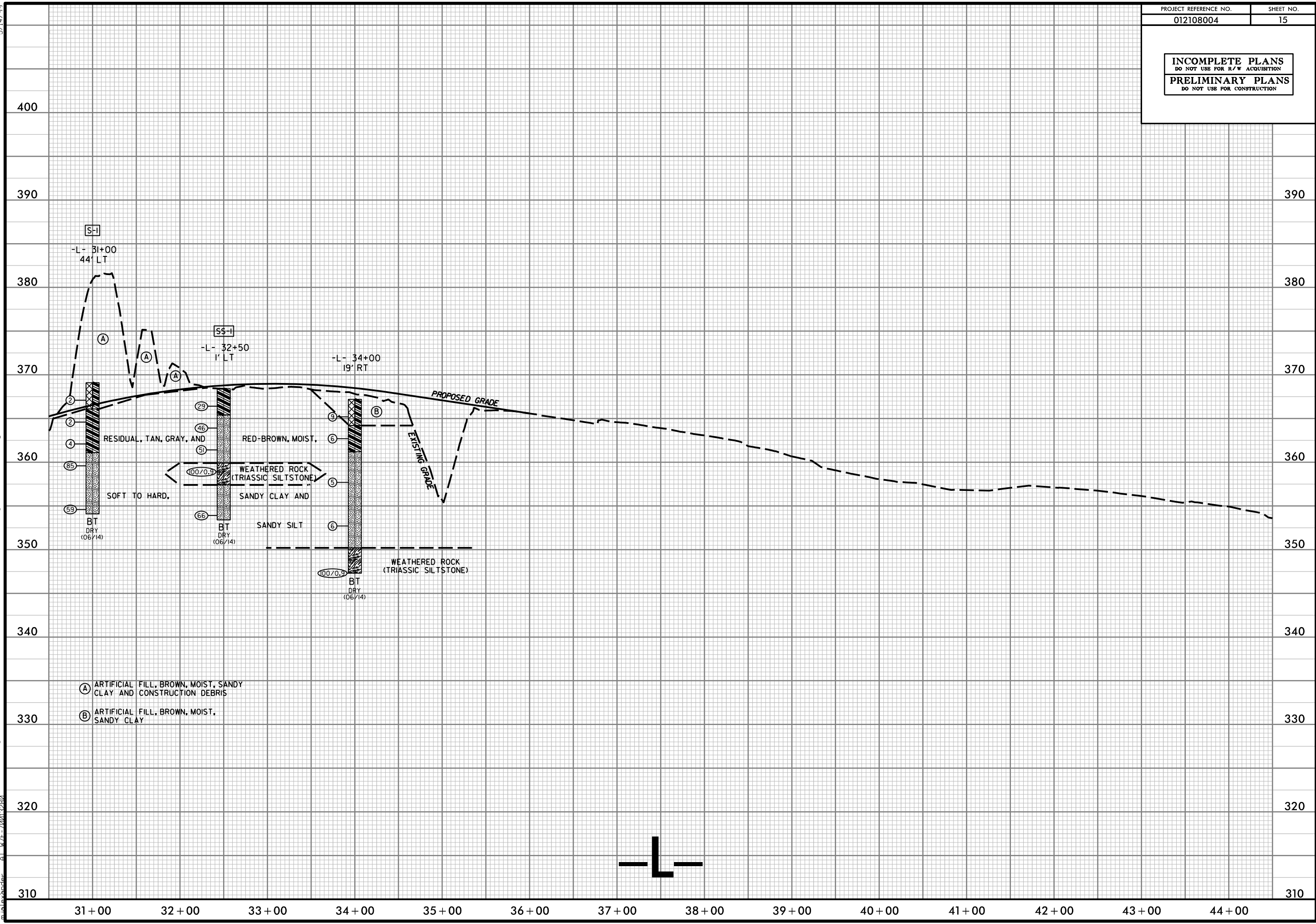
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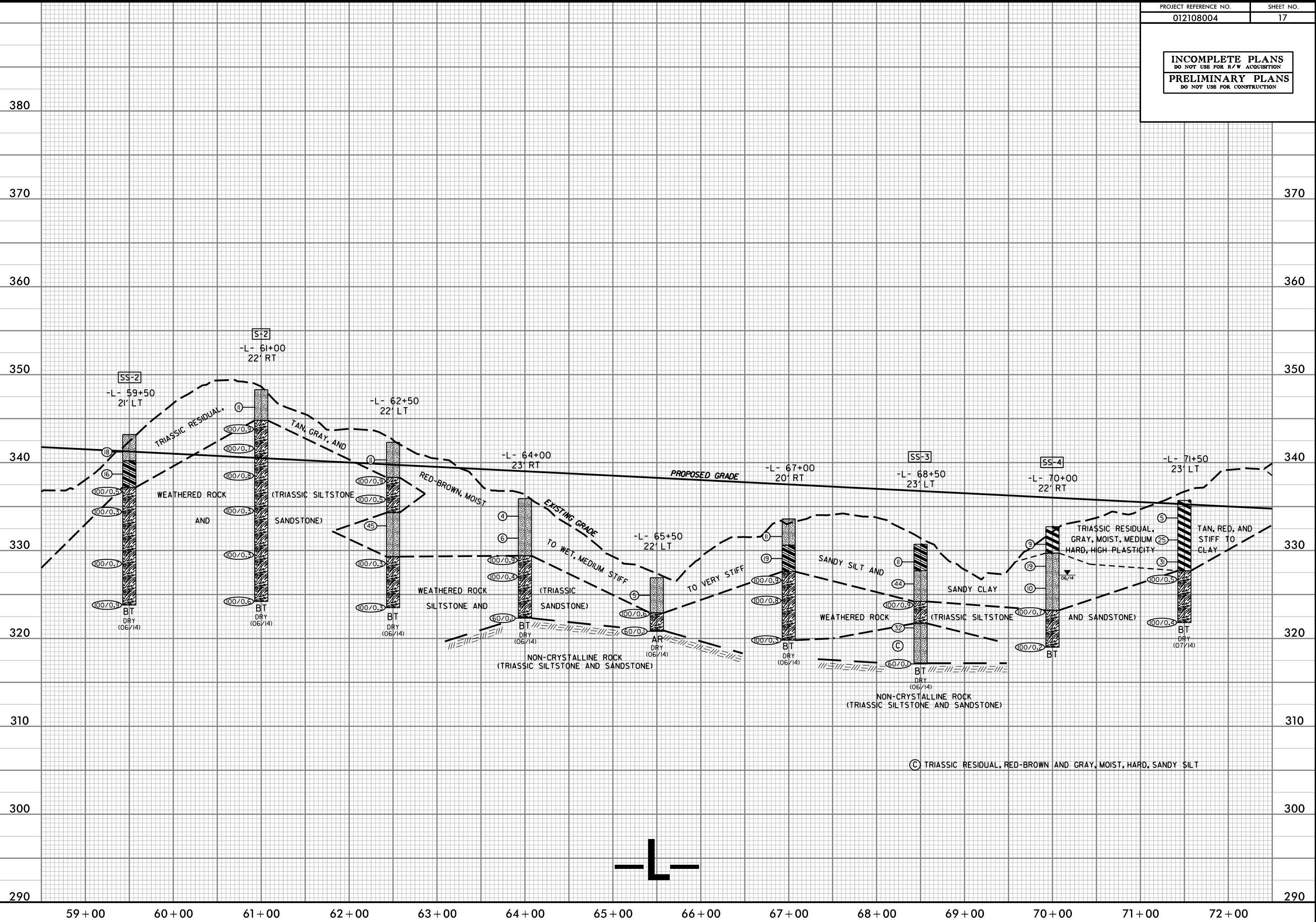
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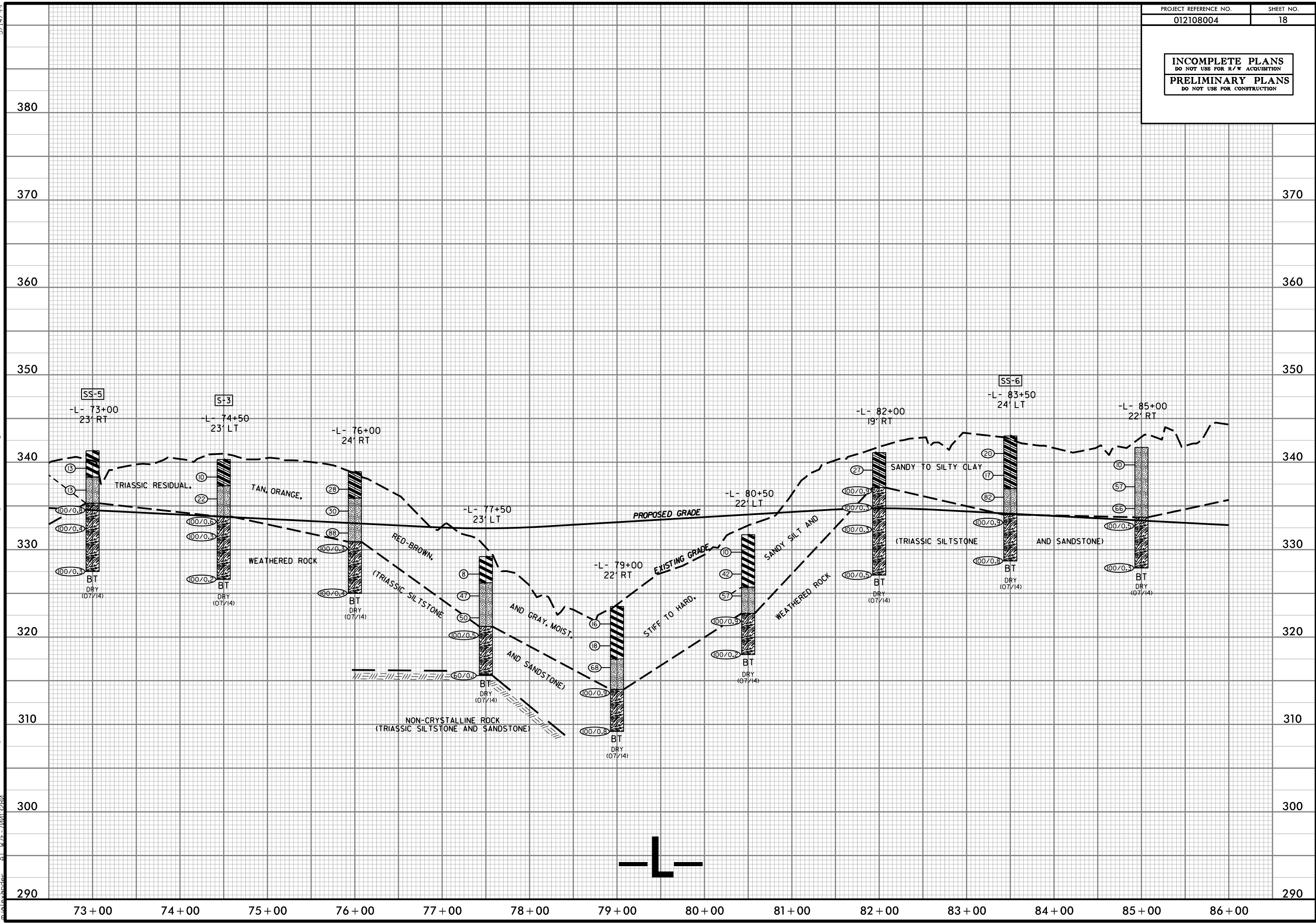
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© TRIASSIC RESIDUAL, RED-BROWN AND GRAY, MOIST, HARD, SANDY SILT

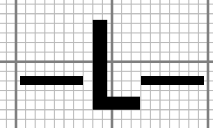
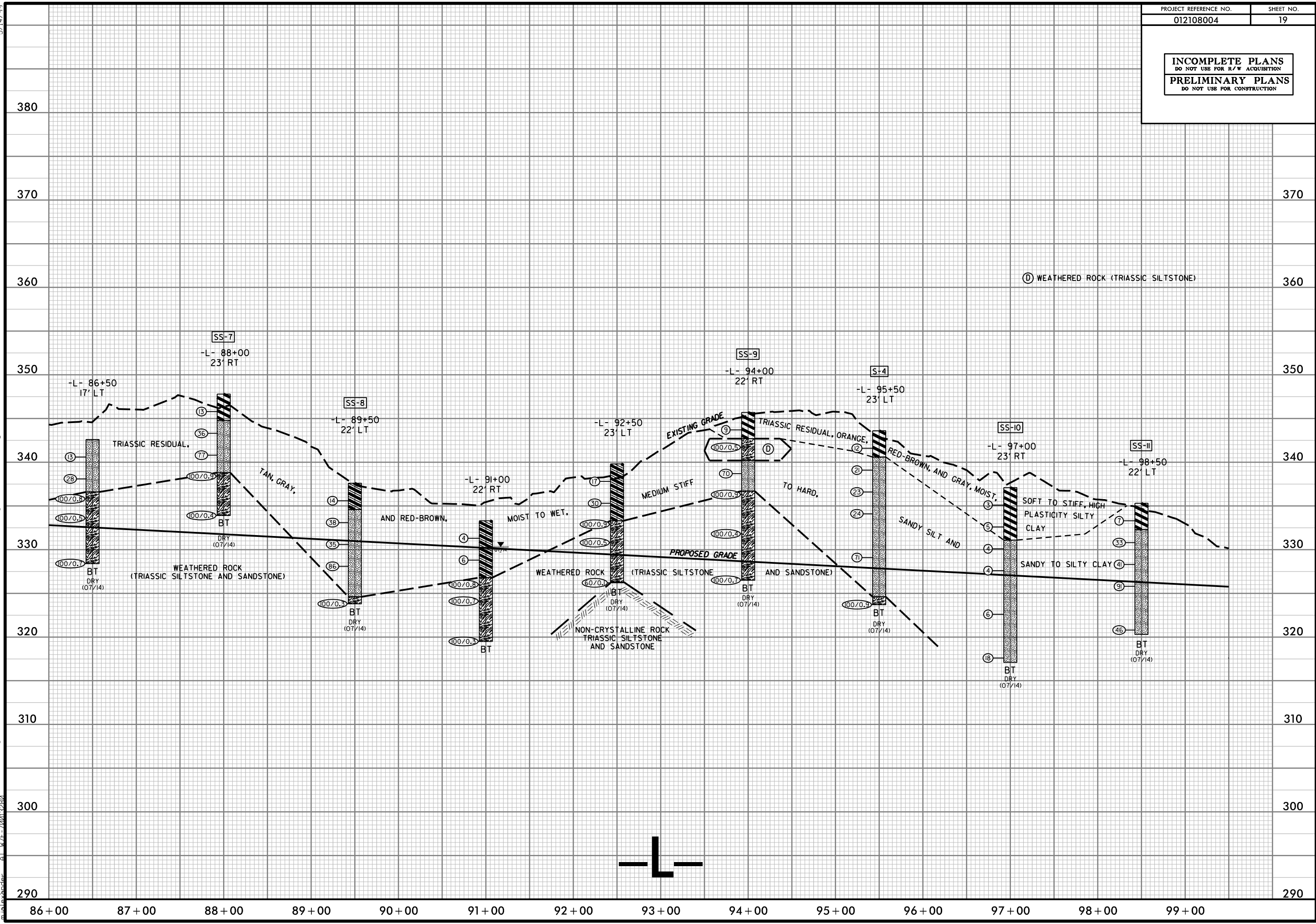
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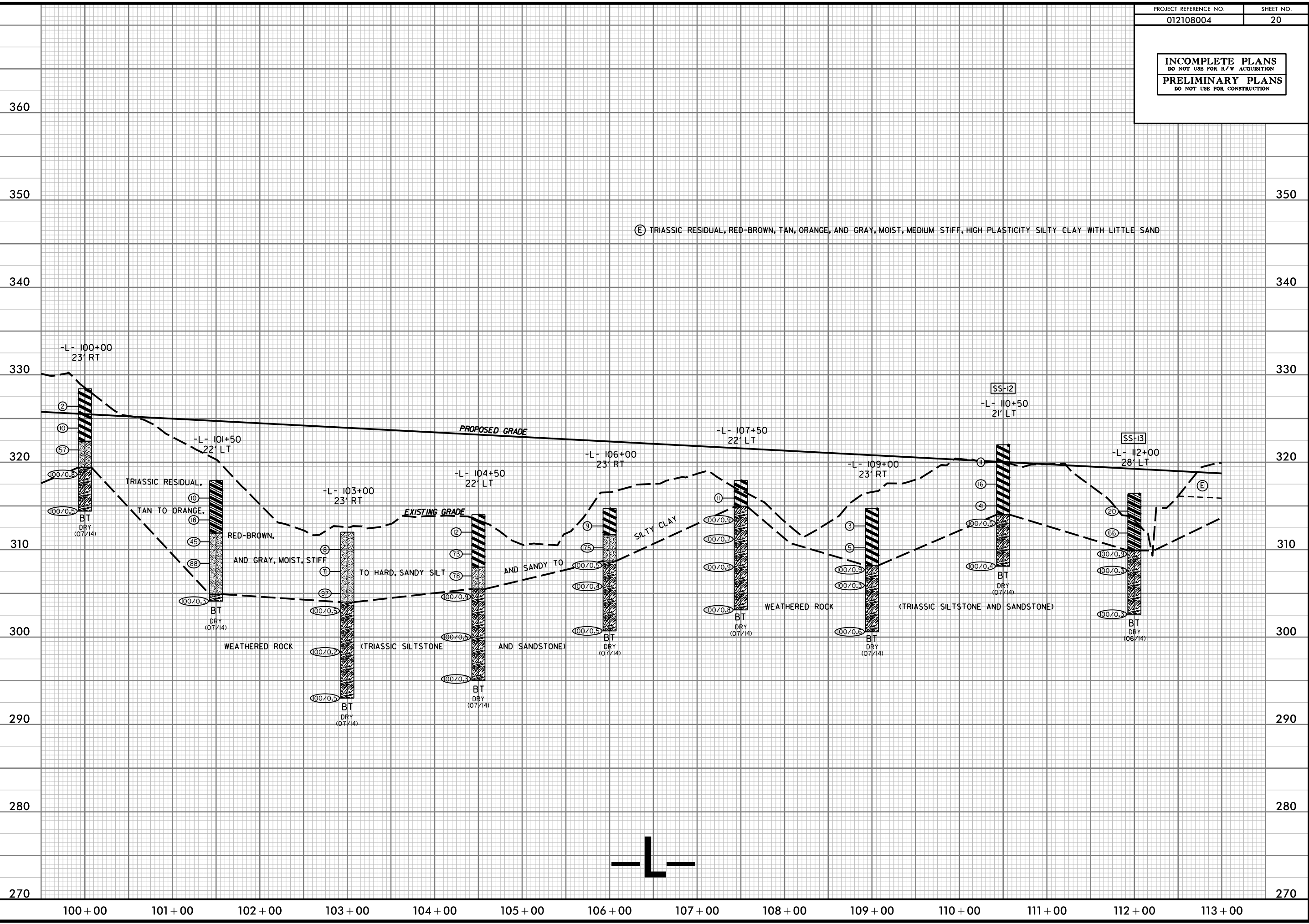
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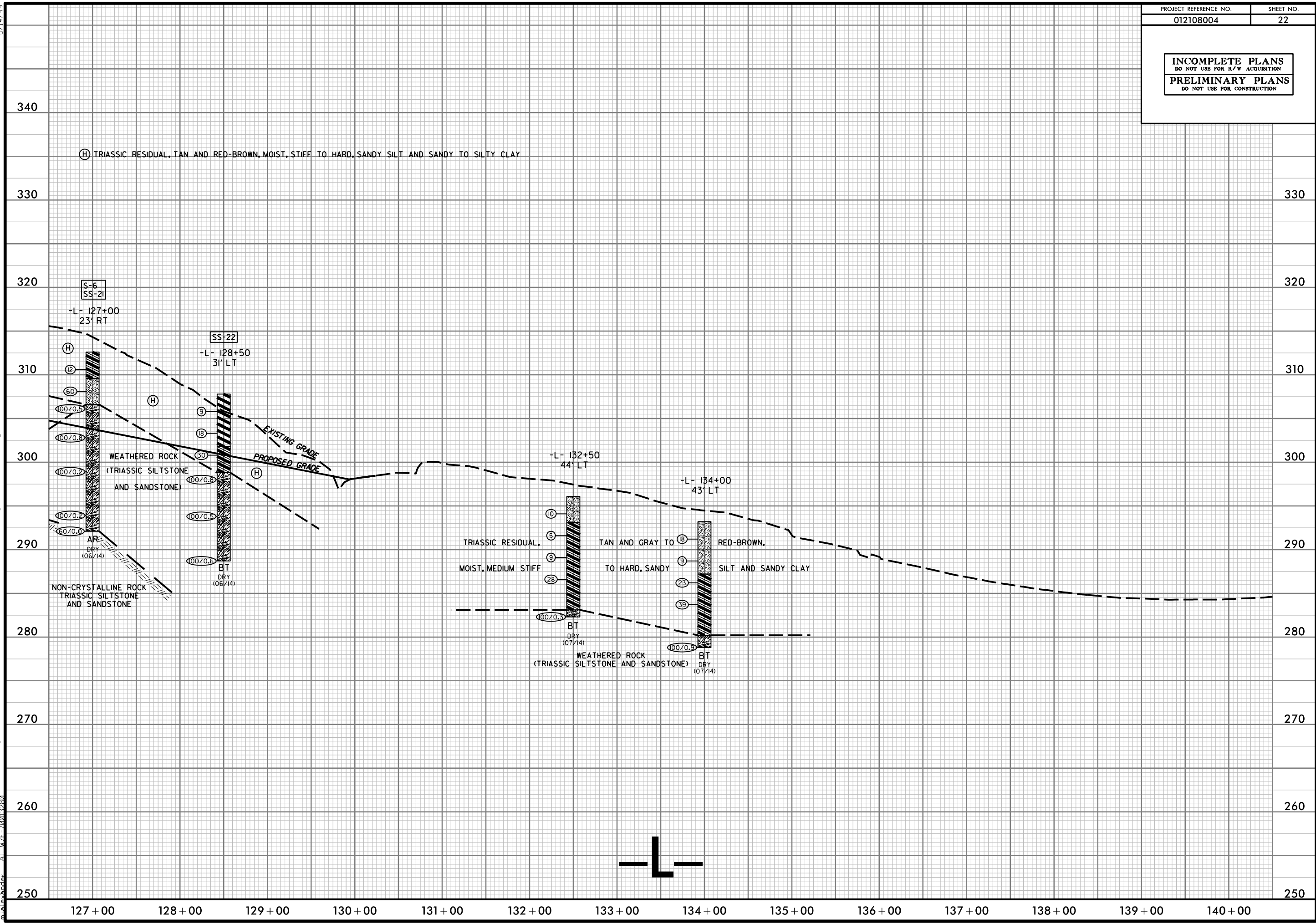


