

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	P-5205	1	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

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

RAILWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. P-5205 F.A. PROJ. NA
COUNTY ALAMANCE
PROJECT DESCRIPTION HAW RIVER SIDING & MAINLINE
RELOCATION

INVENTORY

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-MAIN-	1139+00 - 1247+00	3-12	3-12	-
-L-	11+85 - 16+80	4	13	-
-Y-	11+90 - 21+58	4-5	13	-
SOIL TEST RESULTS		14-18		

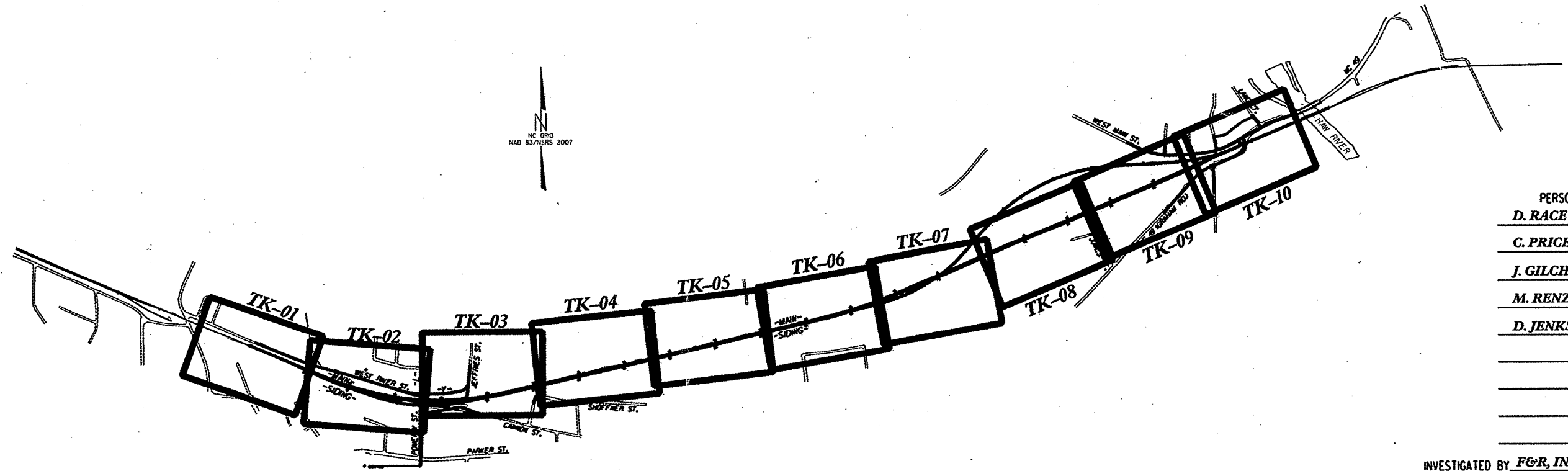
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (ON-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: NA **ID: P-5205**



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INVESTIGATED BY F&R, INC.
CHECKED BY E.C. HOWEY, P.E., P.G.
SUBMITTED BY F&R, INC.
DATE 8/09

ELIZABETH C. HOWEY

DRAWN BY: D. RACEY

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.

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: P-5205

COUNTY: Alamance

DATE: 2/8/2013

COMPILED BY: BDD

SHEET ___ OF ___ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +20%		ROCK	SUITABLE	UNSUIT.	TOTAL
-ML- 1141+00	-ML- 1156+28	8,800				8,800	3,398		3,398	4,078			4,722		4,722
-ML- 1156+88	-ML- 1186+00	32,621				32,621	2,722		2,722	3,266			29,355		29,355
-ML- 1186+00	-ML- 1216+00	8,063	462			7,601	28,845	462	28,383	34,522	26,459				
-ML- 1216+00	-ML- 1246+00	175,569	43,461			132,108	1,936	1,936		1,936			41,525	132,108	173,633
-ML- 1246+00	-ML- 1248+46	60				60	540		540	648	588				
	SUBTOTAL	225,113	43,923			181,190	37,441	2,398	35,043	44,450	27,047		41,525	166,185	207,710
-L- 11+85	-L- 13+00	170				170	7		7	8			162		162
-L- 14+00	-L- 16+80	2,228				2,228	6		6	7			2,221		2,221
	SUBTOTAL	2,398				2,398	13		13	16			2,382		2,382
-Y- 11+90	-Y- 14+50	1,328				1,328	5		5	6			1,322		1,322
-Y- 15+50	-Y- 21+58	10,216				10,216	2		2	2			10,214		10,214
	SUBTOTAL	11,544				11,544	7		7	8			11,536		11,536
	SUBTOTAL														
	TOTAL	239,055	43,923			195,132	37,461	2,398	35,063	44,474	27,047		41,525	180,103	221,628
MATERIAL FOR SHOULDER CONSTRUCTION LOSS DUE TO CLEARING & GRUBBING		-35,723				-35,723							-35,723		-35,723
ADDITIONAL UNDERCUT															
ROCK WASTE TO REPLACE BORROW								22,539	-22,539		-22,539		-22,539		-22,539
ADJUSTMENT FOR ROCK WASTE										-4,508	-4,508				
ADJUSTMENT FOR PERMANENTLY WASTED ROCK											0		3,797	0	3,797
	PROJECT TOTAL	203,332	43,923			159,409	37,461	24,937	12,524	39,966			22,783	144,380	167,163
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT															
	GRAND TOTAL		43,923			159,409	37,461	24,937	12,524	39,966			22,783	144,380	167,163
	SAY														

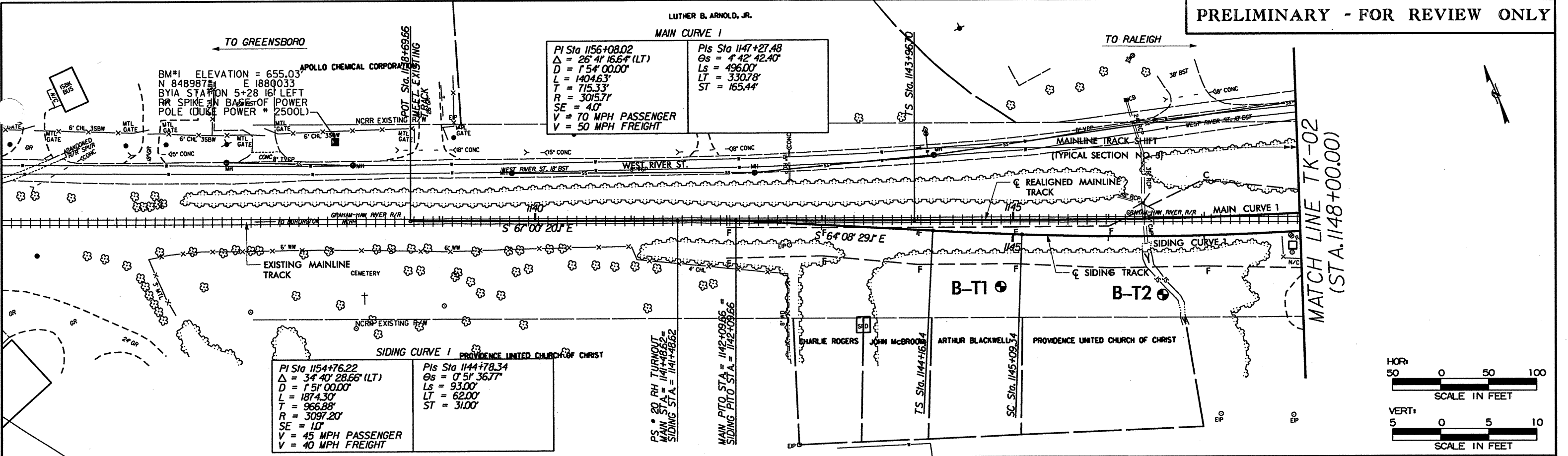
NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

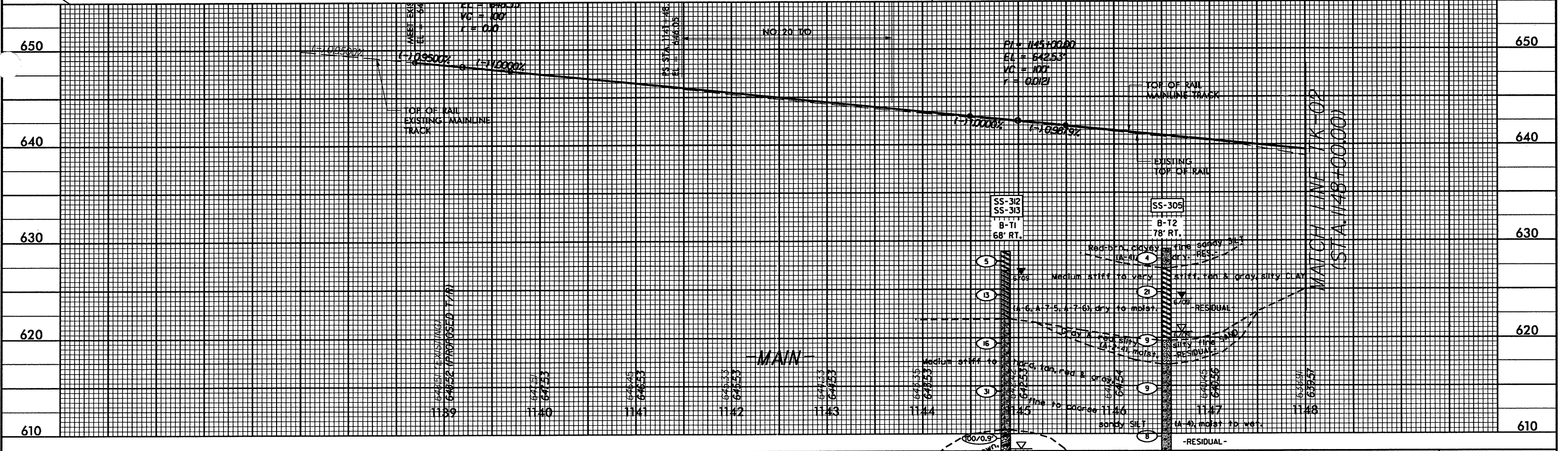
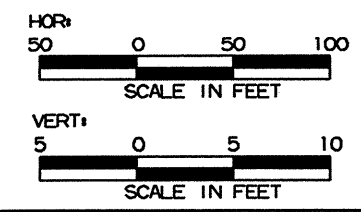
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <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.										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:										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 (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																			
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING										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.										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.																			
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7										COMPRESSIBILITY										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 (CPS) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																			
SYMBOL										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 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.																			
% PASSING # 10, # 40, # 200										PERCENTAGE OF MATERIAL										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.																			
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX										ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL										MODERATELY SEVERE (MOD. SEV) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.										SEVERE (SEV) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF.																			
USUAL TYPES OF MAJOR MATERIALS										GROUND WATER										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 HINDR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.										COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.																			
GEN. RATING AS A SUBGRADE										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										ROCK HARDNESS										ROCK HARDNESS																			
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										MISCELLANEOUS SYMBOLS										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.																			
CONSISTENCY OR DENSENESS										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD										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.																			
PRIMARY SOIL TYPE										SPT DPT VST TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL										MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
COMPACTNESS OR CONSISTENCY										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST V - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS										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 HINDR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.										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.																			
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										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										SAMPLE DESIGNATIONS S - BULK SAMPLE SS - SPLIT SPOON SAMPLE ST - SHELBY TUBE SAMPLE RS - ROCK SAMPLE RT - RECOMPACTED TRIAXIAL SAMPLE CBR - CALIFORNIA BEARING RATIO SAMPLE										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.																			
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										ABBREVIATIONS										THICKNESS										THICKNESS																			
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)										w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT										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										FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.																			
GENERALLY SILT-CLAY MATERIAL (COHESIVE)										MO - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT										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.																			
TEXTURE OR GRAIN SIZE										EQUIPMENT USED ON SUBJECT PROJECT										EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.																			
U.S. STD. SIEVE SIZE OPENING (MM)										DRILL UNITS: MOBILE B- BK-51 CME-45C CME-55 PORTABLE HOIST										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT										HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N-03 H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST										BENCH MARK: N/A ELEVATION: N/A FT.									
BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F, SD.), SILT (SL.), CLAY (CL.)										SOIL MOISTURE - CORRELATION OF TERMS										INDURATION										INDURATION																			
GRAIN SIZE										SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										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.																			
LIQUID LIMIT, PLASTIC LIMIT, OPTIMUM MOISTURE SHRINKAGE LIMIT										SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										INDURATION										INDURATION																			
PLASTICITY										PLASTICITY										INDURATION										INDURATION																			
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY										PLASTICITY INDEX (PI) DRY STRENGTH										INDURATION										INDURATION																			
COLOR										PLASTICITY INDEX (PI) DRY STRENGTH										INDURATION										INDURATION																			
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										PLASTICITY INDEX (PI) DRY STRENGTH										INDURATION										INDURATION																			



LUTHER B. ARNOLD, JR.
MAIN CURVE 1
 PI Sta 1156+08.02
 $\Delta = 26^\circ 41' 16.64''$ (LT)
 $D = 154' 00.00''$
 $L = 1404.63'$
 $T = 715.33'$
 $R = 3015.71'$
 $SE = 4.0'$
 $V = 70$ MPH PASSENGER
 $V = 50$ MPH FREIGHT