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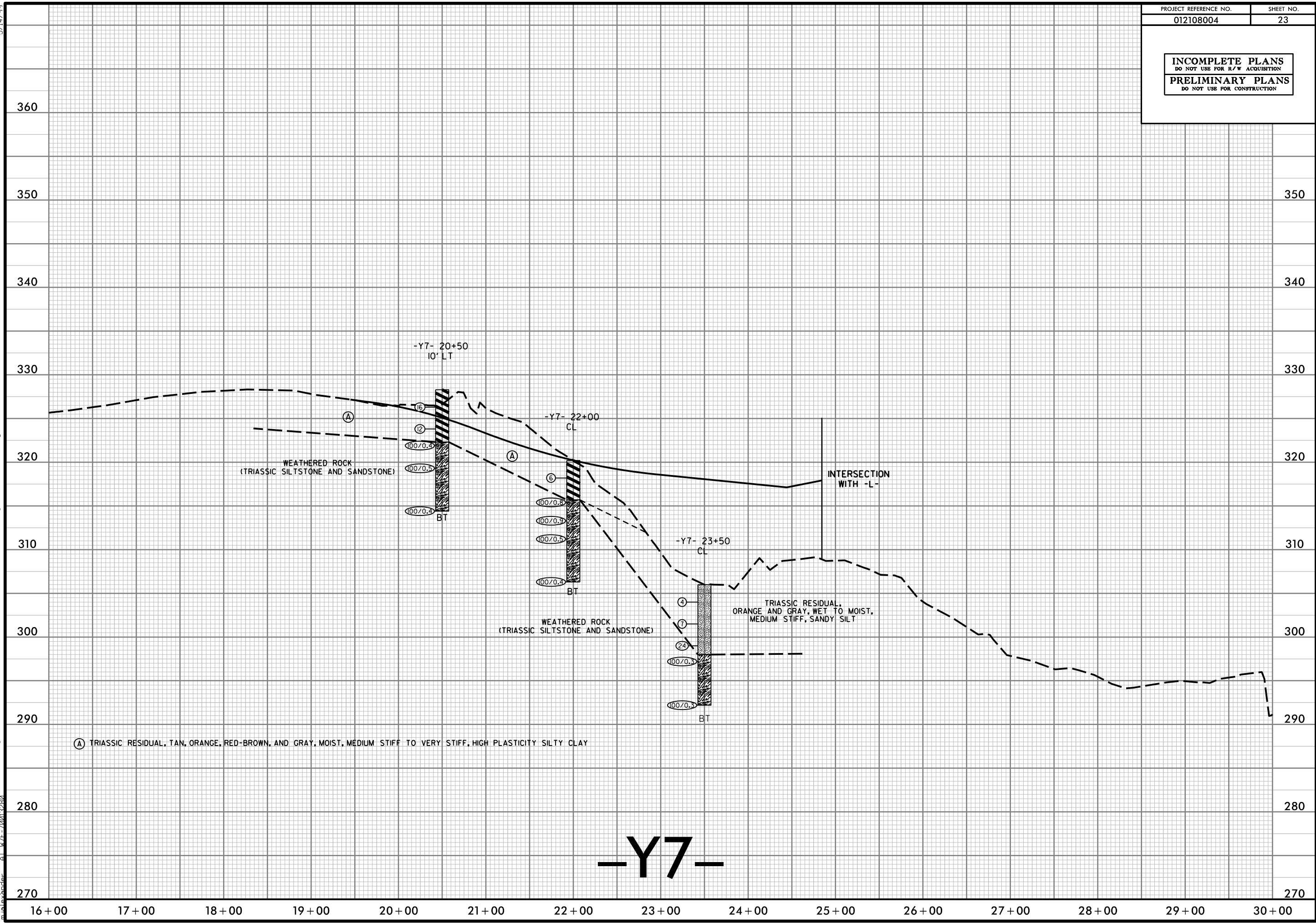


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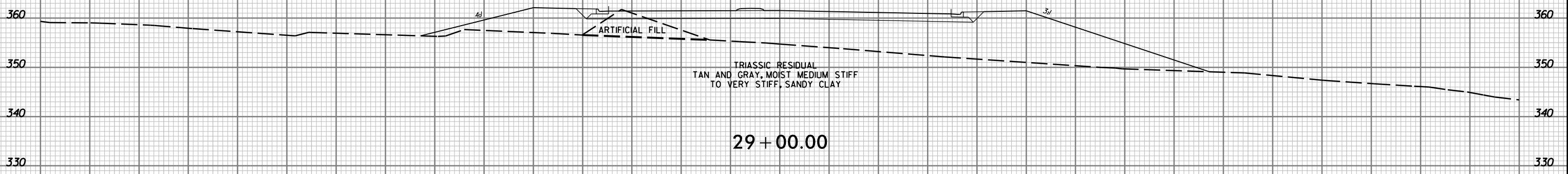
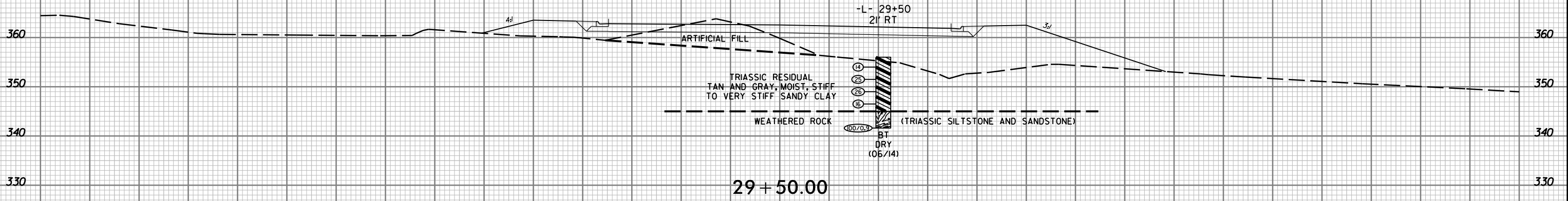
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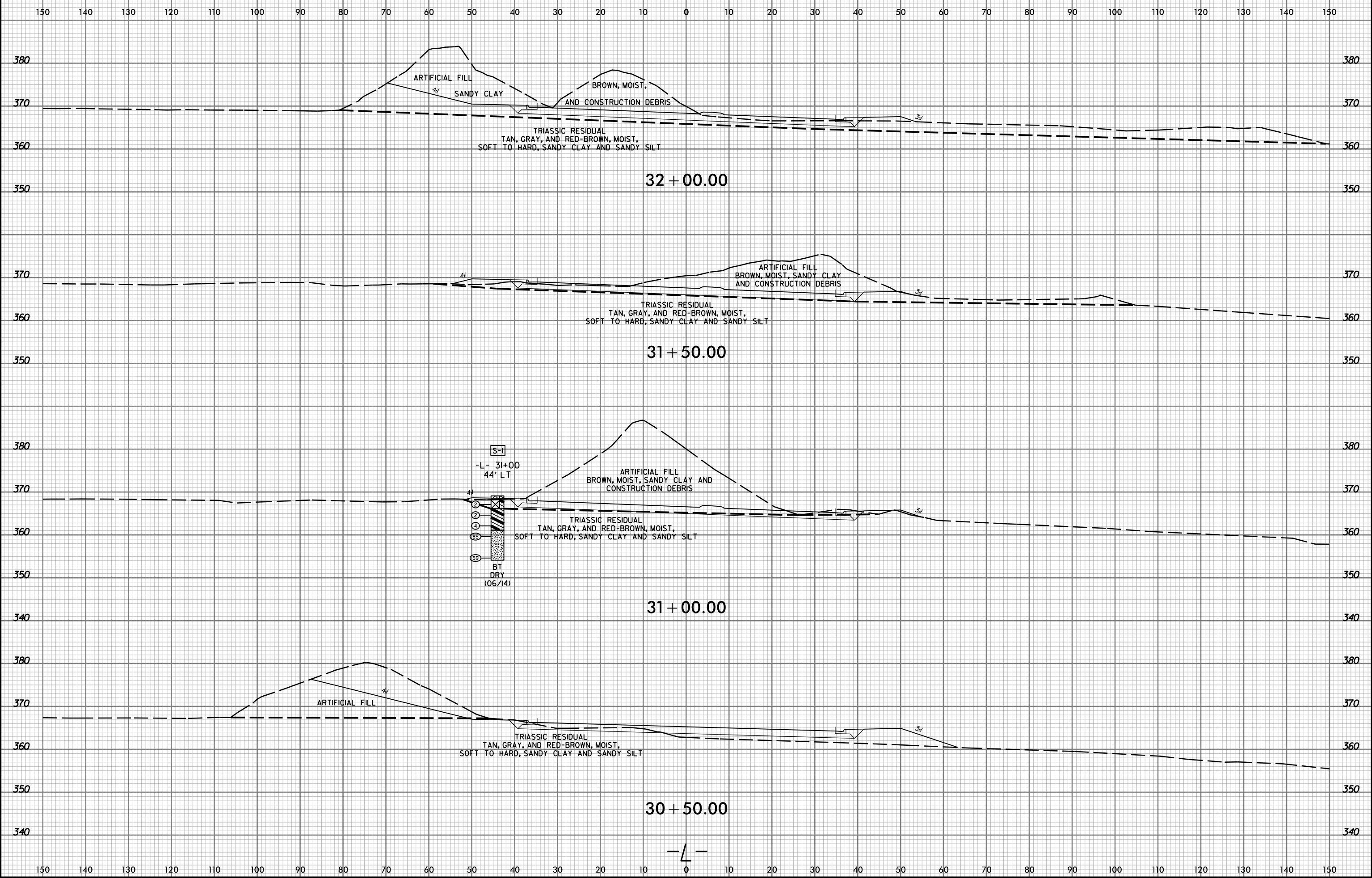


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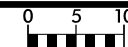
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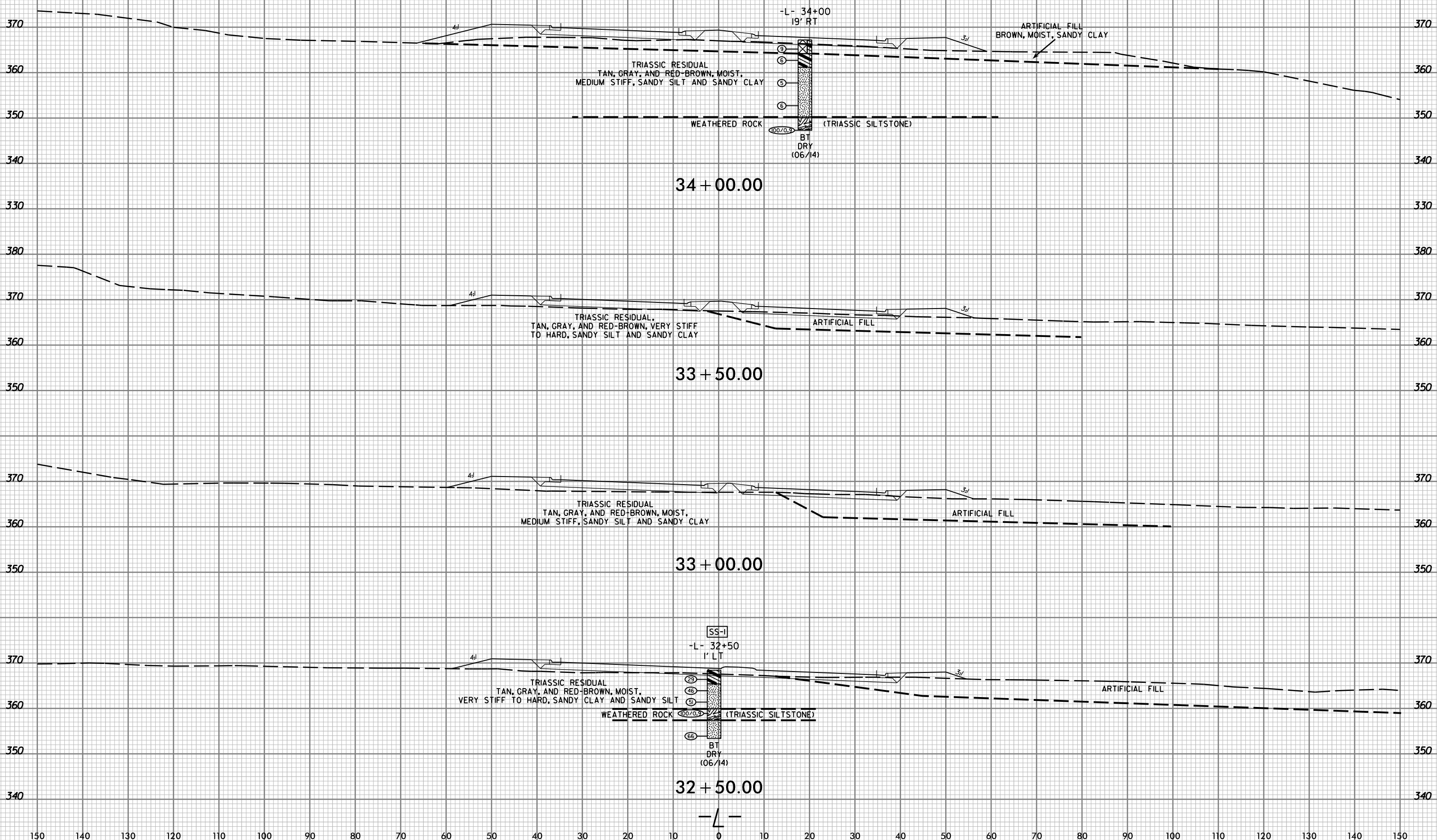
8/23/99



PROJ. REFERENCE NO.
012108004

SHEET NO.
26

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8/23/99

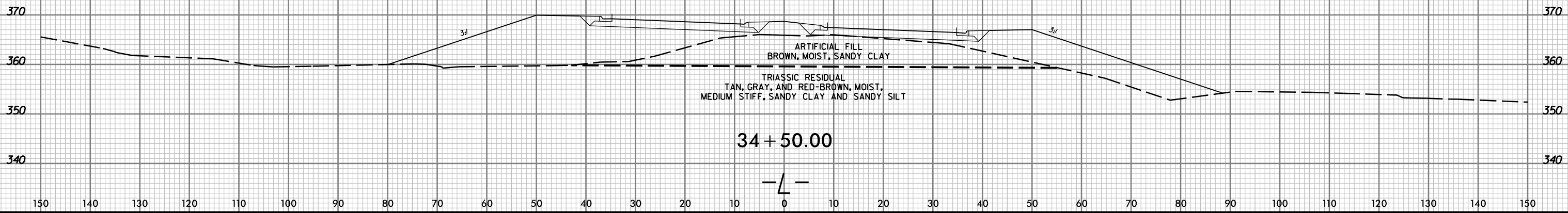


PROJ. REFERENCE NO.
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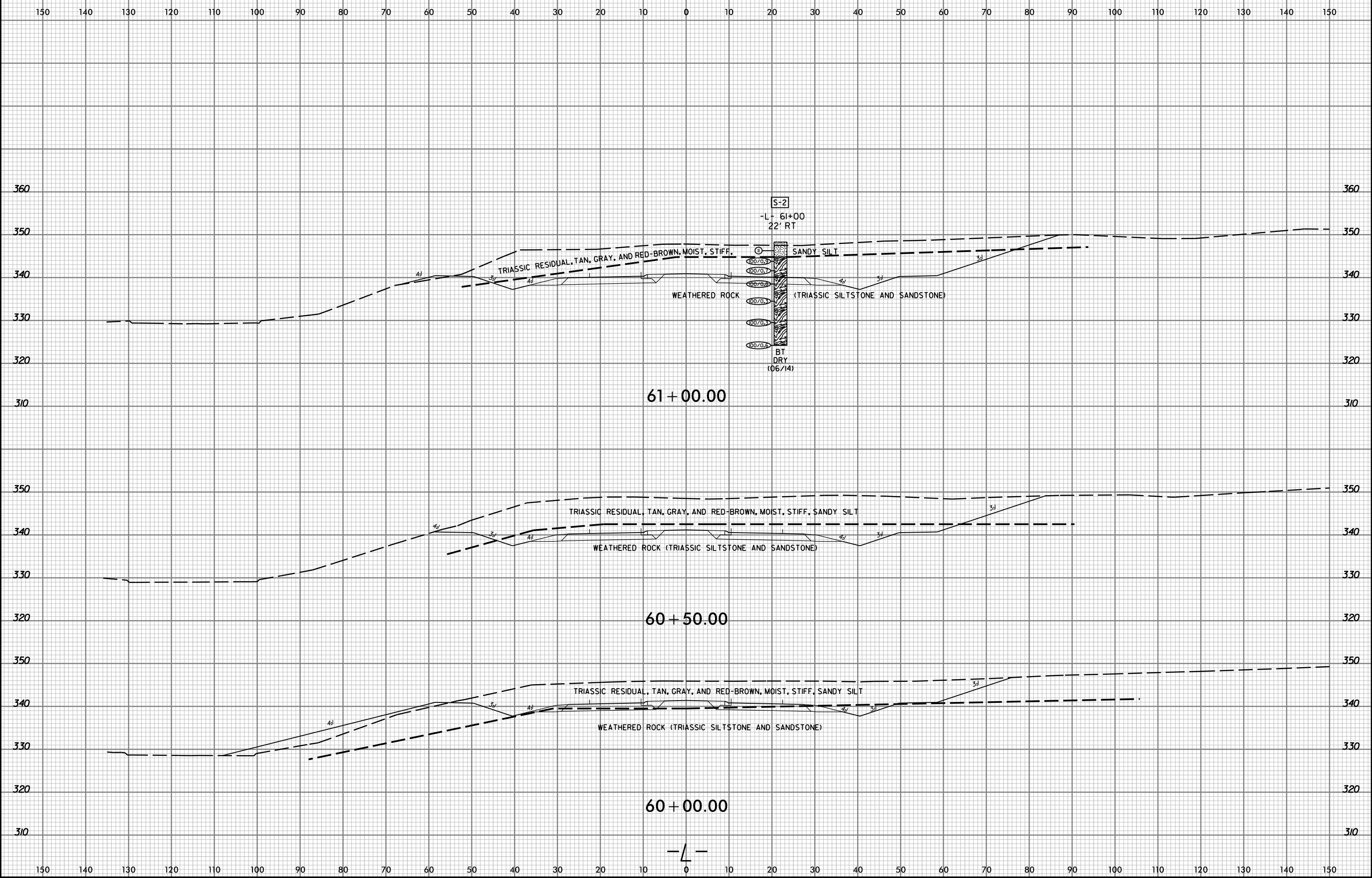
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27

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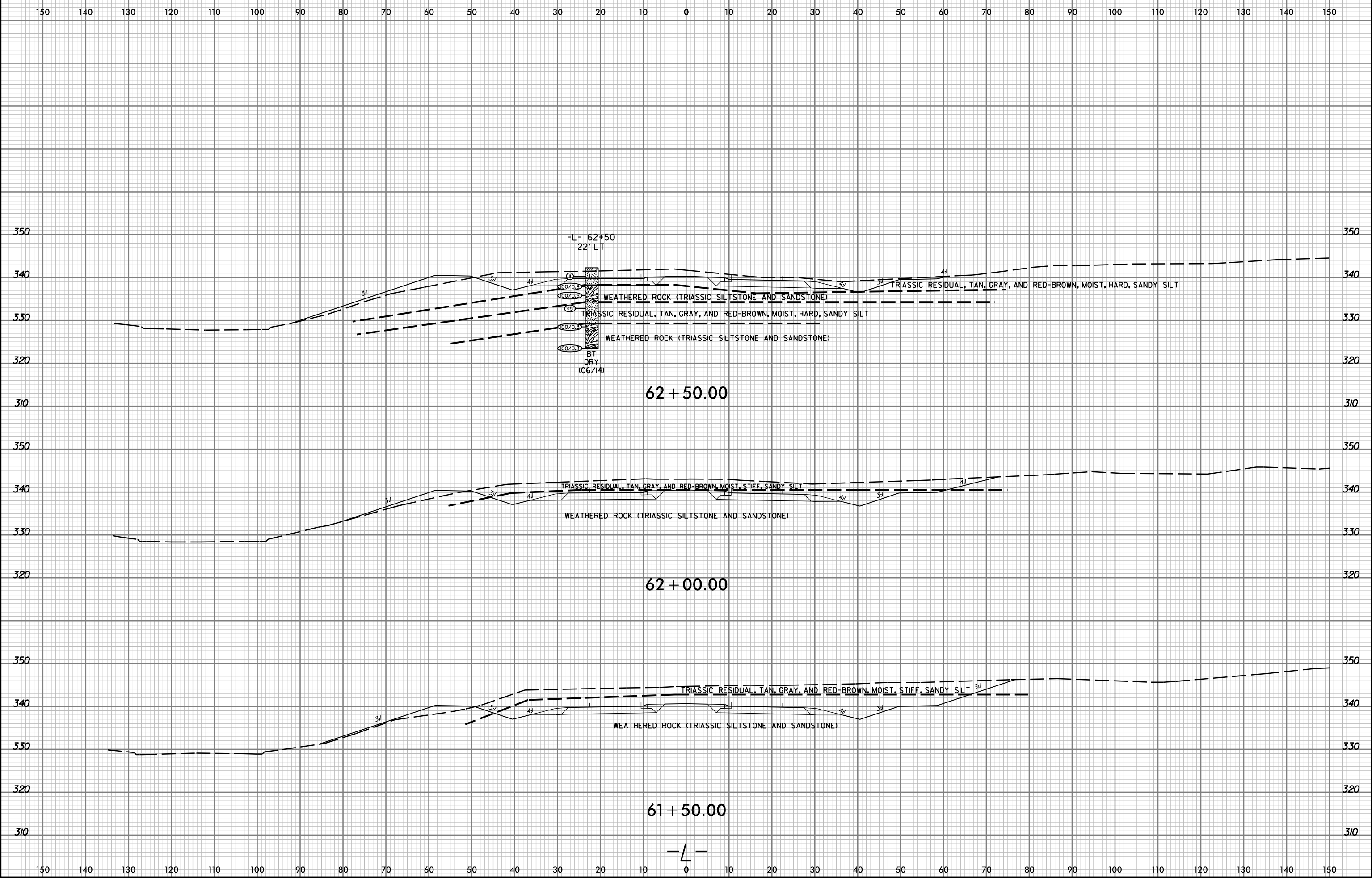


8/23/99



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8/23/99



-L- 62+50
22' LT

62 + 50.00

62 + 00.00

61 + 50.00

-L-

25-NOV-2014 15:33
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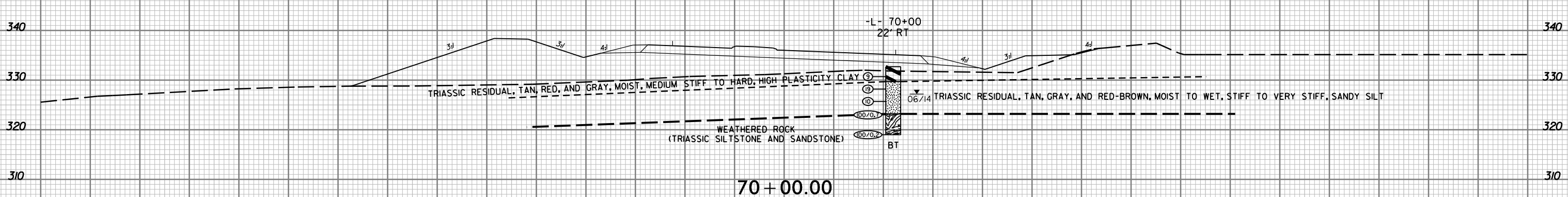
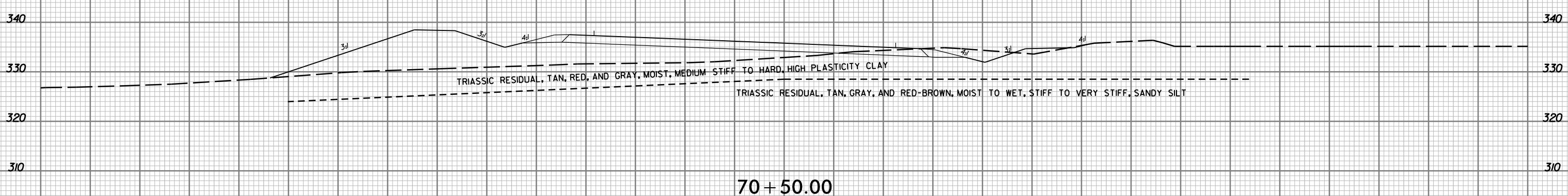
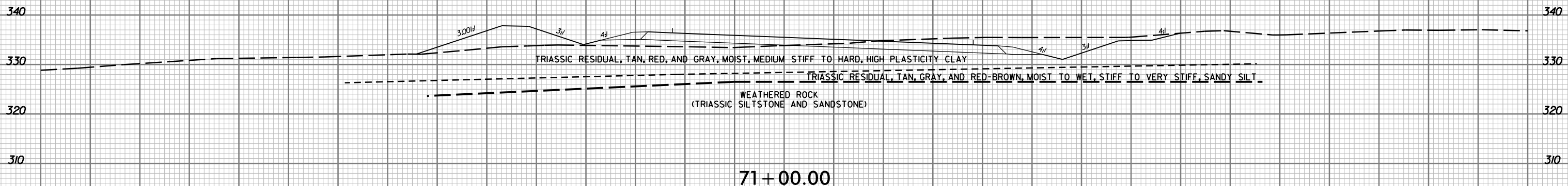
8/23/99



PROJ. REFERENCE NO.
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SHEET NO.
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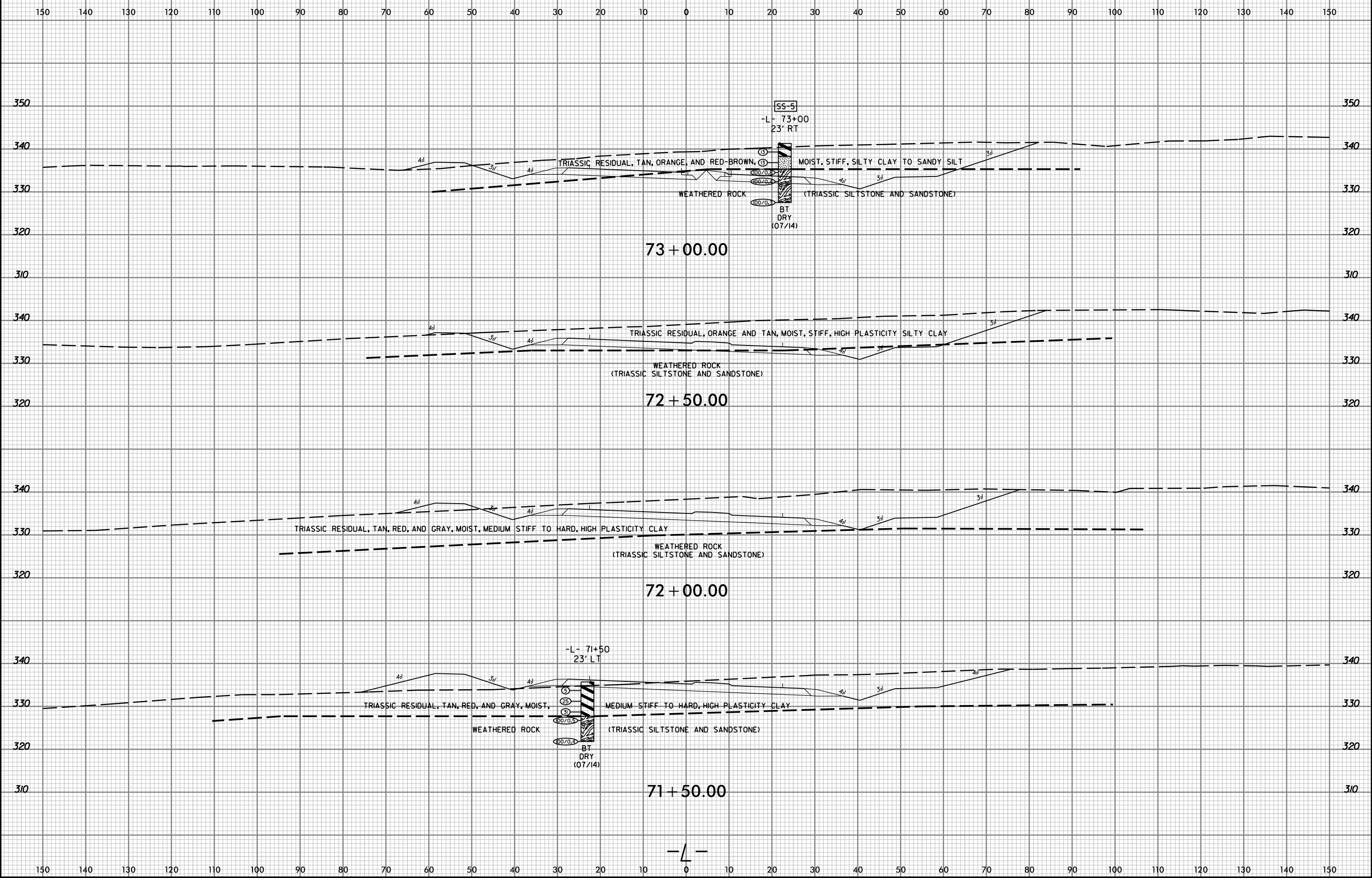
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8/23/99



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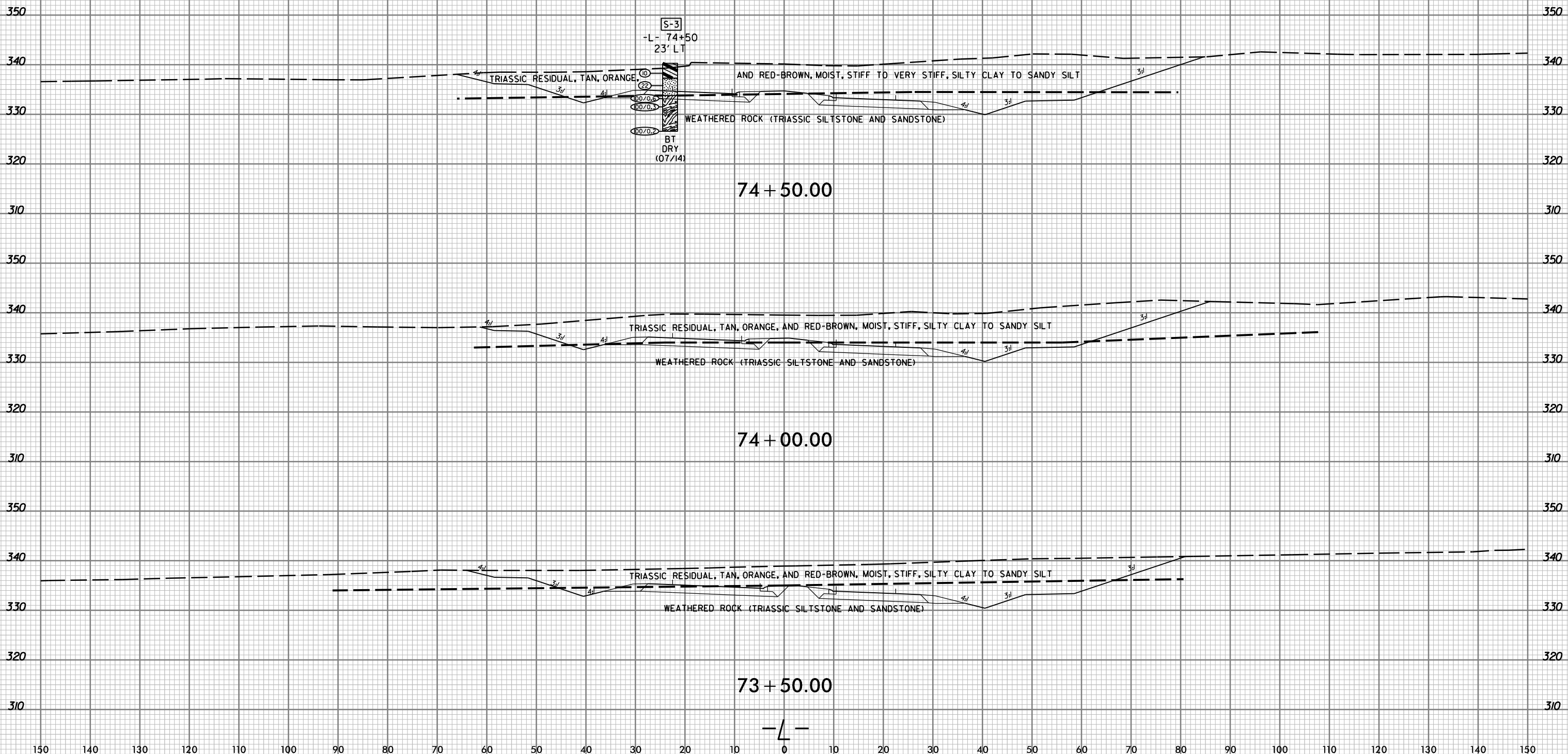
8/23/99



PROJ. REFERENCE NO.
012108004

SHEET NO.
32

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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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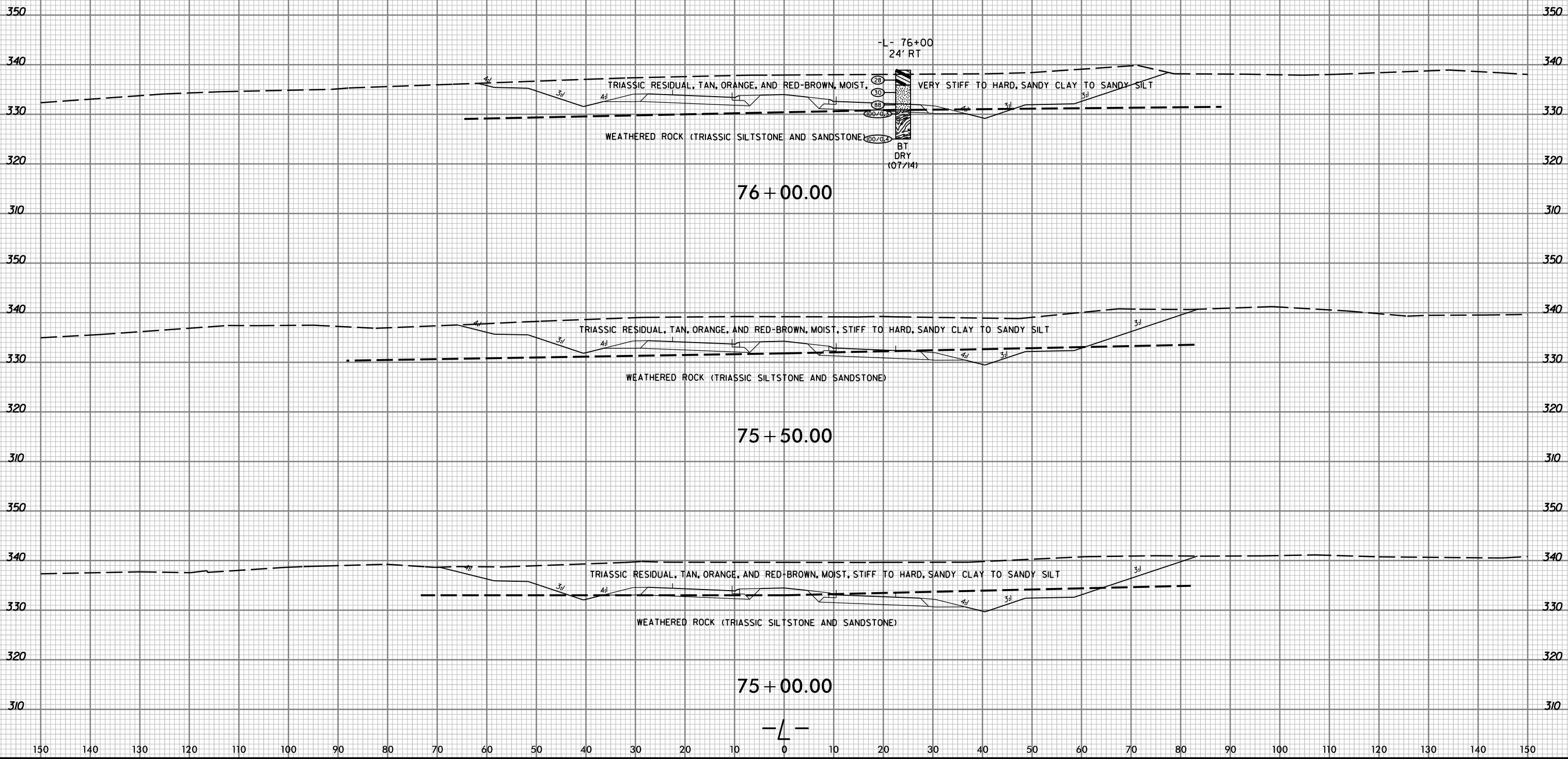
8/23/99



PROJ. REFERENCE NO.
012108004

SHEET NO.
33

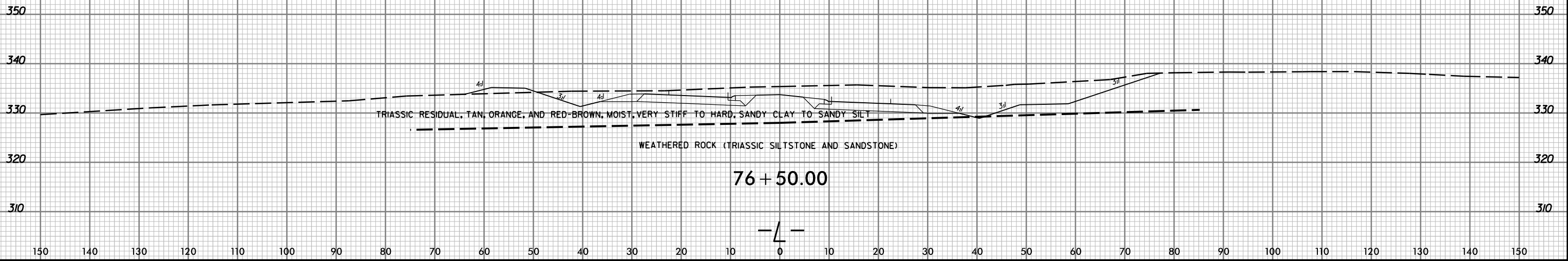
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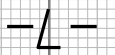
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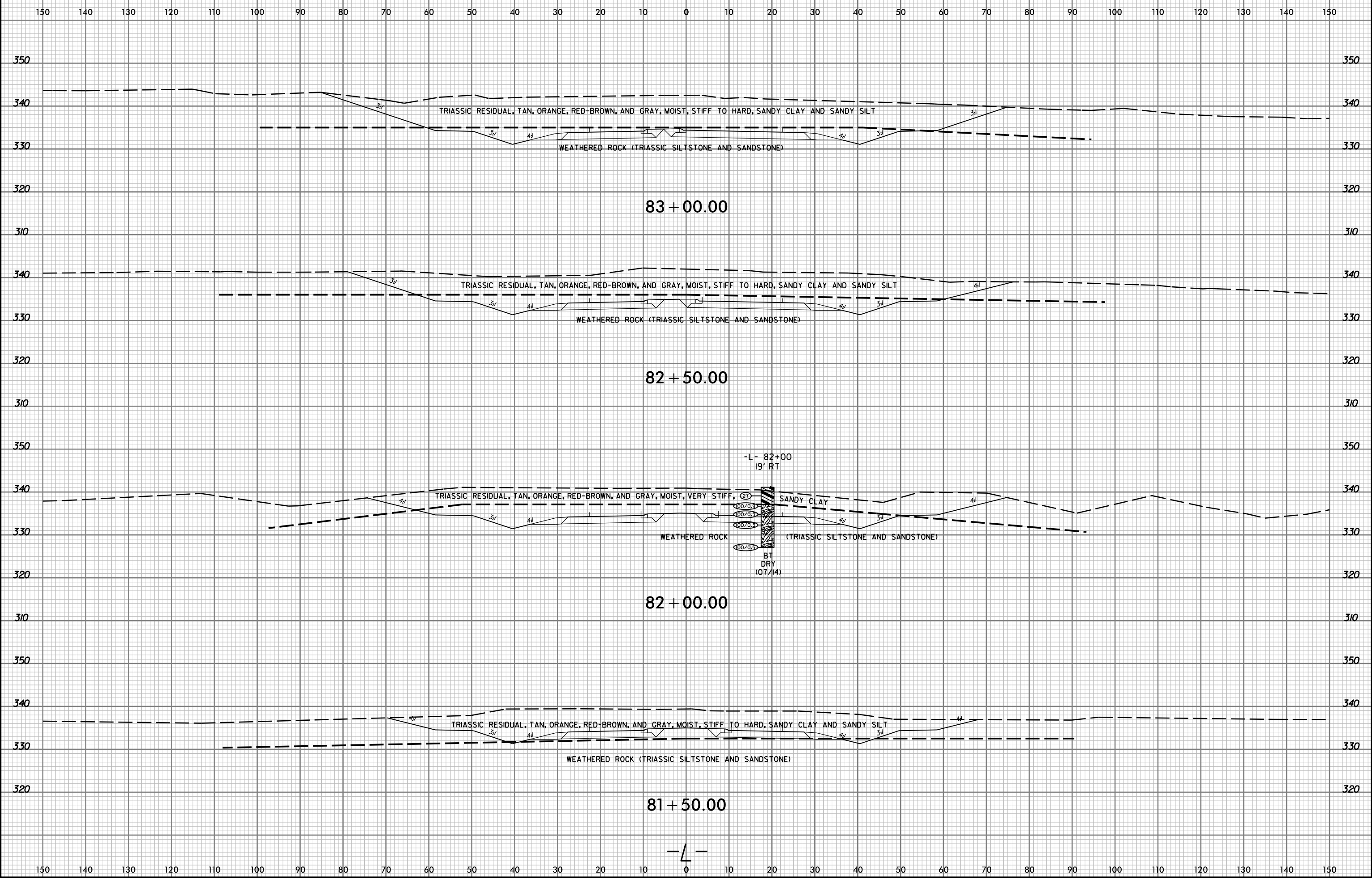
TRIASSIC RESIDUAL, TAN, ORANGE, AND RED-BROWN, MOIST, VERY STIFF TO HARD, SANDY CLAY TO SANDY SILT