SIDING CURVE 1
 PI Sta 1154+76.22
 $\Delta = 34^\circ 40' 28.66''$ (LT)
 $D = 151' 00.00''$
 $L = 1874.30'$
 $T = 966.88'$
 $R = 3097.20'$
 $SE = 1.0'$
 $V = 45$ MPH PASSENGER
 $V = 40$ MPH FREIGHT



NO.	DATE	BY	APP. BY	DESCRIPTION
				INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION
				PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DRAWN BY:		
CHECKED BY:		
DATE:		

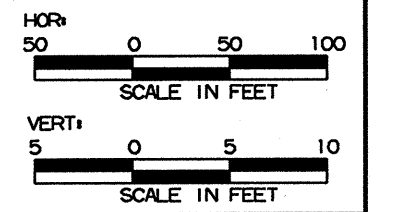
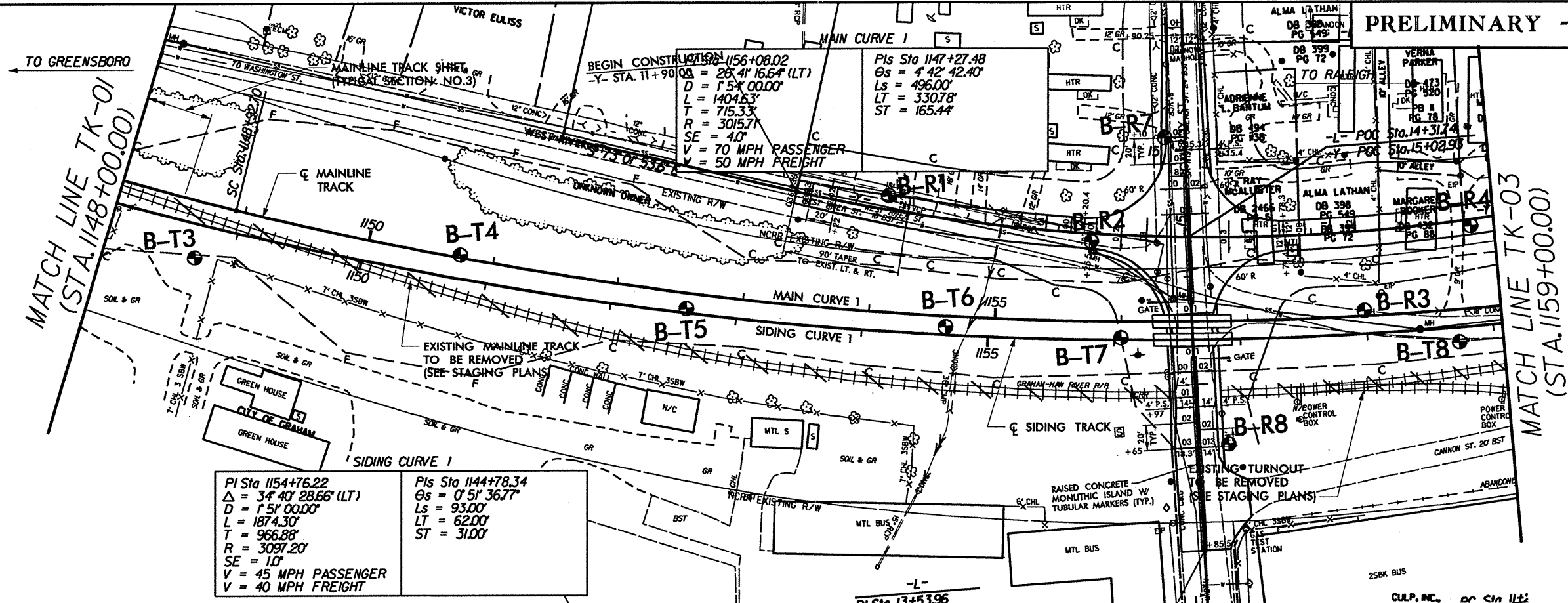
NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

HDR Engineering, Inc. of the Carolinas
 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202

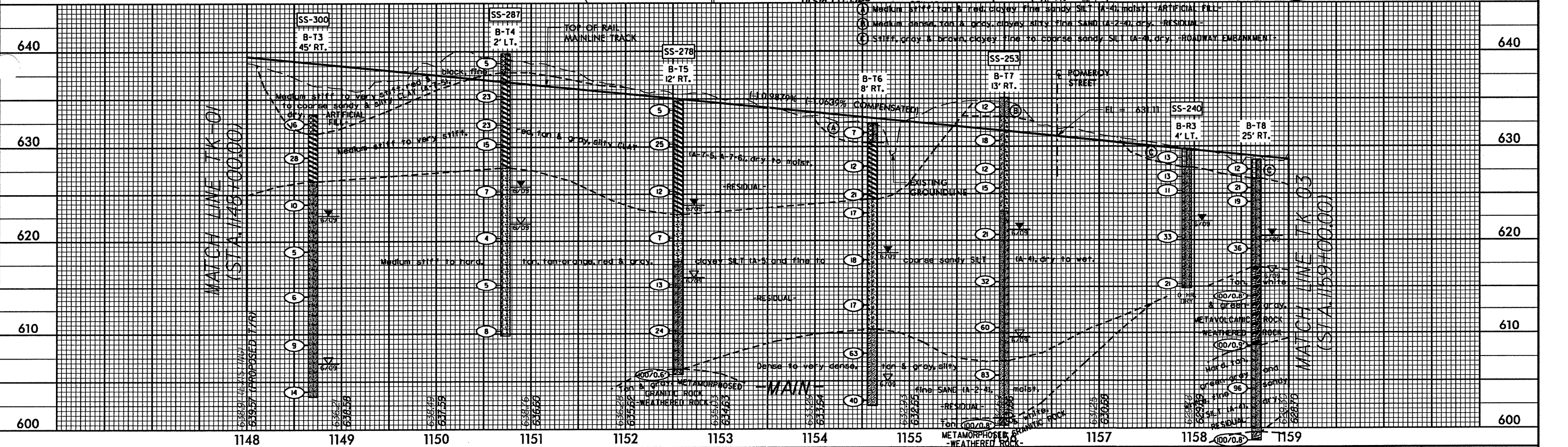
60/0.3%
 Tan, gray & brown METAMORPHOSSED SAND
 100/0.4%
 Tan, gray silty fine SAND
 60/0.3%
 GRANULIC ROCK WEATHERED ROCK- & brown to coarse (A-2-4, wet.)
 -RESIDUAL-

GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION
TRACK PLAN AND PROFILE
 SHEET 3 OF 18
 ALAMANCE COUNTY

DESIGN SPEED:
 DRAWING NO: TK-01
 SCALE: 1" = 50'
 SHEET NO:



PIS Sta 1154+76.22 $\Delta = 34^\circ 40' 28.66''$ (LT) $D = 151' 00.00''$ $L = 1874.30'$ $T = 966.88'$ $R = 3097.20'$ $SE = 1.0'$ $V = 45$ MPH PASSENGER $V = 40$ MPH FREIGHT	PIS Sta 1144+78.34 $\Theta_s = 0^\circ 51' 36.77''$ $L_s = 93.00'$ $LT = 62.00'$ $ST = 31.00'$
--	--



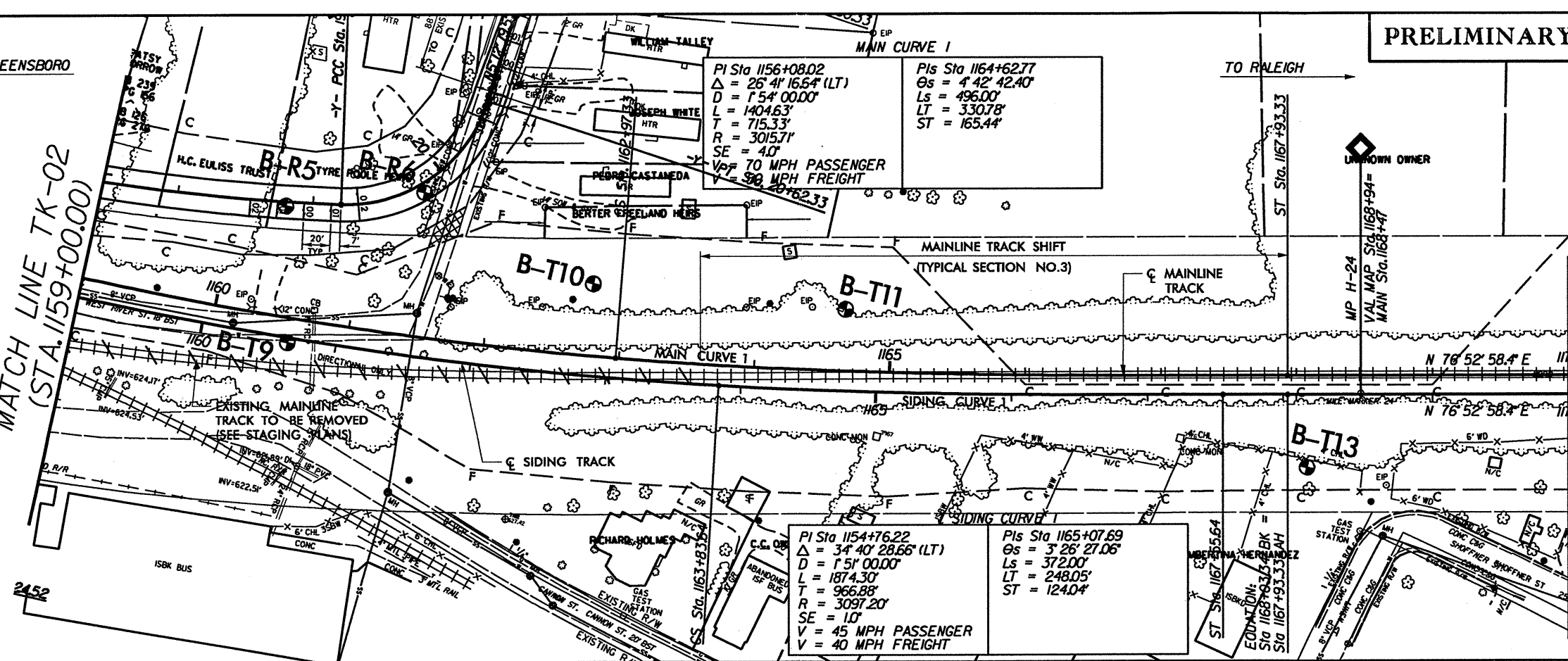
INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	DESIGNED BY: ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER	NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202	GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION TRACK PLAN AND PROFILE SHEET 4 OF 18 ALAMANCE COUNTY	DESIGN SPEED: DRAWING NO: TK-02 SCALE: 1" = 50' SHEET NO:
--	--	--	--	--

TO GREENSBORO

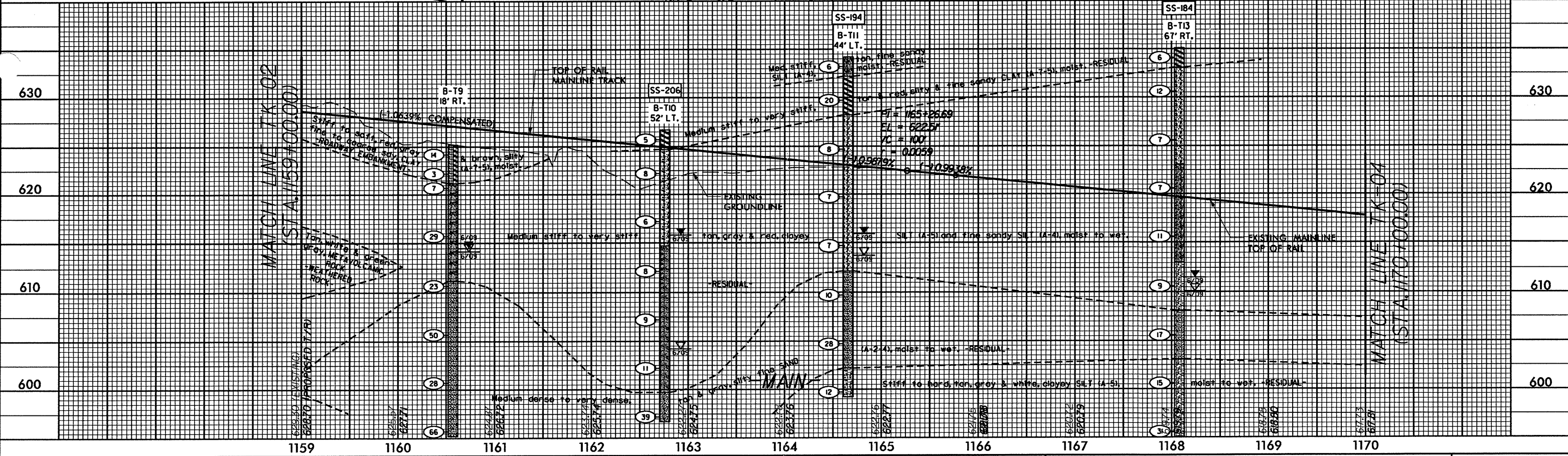
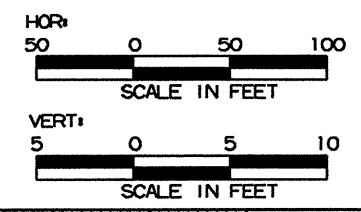
TO RALEIGH