WEATHERED ROCK (TRIASSIC SILTSTONE AND SANDSTONE)

76 + 50.00

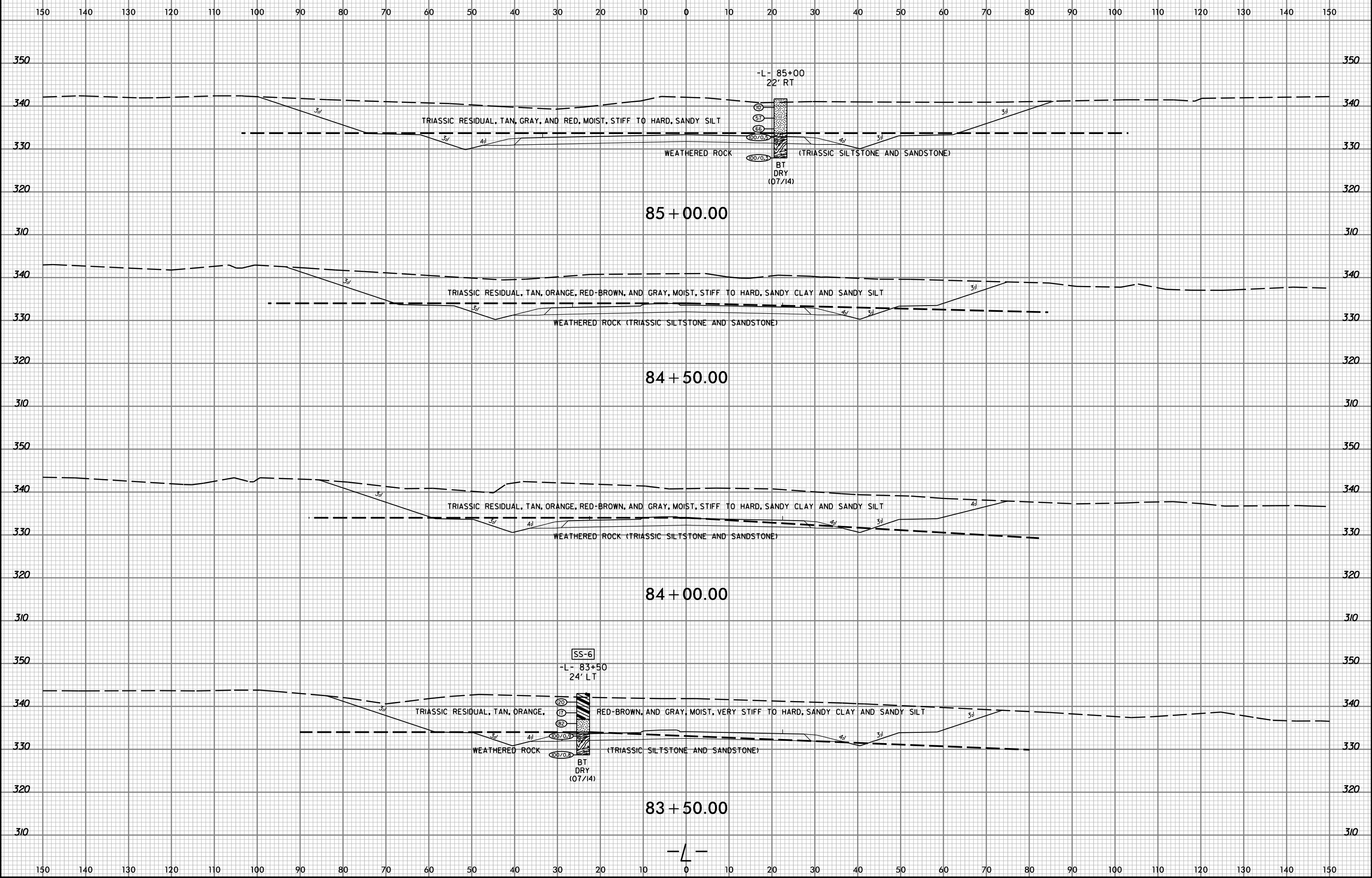


8/23/99



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8/23/99



25-NOV-2014 15:33
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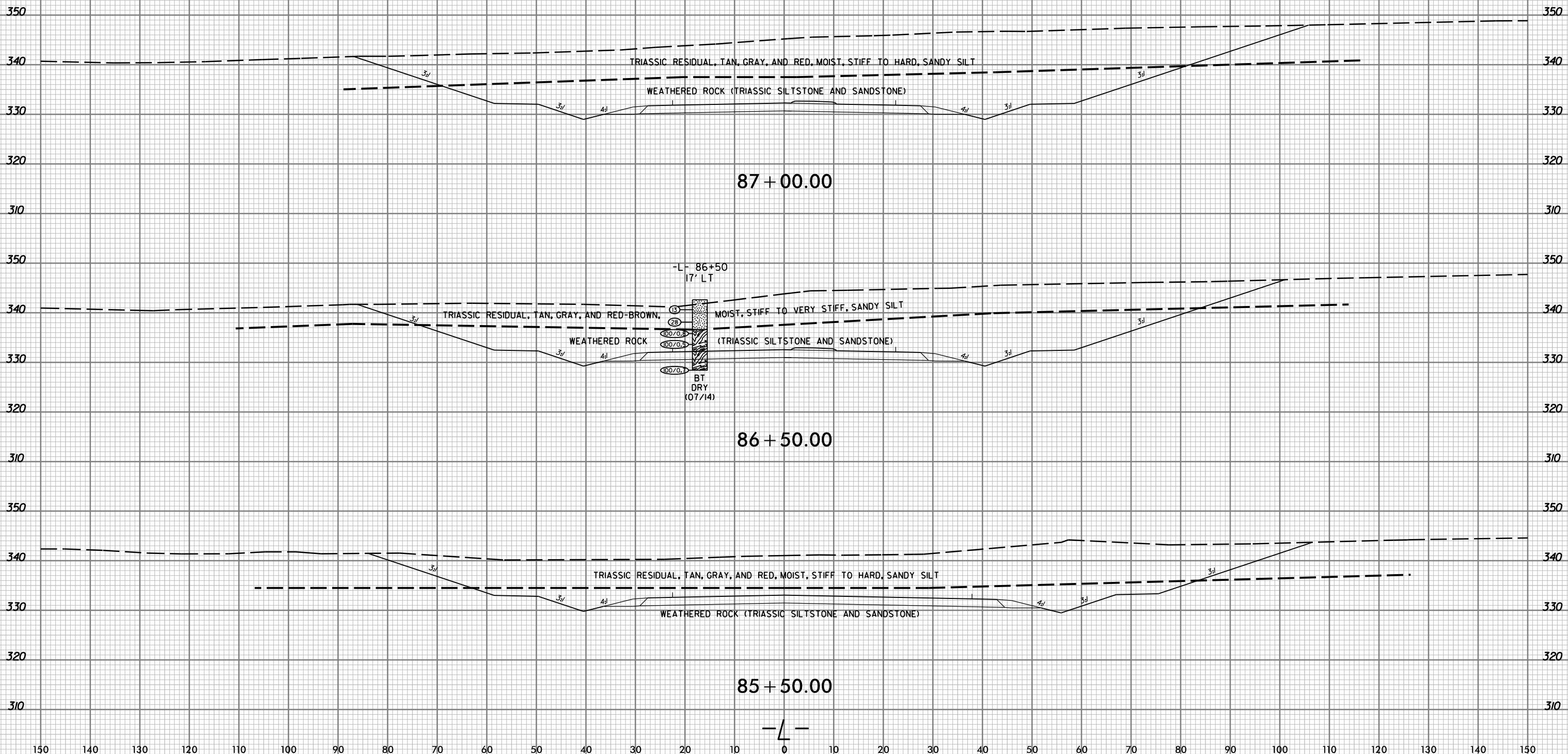
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PROJ. REFERENCE NO.
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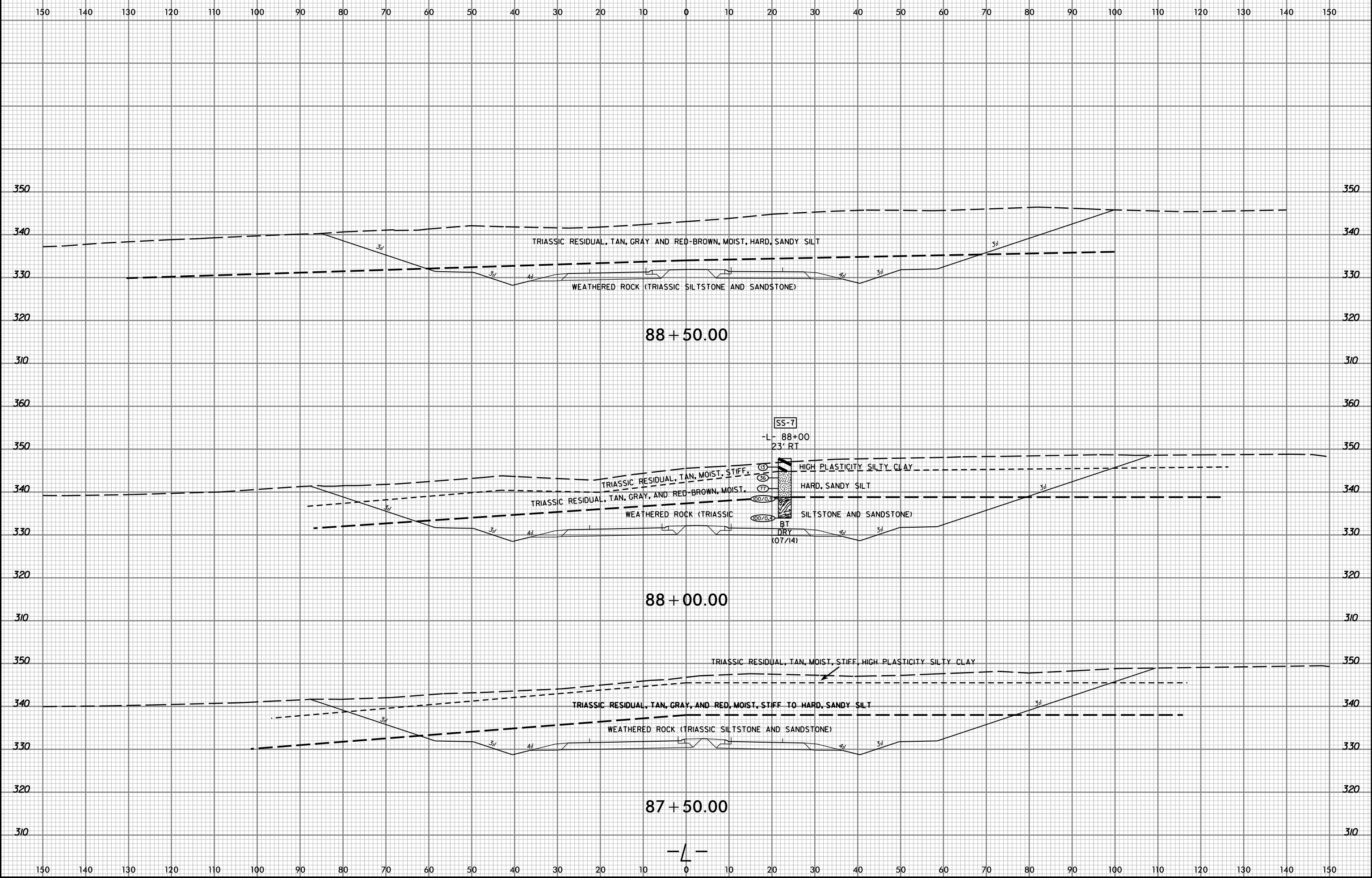
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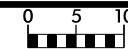
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m\alexander... 11/17/00 13:50

8/23/99



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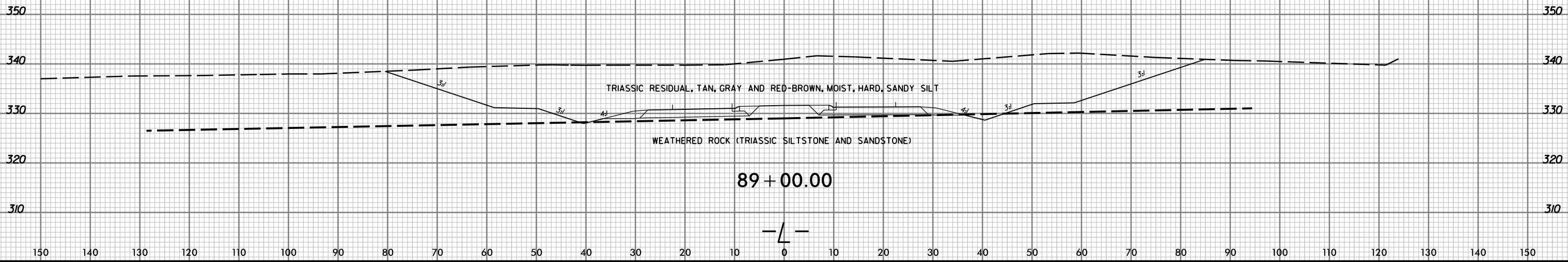
8/23/99



PROJ. REFERENCE NO.
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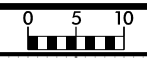
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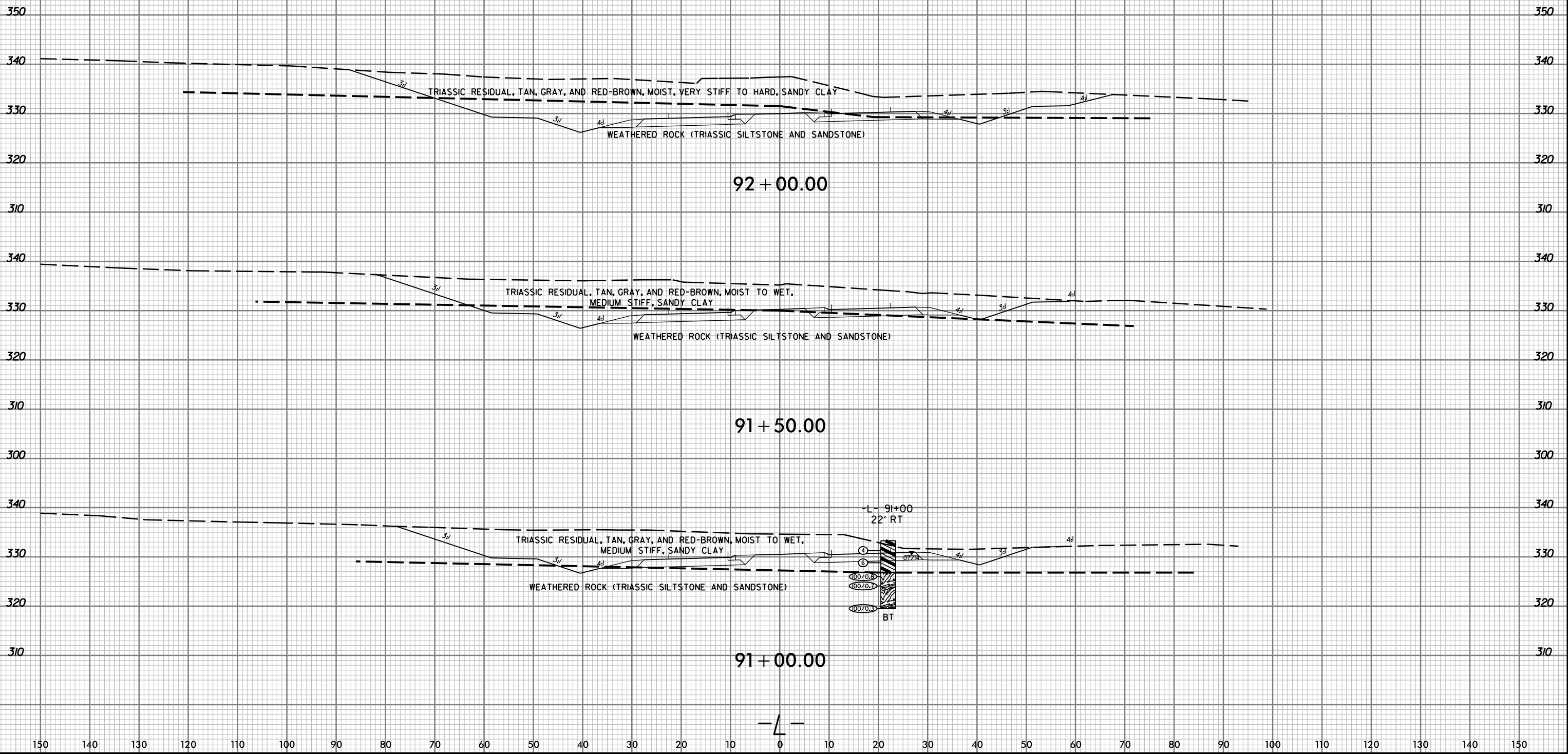
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8/23/99



PROJ. REFERENCE NO.	SHEET NO.
012108004	40

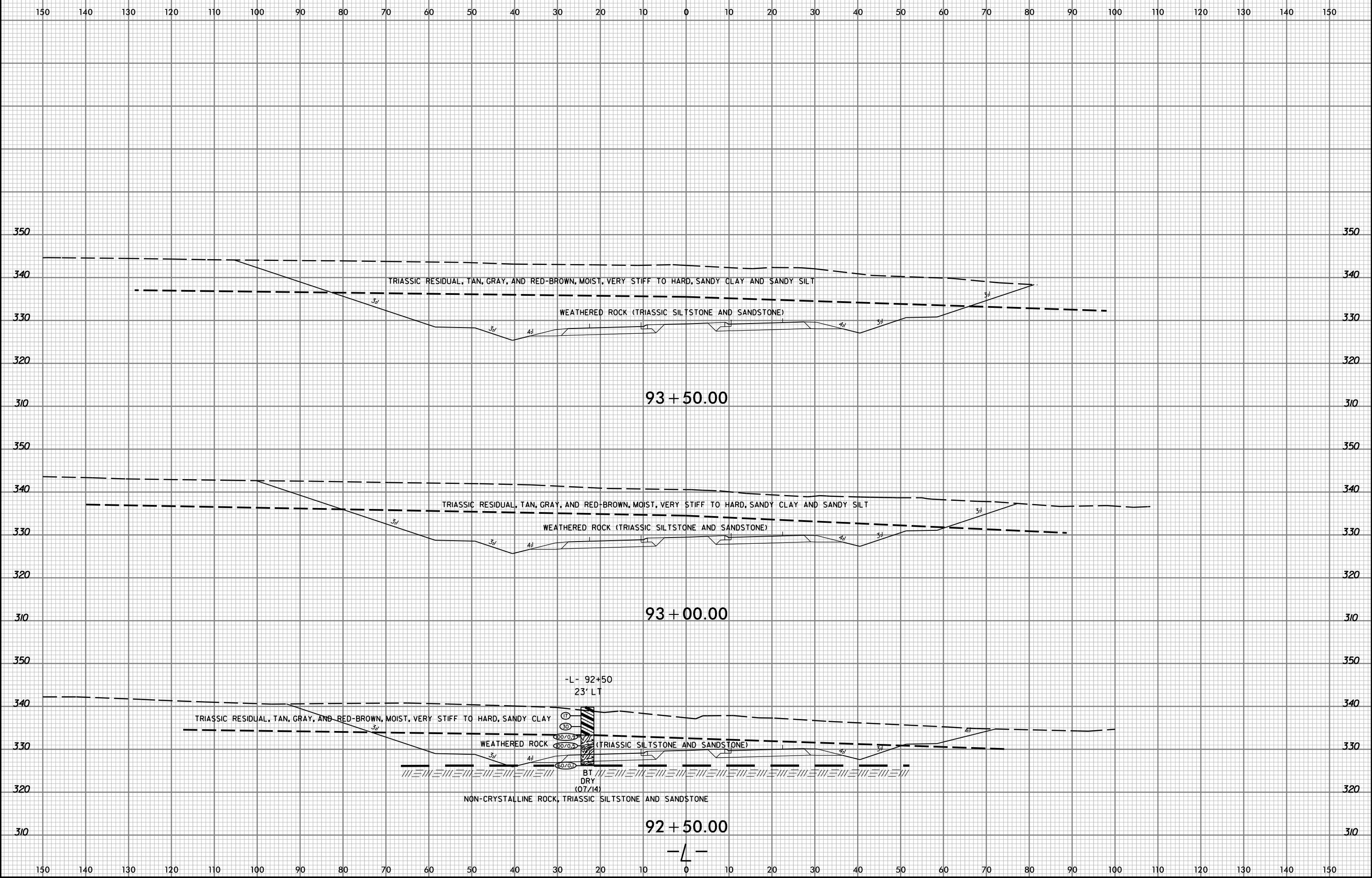
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8/23/99