MATCH LINE TK-02
(STA. 1159+00.00)

MATCH LINE TK-04
(STA. 1170+00.00)

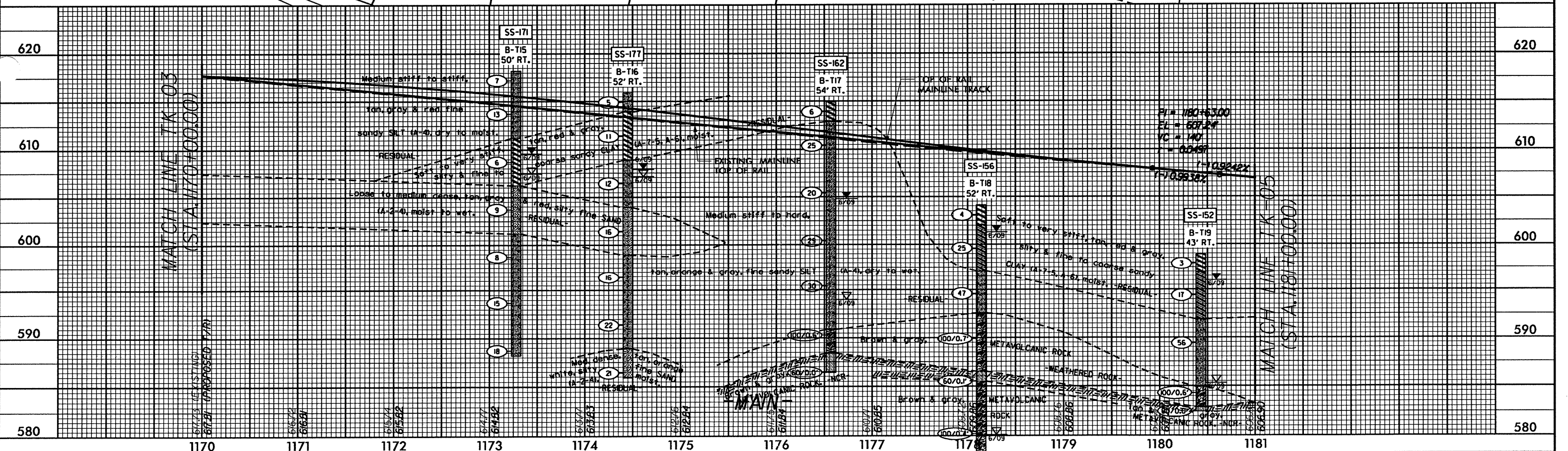
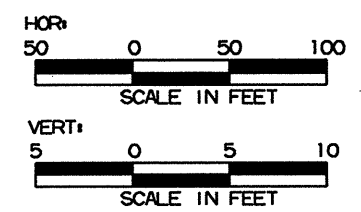
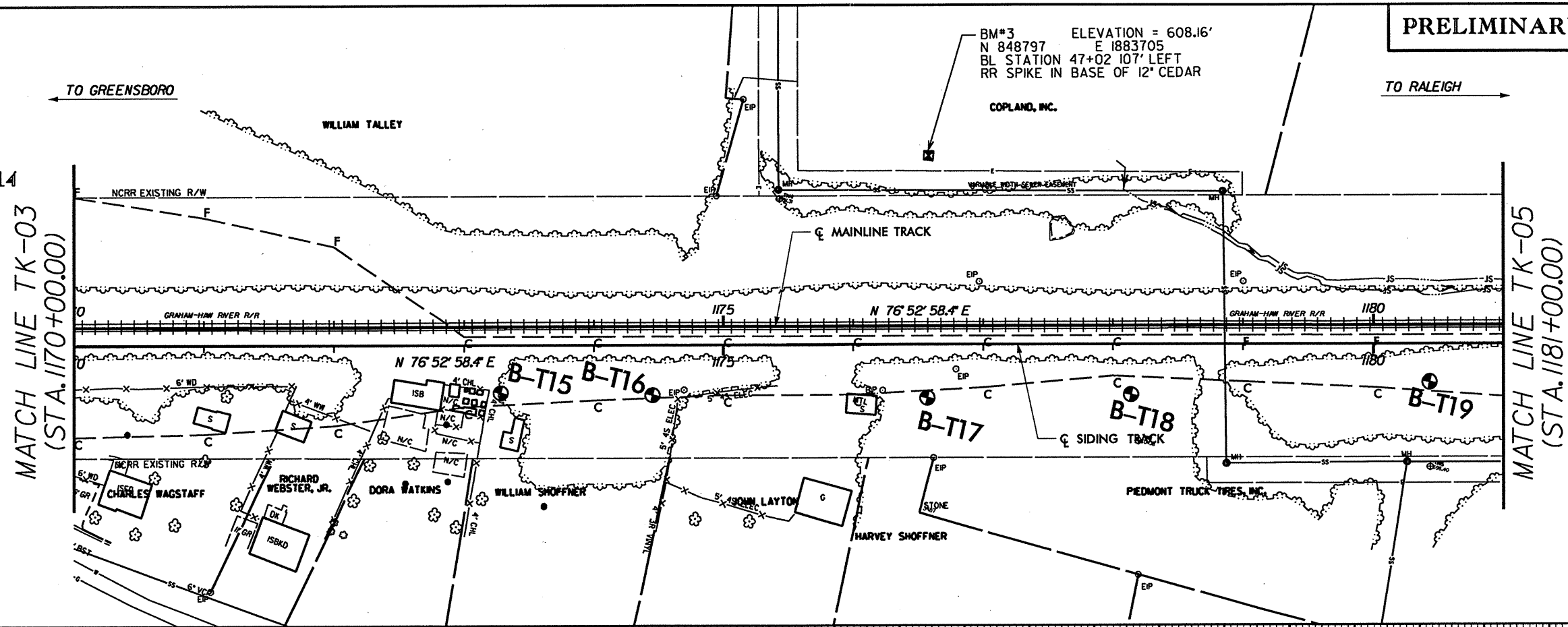


NOTE: Boring B-T12 omitted due to inaccessibility.



REV. NO.	DATE	BY	APP. BY	DESCRIPTION	DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	<p>NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION</p> <p>HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202</p>	<p>ENGINEERING AND SAFETY BRANCH CAPITAL TASK 104 MAIL SERVICE CENTER RALEIGH, NC 27699-1044</p>	GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION		DESIGN SPEED:
				INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION	DRAWN BY:					TRACK PLAN AND PROFILE		DRAWING NO: TK-03
				PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	CHECKED BY:					SHEET 5 OF 18		SCALE: 1" = 50'
					DATE:					ALAMANCE COUNTY		SHEET NO:

NOTE: Boring B-T14 omitted due to inaccessibility.



REV. NO.	DATE	BY	APP. BY	DESCRIPTION

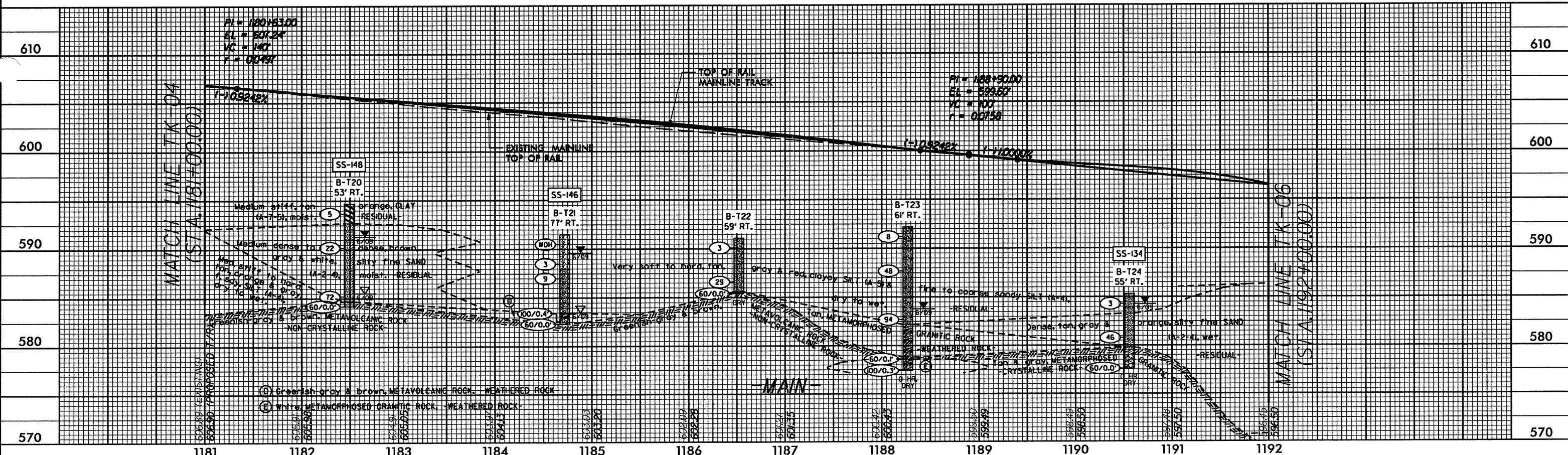
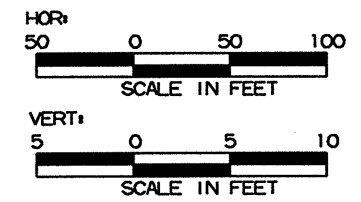
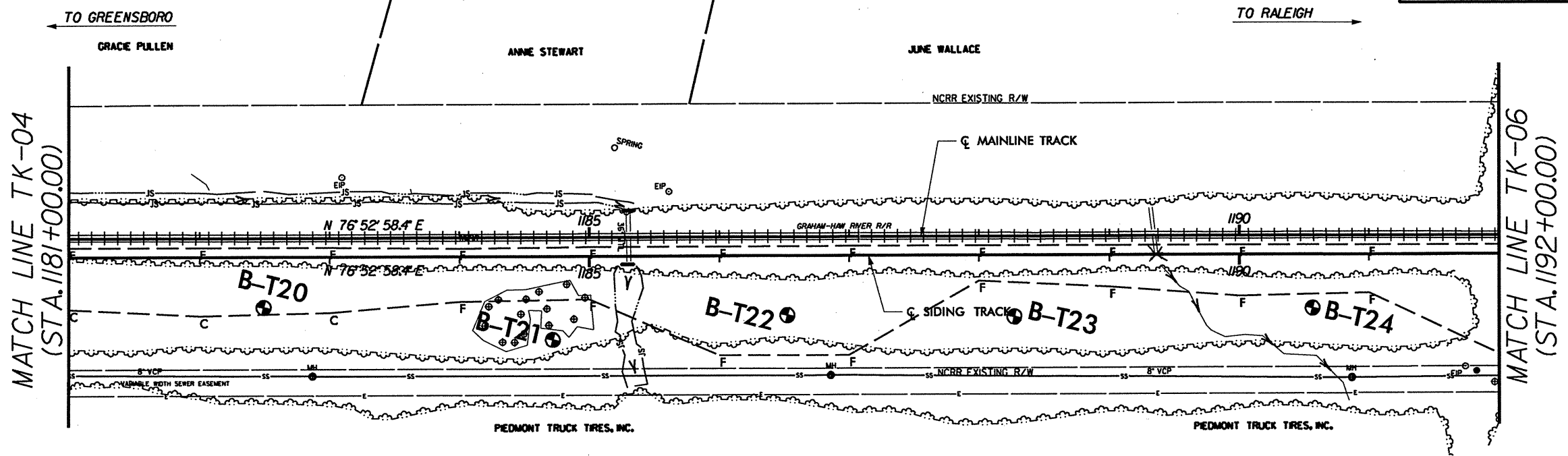
DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DRAWN BY:		
CHECKED BY:		
DATE:		

NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
 -WEATHERED ROCK-
 100/0.3
HDR HDR Engineering, Inc. of the Carolinas
 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202

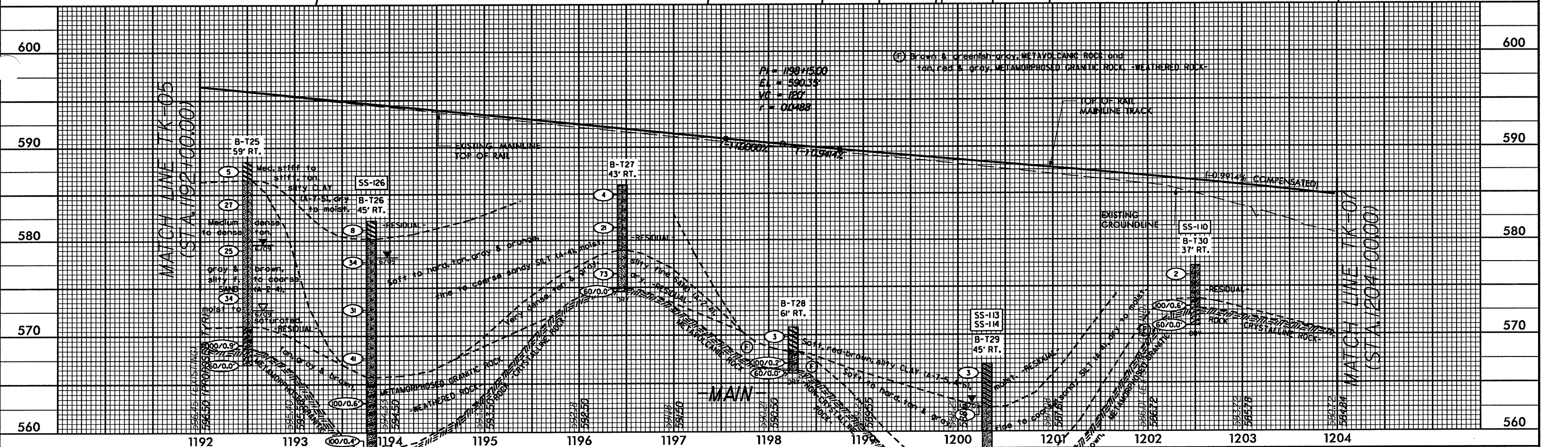
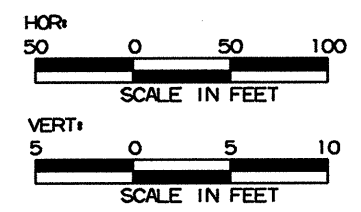
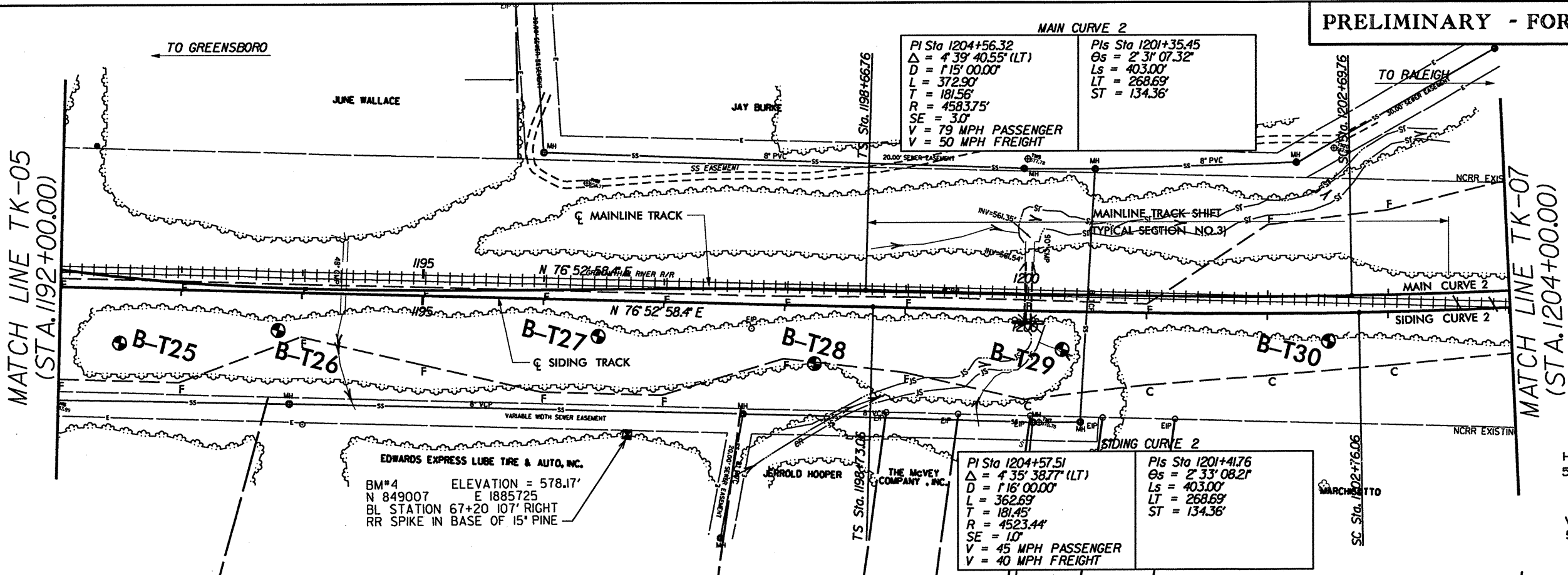
GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION
TRACK PLAN AND PROFILE
 SHEET 6 OF 18
 ALAMANCE COUNTY

DESIGN SPEED:	
DRAWING NO:	TK-04
SCALE:	1" = 50'
SHEET NO:	

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



REV. NO.	DATE	BY	APP. BY	DESCRIPTION	DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202	GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION TRACK PLAN AND PROFILE SHEET 7 OF 18 ALAMANCE COUNTY	DESIGN SPEED:
					DRAWN BY:						DRAWING NO: TK-05
					CHECKED BY:						SCALE: 1" = 50'
					DATE:						SHEET NO.:
				INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION							



NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION

HDR Engineering, Inc. of the Carolinas
 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202

GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION
TRACK PLAN AND PROFILE
 SHEET 8 OF 18
 ALAMANCE COUNTY

DESIGN SPEED:	
DRAWING NO:	TK-06
SCALE:	1" = 50'
SHEET NO:	

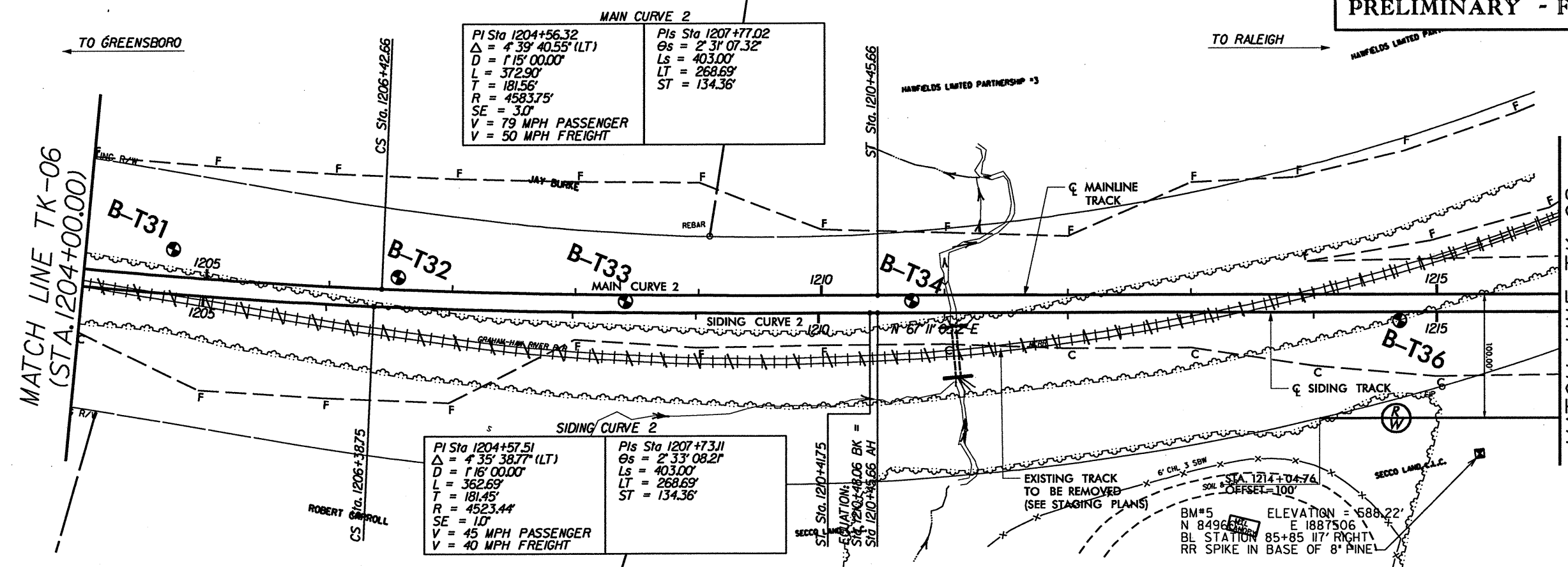
INCOMPLETE PLANS
 DO NOT USE FOR ROW ACQUISITION

PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

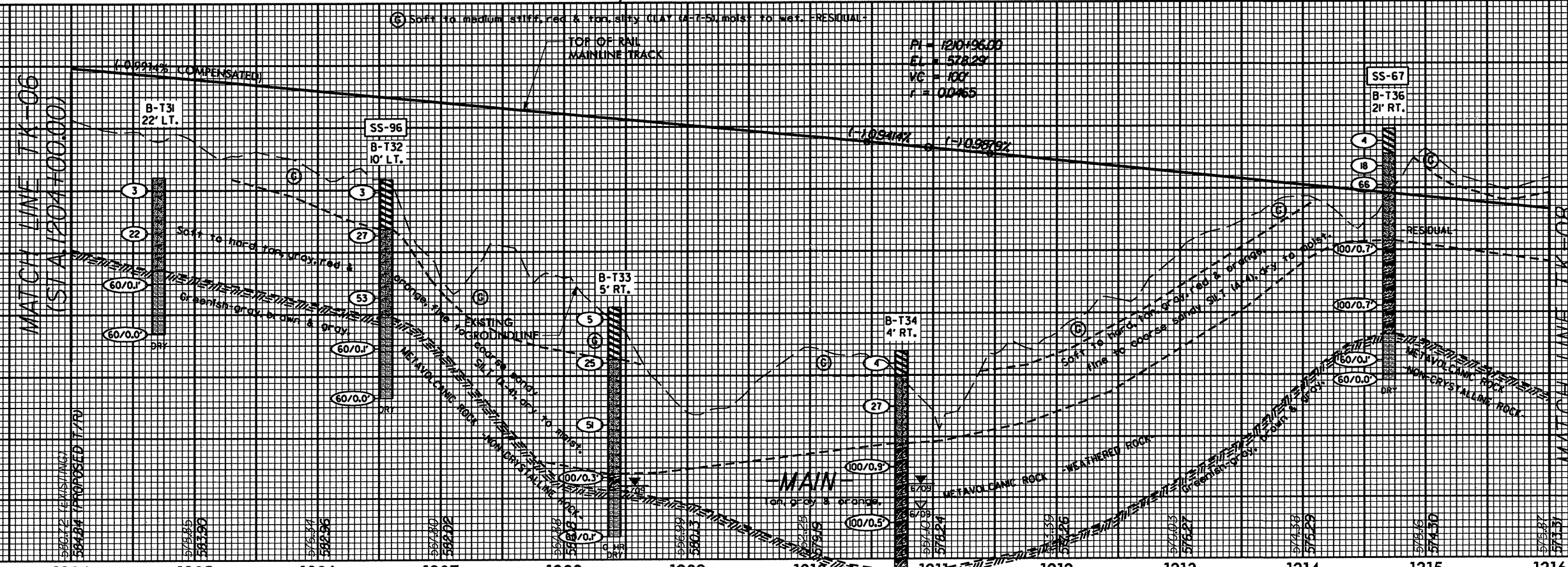
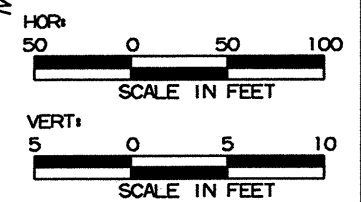
DRAWN BY: 60/0.0

CHECKED BY:

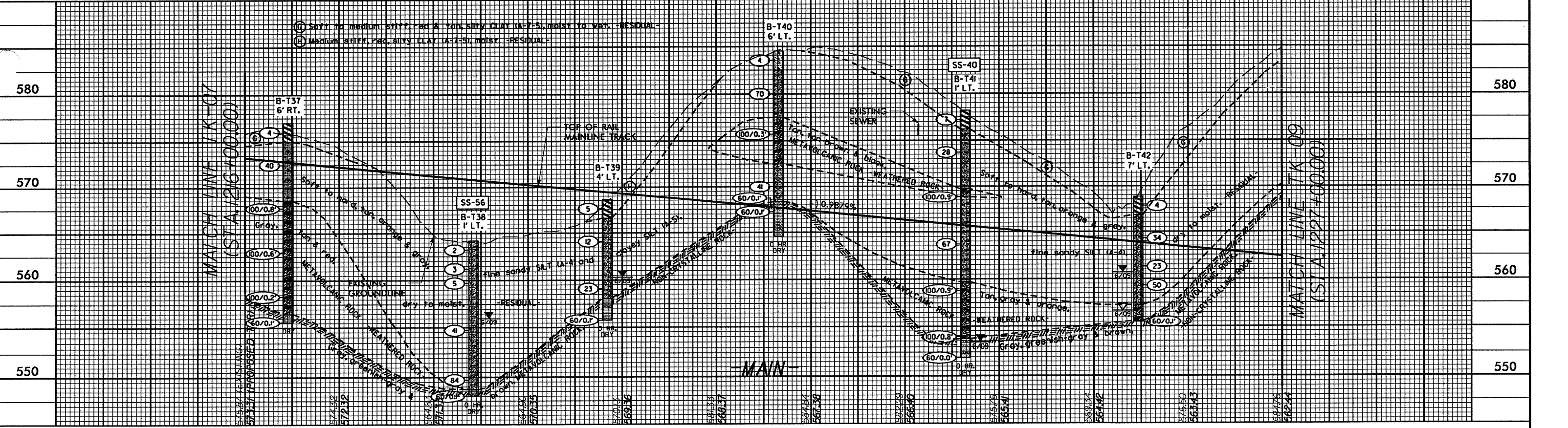
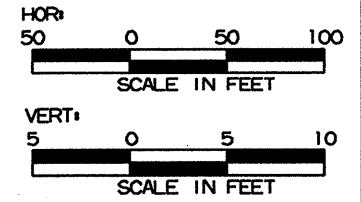
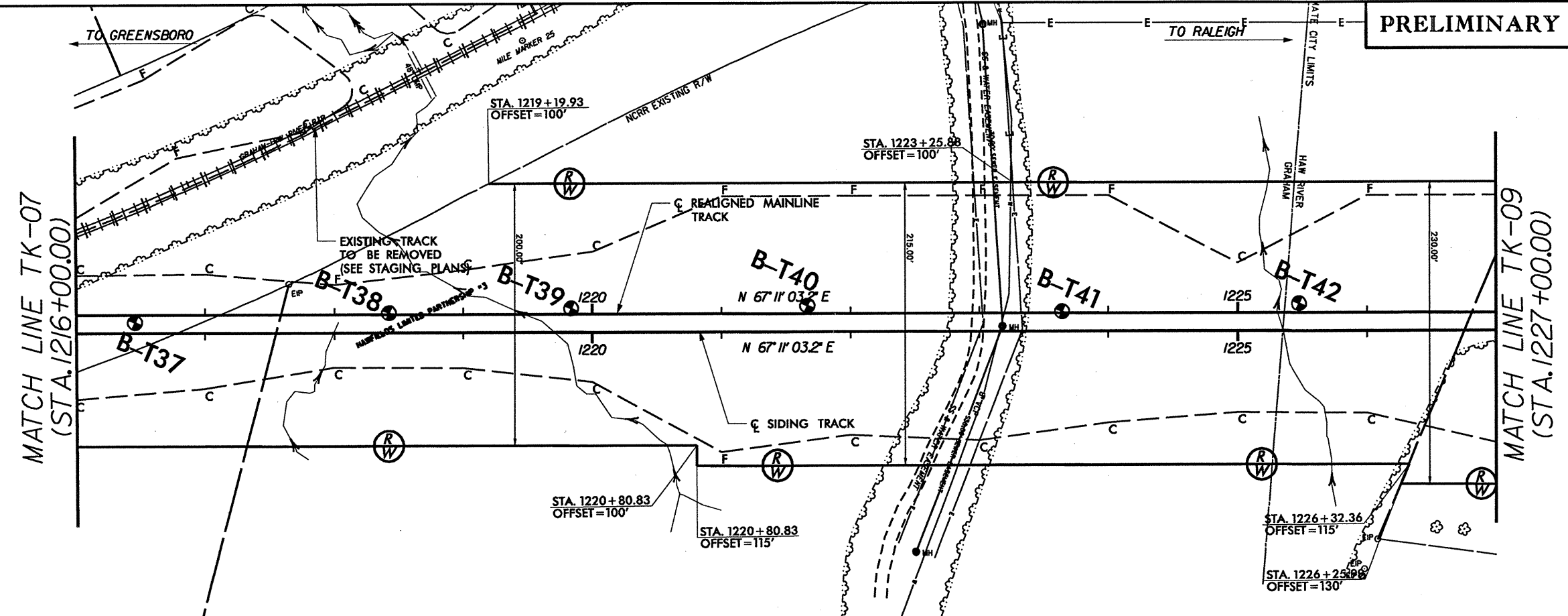
DATE:



NOTE: Boring B-T35 omitted due to inaccessibility.



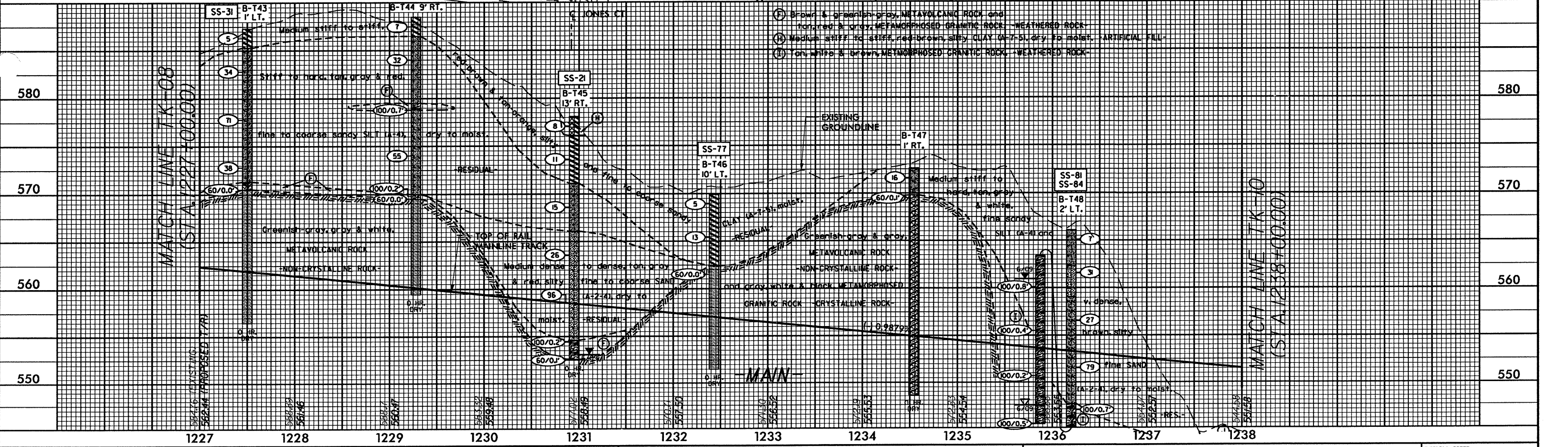
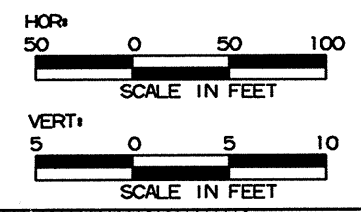
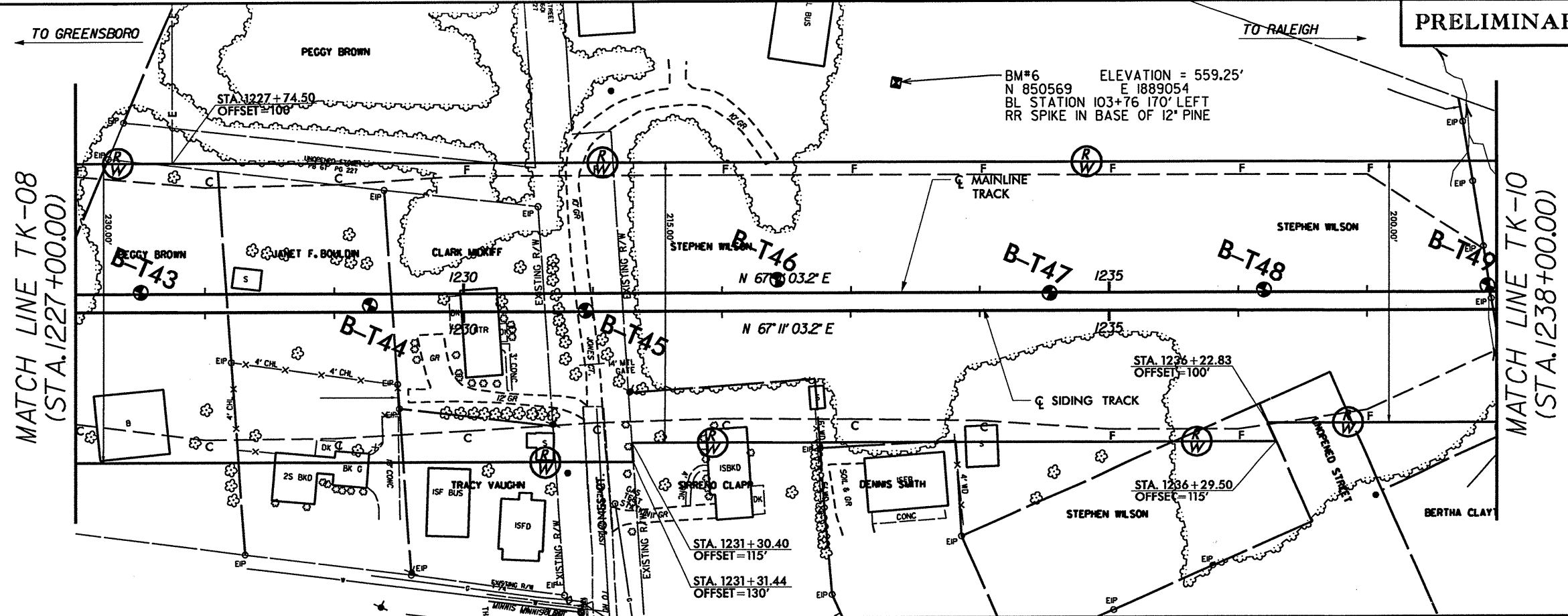
REV. NO.	DATE	BY	APP. BY	DESCRIPTION	DESIGNED BY:	ROADWAY DESIGN ENGINEER:	HYDRAULICS ENGINEER:	NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION		ENGINEERING AND SAFETY BRANCH CAPITAL YARD 146 NAIL SERVICE CENTER RALEIGH, NC 27699-1666	GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION		DESIGN SPEED:
									HDR HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202		TRACK PLAN AND PROFILE SHEET 9 OF 18 ALAMANCE COUNTY		
													INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION



<table border="1"> <tr> <td>DESIGNED BY:</td> <td>ROADWAY DESIGN ENGINEER</td> </tr> <tr> <td>DRAWN BY:</td> <td></td> </tr> <tr> <td>CHECKED BY:</td> <td></td> </tr> <tr> <td>DATE:</td> <td></td> </tr> </table>	DESIGNED BY:	ROADWAY DESIGN ENGINEER	DRAWN BY:		CHECKED BY:		DATE:		<table border="1"> <tr> <td>DESIGNED BY:</td> <td>HYDRAULICS ENGINEER</td> </tr> </table>	DESIGNED BY:	HYDRAULICS ENGINEER	<p>NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION</p> <p>HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202</p>	<p>GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION</p> <p>TRACK PLAN AND PROFILE</p> <p>SHEET 10 OF 18</p> <p>ALAMANCE COUNTY</p>	<p>DESIGN SPEED:</p> <p>DRAWING NO: TK-08</p> <p>SCALE: 1" = 50'</p> <p>SHEET NO:</p>
DESIGNED BY:	ROADWAY DESIGN ENGINEER													
DRAWN BY:														
CHECKED BY:														
DATE:														
DESIGNED BY:	HYDRAULICS ENGINEER													

INCOMPLETE PLANS
DO NOT USE FOR ROW ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



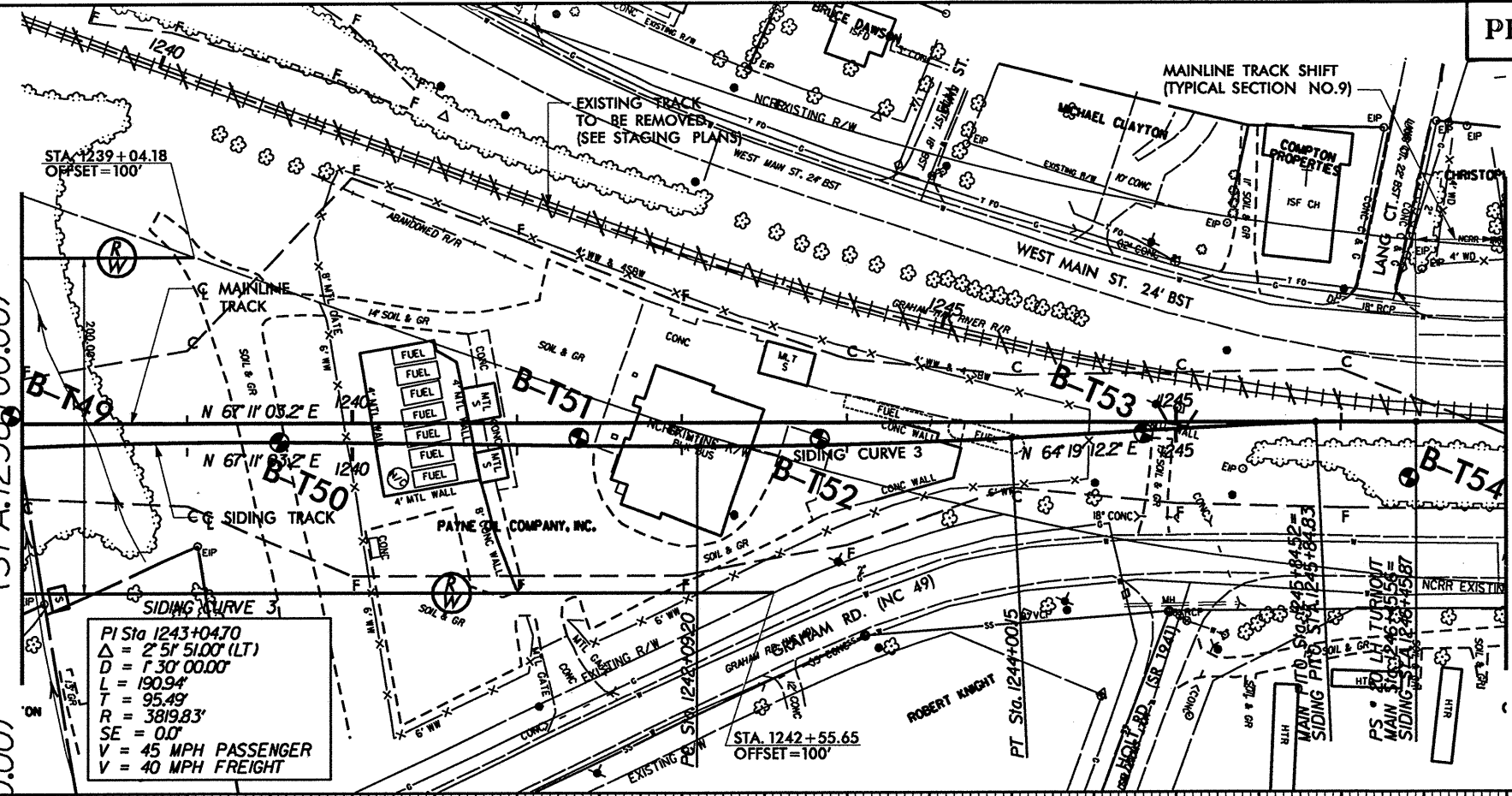
NO.	DATE	BY	APP. BY	DESCRIPTION	DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	<p>NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION</p> <p>HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202</p>	<p>ENGINEERING AND SAFETY BRANCH CAPITAL YARD 100 MAIL SERVICE CENTER RALEIGH, NC 27609-1000</p>	<p>GRAHAM-HAW RIVER SIDING AND MAINLINE RELOCATION</p> <p>TRACK PLAN AND PROFILE</p> <p>SHEET 11 OF 18</p> <p>ALAMANCE COUNTY</p>	DESIGN SPEED:	
				<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> <p>INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION</p> <p>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</p> </div>	DRAWN BY:							DRAWING NO: TK-09
					CHECKED BY:							SCALE: 1" = 50'
					DATE:							SHEET NO:

TO GREENSBORO

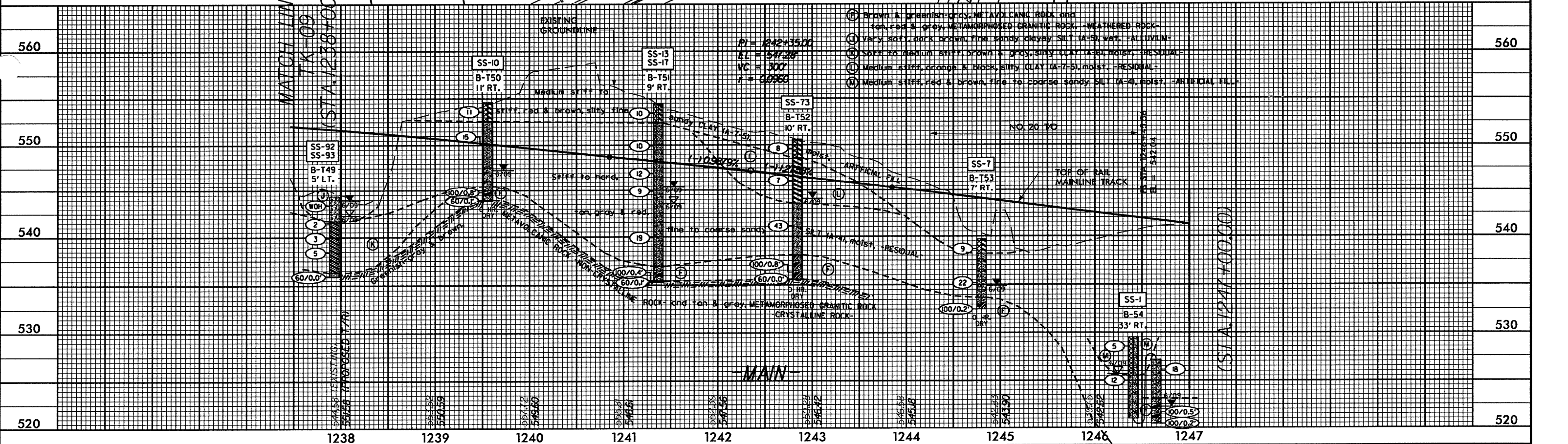
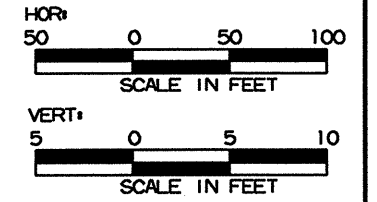
TO RALEIGH

MATCH LINE TK-09
(STA. 1238+00.00)

(STA. 1247+00.00)



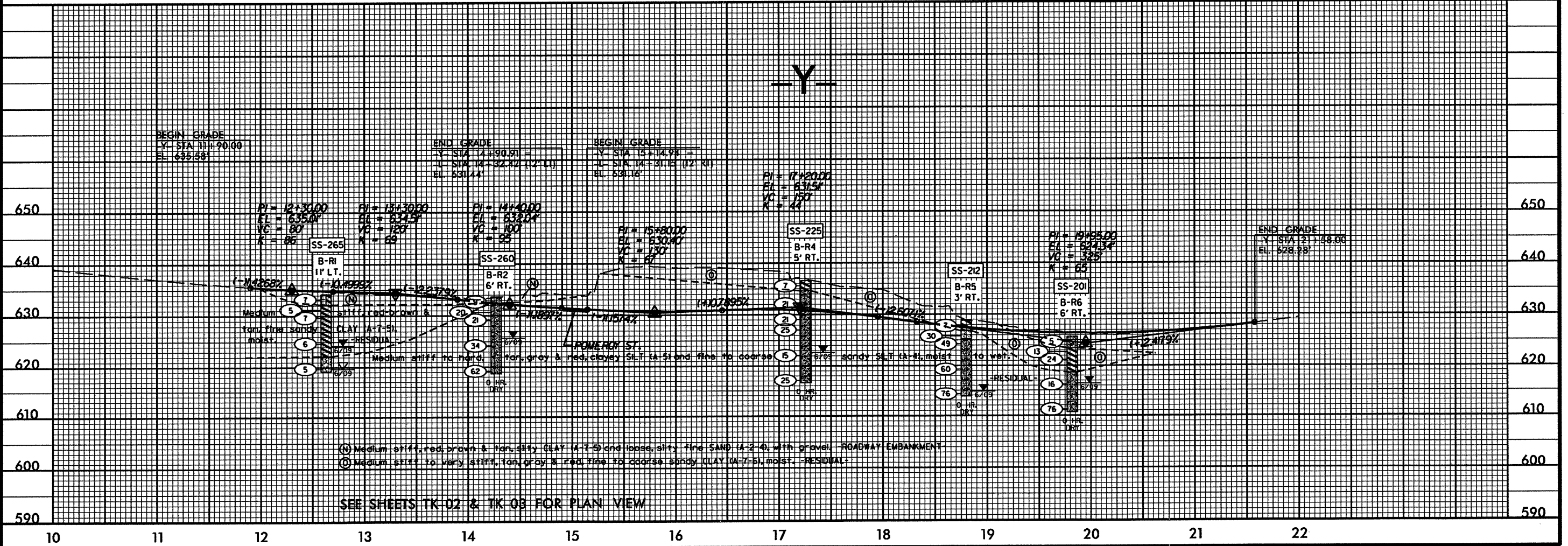
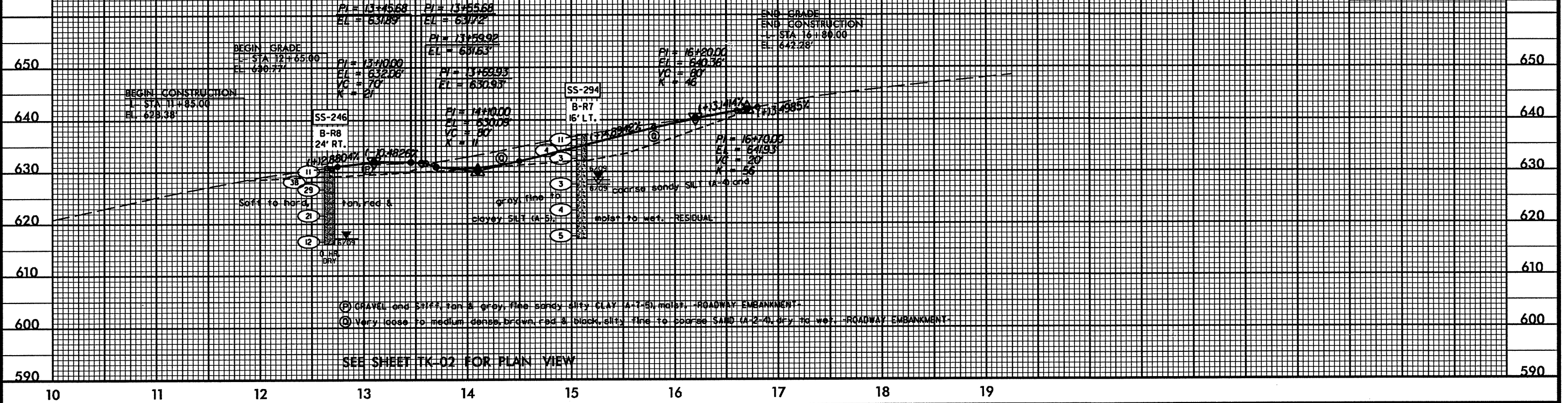
PI Sta 1243+04.70
 $\Delta = 2' 51'' 51.00''$ (LT)
 $D = 1' 30'' 00.00''$
 $L = 190.94'$
 $T = 95.49'$
 $R = 3819.83'$
 $SE = 0.0'$
 $V = 45$ MPH PASSENGER
 $V = 40$ MPH FREIGHT



- (E) Brown & greenish-grey, METAMORPHIC GRANITE ROCK AND tan, red & grey, METAMORPHIC GRANITE ROCK - WEATHERED ROCK
- (J) Very soft, dark brown fine sandy clayey SILT (A-3) moist - ALLUVIAL
- (K) Soft to medium stiff, brown & grey, silty CLAY (A-3) moist - RESIDUAL
- (L) Medium stiff, orange & black, silty CLAY (A-7-S) moist - RESIDUAL
- (M) Medium stiff, red & brown, fine to coarse sandy SILT (A-4) moist - ARTIFICIAL FILL

REV. NO.	DATE	BY	APP. BY	DESCRIPTION	DESIGNED BY:	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	 NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION ENGINEERING AND SAFETY BRANCH CAPITAL YARD 100 MAIL SERVICE CENTER RALEIGH, NC 27699-3466	GRAHAM-HAWK RIVER SIDING AND MAINLINE RELOCATION TRACK PLAN AND PROFILE SHEET 12 OF 18 ALAMANCE COUNTY	DESIGN SPEED:
				INCOMPLETE PLANS DO NOT USE FOR ROW ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	DRAWN BY:			 HDR Engineering, Inc. of the Carolinas 128 S. Tryon Street, Suite 1400, Charlotte, NC 28202		DRAWING NO: TK-10
					CHECKED BY:					SCALE: 1" = 50'
					DATE:					SHEET NO:

5/28/99



SYSTEMS ENGINEERING

North Carolina Department of Transportation
Division of Highways
Materials and Test Unit
Soils Laboratory

T.I.P. ID NO.: P-5205
 DESCRIPTION: Haw River Siding & Mainline Relocation

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: N/A
 DATE SAMPLED: 6/09
 SAMPLED FROM: -MAIN-
 SUBMITTED BY: B. Howey

COUNTY: Alamance
 RECEIVED: 6/09
 REPORTED: 6/09 and 7/09
 BY: D. Jenks
Cert No. 101-02-0603

TEST RESULTS

PROJ. SAMPLE NO.	B-T1	B-T1	B-T2	B-T3	B-T4	B-T5	B-T7	B-T10	B-T11	B-T13	B-T15	B-T16	B-T17	B-T18	B-T19	B-T20	B-T21
BORING NO.	SS-312	SS-313	SS-305	SS-300	SS-287	SS-278	SS-253	SS-206	SS-194	SS-184	SS-171	SS-177	SS-162	SS-156	SS-152	SS-148	SS-146
Retained #4 Sieve %	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.2	1.5	0.5	0.0
Passing #10 Sieve %	87.8	99.9	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.3	99.9	99.0	97.7	99.2	100.0
Passing #40 Sieve %	81.3	79.9	97.6	92.6	97.6	96.7	90.5	96.2	99.8	93.9	97.4	88.3	96.2	89.4	93.0	95.3	98.8
Passing #200 Sieve %	51.4	44.6	81.1	61.0	81.5	70.6	53.3	67.7	98.3	74.8	82.7	61.7	87.0	59.6	65.7	73.0	69.8