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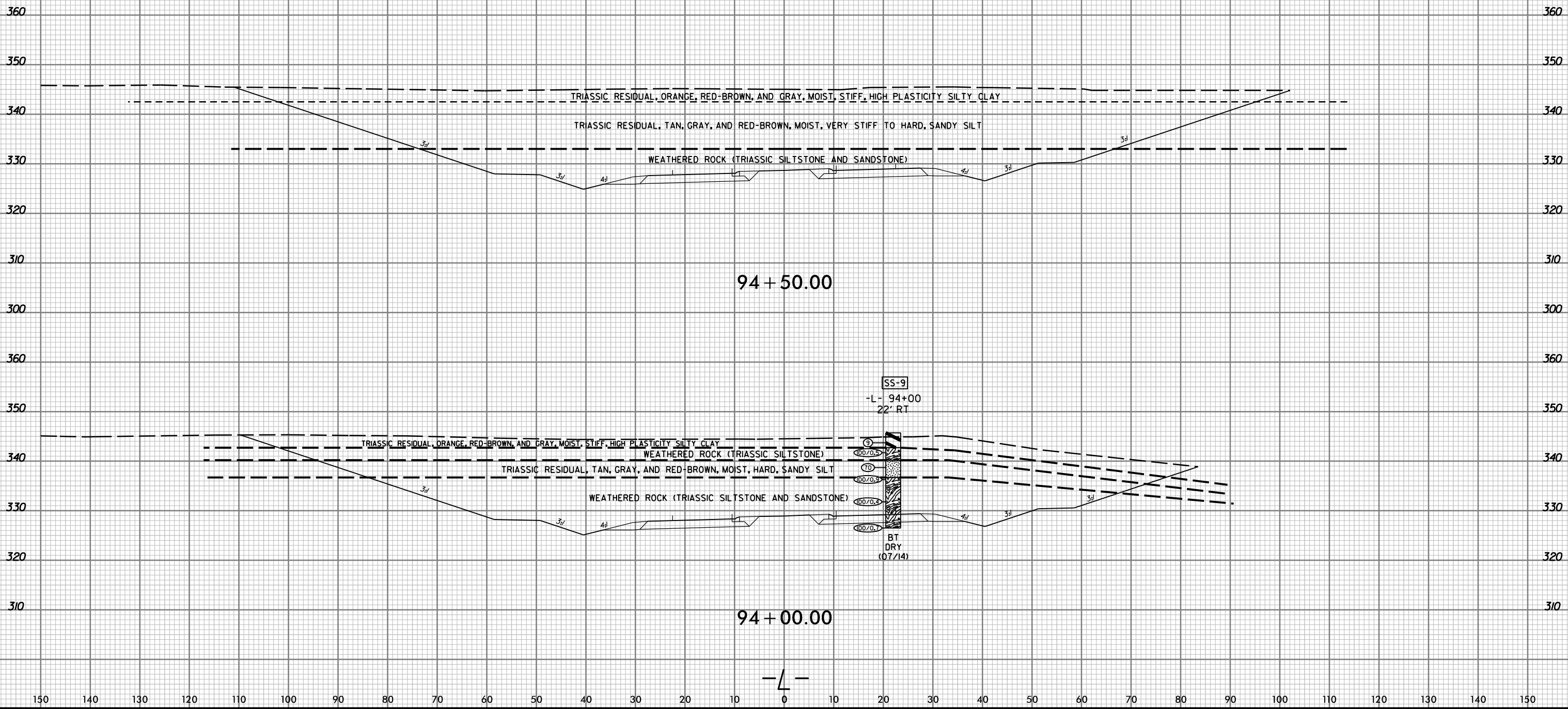
8/23/99



PROJ. REFERENCE NO.
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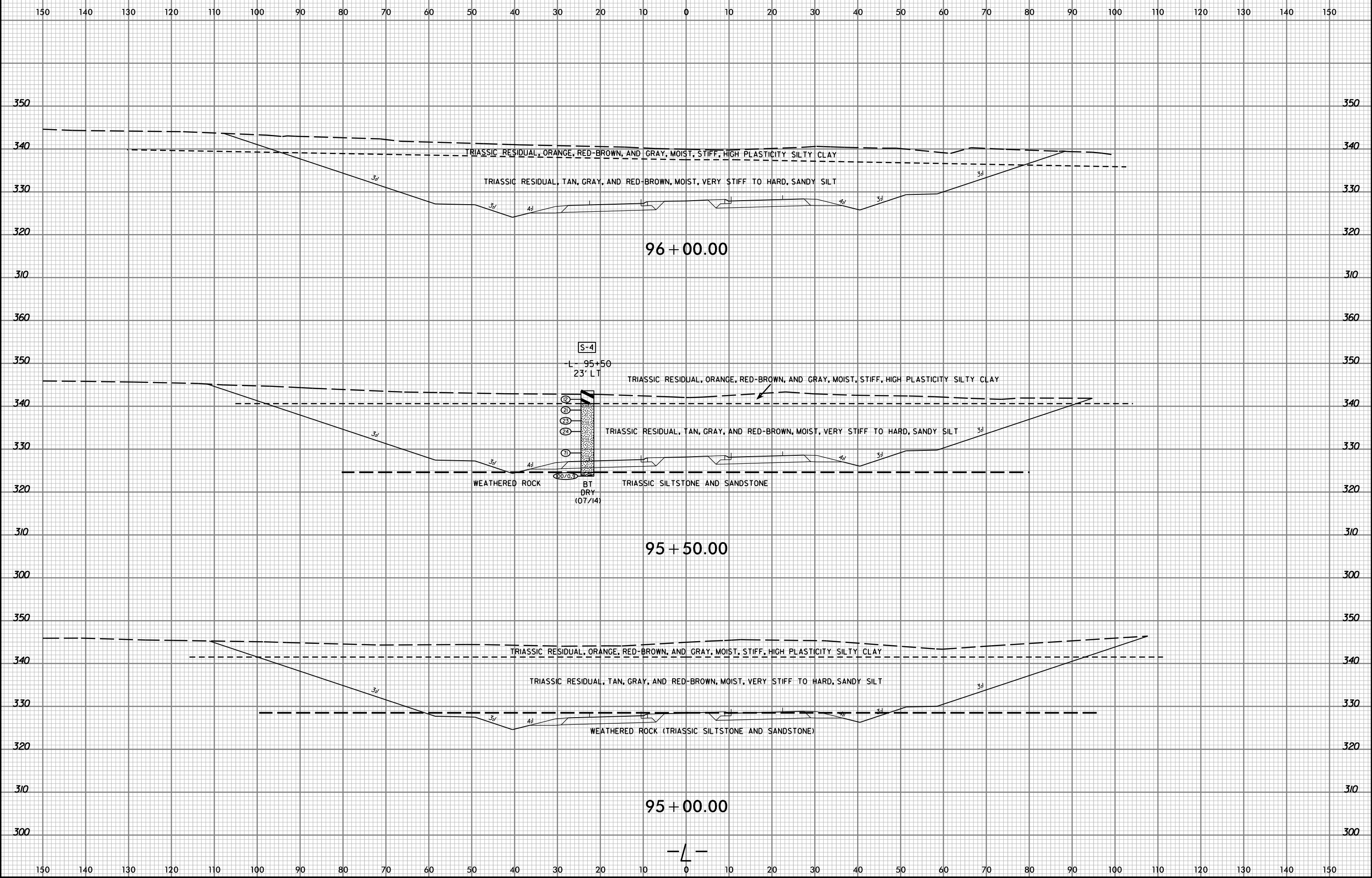
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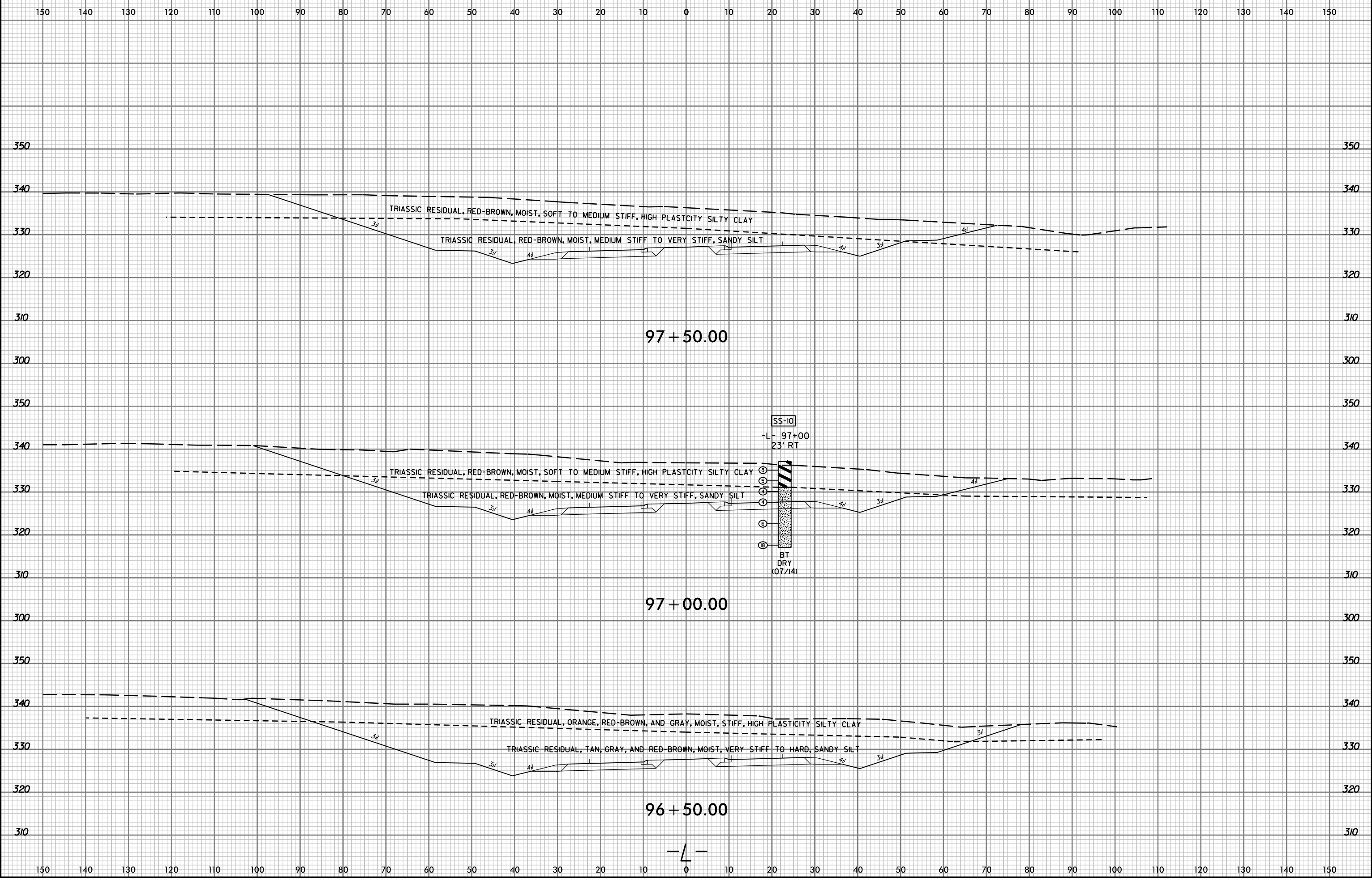
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8/23/99



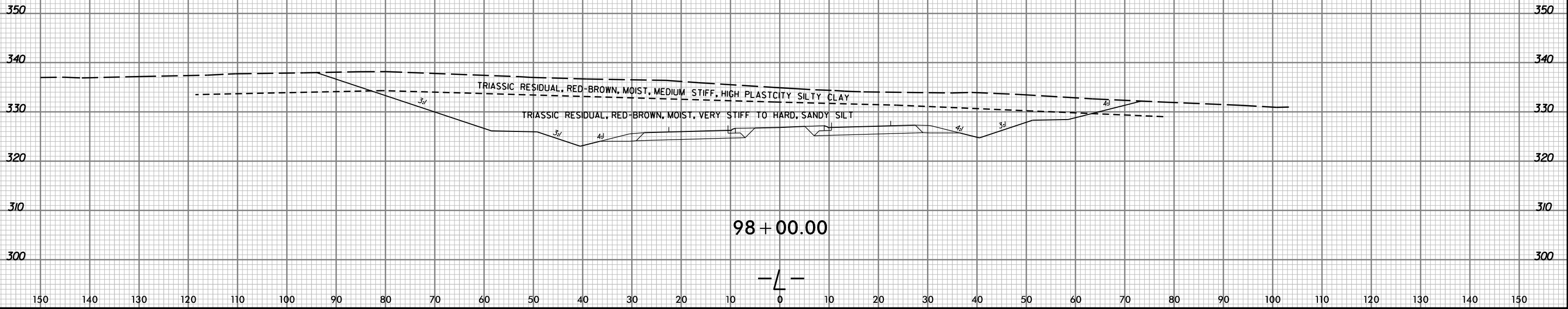
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8/23/99



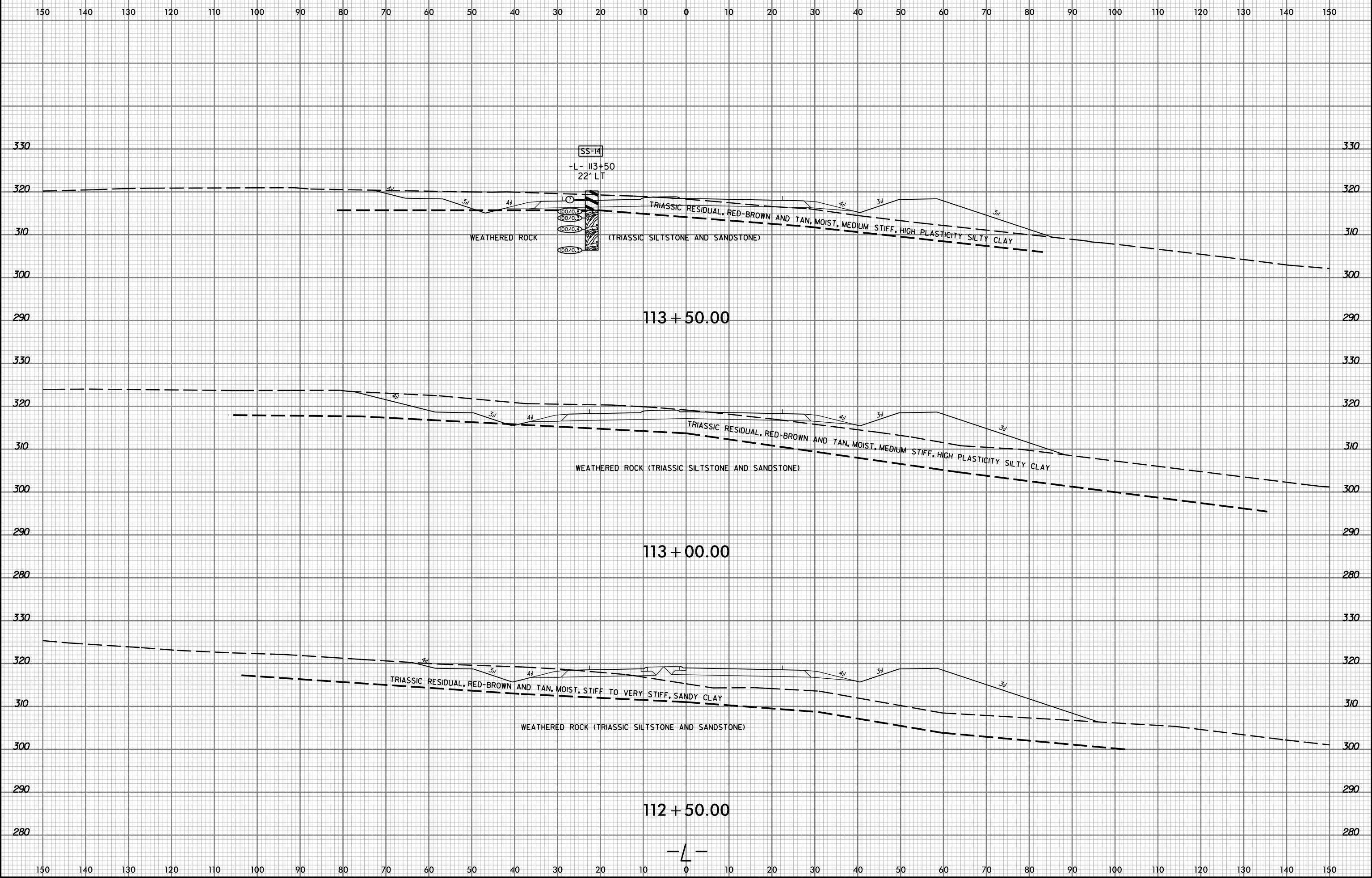
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8/23/99