MINUS #10 FRACTION

SOIL MORTAR - 100%																	
Coarse Sand Ret - #60 %	17.7	33.4	6.7	15.1	6.6	11.0	22.7	14.8	0.2	10.2	6.1	18.5	5.7	19.6	12.0	12.4	4.7
Fine Sand Ret - #270 %	30.1	28.8	16.1	34.1	18.0	24.7	32.9	23.9	4.2	22.5	16.5	28.1	11.2	25.9	27.0	16.8	33.1
Silt 0.053 - 0.010 mm %	34.9	28.4	24.1	39.0	41.7	29.1	34.0	33.7	55.7	36.9	44.5	35.2	40.5	27.8	19.8	11.2	29.9
Clay < 0.010 mm %	17.3	9.4	53.1	11.8	33.7	35.2	10.4	27.6	39.9	30.4	32.9	18.5	42.6	26.7	41.2	59.6	32.3
L.L.	39	25	46	33	54	46	26	45	64	46	45	43	47	33	40	64	26
P.L.	19	NP	24	NP	48	25	NP	40	59	NP	32	31	27	18	17	31	16
P.I.	20	NP	22	NP	6	21	NP	5	5	NP	13	12	20	15	23	33	10
AASHTO Classification	A-6 (7)	A-4 (0)	A-7-6 (19)	A-4 (0)	A-5 (10)	A-7-6 (14)	A-4 (0)	A-5 (5)	A-5 (16)	A-5 (3)	A-7-5 (13)	A-7-5 (7)	A-7-5 (19)	A-6 (6)	A-6 (13)	A-7-5 (26)	A-4 (5)
Station -MAINLINE-	1144+87	1144+87	1146+55	1148+70	1150+73	1152+56	1156+00	1162+76	1164+66	1168+08	1173+28	1174+45	1176+57	1178+14	1180+43	1182+49	1184+72
Offset	68' RT	68' RT	78' RT	45' RT	2' LT	12' RT	13' RT	52' LT	44' LT	67' RT	50' RT	52' RT	54' RT	52' RT	43' RT	53' RT	77' RT
Depth (ft)	3.5	8.5	3.5	13.5	13.5	8.5	13.5	3.5	8.5	3.5	8.5	3.5	0.3	3.5	3.5	0.5	3.5
to	5.0	10.0	5.0	15.0	15.0	10.0	15.0	5.0	10.0	5.0	10.0	5.0	1.5	5.0	5.0	1.5	5.0
Moisture Content (%)	19.5	16.2	21.1	33.7	46.7	23.0	18.7	27.3	44.6	34.2	36.8	19.7	24.5	18.8	16.6	27.9	17.1

NP = Not Plastic
 NT = Not Tested
 NA = Not Applicable

E.C. Howey, L.G., P.E.
 Soils Engineer

North Carolina Department of Transportation
Division of Highways
Materials and Test Unit
Soils Laboratory

T.I.P. ID NO.: P-5205
 DESCRIPTION: Haw River Siding & Mainline Relocation

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: N/A
 DATE SAMPLED: 6/09
 SAMPLED FROM: -MAIN-
 SUBMITTED BY: B. Howey

COUNTY: Alamance
 RECEIVED: 6/09
 REPORTED: 6/09 and 7/09
 BY: D. Jenks
Cert No. 101-02-0603

TEST RESULTS

PROJ. SAMPLE NO.	B-T24	B-T26	B-T29	B-T29	B-T30	B-T32	B-T36	B-T38	B-T41	B-T43	B-T45	B-T45	B-T46	B-T48	B-T48	B-T48	B-T48
BORING NO.	SS-134	SS-126	SS-113	SS-114	SS-110	SS-96	SS-67	SS-56A	SS-40	SS-31	SS-21	CBR-1	SS-77	SS-81	CBR-2	CBR-3	SS-84
Retained #4 Sieve %	0.7	0.2	0.0	19.4	2.4	0.1	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.1	0.1	0.0
Passing #10 Sieve %	96.6	98.7	99.8	80.2	93.1	99.1	99.8	99.3	100.0	100.0	100.0	92.6	99.1	100.0	99.8	99.8	100.0
Passing #40 Sieve %	86.6	70.8	98.1	69.7	76.9	89.7	93.9	94.5	97.4	97.4	97.0	90.2	97.7	89.8	93.0	92.1	86.7
Passing #200 Sieve %	57.1	41.4	89.7	43.5	57.0	60.1	75.7	73.0	69.1	89.4	63.3	78.9	95.1	41.3	68.7	64.4	39.4

MINUS #10 FRACTION

SOIL MORTAR - 100%																	
Coarse Sand Ret - #60 %	17.4	39.7	2.8	22.8	21.5	17.7	9.9	7.7	7.7	4.6	10.6	4.6	1.7	26.0	13.8	15.5	27.8
Fine Sand Ret - #270 %	31.2	24.0	13.0	30.2	25.7	31.0	21.2	27.9	30.9	9.0	35.9	11.4	5.1	40.2	24.0	27.0	41.7
Silt 0.053 - 0.010 mm %	28.4	25.7	45.7	27.3	28.7	39.9	56.6	42.4	55.7	38.8	39.8	15.5	55.0	20.5	32.2	26.7	23.7
Clay < 0.010 mm %	23.0	10.6	38.5	19.7	24.1	11.4	12.3	22.0	5.7	47.6	13.7	68.5	38.2	13.4	30.0	30.8	6.8
L.L.	22	29	37	31	27	27	36	24	29	61	32	65	49	24	32	29	22
P.L.	17	22	25	30	21	NP	28	21	NP	34	NP	35	32	NP	22	19	NP
P.I.	5	7	12	1	6	NP	8	3	NP	27	NP	30	17	NP	10	10	NP
AASHTO Classification	A-4 (0)	A-4 (0)	A-6 (12)	A-4(0)	A-4 (1)	A-4 (0)	A-4 (6)	A-4 (1)	A-4 (0)	A-7-5 (29)	A-4 (0)	A-7-5 (27)	A-7-5 (20)	A-4 (0)	A-4 (5)	A-4 (4)	A-4 (0)
Station -MAINLINE-	1190+56	1193+81	1200+31	1200+31	1202+50	1206+56	1214+70	1218+42	1224+64	1227+50	1230+95	1230+95	1232+43	1236+20	1236+20	1236+20	1236+20
Offset	55' RT	45' RT	45' RT	45' RT	37' RT	10' LT	21' RT	1' LT	1' LT	1' LT	13' RT	13' RT	10' LT	2' LT	2' LT	2' LT	2' LT
Depth (ft)	0.4	13.5	0.3	4.5	0.3	8.5	2.0	2.0	3.5	0.1	8.5	1.0	3.5	0.2	6.0	13.0	13.5
to	1.5	15.0	1.5	5.0	1.5	10.0	3.5	3.5	5.0	1.5	10.0	4.0	5.0	1.5	9.0	16.0	15.0
Moisture Content (%)	19.9	16.1	27.6	13.2	24.4	19.6	15.0	27.3	28.8	32.2	33.7	34.6	40.6	16.5	11.8	10.9	6.1

NP = Not Plastic
 NT = Not Tested
 NA = Not Applicable

E.C. Howey, L.G., P.E.
 Soils Engineer

**North Carolina Department of Transportation
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TEST RESULTS

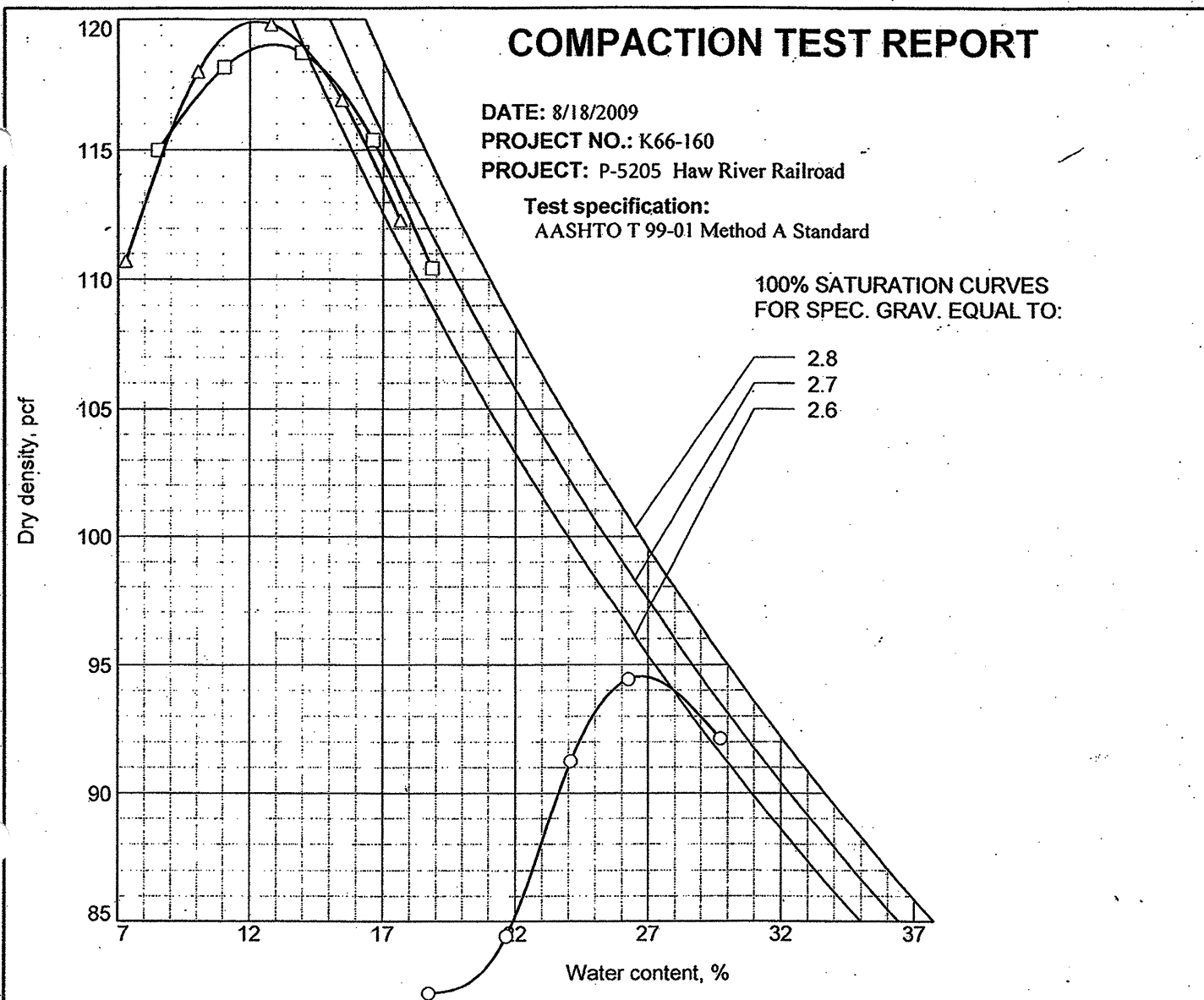
PROJ. SAMPLE NO.	B-T49	B-T49	B-T50	B-T51	B-T51	B-T52	B-T53	B-T54	B-R1	B-R2	B-R3	B-R4	B-R5	B-R6	B-R7	B-R8
BORING NO.	SS-92	SS-93	SS-10	SS-13	SS-17	SS-73	SS-7	SS-1	SS-265	SS-260	SS-240	SS-225	SS-212	SS-201	SS-294	SS-246
Retained #4 Sieve %	0.1	0.6	2.7	0.4	0.4	0.8	0.1	0.0	7.1	0.0	0.0	0.0	2.3	0.5	0.0	0.0
Passing #10 Sieve %	99.8	99.3	96.0	99.5	97.9	99.0	98.2	99.9	90.5	100.0	99.5	100.0	94.5	98.7	100.0	99.9
Passing #40 Sieve %	94.9	96.0	78.9	98.4	88.7	97.9	82.9	92.9	83.6	86.8	87.4	96.9	84.8	94.3	99.0	92.5
Passing #200 Sieve %	79.1	82.3	45.3	81.2	54.3	92.6	42.9	67.0	63.9	51.8	60.6	84.8	66.4	72.5	93.2	70.9

MINUS #10 FRACTION

SOIL MORTAR - 100%																
Coarse Sand Ret - #60 %	8.7	6.4	31.5	2.6	19.8	1.5	28.2	13.9	14.5	24.9	20.2	6.3	15.7	11.1	3.3	13.5
Fine Sand Ret - #270 %	16.9	15.3	27.6	22.7	33.6	8.8	36.7	54.7	18.6	32.3	27.5	12.8	18.7	19.4	4.9	24.1
Silt 0.053 - 0.010 mm %	34.9	37.4	22.3	31.6	36.7	29.6	24.6	36.7	8.7	32.9	39.8	23.3	20.5	11.1	64.2	46.3
Clay < 0.010 mm %	39.5	40.9	18.6	43.1	9.9	60.1	10.5	22.5	58.2	9.9	12.5	57.6	45.1	58.4	27.6	16.1
L.L.	36	35	27	55	27	68	22	34	58	27	33	64	51	64	59	34
P.L.	23	24	23	35	NP	31	NP	29	33	NP	NP	24	22	26	50	26
P.I.	13	11	4	20	NP	37	NP	5	25	NP	NP	40	29	38	9	8
AASHTO Classification	A-6 (10)	A-6 (9)	A-4 (0)	A-7-5 (19)	A-4 (0)	A-7-5 (41)	A-4 (0)	A-4 (3)	A-7-5 (16)	A-4 (0)	A-4 (0)	A-7-6 (37)	A-7-6 (18)	A-7-6 (28)	A-5 (16)	A-4 (5)
Station -MAINLINE-	1237+93	1237+93	1239+56	1241+37	1241+37	1242+84	1244+80	1246+41	12+63 (-Y-)	14+27 (-Y-)	16+37 (-Y-)	17+26 (-Y-)	18+80 (-Y-)	19+82 (-Y-)	15+10 (-L-)	12+67 (-L-)
Offset	5' LT	5' LT	11' RT	9' RT	10' RT	10' RT	7' RT	33' RT	11' LT	6' RT	63' RT	5' RT	3' RT	6' RT	16' LT	24' RT
Depth (ft)	3.5	5.6	3.5	0.3	13.5	3.5	3.5	0.4	3.5	3.5	2.0	0.4	0.3	2.3	8.5	3.5
to	5.0	6.5	5.0	1.5	15.0	5.0	5.0	1.5	5.0	5.0	3.5	1.5	1.5	3.5	10.0	5.0
Moisture Content (%)	24.0	25.4	29.4	28.2	23.2	32.9	15.8	22.9	26.2	12.3	22.6	25.2	19.4	17.2	58.0	14.9

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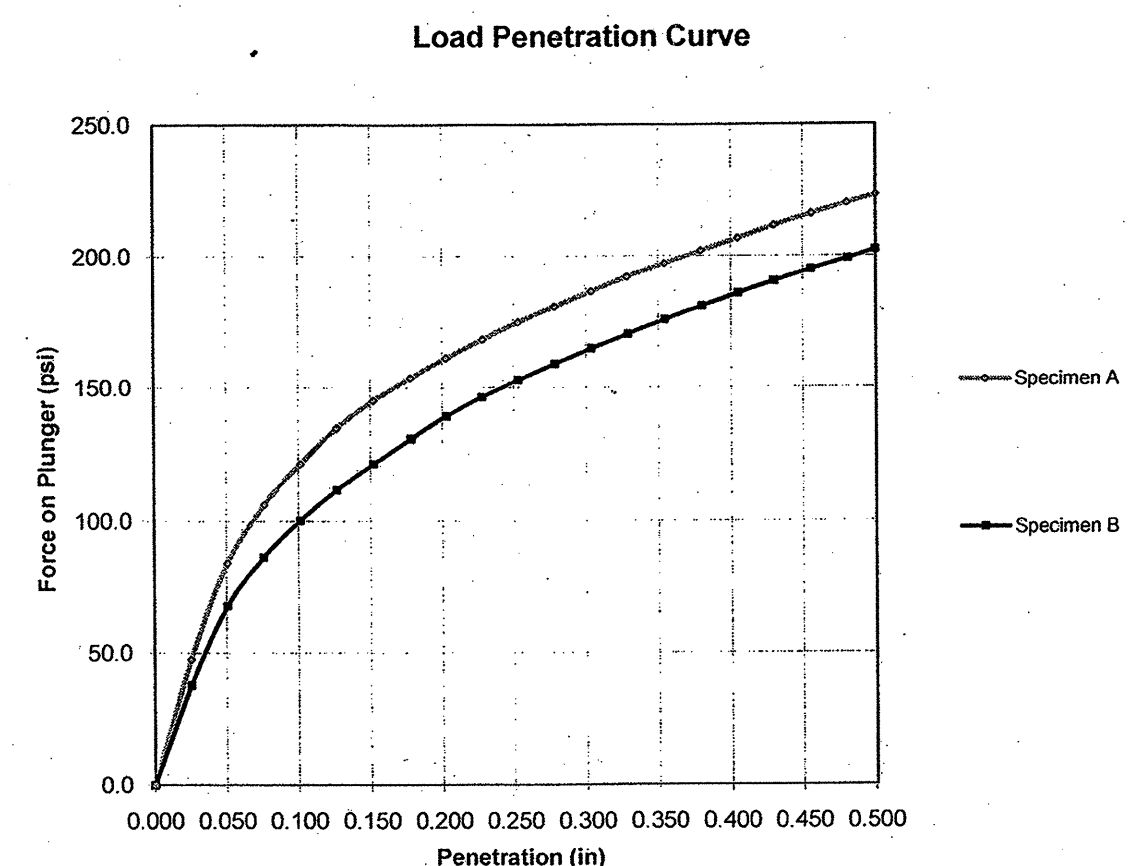
No.	LOCATION AND DESCRIPTION	REMARKS
○ CBR-1	Location: B-T45 Depth: 1' - 4' Sample Number: CBR-1 Dark Orange Brown, Clay with little Silt & fine to coarse Sand.	Sample Received on 06/22/2009
□ CBR-2	Location: B-T48 Depth: 6' - 9' Sample Number: CBR-2 Brown, fine to coarse Sandy Silt with some Clay.	Sample Received on 06/30/2009
△ CBR-3	Location: B-T48 Depth: 13' - 16' Sample Number: CBR-3 Brown, fine to coarse Sandy Silt with some Clay.	Sample Recived on 06/22/2009

No.	AASHTO	LL	PI	NAT. MOIST.	OVERSIZE	% < No.200	MAX. DRY DEN.	OPT. MOIST.
○ CBR-1	A-7-5(27)	65	30	34.6	%>#4=5.0	78.9 %	95	27 %
□ CBR-2	A-4(5)	32	10	11.8	%>#4=0.1	68.7 %	119	13 %
△ CBR-3	A-4(4)	29	10	10.9	%>#4=0.1		120	12 %

FROEHLING & ROBERTSON, INC. Figure

Tested By: Dave Jenks Checked By: Dave Jenks

Froehling & Robertson California Bearing Ratio Test Report

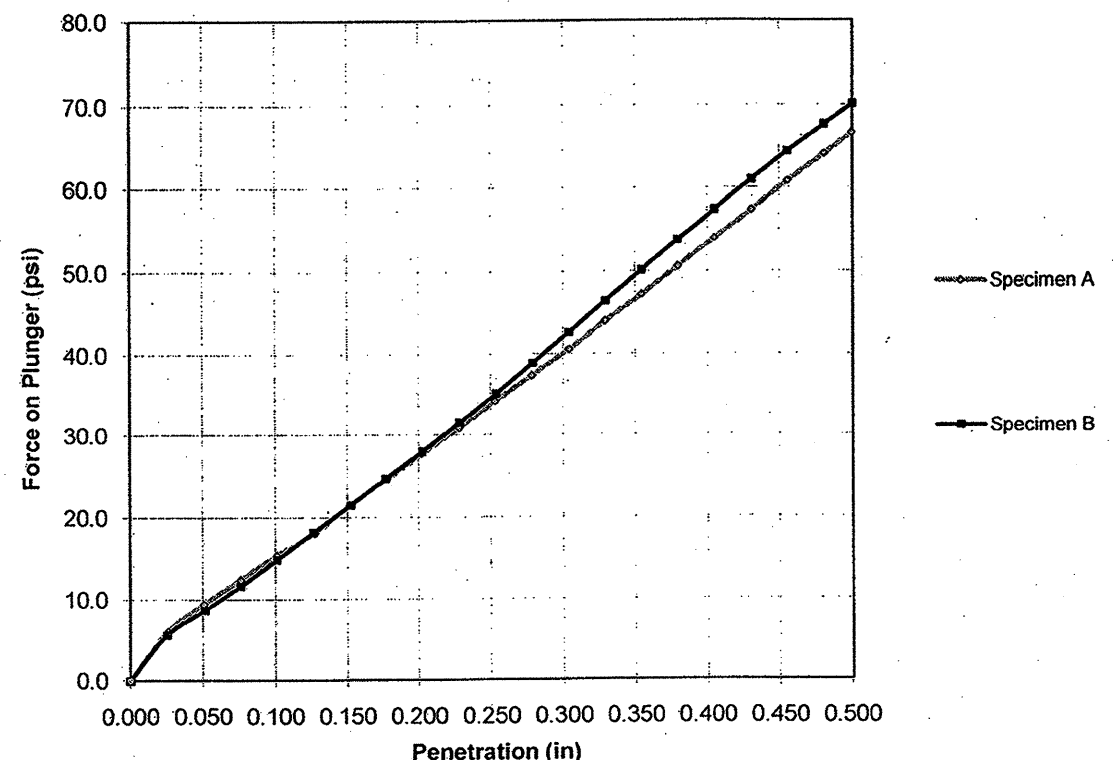


CBR-1 RESULTS				
Results	A	B	Average	
0.1 in Pen.	12.2	10.0	11.1	
0.2 in Pen.	10.8	9.3	10.0	
Moisture (%)	27.4	28.2	27.8	
Dens (pcf)	94.2	92.9	93.6	

Project Information			
Project No.	K66-160		Proctor Value
Project	P-5205 Haw River Railroad		Max. Dry Den.
Date	07/06/2009		Opt. Moisture
Client	HDR		
Classification	Dark Orange-Brown Clay with little Silt & Sand		
Boring	B-T45		Test Variables
AASHTO:	(A-7-5)(27)		Liquid Limit:
Sample No.	CBR-1		Plastic Limit:
Depth	1' - 4'		Platic Index:
Received	6/22/2009		Natural Moisture

Froehling & Robertson
California Bearing Ratio Test Report

Load Penetration Curve

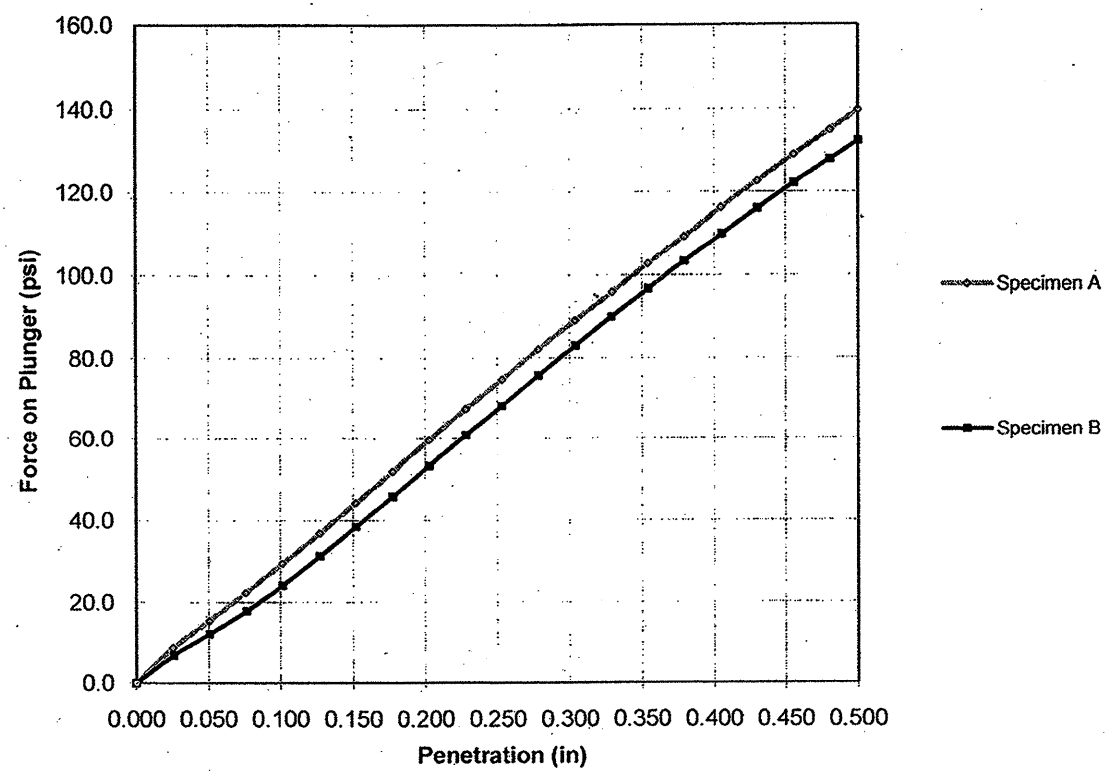


CBR-2 RESULTS				
Results	A	B	Average	
0.1 in Pen.	1.5	1.5	1.5	
0.2 in Pen.	1.8	1.9	1.9	
Moisture (%)	13.9	14.3	14.1	
Dens (pcf)	118.9	119.0	118.9	

Project Information			
Project Num	K66-160		Proctor Value
Project	P-5205 Haw River Railroad		Max. Dry Den. Opt. Moisture
Date	07/06/2009		119 13
Client	HDR		
Classification	Brown fine to coarse Sandy Silt with some clay		
Boring	B-T48		Test Variables
AASHTO	(A-4)(5)		Liquid Limit: 32
Sample No.	CRB-2		Plastic Limit: 22
Depth	6' - 9'		Plastic Index: 10
Received	6/22/2009		Natural Moisture: 11.8

Froehling & Robertson
California Bearing Ratio Test Report

Load Penetration Curve



CBR Results				
Results	A	B	Average	
0.1 in Pen.	2.9	2.4	2.7	
0.2 in Pen.	4.0	3.6	3.8	
Moisture (%)	13.1	13.1	13.1	
Dens (pcf)	121.0	120.7	120.9	

Project Information			
Project Num	K66-160		Proctor Value
Project	P-5205 Haw River Railroad		Max. Dry Den. Opt. Moisture
Date	07/06/2009		120 12
Client	HDR		
Classification	Brown fine to coarse Sandy Silt with some clay		
Boring	B-T48		Test Variables
AASHTO	(A-4)(4)		Liquid Limit: 29
Sample No.	CBR-3		Plastic Limit: 19
Depth	13' - 16'		Plastic Index: 10
Received	6/22/2009		Natural Moisture: 10.9