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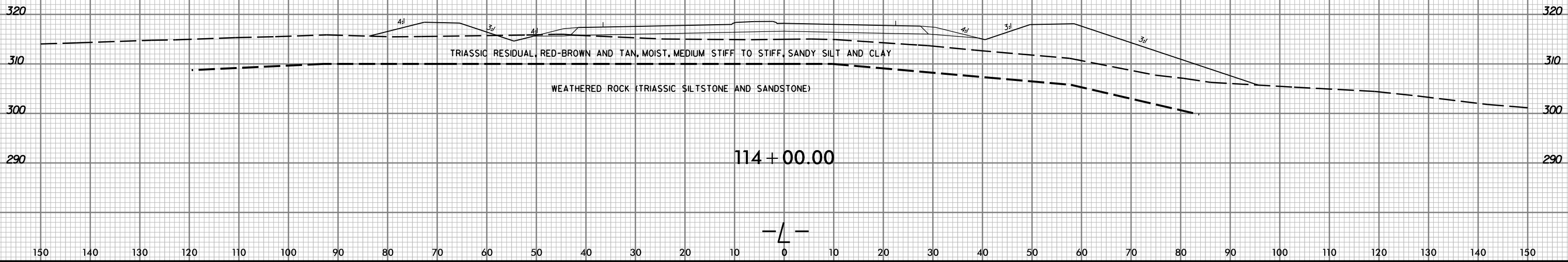
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PROJ. REFERENCE NO.
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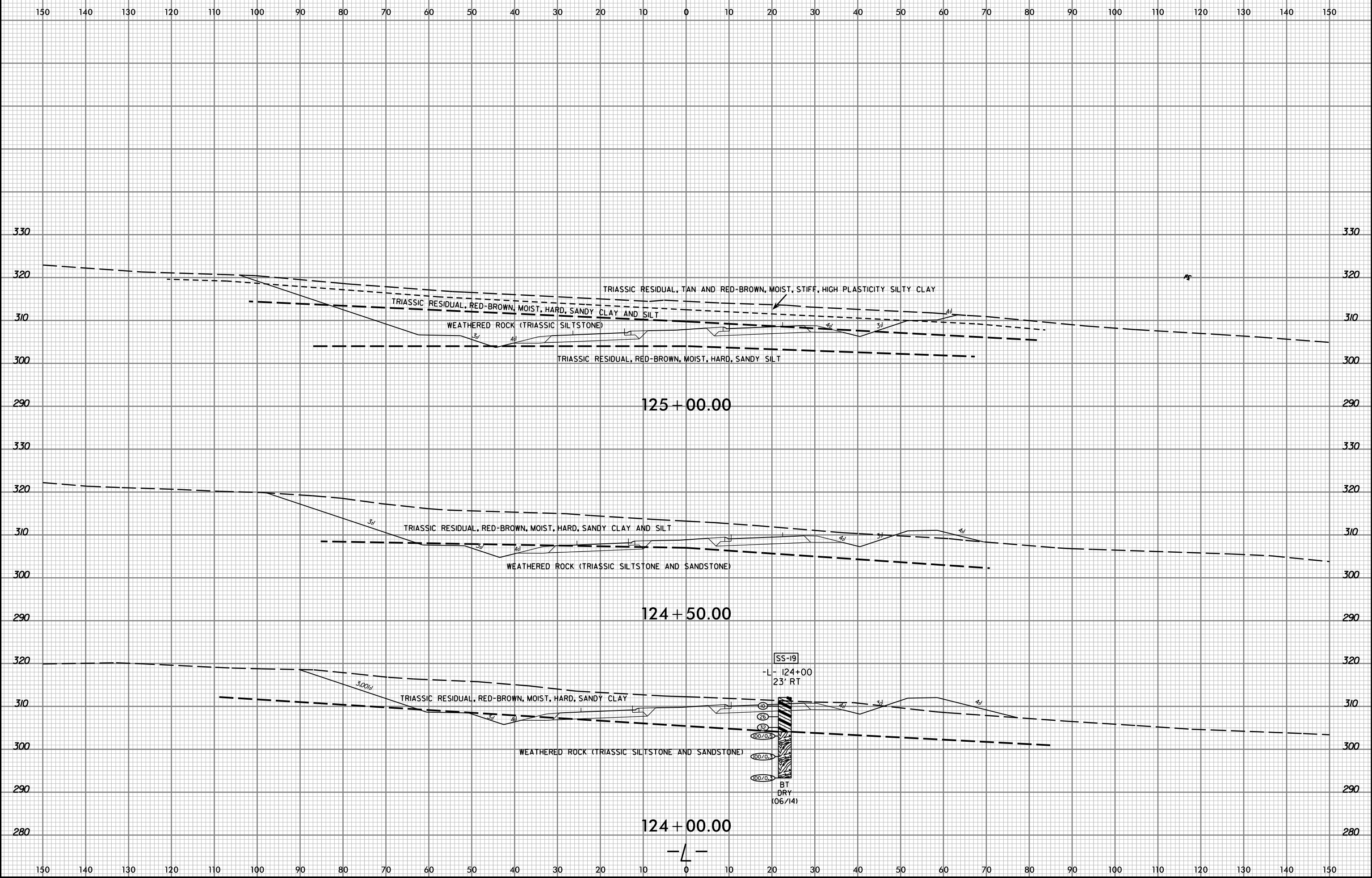
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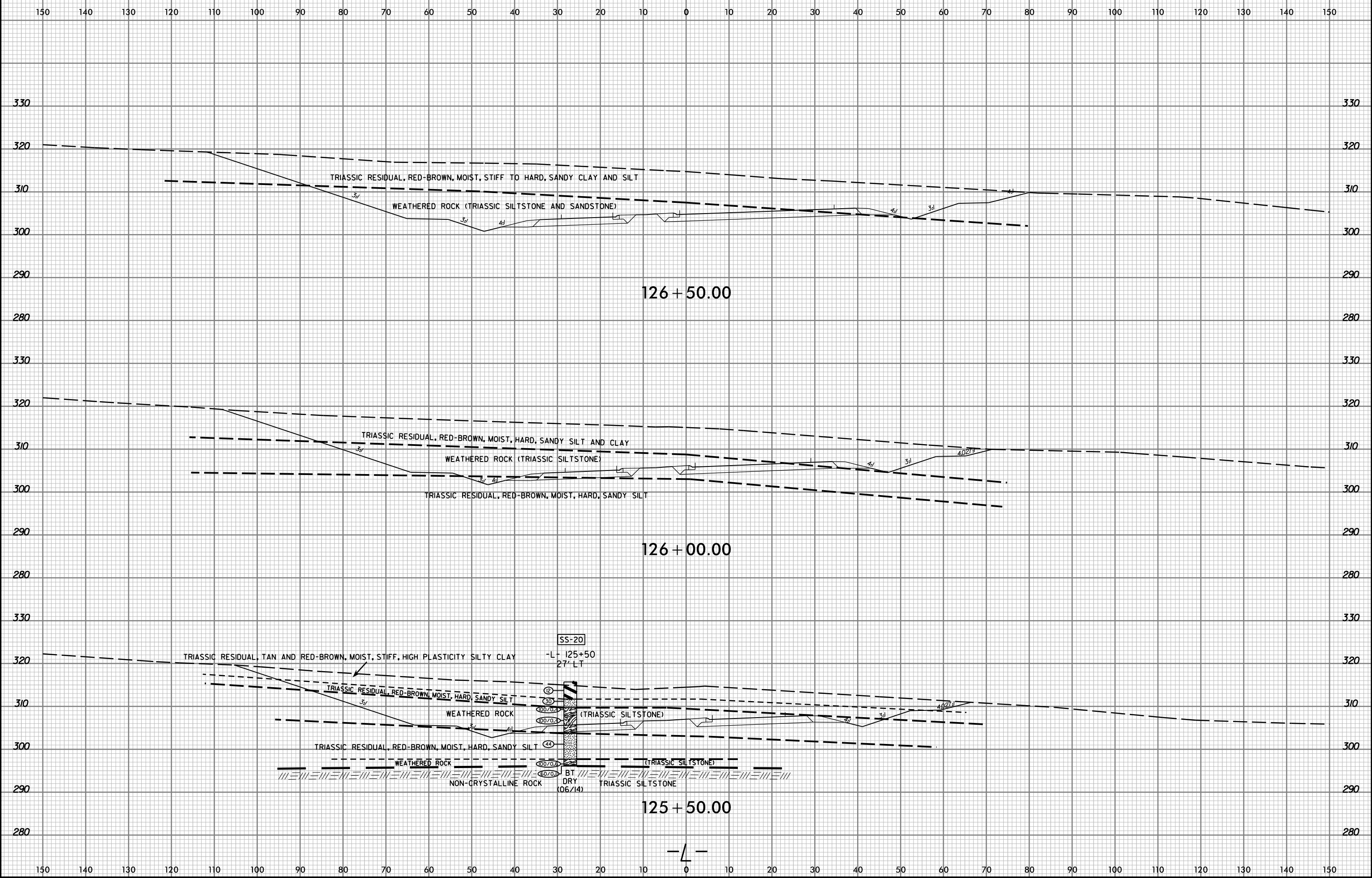
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8/23/99



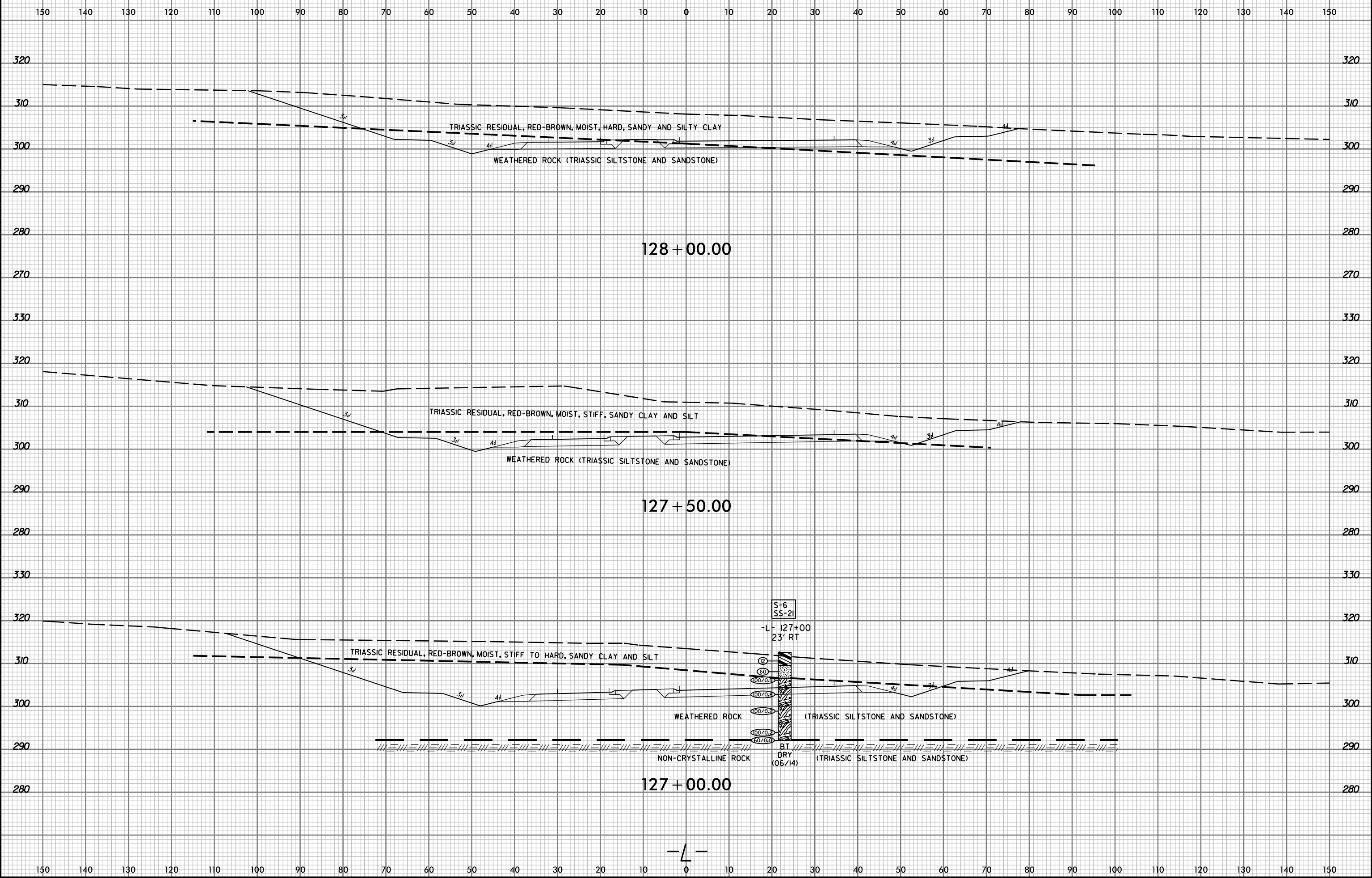
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8/23/99



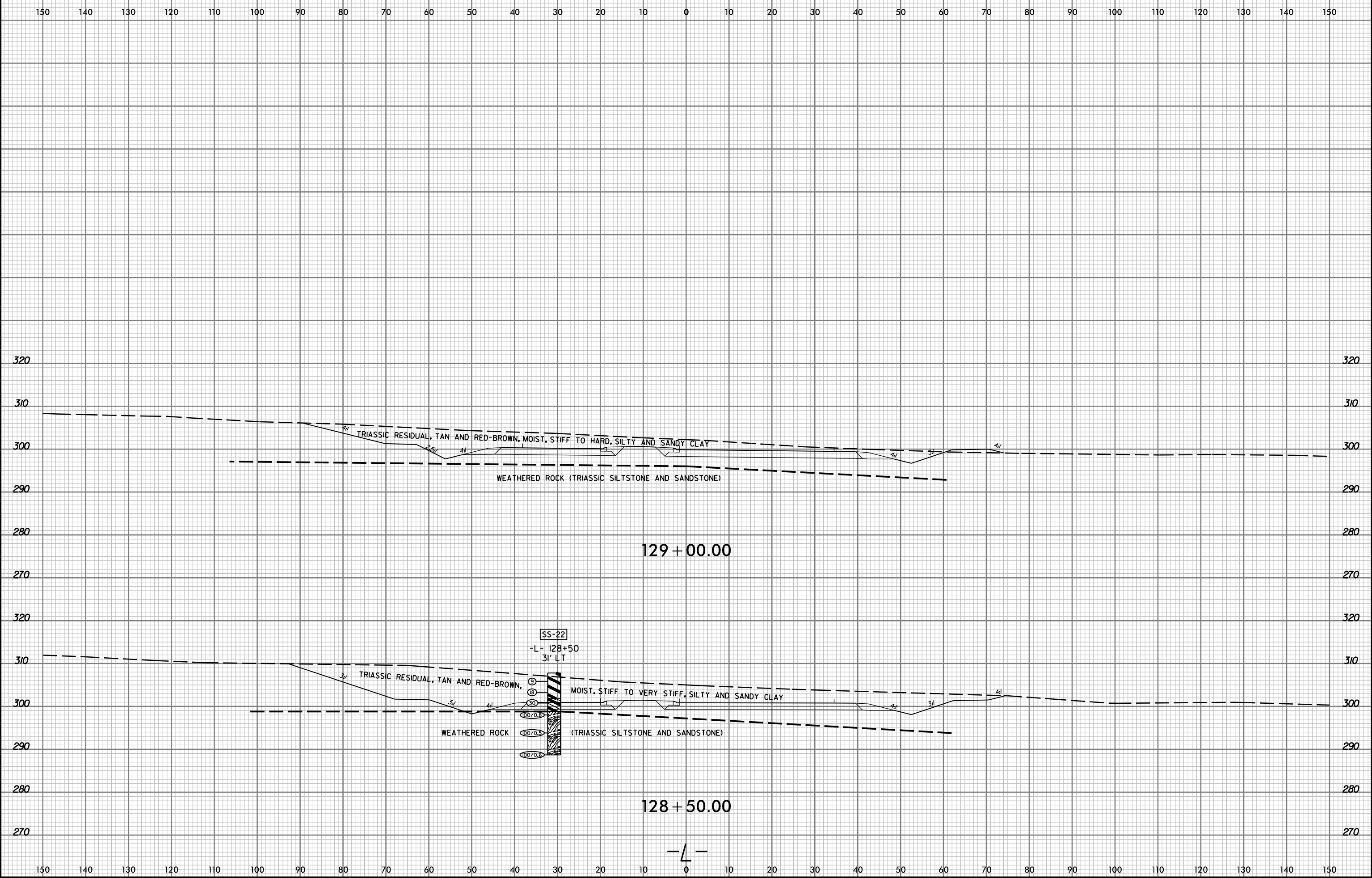
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8/23/99



25-NOV-2014 15:33
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8/23/99



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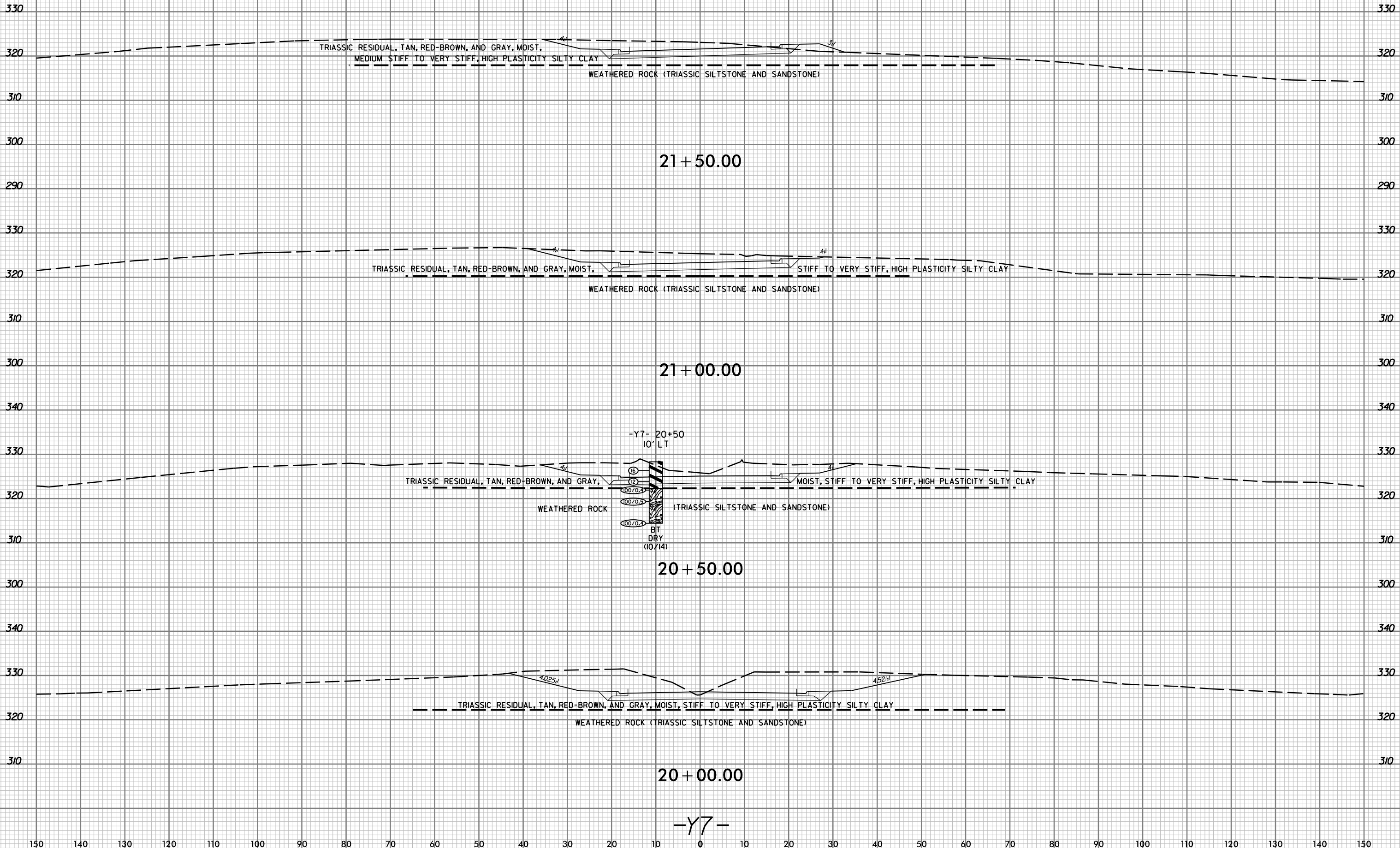
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PROJ. REFERENCE NO.
012108004

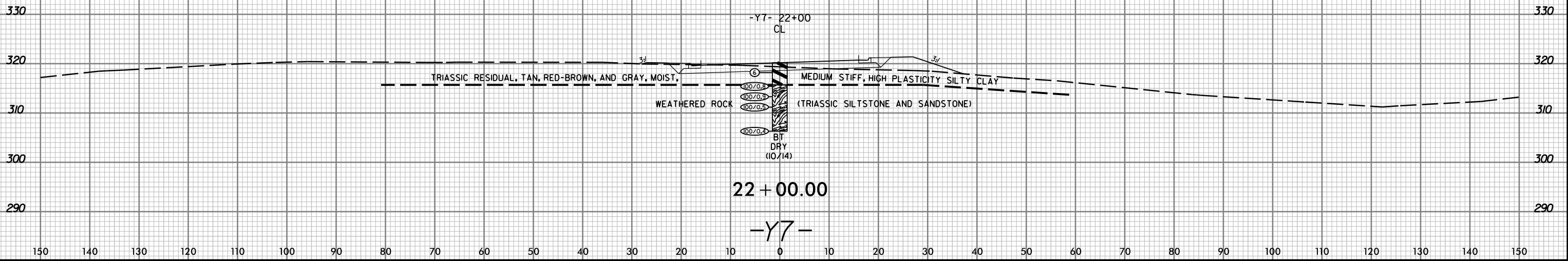
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



SOIL LABORATORY TESTING SUMMARY

PROJECT NUMBER: 12108004

ID (TIP): N/A

COUNTY: Wake

DESCRIPTION: McCrimmon Parkway Extension from NC 54 / Chapel Hill Road to Aviation Parkway

Boring No.	Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic	
									Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200			
L-3100	S-1	-L-	31+00	20' LT	0-10	A-6 (7)	33	16	16.9	19.3	29.0	34.8	6	89	79	61	19.7	-	
L-6100	S-2	-L-	61+00	22' RT	0-10	A-4 (2)	27	10	22.2	27.6	30.1	20.1	2	95	81	53	6.8	-	
L-7450	S-3	-L-	74+50	23' LT	0-10	A-6 (11)	30	13	2.1	10.1	56.1	31.7	0	0	98	91	12.7	-	
L-9550	S-4	-L-	95+50	23' LT	0-10	A-7-6 (9)	42	17	24.3	18.6	24.2	32.9	0	100	84	62	17.8	-	
L-11650	S-5	-L-	116+50	18' LT	0-10	A-6 (10)	32	15	7.3	20.5	37.6	34.6	0	100	95	77	-	-	
L-12700	S-6	-L-	127+00	23' RT	0-10	A-6 (11)	37	17	13.7	14.3	37.9	34.1	0	98	88	74	12.2	-	
L-3250	SS-1	-L-	32+50	1' LT	1-2.5	A-6 (13)	37	16	8.3	12.8	40.0	38.9	0	99	93	83	12.8	-	
L-5950	SS-2	-L-	59+50	21' LT	3.5-5.0	A-6 (13)	36	15	3.8	10.4	48.8	37.0	3	96	94	86	13.2	-	
L-6850	SS-3	-L-	68+50	23' LT	1.0-2.5	A-6 (13)	37	16	3.5	18.3	42.5	35.7	0	100	98	83	14.8	-	
L-7000	SS-4	-L-	70+00	22' RT	1.0-2.5	A-7-6 (27)	48	28	0.1	11.8	41.4	46.7	0	100	99	91	17.7	-	
L-7300	SS-5	-L-	73+00	23' RT	1.0-2.5	A-7-6 (23)	43	23	1.7	5.0	43.2	50.1	0	99	98	94	13.2	-	
L-8350	SS-6	-L-	83+50	24' LT	1.0-2.5	A-6 (9)	33	15	15.1	14.2	33.3	37.4	0	98	88	72	11.4	-	
L-8800	SS-7	-L-	88+00	23' RT	1.0-2.5	A-7-6 (18)	46	25	13.5	12.5	35.8	38.2	1	97	87	75	11.7	-	
L-8950	SS-8	-L-	89+50	22' LT	1.0-2.5	A-6 (9)	35	15	16.2	12.5	34.7	36.6	1	97	84	72	12.9	-	
L-9400	SS-9	-L-	94+00	22' RT	1.0-2.5	A-7-6 (27)	52	35	11.4	13.5	26.3	48.8	0	100	93	78	15.5	-	
L-9700	SS-10	-L-	97+00	23' RT	3.5-5.0	A-7-6 (46)	73	44	2.3	9.9	31.5	56.3	0	100	99	91	42.4	-	
L-9850	SS-11	-L-	98+50	22' LT	1.0-2.5	A-7-6 (20)	41	21	2.8	6.2	46.8	44.2	0	100	98	93	17.4	-	
L-11050	SS-12	-L-	110+50	21' LT	1.0-2.5	A-7-6 (22)	44	24	5.5	8.1	38.7	47.7	1	98	94	87	14.5	-	
L-11200	SS-13	-L-	112+00	28' LT	1.0-2.5	A-6 (5)	30	12	27.0	12.7	34.7	25.6	0	98	79	61	7.4	-	
L-11350	SS-14	-L-	113+50	22' LT	1.0-2.5	A-7-6 (29)	51	32	7.8	6.9	35.4	49.9	0	98	94	86	21.2	-	
L-11650	SS-15	-L-	116+50	18' LT	1.0-2.5	A-7 (17)	39	21	2.0	18.1	38.3	41.6	0	100	99	85	14.6	-	
L-11950	SS-16	-L-	119+50	22' LT	1.0-2.5	A-7-6 (21)	46	23	4.6	11.7	40.9	42.8	0	100	97	87	18.0	-	
L-12100	SS-17	-L-	121+00	22' RT	1.0-2.5	A-7-6 (33)	57	34	4.8	6.5	36.0	52.7	1	98	95	89	17.3	-	
L-12250	SS-18	-L-	122+50	22' LT	3.5-5.0	A-4 (4)	26	10	19.1	15.8	38.0	27.1	4	93	81	63	6.7	-	
L-12400	SS-19	-L-	124+00	23' RT	3.5-5.0	A-6 (5)	26	11	12.3	22.8	35.3	29.6	0	100	92	70	8.9	-	
L-12550	SS-20	-L-	125+50	27' LT	1.0-2.5	A-7-6 (31)	56	34	7.6	8.2	31.4	52.8	0	99	94	86	19.1	-	
L-12700	SS-21	-L-	127+00	23' RT	3.5-5.0	A-4 (5)	30	10	17.4	18.3	40.8	23.5	0	98	85	67	8.9	-	
L-12850	SS-22	-L-	128+50	31' LT	3.5-5.0	A-7-6 (18)	43	25	13.3	11.9	30.7	44.1	1	98	89	77	16.2	-	

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203
Certification Number

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

REPORT FOR CALIFORNIA BEARING RATIO



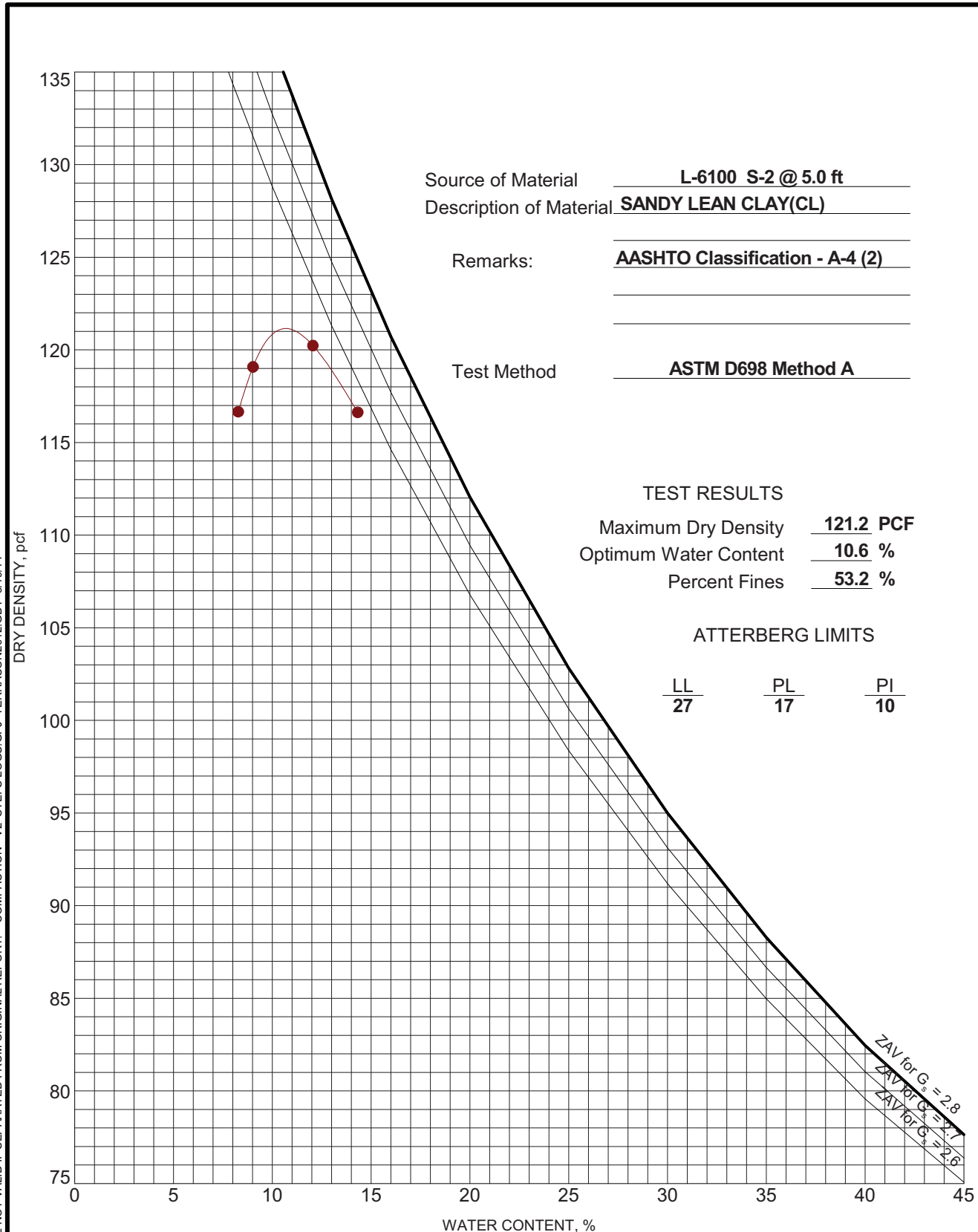
2401 Brentwood Road, Suite 107
Raleigh, NC 27604
919-873-2211

Report Number:
Service Date: 08/04/14
Report Date: 08/19/14

Client
Kimley-Horn and Associates, Inc.
Attn: Matthew West
3001 Weston Parkway
Cary, North Carolina 27513

Project
McCrimmon Parkway Extension
McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina

Project No. 70135172



SAMPLE INFORMATION

Sample Number:	<u>S-2</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:	<u>L-6100</u>	Maximum Dry Density (pcf):	<u>121.2</u>
Sample Location:	<u>N/A</u>	Optimum Moisture:	<u>10.6</u>
Depth:	<u>0-10'</u>	Liquid Limit:	<u>27</u>
Material Description:	<u>Sandy Lean Clay - AASHTO Classification A-4 (2)</u>	Plasticity Index:	<u>10</u>

CBR TEST DATA

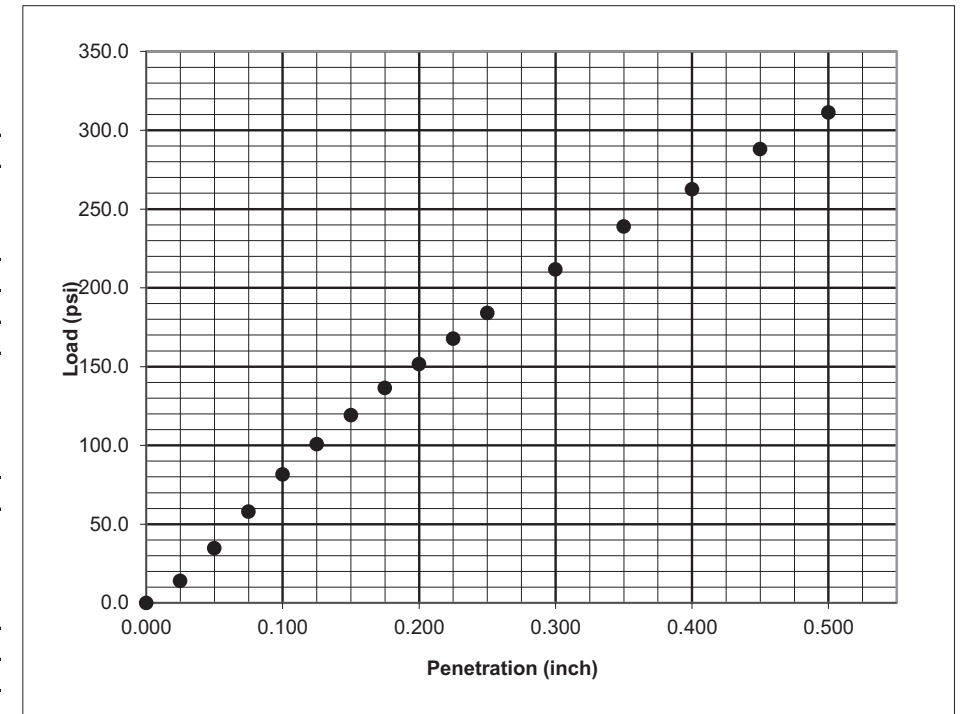
CBR Value at 0.100 inch	<u>8.2</u>
CBR Value at 0.200 inch	<u>10.1</u>
Surcharge Weight (lbs)	<u>10</u>
Soaking Condition	<u>Soaked</u>
Length of Soaking (hours)	<u>96</u>
Swell (%)	<u>1.1</u>

DENSITY DATA

Dry Density Before Soaking (pcf)	<u>120.7</u>
Compaction of Proctor (%)	<u>99.6</u>

MOISTURE DATA

Before Compaction (%)	<u>9.5</u>
After Compaction (%)	<u>9.6</u>
Top 1" After Soaking (%)	<u>14.0</u>
Average After Soaking (%)	<u>13.7</u>



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Matthew J. Alexander, PE
Contractor:

Report Distribution

Reviewed by: Matthew J. Alexander, PE
Geotechnical Project Engineer

Test Methods:

ASTM D1883
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PROJECT: McCrimmon Parkway Extension

SITE: McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina



PROJECT NUMBER: 70135172

CLIENT: Kimley-Horn and Associates, Inc.
Cary, North Carolina

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

REPORT FOR CALIFORNIA BEARING RATIO



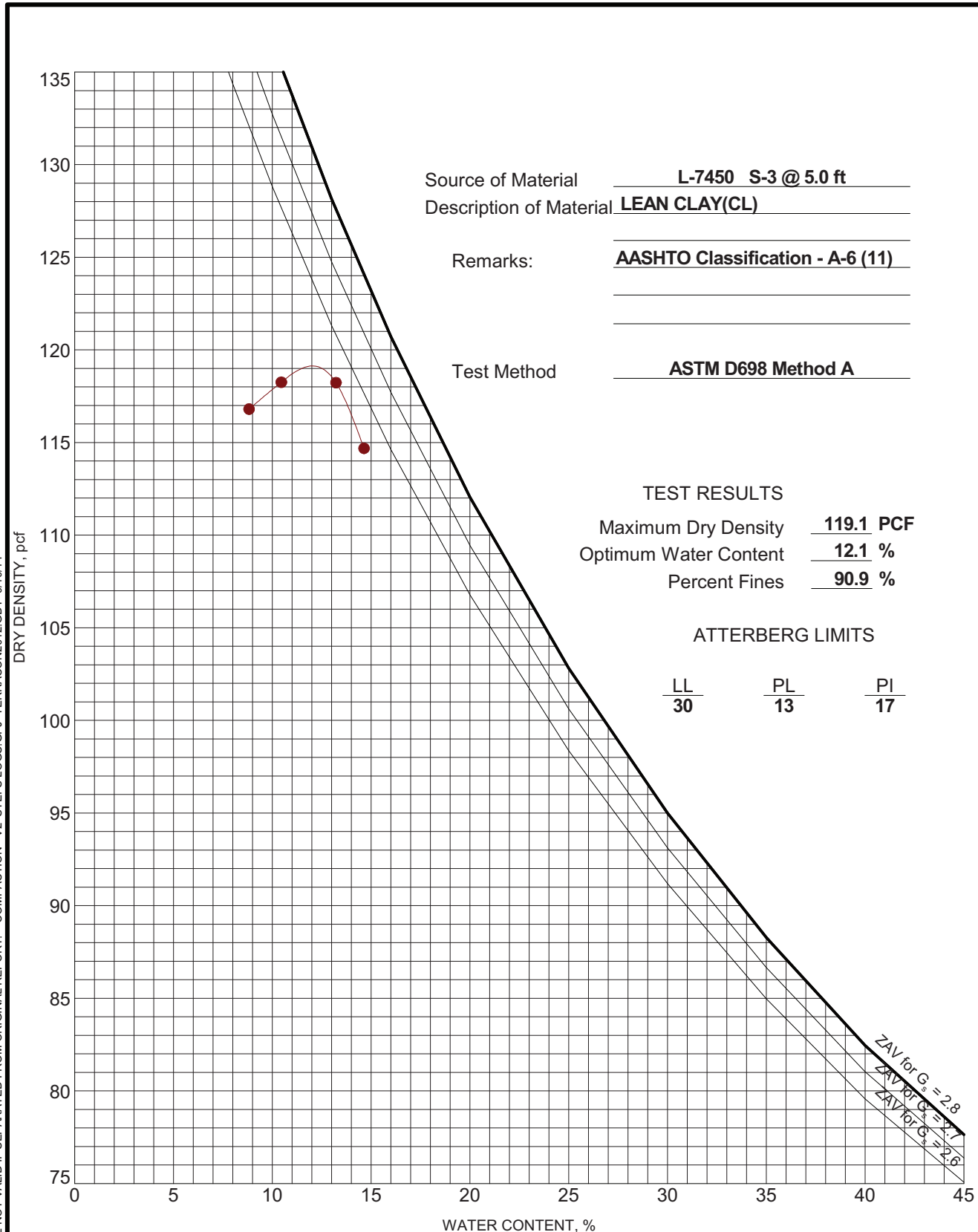
2401 Brentwood Road, Suite 107
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919-873-2211

Report Number:
Service Date: 09/04/14
Report Date: 09/10/14

Client
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Attn: Matthew West
3001 Weston Parkway
Cary, North Carolina 27513

Project
McCrimmon Parkway Extension
McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina

Project No. 70135172



SAMPLE INFORMATION

Sample Number:	<u>S-3</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:	<u>L-7450</u>	Maximum Dry Density (pcf):	<u>119.1</u>
Sample Location:	<u>N/A</u>	Optimum Moisture:	<u>12.1</u>
Depth:	<u>0-10'</u>	Liquid Limit:	<u>30</u>
Material Description:	<u>Lean Clay - AASHTO Classification A-6 (11)</u>	Plasticity Index:	<u>13</u>

CBR TEST DATA

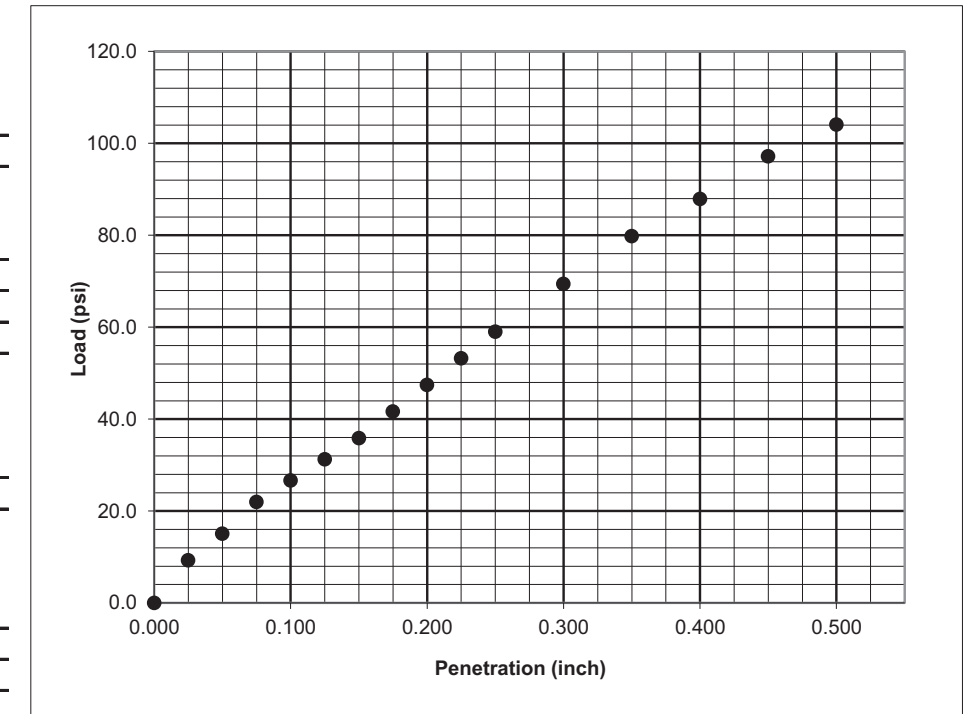
CBR Value at 0.100 inch	<u>2.0</u>
CBR Value at 0.200 inch	<u>3.2</u>
Surcharge Weight (lbs)	<u>10</u>
Soaking Condition	<u>Soaked</u>
Length of Soaking (hours)	<u>96</u>
Swell (%)	<u>1.4</u>

DENSITY DATA

Dry Density Before Soaking (pcf)	<u>119.4</u>
Compaction of Proctor (%)	<u>100.2</u>

MOISTURE DATA

Before Compaction (%)	<u>12.6</u>
After Compaction (%)	<u>12.9</u>
Top 1" After Soaking (%)	<u>16.6</u>
Average After Soaking (%)	<u>15.0</u>



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Matthew J. Alexander, PE
Contractor:

Report Distribution

Reviewed by: Matthew J. Alexander, PE
Geotechnical Project Engineer

Test Methods: ASTM D1883

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PROJECT: McCrimmon Parkway Extension

SITE: McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina



PROJECT NUMBER: 70135172

CLIENT: Kimley-Horn and Associates, Inc.
Cary, North Carolina

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

REPORT FOR CALIFORNIA BEARING RATIO



2401 Brentwood Road, Suite 107
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Report Number:
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3001 Weston Parkway
Cary, North Carolina 27513

Project
McCrimmon Parkway Extension
McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina

Project No. 70135172

SAMPLE INFORMATION

Sample Number:	S-4	Proctor Method:	AASHTO T99 - Method A
Boring Number:	L-9550	Maximum Dry Density (pcf):	109.7
Sample Location:	N/A	Optimum Moisture:	19.1
Depth:	0-8.5'	Liquid Limit:	42
Material Description:	Sandy Lean Clay - AASHTO Classification A-7-6 (9)	Plasticity Index:	17

CBR TEST DATA

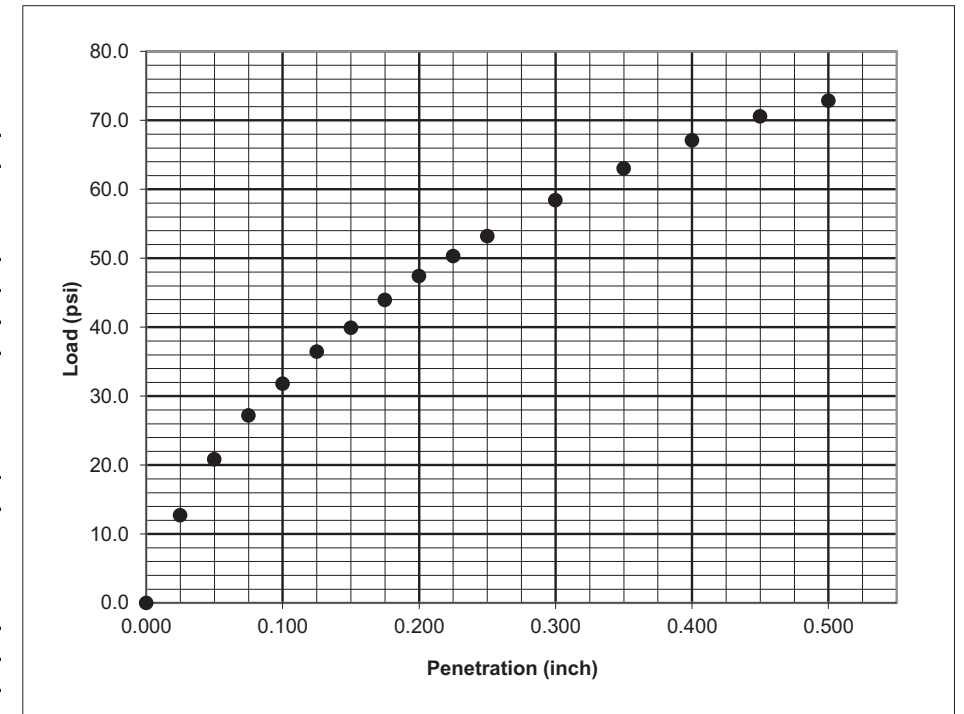
CBR Value at 0.100 inch	3.2
CBR Value at 0.200 inch	3.2
Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	1.1

DENSITY DATA

Dry Density Before Soaking (pcf)	108.2
Compaction of Proctor (%)	98.6

MOISTURE DATA

Before Compaction (%)	20.0
After Compaction (%)	20.1
Top 1" After Soaking (%)	25.1
Average After Soaking (%)	24.0



Comments:
Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Matthew J. Alexander, PE
Contractor:

Report Distribution

Reviewed by: Matthew J. Alexander, PE
Geotechnical Project Engineer

Test Methods: ASTM D1883
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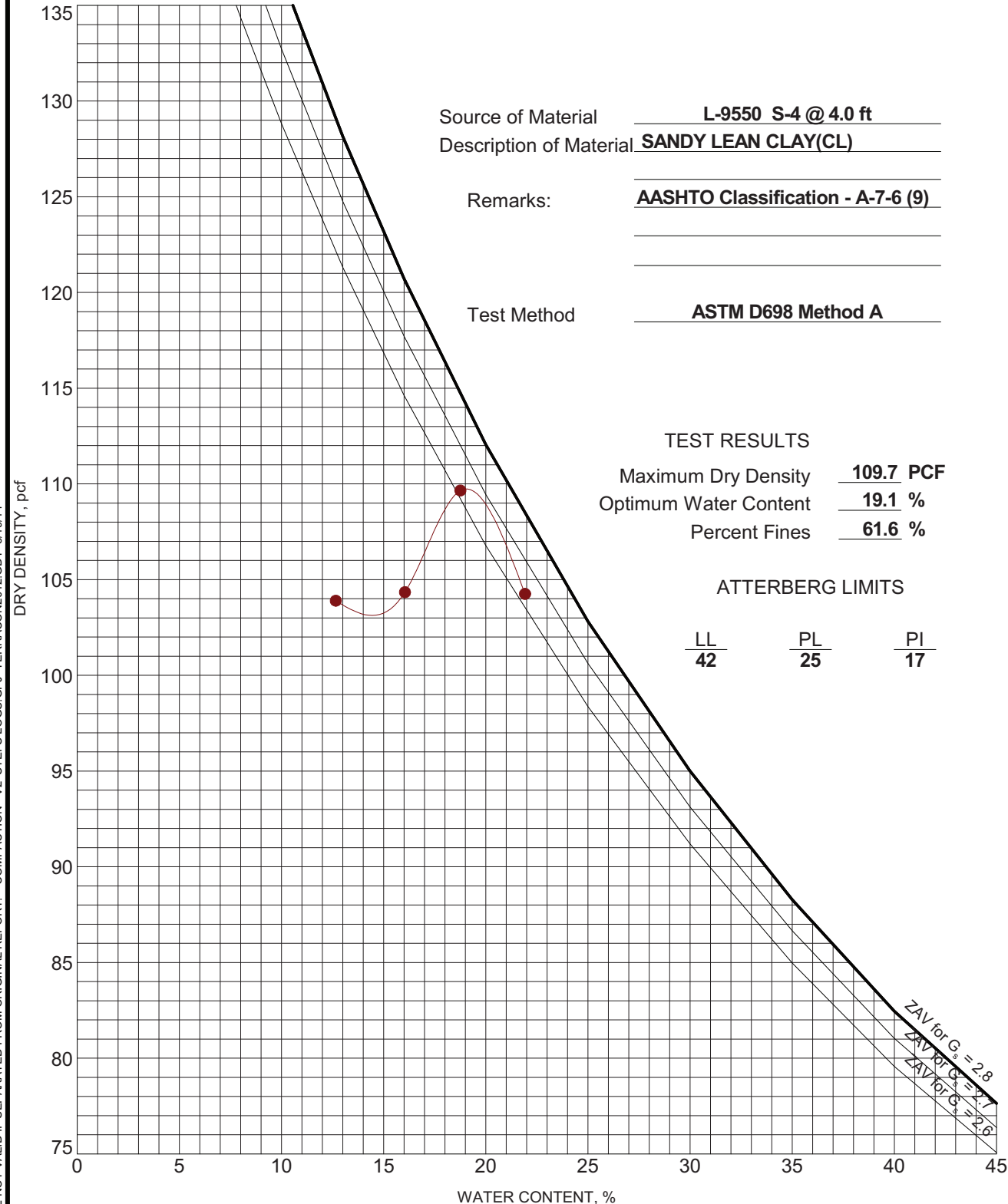
PROJECT: McCrimmon Parkway Extension

SITE: McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina



PROJECT NUMBER: 70135172

CLIENT: Kimley-Horn and Associates, Inc.
Cary, North Carolina



MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

REPORT FOR CALIFORNIA BEARING RATIO



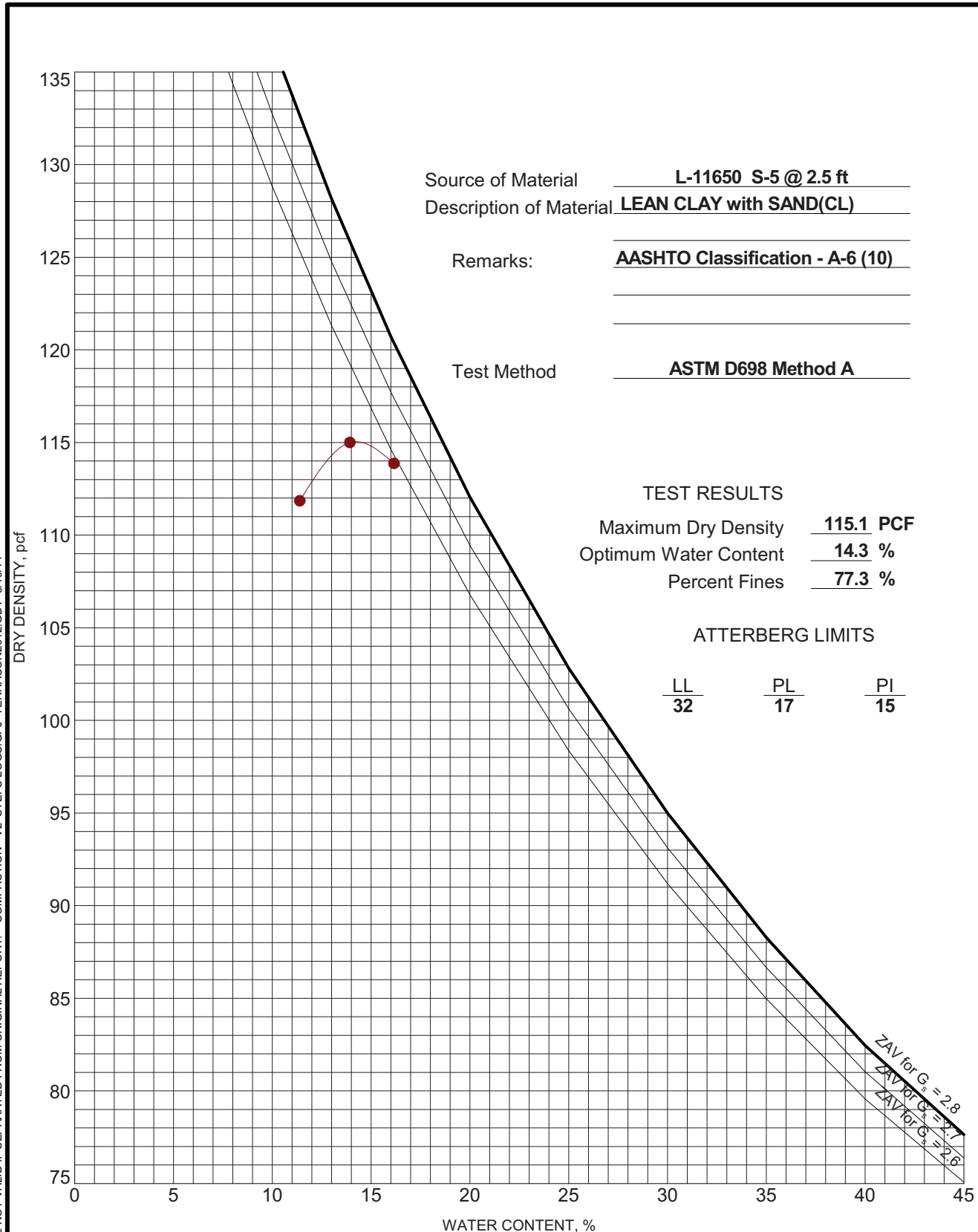
2401 Brentwood Road, Suite 107
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919-873-2211

Report Number:
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Client
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3001 Weston Parkway
Cary, North Carolina 27513

Project
McCrimmon Parkway Extension
McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina

Project No. 70135172

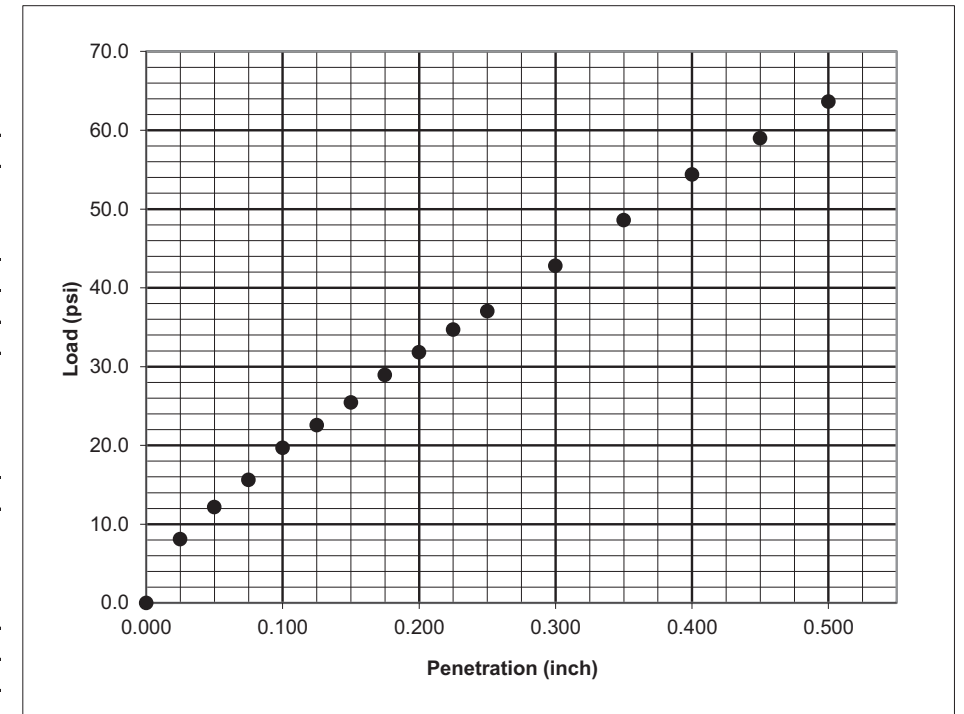


SAMPLE INFORMATION

Sample Number:	S-5	Proctor Method:	AASHTO T99 - Method A
Boring Number:	L-11650	Maximum Dry Density (pcf):	115.1
Sample Location:	N/A	Optimum Moisture:	14.3
Depth:	1-5'	Liquid Limit:	32
Material Description:	Lean Clay with Sand - AASHTO Classification A-6 (10)	Plasticity Index:	15

CBR TEST DATA

CBR Value at 0.100 inch	2.0
CBR Value at 0.200 inch	2.1
Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	1.8



DENSITY DATA

Dry Density Before Soaking (pcf)	115.6
Compaction of Proctor (%)	100.4

MOISTURE DATA

Before Compaction (%)	14.4
After Compaction (%)	14.3
Top 1" After Soaking (%)	18.9
Average After Soaking (%)	17.7

Comments:
Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Matthew J. Alexander, PE
Contractor:

Report Distribution

Reviewed by: Matthew J. Alexander, PE
Geotechnical Project Engineer

Test Methods: ASTM D1883
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PROJECT: McCrimmon Parkway Extension	 2401 Brentwood Road, Suite 107 Raleigh, North Carolina	PROJECT NUMBER: 70135172
SITE: McCrimmon Parkway and Aviation Parkway Morrisville, North Carolina		CLIENT: Kimley-Horn and Associates, Inc. Cary, North Carolina
		EXHIBIT: B-1

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

REPORT FOR CALIFORNIA BEARING RATIO



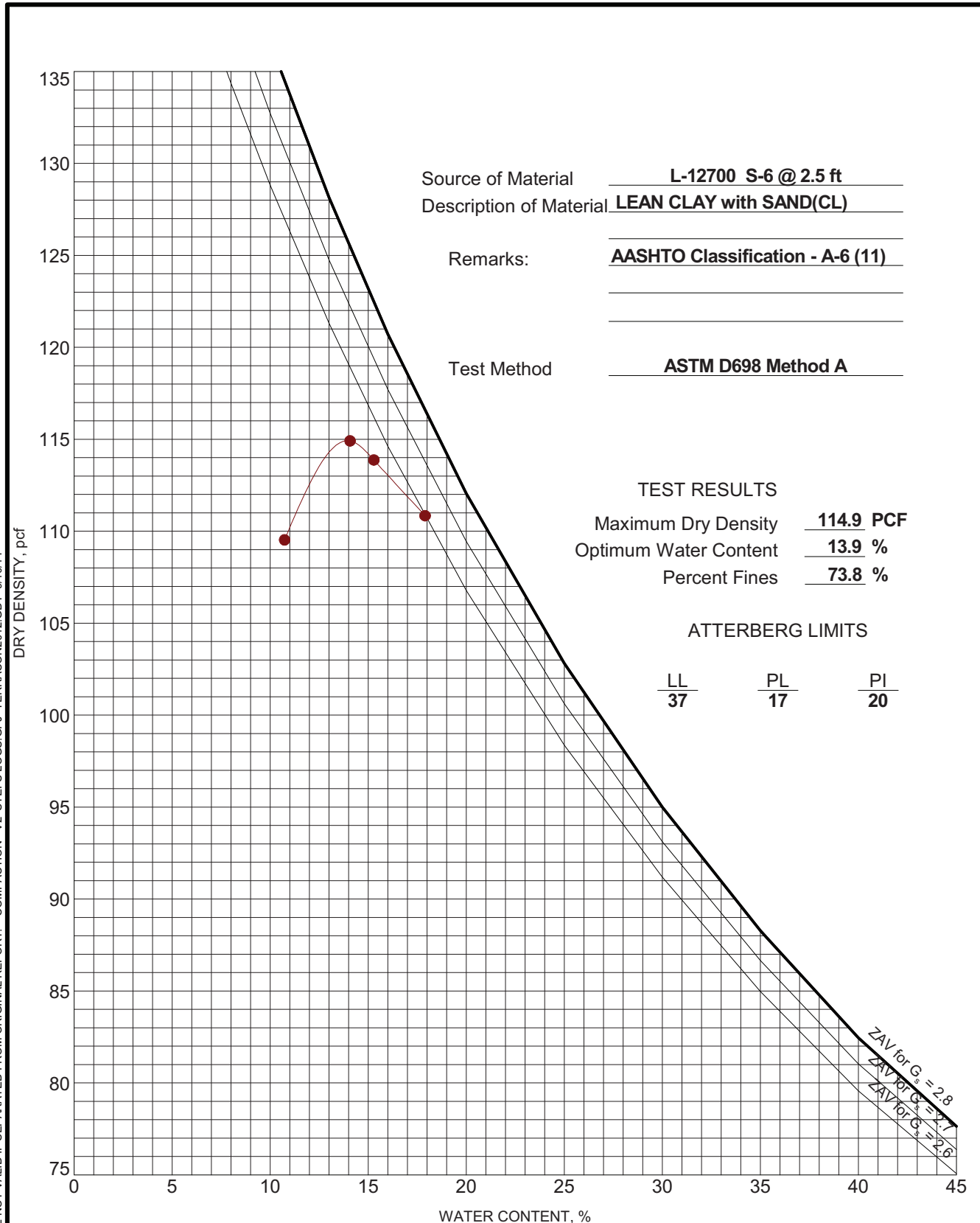
2401 Brentwood Road, Suite 107
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Report Number:
Service Date: 09/04/14
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Client
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Attn: Matthew West
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Project
McCrimmon Parkway Extension
McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina

Project No. 70135172

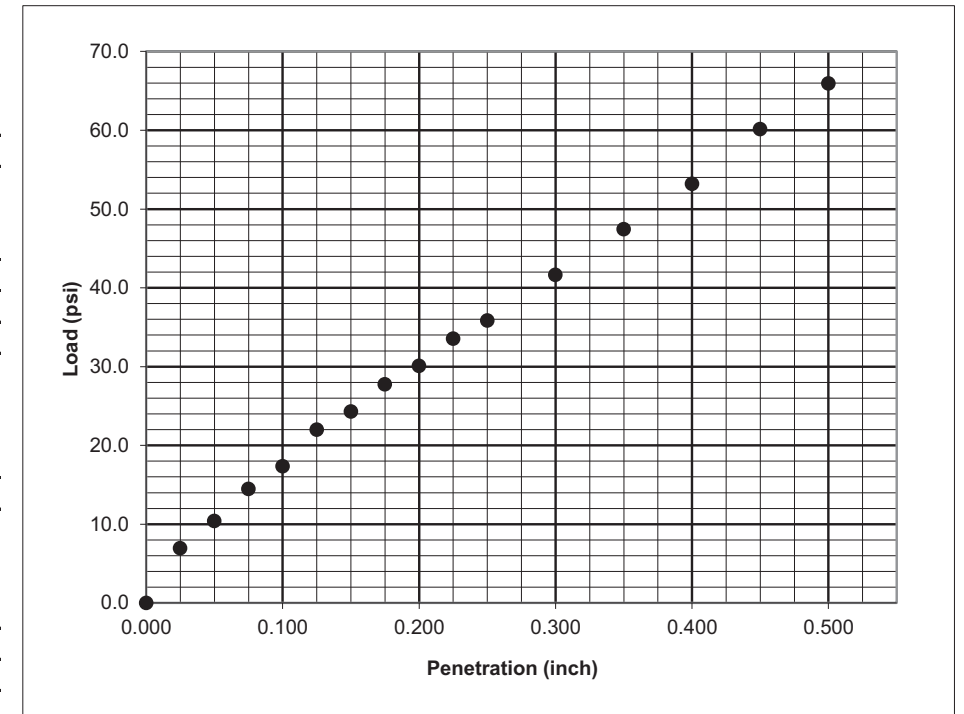


SAMPLE INFORMATION

Sample Number:	S-6	Proctor Method:	AASHTO T99 - Method A
Boring Number:	L-12700	Maximum Dry Density (pcf):	114.9
Sample Location:	N/A	Optimum Moisture:	13.9
Depth:	1-5'	Liquid Limit:	37
Material Description:	Lean Clay with Sand - AASHTO Classification A-6 (11)	Plasticity Index:	17

CBR TEST DATA

CBR Value at 0.100 inch	1.7
CBR Value at 0.200 inch	2.0
Surcharge Weight (lbs)	10
Soaking Condition	Soaked
Length of Soaking (hours)	96
Swell (%)	3.1



DENSITY DATA

Dry Density Before Soaking (pcf)	114.2
Compaction of Proctor (%)	99.4

MOISTURE DATA

Before Compaction (%)	14.0
After Compaction (%)	14.1
Top 1" After Soaking (%)	20.5
Average After Soaking (%)	16.3

Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
Reported To: Matthew J. Alexander, PE
Contractor:

Report Distribution

Reviewed by: Matthew J. Alexander, PE
Geotechnical Project Engineer

Test Methods:

ASTM D1883
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PROJECT: McCrimmon Parkway Extension

SITE: McCrimmon Parkway and Aviation Parkway
Morrisville, North Carolina



PROJECT NUMBER: 70135172

CLIENT: Kimley-Horn and Associates, Inc.
Cary, North Carolina